

A NEW DAWN FOR INDIAN HIGHER EDUCATION: EMBRACING THE PARADIGM SHIFT

Editors

Dr. Pargat Singh Garcha

Dr. Manu Chadha

Dr. Mini Sharma

Dr. Ramandeep Kaur Sidhu

Dr. Rachhpal Singh

Dr. Jasbir Kaur



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Ph. 99153-98354, 92167-53888

e-mail : rinku_randhawa77@yahoo.com

tfcpublications11@gmail.com

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A New Dawn For Indian Higher Education: Embracing The Paradigm Shift

Edited by

Dr. Pargat Singh Garcha, Dr. Manu Chadha, Dr. Mini Sharma, Dr. Ramandeep Kaur Sidhu,
Dr. Rachhpal Singh, Dr. Jasbir Kaur

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We extend our gratitude to all the contributors whose research papers and articles form the essence of this book. The diverse range of studies presented in this compilation reflects the depth of scholarly engagement with contemporary issues in higher education. Each paper is a testament to the dedication and intellectual rigor of the contributors, who have worked tirelessly to analyze and propose solutions for the pressing challenges in higher education and teacher education in India.

We are deeply grateful to our esteemed management for their steadfast support and visionary leadership, which have been instrumental in the successful planning of this seminar and the subsequent publication of the book. Their commitment to academic excellence and innovation continues to inspire and guide us in our pursuit of quality education.

A special word of thanks to our faculty members, whose constructive suggestions, meticulous planning, and untiring efforts played a pivotal role in ensuring the smooth compilation of this volume. Their teamwork, dedication, and scholarly acumen have been invaluable in making this endeavor a success. We also extend our appreciation to Twenty-First Century Printing Press, Patiala, for their professional support in the timely and high-quality printing of this book. Their cooperation and attention to detail have contributed significantly to the successful completion of this publication.

Above all, we bow our heads in gratitude to Guru Hargobind Sahib Ji for His divine blessings on our institution and team, enabling us to accomplish this academic milestone with dedication and perseverance. We humbly pray to the Almighty to continue guiding us in our journey as we strive to make meaningful contributions to the advancement of higher and teacher education in India.

With sincere appreciation and gratitude,

Editorial Team

PREFACE

India stands at the cusp of a transformative era in higher education, propelled by the visionary National Education Policy (NEP) 2020. This landmark policy is not merely a reformative framework but a paradigm shift that redefines the very essence of education—its delivery, assessment, and alignment with global standards. Rooted in the principles of holistic and multidisciplinary learning, NEP 2020 envisions a flexible education system that nurtures creativity, critical thinking, and problem-solving abilities among students. It underscores the imperatives of equity, inclusivity, and accessibility, ensuring that education remains a fundamental right rather than a privilege. Furthermore, the policy emphasizes the internationalization of Indian education, aiming to make it globally competitive while preserving and integrating the nation's rich indigenous knowledge traditions. This dual focus on global excellence and cultural rootedness positions India uniquely in the global educational landscape, setting the stage for a renaissance in higher education.

One of the most significant shifts is the transition from rigid disciplinary boundaries to a multidisciplinary approach, which seeks to dismantle academic silos and foster innovation. The transformation of single-stream colleges into multidisciplinary institutions is a cornerstone of this evolution, necessitating comprehensive curriculum redesign, faculty capacity building, and infrastructural upgrades. This shift is not merely structural but also philosophical, as it encourages students to explore diverse fields of knowledge, thereby fostering a more holistic and interconnected understanding of the world. Additionally, the integration of emerging technologies, the emphasis on digital learning, and the push for skill-based education are reshaping the future of higher education. However, these transformative changes bring forth challenges, including funding constraints, the need for faculty development, and the adaptation of institutions to new pedagogical approaches. Addressing these challenges demands a concerted effort from policymakers, educators, and institutional leaders, ensuring that the vision of NEP 2020 is realized effectively.

One of the most critical domains impacted by NEP 2020 is teacher education, which serves as the foundation of any robust education system. The introduction of the Integrated Teacher Education Programme (ITEP) marks a significant shift in how teachers are trained, emphasizing a four-year multidisciplinary approach aligned with global best practices. This

transformation, however, necessitates comprehensive institutional readiness, including faculty upskilling, curriculum restructuring, and infrastructural enhancements. While ITEP presents immense opportunities for producing well-rounded and highly competent teachers, it also poses challenges such as resistance to change, lack of awareness, and the need for extensive policy support. Teacher education institutions, therefore, play a pivotal role in navigating these challenges and leveraging the opportunities to ensure the successful implementation of NEP 2020. Their ability to adapt and innovate will determine the quality of educators who, in turn, shape the future of the nation. Moreover, the success of ITEP is intrinsically linked to the broader goals of NEP 2020, as quality teacher education is essential for achieving the policy's vision of a holistic, multidisciplinary, and globally competitive education system.

In this evolving educational ecosystem, accreditation bodies play a fundamental role in driving institutional excellence and ensuring adherence to quality benchmarks. Various agencies have been entrusted with the responsibility of fostering a culture of quality enhancement and continuous improvement. However, in the context of NEP 2020, accreditation must transcend conventional metrics and encompass innovation, research impact, and societal contributions. Strengthening the accreditation framework is essential to elevate Indian institutions to global standards and improve their rankings on the international stage. By doing so, accreditation bodies can act as catalysts for institutional transformation, ensuring that higher education institutions not only meet but exceed global expectations. This enhanced accreditation framework will also support the multidisciplinary and research-driven approach advocated by NEP 2020, thereby creating a more dynamic and responsive higher education system.

The advent of Artificial Intelligence (AI) and automation has further redefined the educational landscape, introducing adaptive learning, intelligent tutoring systems, and data-driven decision-making as integral components of pedagogy. In higher education, AI-driven analytics can enhance personalized learning experiences, optimize assessment mechanisms, and predict student performance trends with remarkable precision. In teacher education, AI offers revolutionary prospects, such as sophisticated training models that provide real-time feedback, simulate classroom scenarios, and improve instructional strategies. However, the integration of AI also raises ethical concerns, including data privacy, the digital divide, and the potential erosion of the human element in education. Striking a balance between technological advancements and human-centric pedagogy is crucial to harnessing the full potential of AI while preserving the essence of education as a deeply human endeavor. This balance is particularly important in the context of NEP 2020, which emphasizes the importance of holistic and inclusive education. By leveraging AI responsibly, Indian higher education can enhance its global competitiveness while remaining true to its core values.

Quality teachers and institutions have always been the backbone of any thriving education

system. India's rich legacy of higher education, epitomized by the ancient universities of Nalanda and Takshashila, positioned the nation as a global center for learning, attracting scholars from across the world. To revive this legacy, Indian higher education must aspire to achieve excellence by fostering research, innovation, and cultural exchange. Teachers, as the architects of the future, must be equipped with the necessary skills, knowledge, and ethical grounding to shape the next generation of learners. Institutions, in turn, must play a proactive role in nurturing competent educators, promoting research-driven teaching methodologies, and fostering a culture of lifelong learning. This dual focus on teacher empowerment and institutional excellence is indispensable for reclaiming India's position as a global leader in education. The integration of NEP 2020's principles with the rich historical legacy of Indian education creates a unique opportunity to build a system that is both globally competitive and deeply rooted in its cultural heritage.

The path to achieving excellence in higher education is a collective endeavor that requires the active participation of all stakeholders—policymakers, educators, researchers, students, and industry leaders. Strengthening teacher education is particularly crucial, as teachers are the nation-builders who influence the intellectual and moral fabric of society. Investing in quality teacher training programs, integrating innovative pedagogies, and enhancing institutional frameworks are essential steps toward realizing the vision of a globally competitive and socially responsible education system. As India embarks on this transformative journey, the collaborative efforts of all stakeholders will determine the success of NEP 2020 and, ultimately, the future of the nation's education system. This preface sets the stage for a deeper exploration of these themes, offering insights and strategies to navigate the challenges and opportunities that lie ahead. By embracing the principles of NEP 2020 and building on the rich legacy of Indian education, we can create a system that not only meets the needs of the present but also inspires future generations to achieve greatness.

Dr. Pargat Singh Garcha

Principal, GHG Khalsa College of Education, Gurusar Sadhar

MESSAGE

I extend my heartfelt congratulations to the esteemed editorial team and the distinguished contributors whose academic endeavors have culminated in this significant publication. This book, comprising scholarly papers presented in the National Seminar on A New Dawn for Indian Higher Education: Embracing the Paradigm Shift, organized by GHG Khalsa College of Education, Gurusar Sadhar, under the sponsorship of the Indian Council of Social Science Research (ICSSR), stands as a testament to the transformative discourse unfolding in the domain of higher education in India.



Higher education in our country is at a crucial juncture, witnessing a dynamic shift driven by the progressive vision of the National Education Policy (NEP) 2020. The emphasis on multidisciplinary approaches, digital learning, skill development, and the integration of Indian knowledge systems with global perspectives calls for a collective intellectual engagement by scholars, educators, and policymakers. This seminar has provided a robust platform for such meaningful discussions, and the publication of this book further strengthens the dissemination of innovative ideas and research that can guide the future course of education.

GHG Khalsa College of Education, with its rich legacy of academic excellence and commitment to holistic teacher education, has been at the forefront of fostering intellectual discourse on pressing educational issues. This publication reflects the institution's unwavering dedication to academic research and its resolve to contribute to the evolving landscape of higher education in India. I extend my deepest appreciation to all the academicians, researchers, and scholars whose insightful contributions enrich this book. Their work encapsulates diverse perspectives on the paradigm shift in Indian higher education, shedding light on the challenges and opportunities that lie ahead. Special recognition is due to the editorial team, whose meticulous efforts have ensured the compilation of high-quality research that will serve as a valuable resource for educators, researchers, and policy framers.

As we embark on this journey of educational transformation, I am confident that this publication will inspire constructive dialogue, foster new ideas, and play a pivotal role in shaping policies that align with the aspirations of a new India. May this book serve as a beacon for progressive educational thought and innovation, furthering the noble mission of empowering educators and students alike.

Wishing all the contributors and readers a fruitful intellectual engagement and success in their academic pursuits.

S. Manjit Singh Gill

President,

Governing Council, GHG Khalsa Colleges, Gurusar Sadhar

MESSAGE

The rapidly evolving educational landscape necessitates a proactive approach to embracing innovation, inclusivity, and excellence in higher education. The National Education Policy (NEP) 2020 has set a visionary roadmap for this transformation, emphasizing holistic and multidisciplinary learning, Artificial Intelligence, digital integration, and a learner-centric approach. GHG Khalsa College of Education, Gurusar Sadhar, Ludhiana has taken initiative to provide a platform for academic discussions in the form of research papers and articles compiled in this book.



I am delighted to extend my warmest congratulations to the Editorial Team and all the distinguished contributors for their scholarly efforts in compiling this insightful volume. This publication, developed in the context of the National Seminar on A New Dawn for Indian Higher Education: Embracing the Paradigm Shift, sponsored by the Indian Council of Social Science Research (ICSSR) and hosted by GHG Khalsa College of Education, Gurusar Sadhar, Ludhiana, is a significant academic contribution that will undoubtedly enrich the ongoing discourse on the transformation of Indian higher education. The research papers compiled in this volume reflect a deep engagement with these themes, offering valuable insights and forward-looking perspectives that will guide educators, policymakers, and researchers in their efforts to implement meaningful reforms.

GHG Khalsa College of Education has always been committed to academic excellence and intellectual exploration. The organization of this seminar and the subsequent publication of these research papers reaffirm our dedication to fostering rigorous scholarship and informed discussions on crucial educational reforms. This collection is a testament to the collective wisdom and academic rigor of scholars who are shaping the future of education in India.

I sincerely appreciate the meticulous efforts of the Editorial Team in bringing together these diverse and thought-provoking contributions. Their dedication, along with the

intellectual engagement of the contributors, has resulted in a volume that will serve as a vital resource for academic and policy discussions. To all the contributors, I extend my gratitude for their commitment to advancing knowledge and contributing to the evolving dialogue on higher education. I hope this publication inspires further research and innovative thinking in the field of education.

My best wishes to the Editorial Team and all contributors for their continued academic endeavors and future pursuits.

Dr. S.S. Thind

Secretary

Governing Council, GHG Khalsa Colleges, Gurusar Sadhar

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Theme I

*The Future of Higher Education: Long-term
Implications of the Merging Policy*

1

ENHANCING THE GLOBAL RANKINGS AND COMPETITIVENESS OF INDIAN HIGHER EDUCATION

Dr. Adit Gupta*

Abstract

This chapter critically explores strategies to raise Indian higher education institutions (HEIs) in global rankings and improve their international competitiveness. Despite significant progress, Indian universities remain underrepresented at the top of global academic rankings. The chapter provides a comprehensive analysis of the systemic challenges that hinder the global standing of Indian HEIs, including inadequate research funding, suboptimal faculty-to-student ratios, limited internationalisation, and restrictive regulatory environments. Drawing insights from international case studies such as China, Singapore, and the UAE, the chapter outlines a strategic roadmap tailored to India's unique academic and socio-economic contexts. Key interventions discussed include increasing research funding, implementing faculty development programmes, expanding global partnerships, and reforming governance structures. The chapter emphasises that enhancing global rankings should not solely focus on achieving higher academic recognition but also on driving substantial socio-economic benefits, ultimately contributing to India's transformation into a global knowledge economy.

Keywords: Indian Higher Education, global rankings, international competitiveness

Introduction

The quest for higher global standings among Indian higher education institutions (HEIs) extends beyond a mere pursuit of academic prestige—it embodies a strategic imperative to enhance national competitiveness within the knowledge economy. This chapter examines the intricate dynamics influencing the global rankings and competitiveness of Indian universities, set against the broader backdrop of international educational standards. In an era defined by rapid technological advancements and interconnectivity, the necessity for Indian HEIs to integrate into the global academic community has never been more pressing. Although Indian universities are exhibiting signs of progress in their current global position, there remains a persistent need for systemic transformations to fully harness the vast potential of

* Professor and Principal, MIER College of Education, Jammu, India

India's rich academic resources. By drawing on diverse international case studies and the experiences of nations that have successfully uplifted their educational infrastructures, this chapter outlines a comprehensive roadmap for India. This roadmap seeks not only to elevate the standing of Indian universities on the global stage but also to catalyse a transformative impact on the nation's socio economic landscape through enhanced research output, improved educational quality, and increased international collaboration.

Current Global Position of Indian Universities

Currently, Indian universities have a limited presence at the top of major global rankings such as QS, Times Higher Education (THE), and the Academic Ranking of World Universities (ARWU). In the QS World University Rankings 2025, only two Indian institutions are among the top 150 globally: IIT Bombay at 118 and IIT Delhi at 150 (QS World University Rankings, 2025). The number of Indian universities featured has grown substantially, with 46 institutions ranked in QS 2025, up from just 11 in 2015 (QS World University Rankings, 2025). However, most Indian universities cluster in the lower tiers; only 11 are within the top 500 (QS World University Rankings, 2025), and the average Indian rank remains around the 700–800 range. Similarly, in the THE-World University Rankings 2025, no Indian university appears in the top 200; the highest performer, IISc Bangalore, is placed in the 251–300 band (Times Higher Education, 2025). A few others, such as Anna University and Mahatma Gandhi University, have improved into the 401–500 band (Times Higher Education, 2025), but overall representation at the top is sparse. In the ARWU (Shanghai Ranking) 2024, 15 Indian institutions feature among the top 1000 worldwide, with the Indian Institute of Science (IISc) being the highest-ranked in the 401–500 bracket (Shanghai Ranking Consultancy, 2024).

These rankings reflect a gradual upward trend; for example, IIT Bombay climbed from 149th to 118th in QS within a year (QS World University Rankings, 2025) – yet India is still pursuing the leading universities from the US, UK, China, and others. Key factors affecting India's position include low international visibility, modest research output and citations, and weaker scores on internationalisation metrics. Indian institutions excel in specific areas; for instance, seven Indian universities rank among the top 100 globally for research citations per faculty (QS World University Rankings, 2025), but they lag in overall reputation and global outreach. The data highlights that while India's presence in global rankings is improving in quantity, significant gaps remain in quality indicators needed to break into the top 100.

Challenges and Barriers to Global Competitiveness

Multiple structural challenges prevent Indian higher education from attaining world-class status. Insufficient research funding is a fundamental issue—India allocates only approximately 0.65–0.7% of its GDP to R&D, significantly less than countries like China (~2.4%), the US

(~3.5%), or even Brazil (~1.2%) (Economic Times, 2022; The PIE News, 2022). Within that limited budget, universities receive a small proportion; historically, only about 10% of government research funding in India goes to universities (the remainder flows to national labs and institutes), thereby curtailing campus-based research output (The Chronicle of Higher Education, 2022). This financial constraint results in fewer high-impact publications and patents. Consequently, Indian faculty produce, on average, about one research paper per year, compared to six per faculty at an institution like MIT (The Chronicle of Higher Education 2022).

A related challenge is the faculty-to-student ratio. Indian universities have a high student-to-faculty ratio, averaging roughly 26:1 in higher education (iLearnCanada, 2022). This is double the ratio in the US (~12:1) and significantly higher than China's (~19:1) (iLearnCanada, 2022). Large class sizes and numerous vacant faculty positions (with faculty vacancies reaching up to 30–40% in some colleges) strain teaching quality and leave little time for research mentorship. Recruiting and retaining top academic talent proves difficult when salaries and research grants are not competitive globally.

Industry collaboration remains underdeveloped as well. While leading American and Chinese universities benefit from robust industry-funded research and innovation ecosystems, Indian institutions have historically maintained weak linkages with academia and industry. Few Indian universities have the type of research parks or corporate R&D partnerships that stimulate cutting-edge innovation. This is gradually changing through initiatives such as innovation hubs, but the scale remains modest. As a result, Indian universities score low on measures of industry income and patents—metrics that global rankings like THE use to assess knowledge transfer.

Regulatory and structural factors also pose barriers. The higher education system is governed by complex regulations (UGC, AICTE, etc.) that often stifle flexibility and innovation. Until recently, limited autonomy meant curricula and hiring were tightly controlled, making it hard for universities to modernize or differentiate. Many public universities are burdened with managing hundreds of affiliated colleges (The Chronicle of Higher Education, 2022), diverting focus from research and postgraduate education. Due to bureaucratic hurdles, approval processes for new programs or international partnerships can be slow.

Moreover, internationalisation remains a significant weak point: India hosts relatively few foreign students and faculty. In 2020-21, there were only about 48,000 foreign students enrolled across all of India's colleges and universities (Rural India Online, 2022)—a minuscule fraction of the total enrollment exceeding 40 million. In contrast, China accommodates over 490,000 international students (2018 data), while countries such as the US host over 1 million. The lack of global diversity on campuses hampers cultural exchange and diminishes India's score on "international outlook" criteria in rankings. Similarly, very few faculty members at Indian universities come from abroad, partly due to bureaucratic hurdles and less attractive

compensation. Furthermore, governance and quality assurance issues remain persistent. Not all institutions are accredited or meet high standards (Acumen Education, 2022), leading to significant disparities in quality. Ensuring consistent excellence is challenging in such an extensive system. In summary, inadequate funding for research, high student–faculty ratios, weak industry linkages, restrictive regulations, and low internationalisation collectively hinder Indian universities’ global competitiveness.

International Case Studies: China, Singapore, and The UAE

Lessons from other countries illustrate how strategic reforms and investments can swiftly enhance higher education on the global stage. China is a prime example of a concerted national effort to establish world-class universities. In the late 1990s, China initiated initiatives like Project 211 and Project 985, allocating substantial funding to select universities to elevate research output and faculty quality. These programmes, which were succeeded by the Double First-Class plan in 2017, have yielded positive rankings. Over two decades, China has significantly increased its share of the top 100 universities worldwide – seven Chinese universities are now in the world’s top 100, up from just two in 2020 (World Economic Forum, 2020). Flagship institutions such as Tsinghua and Peking University now rank just outside the global top 10 (World Economic Forum, 2020), rivalling the Ivy League in reputation and research strength. Key strategies contributing to this achievement include substantial government R&D expenditure (over 2% of GDP) (The Economic Times, 2020), generous research grants, recruiting overseas Chinese and foreign professors, and the establishment of specialised research institutes. China developed significant research capacity through these initiatives, becoming second only to the US in total scientific publications and citations (Inside Higher Ed, 2020). It has also prioritised disciplines vital to innovation (for instance, leading in materials science output) (Inside Higher Ed, 2020). Equally important, Chinese universities were granted greater autonomy to modernise curricula and cultivate global collaborations while the government established clear targets for global excellence. This systematic approach has transformed China’s top universities into globally competitive institutions within a generation.

Singapore provides another successful model, albeit on a smaller scale. Despite its size, Singapore’s top universities consistently rank among the world’s elite. The National University of Singapore (NUS) is ranked 8th globally (QS 2025), and Nanyang Technological University (NTU) is 15th (Nanyang Technological University, 2025), making NUS the highest-ranked Asian university on that list. Singapore has achieved this through significant investments in higher education and research, which are the cornerstones of its development. NUS and NTU benefit from substantial government funding, cutting-edge facilities, and strong policy support. One strategy has been to internationalise aggressively – both universities employ many international faculty and enrol thousands of international students, enhancing their

global outlook and talent pool. They also prioritise research impact: Singapore's universities focus on high-impact publications and industry-relevant innovation, supported by initiatives like CREATE (Campus for Research Excellence and Technological Enterprise), which brings together top global universities for joint research in Singapore. Global partnerships have been crucial – NTU, for instance, was co-founded with assistance from leading foreign universities and consistently collaborates worldwide. The leadership in these institutions is given the flexibility to recruit world-class faculty with competitive salaries and to establish interdisciplinary centres in emerging fields. Consequently, NUS and NTU excel in indicators such as academic reputation, citations per faculty, and employer reputation, underpinning their top 20 rankings (Nanyang Technological University, 2025).

The United Arab Emirates (UAE), while newer to the scene, demonstrates how focused reforms can enhance rankings in a short time. The oil-rich UAE has prioritised the development of a knowledge economy by elevating its universities. Through sustained investment, the UAE now has universities rapidly climbing global ranks – for instance, Khalifa University in Abu Dhabi is ranked 202nd worldwide (QS 2025), a rise of 28 places from the previous year (Wikipedia, 2025), while United Arab Emirates University (UAEU) has jumped to 261st (QS 2025) after advancing 29 spots (Asia Education Review, 2025). The UAE's approach includes establishing new research-oriented institutions (such as Khalifa University for Science and Technology), attracting international faculty and students with generous funding and modern campuses, and forming global partnerships. Branch campuses of renowned foreign universities (like NYU Abu Dhabi and Sorbonne Abu Dhabi) have also created an international academic environment. A recent analysis highlighted four key pillars behind the UAE's progress: improving teaching quality, boosting research impact, expanding international outlook, and strengthening industry engagement (Asia Education Review, 2025). For example, UAE universities have forged collaborations with industries (such as aerospace and energy companies) to drive research that addresses economic needs. The government has also introduced competitive benchmarking and accountability, ranking local universities for the first time to incentivise performance (Asia Education Review, 2025). These efforts are not merely about boasting rights in rankings; the UAE explicitly ties enhancements in higher education to its goal of a diversified, knowledge-driven economy (Asia Education Review, 2025). The rapid rise of certain Emirati universities underscores that targeted investment and internationalisation, even within a minor system, can yield swift gains in global competitiveness. Each of these case studies – China's large-scale investment and reform, Singapore's focused excellence and internationalisation, and the UAE's strategic partnerships and funding – offers valuable insights for India. They illustrate that political will, adequate funding, global collaboration, and an unwavering focus on research and quality are common ingredients in ascending the global academic ranks.

Policy and Institutional Reforms for India

To emulate these successes, India needs bold policy and institutional reforms aimed at its unique challenges.

- 1. Boost Research Funding and Infrastructure:** Significantly increasing research funding is essential. India should elevate its R&D expenditure to between 1.5% and 2% of GDP over the next decade (up from approximately 0.7% now), with a substantial portion directed towards universities. The recent establishment of the National Research Foundation (NRF) under the Anusandhan National Research Foundation Act, 2023, marks progress in this direction—committing roughly ₹50,000 crore (about \$6 billion) to support research in Indian universities (The PIE News, 2023). Ensuring the NRF is effectively implemented will be critical in providing competitive grants for scientific and social science research. Furthermore, enhancing research infrastructure (laboratories, equipment, digital libraries) within universities can support high-quality work. Research parks and incubation centres should be established on campuses to promote innovation and entrepreneurship.
- 2. Faculty Development and Recruitment:** Enhancing the faculty-to-student ratio and the quality of faculty is essential. This requires hiring more faculty to fill vacancies and accommodate increasing enrolment, as well as attracting top talent from India and abroad. Incentives such as higher salaries, start-up research grants, and modern housing can assist in recruiting Indian diaspora academics and foreign professors to Indian campuses. For example, China's "Thousand Talents" programme successfully brought back academics; India could initiate a similar "Brain Gain" initiative. Additionally, ongoing faculty development programmes are necessary—providing funding for Indian faculty to pursue PhDs/postdocs (to elevate the percentage of doctoral-qualified instructors) and opportunities for mid-career training in pedagogy and research skills. Reducing teaching loads for research-active faculty (by hiring teaching assistants or adjuncts for undergraduate instruction) can create more time for publishing and grant writing. Performance-based promotions and tenure systems that reward research output, teaching excellence, and collaboration with industry will encourage faculty to excel. Simultaneously, international faculty exchanges and visiting scholar schemes can expose Indian academics to global best practices and vice versa. Over time, these measures will bring the student-faculty ratio closer to global norms and cultivate a cohort of world-class educators and researchers.
- 3. Global Partnerships and Internationalisation:** Indian universities must become more outward-looking. Internationalisation should be pursued on multiple fronts: recruiting more international students, encouraging Indian students to spend a semester abroad, and increasing the presence of international faculty. Simplifying visa processes,

offering scholarships, and marketing the best Indian institutions globally (through initiatives like Study in India) can attract talented foreign students. For faculty, clear guidelines for hiring overseas scholars and recognising foreign qualifications will help. The government's decision to allow top foreign universities to establish campuses in India (e.g., in GIFT City) should be implemented swiftly to spur healthy competition and collaboration. Indian universities should seek global partnerships for joint degrees, twinning programmes, and research collaboration networks. For instance, joint research centres can be set up with leading universities in the US, Europe, or East Asia, focusing on areas such as AI, renewable energy, or public health. Such partnerships can enhance Indian institutions' research output and citation impact, as well as create pathways for academic exchange. The SPARC programme (Scheme for Promotion of Academic and Research Collaboration) already funds international research projects—this should be expanded and widely utilised. Hosting international conferences and participating in global university networks (such as Universitas 21 or the IARU) will elevate India's academic profile. By internationalising the campus experience and research enterprise, Indian universities can improve their scores in “international outlook” and reputation, which together often account for 20–30% of global ranking criteria (The Chronicle of Higher Education, 2023).

- 4. Governance and Regulatory Reform:** Policy changes should grant greater autonomy and flexibility to higher education institutions. The Institutions of Eminence (IoE) scheme initiated in 2017 aimed to achieve this for a select group of universities—providing autonomy from specific UGC regulations and additional funding. Early indicators suggest that IoEs are progressing (82% of IoE programs maintained or improved their rankings in recent evaluations) (QS World University Rankings, 2023), implying that deregulation coupled with resources is effective. This approach should be expanded: more public universities and IITs should be free to set curricula, hire international faculty, and forge partnerships without bureaucratic delays. A light-touch regulatory framework focused on outcomes (graduate employability, research output, inclusion) rather than inputs will foster innovation. Merging or phasing out the rigid affiliation system (as envisaged by NEP 2020) will enable universities to concentrate on becoming multidisciplinary research-driven campuses instead of merely overseeing numerous colleges. Academic governance should be professionalised—leadership positions (Vice Chancellors, Directors) should be filled through global searches based on merit, with accountability for performance. Establishing independent boards comprising industry and international experts can enhance decision-making. Streamlining approval processes (for new courses, foreign collaborations, etc.) by transitioning to an online single-window system would eliminate unnecessary hurdles. Accreditation and quality assurance mechanisms also require strengthening: accreditation agencies should be

empowered (and increased in number) to ensure all institutions meet basic standards while also benchmarking Indian programs against international quality metrics.

- 5. Digital Transformation and Educational Technology:** Embracing digital tools can enhance quality and global competitiveness. India's SWAYAM platform is already one of the largest free e-learning portals; integrating Massive Open Online Courses (MOOCs) into university curricula can provide top-tier content to all campuses and assist in standardising learning outcomes. Universities should invest in smart classrooms, virtual laboratories, and high-speed internet to facilitate hybrid learning and global classrooms (where an expert abroad can co-teach via video). Digital libraries and open-access repositories will enable students and faculty to access the latest research. Furthermore, data analytics can be employed for academic planning—tracking student performance and feedback to improve teaching methods. A push for administrative digitisation (online admissions, digital transcripts, research management systems) will enhance efficiency and transparency. Emphasising digital literacy and offering programmes in emerging tech fields (AI, data science, cybersecurity) will align graduates' skills with global demands. By leveraging India's IT strength in education, institutions can leapfrog in teaching quality and outreach, even partnering with ed-tech companies to develop adaptive learning systems or virtual exchange programmes. This digital pivot modernises education delivery and is viewed favourably in global rankings that increasingly consider innovation and teaching resources.
- 6. Industry-Academia Collaboration:** Bridging the gap between academia and industry is essential for enhancing research relevance and graduate outcomes. Policies should incentivise joint research projects with industry through tax benefits or matching grants. Establishing more centres of excellence funded by industry at universities (as exists in some IITs) can channel corporate R&D funds into campus laboratories. The government's recent initiative to create a ₹20,000 crore fund to spur private sector R&D (with long-term, low-cost financing for industry research) is an innovative idea. This fund could prioritise projects in partnership with academic institutions. Each university should have a dedicated industry liaison or technology transfer office that connects faculty with industry challenges, assists in patenting and commercialising research, and facilitates student internships. Curriculum reform can involve industry experts in designing courses, ensuring that programmes impart skills required by employers. Promoting co-op programmes, apprenticeship-embedded degrees, and on-campus career development centres (like NUS's Centre for Future-ready Graduates, which links students with internships) will enhance student employability. In the long term, a more substantial industry-academia nexus will result in more innovation (start-ups spun off, patents filed) and a better employer reputation for universities—factors that directly and indirectly bolster global rankings. Successful models abroad, such as Purdue

University's partnerships to tailor engineering curricula to industry needs, demonstrate that engaging employers can make a university more competitive. Indian policymakers should encourage such collaborations by providing grants for industry-driven research at universities and incorporating industry feedback in institutional assessments. By holistically implementing these policy and institutional reforms, India can create an ecosystem where universities flourish in teaching, research, and innovation—setting the stage for enhanced global standing.

Phase-Wise Implementation Roadmap (Next 10 Years)

Achieving significant improvement in global rankings is a long-term endeavour. A phased roadmap can assist in managing the transformation systematically over the next decade:

Phase I (Years 1–3: Foundation Building)

In the initial phase, concentrate on baseline improvements and capacity building. The government should inject increased research funding immediately into selected universities (e.g., Institutions of Eminence and top 100 NIRF-ranked institutes) to kick-start high-quality projects. Launch the National Research Foundation programmes and distribute the first wave of research grants (The PIE News, 2023), prioritising areas that can yield publications in high-impact journals (to enhance citation metrics). Simultaneously, undertake a substantial faculty recruitment drive to reduce student-faculty ratios – this may involve fast-tracking the hiring of Indian PhD holders and inviting international scholars on short-term contracts or visiting positions. Establish a Task Force on Internationalisation to promote Indian higher education abroad and simplify admission and visa processes for foreign students by Year 3. Initiate twinning programmes with a few foreign universities and set up 8–10 joint research centres in collaboration with global partners (leveraging existing MoUs). Regarding governance, autonomy reforms should be implemented for the first set of 20 public institutions, granting them flexibility in curricula, fees, and collaborations as pilots. This phase should also see investment in infrastructure: upgrade laboratories, libraries, and campus facilities at major institutions to meet global standards.

Key deliverables by Year 3: At least five Indian universities break into the top 200 of Asia rankings; research output (papers, citations) from target institutions increases significantly; over 1,000 new faculty positions are filled; and the new “Study in India” initiative achieves a modest rise in foreign student intake (e.g., doubling the current 48,000).

Phase II (Years 4–7: Acceleration and Integration)

The reforms are gaining momentum and expanding across the system in this medium-term phase. Curriculum revamps and pedagogical improvements should be in full swing to enhance teaching quality, with new interdisciplinary programmes launched and obsolete

courses removed following NEP 2020 guidelines. A second tranche of institutions, including state universities and leading private universities, should receive increased autonomy and funding to broaden the reform beyond the central institutions. By year five, several Mega Research Facilities, or national laboratories accessible to multiple universities, should be established for advanced areas such as nanotechnology, genomics, and AI to elevate the research ecosystem. Industry linkages should be intensified, aiming for every major engineering and science institution to have at least one industry-sponsored laboratory or centre by year five and for all professional programmes to incorporate industry internships. Faculty development in this phase includes sending a cohort of young faculty each year to top international universities for exchange or training, thus creating a pipeline of globally exposed educators.

Moreover, an international faculty recruitment programme will be established, offering tenure-track positions to 50–100 foreign professors in critical fields (especially where Indian talent is scarce). Their presence will enhance research mentorship and international perspectives. On the digital front, all universities must implement a Learning Management System (LMS) and begin offering blended learning options; additionally, integrate SWAYAM/online courses formally into curricula by this stage. Global partnerships should be strengthened: Indian universities could regularly co-host international conferences and increase their participation in global ranking surveys (enhancing perception scores). Milestones for Phase II: By around year five or six, at least five to six Indian universities should enter the global top 200 in a major ranking, with approximately three hitting the top 100 in specific subject areas—reflecting advancements from research and faculty improvements. The number of Indian institutions in the QS/THE top 500 could double (from 11 to about 20+). We should also observe a rise in patent filings and startup incubations on campuses, indicating increased innovation output. Student outcomes will improve, with graduate employability rising—perhaps evidenced by greater representation of Indian universities in global employability rankings.

Phase III (Years 8–10: Consolidation and Global Leadership)

In the final phase of the decade, the focus will be on consolidating gains and achieving global parity for the top tier of Indian institutions. By this stage, governance reforms and best practices should have trickled down to a broad base of universities. The IoE programme can be expanded to include more universities demonstrating potential in Phase II. There ought to be a stable mechanism for continuously funding higher education R&D – possibly increasing research grants in alignment with GDP growth to maintain momentum. Internationalisation goals for year 10 might include hosting over 100,000 foreign students (approximately doubling Phase I numbers) and establishing a significant international faculty presence in top universities, making campuses truly cosmopolitan. At this stage, India could aspire to host a

branch of a top 100 global university or forge an alliance such that degrees are co-awarded, thereby enhancing global trust in Indian education. This phase also entails evaluation and fine-tuning: assessing which reforms proved most effective and institutionalising them. For instance, if autonomy and decentralisation improved outcomes, these should be made permanent through legislative changes (such as a new Higher Education Act replacing outdated regulations). Successful models – such as research parks, consortiums, or faculty incentive schemes – can be replicated nationwide. Targets by Year 10: India should confidently aim to have a couple of universities in the world’s top 100 and around 8-10 in the top 200 (across QS, THE, or ARWU). The average ranking of Indian institutions should markedly improve from the current ~700s to, say, ~500s or better, reflecting an overall uplift. By the end of the decade, India hopes to be recognised as a global higher education hub, with at least one university (likely IISc or an IIT) regarded on par with the world’s elite in reputation and research impact. Achieving these milestones will signify that the phase-wise strategy has succeeded in transforming the global competitiveness of Indian higher education.

Monitoring and course correction will be essential throughout all phases. A dedicated national body could track key performance indicators (KPIs) – the number of publications, citations, global ranking scores, student outcomes, etc. – and ensure accountability for the targets set in each phase. This adaptive management will help India stay on track toward the long-term goal of significantly enhanced global standing.

Potential Impact Assessment

Elevating Indian universities in global rankings is not merely for prestige—it brings significant economic and academic benefits to the country. A major consequence would be the reinforcement of India’s knowledge economy. World-class universities function as engines of research and innovation, producing new technologies, startups, and patents that can drive economic growth. Higher rankings often correlate with increased research output; as Indian institutions enhance their standing, we can anticipate more breakthroughs in fields such as biotechnology, renewable energy, and artificial intelligence, among others, emerging from India. This innovation can strengthen industries and create new sectors, aligning with initiatives like Make in India and the digital economy’s expansion. A more competitive higher education system also results in a more skilled workforce. Graduates from globally benchmarked programmes will receive superior training and be more “future-ready,” leading to productivity gains across the economy. According to analysis, university rankings impact policy and funding decisions (Asia Education Review, 2023)—thus, as Indian universities ascend the ranks, it justifies increased public and private investment in the education sector, creating a virtuous cycle of improvement and funding.

There are direct economic benefits to transforming India into an educational hub. Currently, India experiences a significant outflow of students, with over 300,000 Indian

students studying abroad and spending billions on foreign tuition fees (PR Newswire, 2023; The Economic Times, 2023). If Indian universities achieve a high global standing, a greater number of these students may choose to study domestically, thereby reducing brain drain and retaining talent and funds within the country. Conversely, an improved international ranking and reputation would attract more international students to India, generating revenue from education service exports and enhancing cultural exchange on campuses. Countries such as Australia and the UK derive substantial economic advantages from hosting foreign students; similarly, India could develop education into a vital export sector, particularly if it meets future targets of 200,000+ foreign students. Moreover, multinational companies are more inclined to establish R&D centres and high-tech operations near prominent universities, as evidenced by Silicon Valley and universities in Beijing. Thus, enhancing Indian universities could transform cities like Bengaluru, Mumbai, or Delhi into stronger magnets for investment, boosting local economies and job creation.

Academically, the benefits are profound. Achieving higher global competitiveness means an improved quality of education for Indian students. Classrooms will be more engaging, curricula will be more up-to-date, and research opportunities will be more abundant. Students will have access to better laboratories, mentorship, and global experiences, which enhance their learning outcomes and creativity. We can expect an increase in the publication of research from India in high-impact journals, contributing to global knowledge (addressing everything from climate change to public health with Indian insights). Collaborative research with leading foreign universities will also increase, integrating Indian scholars into international networks. In the long term, well-ranked Indian institutions will build national pride and soft power. Just as the IITs and IIMs established a reputation for producing top engineers and managers, a broader range of Indian universities could gain recognition for excellence in various fields. This academic prestige can translate into influence—Indian scholars and universities having a greater voice in global academic discourse, standard-setting, and even diplomacy (education diplomacy is a real tool for international relations).

Ultimately, an often-underappreciated benefit of stronger universities is their societal impact. Great universities produce not only skilled workers but also informed citizens and leaders. With enhanced research and teaching, universities can provide solutions to local challenges—whether improving agriculture, advising on policy, or fostering social innovation. Achieving higher rankings suggests that these institutions are operating at a high level, implying they likely excel in addressing society's needs as well. There may be spillover effects, such as enhancements in primary and secondary education, as universities set examples in teacher training and pedagogical practices alongside an overall culture that values inquiry and merit. While some caution that pursuing rankings should not compromise inclusive education, the proposed reforms are generally synergistic with expansion and

inclusion. A competitive, well-funded university system can accommodate more students while still raising quality.

In summary, pursuing higher global rankings for Indian higher education promises significant rewards if approached through genuine quality enhancements. It would aid in transforming India's demographic advantage into a skilled workforce, reduce the brain drain of talent and resources overseas, and establish India as a global leader in knowledge. The combined economic impact—via innovation, investment, service exports- and academic impact—through enhanced quality and research output—would significantly contribute to India's development objectives. Experts note that the aim is not merely to ascend the rankings but to create universities that truly excel in teaching, research, and societal contributions; the rankings will then naturally follow (The Chronicle of Higher Education, 2023). Suppose India achieves this goal over the coming decade. In that case, its higher education system will not only rank higher on the global scale but also serve as a vital pillar of India's socio-economic advancement in the 21st century.

Conclusion

As India stands on the brink of educational transformation, the strategic imperatives outlined in this chapter provide a blueprint for elevating its higher education institutions (HEIs) to world-class status. The phased implementation roadmap for the next decade highlights a pragmatic approach to achieving significant improvements in global rankings through targeted initiatives in research funding, faculty development, internationalisation, and governance reforms. The potential impacts of these enhancements extend beyond academia—promising to stimulate economic growth, foster innovation, and enhance the global competitiveness of India's workforce. The journey to higher global rankings is intertwined with the broader vision of transforming India into a vibrant knowledge economy capable of producing not only skilled graduates but also groundbreaking research and sustainable innovations. By adopting a holistic and coordinated approach, Indian higher education can transcend traditional barriers and emerge as a global powerhouse. The achievements of this journey will not only redefine the landscape of Indian higher education but also contribute profoundly to the nation's development, enhancing its stature as a leader in the global academic community. The way forward is fraught with challenges, yet it is filled with opportunities that can redefine the future of India's educational system.

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2

ACCESSIBILITY ISSUES WITH NEP 2020 IN AIDED COLLEGES OF PUNJAB

Dr. Gurpreet Singh* & Dr. Charanjit Kaur**

Abstract

According to the National Education Policy (NEP) 2020, the gross enrolment ratio (GER) in educational institutions must reach 100% by 2030. By 2035, the GER in higher education should reach 50%. However, a number of obstacles make higher education in India inaccessible. Communities that are poor and disenfranchised encounter a number of obstacles. States are worried about how little authority they have to make important decisions. Both the federal government and state governments have the authority to enact laws and policies pertaining to education since it is a concurrent topic under the Indian constitution. NEP 2020 has, however, sparked discussions about the scope of government participation and how accessible it is to the general public. Decentralization may result in uniform regulations that ignore the linguistic, cultural, and economic diversity of India. The expansion of digital infrastructure and student financial aid will be essential to guaranteeing that everyone has fair access to higher education. It necessitates significant policy changes and investment. Making higher education accessible to everyone requires bridging the digital divide, guaranteeing funding, promoting inclusion, and improving infrastructure.

Keywords: NEP 2020, higher education, gross enrolment ratio (GER).

Digital Divide and Online Learning Accessibility

The National Education Policy (NEP) 2020 aims to revolutionize higher education through digital learning, but the digital divide remains a major challenge, particularly in Punjab's aided colleges. These institutions, which serve a significant number of students from rural and economically weaker backgrounds, face infrastructural and financial constraints that limit the effective implementation of online education. Many students lack access to high-speed internet, smartphones, or laptops, creating a gap between those who can afford digital resources and those who cannot. This disparity is more pronounced in rural areas of

* Assistant Professor, Department of Punjabi, Guru Tegh Bahadur College, Bhawanigarh.

** Assistant Professor, Department of History, Guru Tegh Bahadur College, Bhawanigarh.

Punjab, where network connectivity remains unreliable, further restricting students' ability to participate in virtual learning.

Additionally, the faculty in aided colleges often struggle with digital teaching methodologies due to inadequate training and resource limitations. While NEP 2020 envisions a tech-driven education system, the absence of well-equipped digital labs, affordable data services, and accessibility tools for students with disabilities hinders its execution. The lack of government support in providing subsidized digital devices and training programs further exacerbates the issue.

To bridge this gap, the Punjab government must invest in digital infrastructure, provide financial aid for students to access online learning tools, and ensure that online education platforms are inclusive, thereby making NEP 2020 truly accessible in aided colleges.

Socio-Economic Barriers

The implementation of NEP 2020 in Punjab's aided colleges faces significant socio-economic barriers that hinder accessibility to higher education. A large proportion of students in these institutions come from economically weaker sections, particularly from rural areas, where financial instability limits their ability to afford higher education expenses, including tuition fees, digital devices, and internet access for online learning. Despite the policy's emphasis on equitable education, the lack of financial support mechanisms such as scholarships and fee subsidies poses a challenge for underprivileged students.

Moreover, many aided colleges struggle with inadequate infrastructure and limited government funding, affecting the quality of education. Societal factors, such as gender-based disparities, also restrict access for female students in conservative communities. Without targeted financial aid, infrastructure development, and inclusive policies, NEP 2020's vision of accessible higher education remains unfulfilled in Punjab's aided colleges, reinforcing existing socio-economic inequalities in educational opportunities.

Regional and Linguistic Barriers in Aided Colleges of Punjab

NEP 2020 emphasizes a multilingual approach in higher education, but regional and linguistic barriers pose significant challenges in Punjab's aided colleges. A major concern is the dominance of English in digital and higher education content, which creates difficulties for students from Punjabi-medium backgrounds. Many rural students struggle with English-based study materials and online courses, impacting their academic performance and engagement. While the policy promotes regional languages, the lack of standardized Punjabi-language digital resources limits accessibility.

Additionally, disparities in faculty proficiency in multilingual instruction further widen the learning gap. The inadequate availability of technical and professional courses in Punjabi restricts students from rural areas from competing at national and global levels. Without

structured policies for linguistic inclusivity, the NEP's objective of equitable higher education remains unmet. Strengthening Punjabi-language educational resources, bilingual teaching approaches, and faculty training programs can bridge this gap and ensure better accessibility in Punjab's aided colleges.

Barrier	Impact	Proposed Solution
English-dominated curriculum	Difficulty in understanding study materials	Develop Punjabi-language resources
Lack of bilingual faculty	Limited multilingual teaching	Faculty training for bilingual education
Digital resources in English	Exclusion of Punjabi-medium students	Create Punjabi digital content
Limited professional courses in Punjabi	Reduced employability for rural students	Introduce Punjabi technical courses

Implementation of Multidisciplinary Approach

NEP 2020 promotes a multidisciplinary approach in higher education, aiming to integrate diverse fields of study. However, its implementation in Punjab's aided colleges faces several challenges. Limited faculty training, rigid curricula, and lack of infrastructure hinder the seamless blending of disciplines. Many institutions struggle to offer interdisciplinary courses due to funding constraints and outdated academic frameworks. Additionally, students from rural backgrounds find it difficult to adapt to new learning models without proper guidance. To ensure effective implementation, aided colleges require curriculum restructuring, faculty development programs, and financial support to create an inclusive and diverse academic environment.

Challenge	Impact	Proposed Solution
Rigid academic structure	Restricts flexibility in learning	Revise curriculum to allow interdisciplinary courses
Faculty untrained in multidisciplinary teaching	Ineffective course delivery	Conduct faculty training programs
Lack of financial resources	Inability to introduce new programs	Increase government funding for colleges
Resistance to new learning models	Students struggle to adapt	Provide orientation and skill-based workshops

Structural and Policy Challenges

The implementation of NEP 2020 in Punjab's aided colleges faces structural and policy challenges that hinder accessibility to higher education. Bureaucratic delays, inconsistent

policy execution, and inadequate financial support create barriers to reform. Many aided colleges operate under rigid administrative structures that resist curriculum changes and interdisciplinary learning. Additionally, gaps in faculty recruitment and training slow down policy adoption. The lack of coordination between state and central education bodies further complicates implementation. To ensure successful policy execution, aided colleges require streamlined governance, increased funding, and better regulatory mechanisms that align with the inclusive vision of NEP 2020.

Challenge	Impact	Proposed Solution
Bureaucratic delays	Slow implementation of reforms	Streamline approval processes
Rigid administrative structures	Resistance to curriculum changes	Introduce flexible governance policies
Insufficient faculty training	Poor execution of NEP policies	Conduct regular teacher training programs
Funding constraints	Limited resources for implementation	Increase financial support from the government

Faculty Shortage and Quality Concerns

A major challenge in implementing NEP 2020 in Punjab’s aided colleges is the shortage of qualified faculty and concerns over teaching quality. Many institutions suffer from vacant teaching positions, reliance on contractual staff and inadequate faculty training programs. This affects the effective delivery of multidisciplinary and skill-based education. Additionally, the lack of exposure to modern teaching methodologies and digital tools further impacts student learning. Without proper recruitment policies, competitive salaries, and continuous professional development programs, aided colleges struggle to meet the policy’s objectives. Strengthening faculty infrastructure is crucial for ensuring quality education and successful NEP 2020 implementation.

Lack of Infrastructure in Tier-2 and Tier-3 Cities

The successful implementation of NEP 2020 in Punjab’s aided colleges is hindered by inadequate infrastructure in tier-2 and tier-3 cities. Many institutions face issues such as outdated classrooms, lack of digital labs, insufficient libraries, and poor internet connectivity. These deficiencies limit the adoption of technology-driven learning and interdisciplinary education. Additionally, the absence of well-equipped research centers and skill development hubs restricts student growth and employability. Without significant investment in modernizing infrastructure, aided colleges in smaller cities struggle to provide quality education, making higher education less accessible for students from rural and economically weaker backgrounds.

Challenge	Impact	Proposed Solution
Outdated classrooms and labs	Limited access to modern learning tools	Upgrade infrastructure with smart classrooms
Poor internet connectivity	Difficulty in accessing online resources	Expand broadband facilities
Lack of research centers	Hinders innovation and skill development	Establish well-equipped research labs
Insufficient libraries and study spaces	Affects student learning and engagement	Improve library resources and digital access

Recognition of Skill-Based and Vocational Education

NEP 2020 emphasizes skill-based and vocational education to enhance employability, but its recognition and implementation in Punjab's aided colleges remain limited. Many institutions lack structured vocational programs, industry collaborations, and practical training facilities. Students, especially from rural backgrounds, face challenges in accessing hands-on learning due to outdated curricula and insufficient funding. Additionally, there is a societal bias toward traditional degree programs, reducing the appeal of vocational education. To bridge this gap, aided colleges must integrate skill-based courses, establish industry linkages, and provide financial support, ensuring students gain practical expertise aligned with the evolving job market.

Conclusion

The implementation of NEP 2020 in Punjab's aided colleges presents significant challenges, including the digital divide, socio-economic barriers, faculty shortages, and inadequate infrastructure in tier-2 and tier-3 cities. The lack of regional language support and limited recognition of skill-based education further hinder accessibility for students, particularly those from rural and economically weaker backgrounds. Additionally, excessive centralization in policy-making risks enforcing a uniform framework that does not align with Punjab's linguistic, cultural, and economic diversity.

To ensure equitable access to higher education, financial aid programs, investment in digital infrastructure, and faculty development initiatives must be prioritized. Without sufficient funding and structured policy reforms, aided colleges will struggle to implement NEP 2020 effectively. Bridging the digital divide, improving infrastructure, promoting multilingual education, and fostering inclusivity are crucial steps toward making higher education accessible to all. A comprehensive and region-specific approach, backed by government support and institutional commitment, is essential to achieving NEP 2020's vision in Punjab's aided colleges.

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3

MULTILINGUAL PEDAGOGY AND ITS ROLE IN RE-SHAPING ENGLISH LANGUAGE TEACHING IN INDIAN HIGHER EDUCATION

Harisankar V P*

Abstract

The role of English in Indian higher education is coupled with the country's linguistic complexity, which poses a major barrier to English Language Teaching (ELT). This study investigates the possibility of Multilingual pedagogy as an effective approach to ELT in the context of India's higher education. The study critically reviews academic articles and policy documents through document analysis to explain how multilingual practices can improve language learning, pedagogical effectiveness, and cultural inclusivity. The integration of students' native languages into the ELT through the multilingual pedagogy, assists the learners to avoid cognitive overload, gain a deeper understanding of the concepts, promote inclusivity in education and address the employability gaps of learners. However, certain systemic barriers such as inadequate teacher training, institutional resistance to multilingual education etc. act as existing hindrances to its practical implementation. This study also highlights the need for systematic actions for strategic interventions, including comprehensive teacher education programs, curricular reforms, and policy shifts, to foster a linguistically inclusive educational environment. The study suggests that the significance of a multilingual strategy for ELT in Indian higher education is not only a proper pedagogical approach but also a way to promote linguistic diversity and equity in education.

Keywords: Multilingual Pedagogy, English Language Teaching (ELT), Indian Higher Education, Language Diversity, Linguistic Equity, Pedagogical Strategies, Multilingualism, Language Acquisition, Educational Inclusivity, Higher Education Policy

Introduction

Linguistic diversity in India is both an asset and a challenge in English Language Teaching (ELT) in higher education. The Indian educational system, with over 22 officially recognized languages and thousands of dialects, faces the challenge of students with diverse

* Research Scholar, School of Pedagogical Sciences, Mahatma Gandhi University, Kottayam, Kerala

linguistic and cultural backgrounds. Although a global lingua franca, English is a second or third language for many students, which serves as both a benefit and a burden for such learners within the classrooms. Multilingual pedagogy, a teaching-learning approach that utilizes multiple languages, offers a suitable solution to bridge the gap between students' native languages and learning of English, thus enhancing language acquisition and overall learning outcomes. This study examines how multilingual pedagogy impacts the reshaping of ELT in Indian higher education, the benefits and challenges of incorporating multilingual strategies into teaching-learning practices, and the overall educational implications of these strategies.

Literature Review

Linguistic Diversity in India and Its Impact on ELT: India's multilingual environment has been a significant feature of its educational landscape. India's linguistic profile is diverse, with its own advantages and disadvantages. English serves as an important academic and professional stepping stone towards global education. According to Kachru (2005), English in India is a second or additional language; thus, there is a need to develop approaches that suit the student's linguistic background. Studies also indicate that the current monolingual approach to ELT does not recognize the native languages (first language) of learners (García & Wei, 2014). The conventional methods of teaching have isolated English from the students' native linguistic practices, which would pose a hindrance to their learning and practical use of language.

Multilingual Pedagogy: A Theoretical Framework: Multilingual pedagogy is a challenge to the traditional monolingual models, which assume that classrooms should only have one language. Garcia and Wei (2014) proposed Translanguaging, a process of language learning that allows students to combine the use of all the known languages, including their native language, to communicate and learn better. This pedagogical approach has served to minimize cognitive load, increase learners' interest and promote comprehensive understanding by using all the linguistic resources that the learners are equipped with (Cummins, 2000).

The Socio-cultural theory of Vygotsky (1978), which focuses on the social context of learning, is in harmony with multilingual pedagogical approaches. According to Vygotsky, language is a tool for cognitive development. Therefore, allowing students to learn in their native language, along with English, would enhance their understanding and retention of knowledge.

Global and Indian Perspectives on Multilingual Pedagogy in ELT: Globally, multilingual teaching methods have proven effective in educational settings involving multiple languages in the teaching-learning process. Research has indicated that employing multilingual teaching strategies enhances language skills and fosters a sense of inclusivity

among various cultures (Wei, 2018). Meanwhile, in India, the adoption of multilingual educational approaches in English Language Teaching (ELT) has been comparatively slow in pace, with educational institutions prioritizing English as the sole language for instruction (Canagarajah, 2005). This practice has led to a gap where students who lack proficiency in English may face certain challenges, thus leading to further disparities in education. However, many scholars from India have highlighted the significance of integrating the languages spoken by students into English Language Teaching (ELT), aiming for an efficient learning experience Choudhury (2015).

Methodology

This research adopts a Document Analysis, focusing on policy documents, curriculum guidelines, academic research, and reports related to multilingual pedagogy and ELT in Indian higher education. The study involved a systematic review of relevant texts, with the goal of identifying key themes, policy shifts, and practices related to multilingualism in ELT. Documents were selected based on their relevance to the topic and their impact on ELT practices in India. The data was analyzed qualitatively, identifying recurring themes and patterns related to the integration of multilingual strategies in English language teaching.

Analysis and Interpretation

The study highlights that multilingual pedagogy can substantially improve English language teaching in India by addressing students' cognitive, emotional, and cultural barriers when learning English. Integrating students' native languages into English instruction has enhanced comprehension, promoted engagement, and created a more inclusive learning environment.

Cognitive and Linguistic Benefits: Multilingual pedagogy helps to reduce cognitive overload and promotes a deeper understanding of English language structures. By connecting new knowledge to students' first languages, teachers can help them make meaningful connections between their linguistic resources and the English language. This approach directly correlates with findings from studies on bilingualism and cognitive development (Cummins, 2000), where the use of the first language (L1) has been shown to improve language retention and overall competency.

Policy and Institutional Support: The National Education Policy (NEP) 2020 provides a positive foundation for integrating multilingualism in Indian education. The NEP advocates for the use of mother tongue or local languages as the medium of instruction up to Grade 5, and it suggests promoting multilingualism at all levels of education. However, while the policy outlines ambitious goals, its practical implementation in higher education requires significant reforms at both institutional and policy levels. Institutions need to develop a supportive environment for multilingual teaching through policy changes, resource allocation, and teacher training.

Cultural Relevance and Inclusivity: Multilingual pedagogy contributes to cultural inclusivity in education. By using students' native languages in the classroom, teachers can make the learning process more culturally relevant, fostering an environment where students feel valued. Using multilingual strategies reduces the emotional barriers often caused by the dominance of English and offers students a sense of ownership over their learning process. Garcia and Wei (2014), emphasize that multilingual pedagogies contribute to inclusive education by recognizing and valuing linguistic diversity.

Equity and Access in Education: Multilingual pedagogy promotes equity in educational outcomes. By ensuring that students can utilize their first language in the classroom, educators can reduce inequalities that arise from a purely English-only teaching model. This is particularly important in Indian higher education, where access to quality English instruction is not equally available to all students due to linguistic disparities (Canagarajah, 2005). Multilingual strategies provide a more equitable framework for language learning, enabling students from diverse linguistic backgrounds to succeed academically.

Results and Discussion

Benefits of Multilingual Pedagogy in ELT: Implementing multilingual pedagogies in ELT in Indian higher education offers several significant pedagogical advantages. These advantages include career, cognitive, emotional, and cultural benefits that align with the growing body of research supporting multilingual approaches in language learning. Multilingual pedagogies can reduce cognitive overload, foster greater engagement, and promote deeper cultural understanding in language acquisition.

- **Career Readiness and Employability:** Multilingual proficiency is increasingly sought after in global job markets. Employers value candidates with the ability to communicate across linguistic and cultural barriers. Integrating multilingual pedagogy into ELT not only enhances language learning but also equips students with communication skills that improve their career prospects in diverse industries, such as international business, translation services, and academia.
- **Cognitive Engagement:** Allowing students to use their native language alongside English facilitates the acquisition of new knowledge by reducing the cognitive load often experienced when learning a second or third language. Studies have shown that translanguaging, where students freely switch between languages, helps retain information and better understand complex academic material (Wei, 2018).
- **Emotional Engagement and Motivation:** Students are often more motivated and engaged when they see their native language used academically. This reduces the anxiety associated with learning English as a foreign language and helps students develop a more positive attitude toward language learning. Additionally, when students see their

linguistic and cultural backgrounds acknowledged, it enhances their sense of belonging in the classroom.

Challenges in Implementing Multilingual Pedagogy: Despite the potential benefits, several challenges remain in the effective implementation of multilingual pedagogy in India. These challenges are rooted in institutional resistance, teacher training deficiencies, and curricular constraints.

- **Institutional Resistance:** Many higher education institutes in India still place an emphasis on English as the language, for academic achievement and success rather than embracing multilingual teaching approaches, that reflect the need for modernity and global recognition (Canagarajah, 2005).
- **Teacher Training Deficiencies:** Lack of adequate teacher training in multilingual education is a critical issue. There is a shortage of teachers equipped with the skills and techniques to effectively integrate students' native languages into their teaching practices. There is a necessity for teacher professional development programs that address the nuances of teaching in multilingual classrooms.
- **Curricular Constraints:** The current educational programs in higher education institutes in India are typically rigid in nature. There exists a lack of the option to utilize different languages effectively in teaching methods. Many courses are structured with English as the language of instruction, restricting the potential for incorporating diverse language teaching approaches. Implementing a curriculum that embraces multiple languages would require institutional and policy-level support.

Conclusion

This study examines the role of multilingual pedagogy in reshaping English Language Teaching in Indian higher education. The findings suggest that multilingual strategies can enhance student engagement, improve career prospects, enhance cognitive processes, and create a more inclusive learning environment. However, successful implementation requires systemic changes in policy, curriculum, and teacher preparation. Future, the study focuses on exploring the significance of multilingual pedagogy implementations, examining how they address the cognitive and cultural challenges faced by students, and investigating their long-term impact on academic achievement and English language proficiency.

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4

ASSESSING THE PROSPECT OF HIGHER EDUCATION IN INDIA THROUGH THE LENS OF NEW EDUCATION POLICY 2020

Dr. Jagjit Singh* & Prativa Tiwari**

Abstract

Education is the means for bringing about the all-round development of an individual. The creation of an advanced society depends absolutely on a well-integrated system of education that is supported by skilled, talented and professionally committed teachers who are capable of imparting quality education to learners as per needs of the present-day dynamic society in this globalized world. Thus, it is likely to be inferred that it is the education that leads to the socio-economic growth of a country in a vibrant manner. In this perspective, higher education plays a crucial role as it is apt to generate the technical manpower suited to various economic sectors. In line with the same, the New Education Policy (NEP), 2020 under implementation these days, lays emphasis on promoting quality education by employing well qualified and competent teachers who may induce creative thinking, skills and productivity among learners. Of course, this new education policy works within parameters of the present International Educational Standards and strives for creating a holistic, flexible and inclusive educational approach adaptive to the needs of the 21st century. Amidst this backdrop, the present research article peeps through the window of wide implication of NEP 2020 for higher education. Side by side, this paper unravels various bottlenecks in the way to realize the vision and goals of the said education policy.

Keywords: *Integrated system of education, Professionally committed teachers, Quality education, Globalized world, Higher education, Technical manpower, New Education Policy 2020, International Educational Standards.*

Introduction

The Indian Higher Education system stands second world over in respect of the higher education network. In fact, the term 'Higher Education' includes the tertiary level

* Assistant Professor, GHG Khalsa College of Education, Gurusar Sadhar, Ludhiana.

** Research Scholar, Department of Education and Community Service, Punjabi University, Patiala.

of education which, of course, is given after the completion of 12 years of schooling, i.e. primary education up to 10 years and secondary education up to 2 years. The ministry of education oversees approximately over 1,1000+ universities and more than 45, 000+ colleges that are in line offering educational opportunities to a large chunk of the young population. All the top-ranking educational institutions, i.e. IIITs, IIMs, NITs, IIMs, teacher training institutes, etc. provide talented manpower to various sectors of economy. A three-layered structure of Indian Higher Education includes in its ambit the universities, colleges and courses. All the same, the universities and colleges work in coordination with regulation and accreditation bodies meant for ensuring quality and standards in the higher education system.

Significance of Higher Education

By and large, in today's era, sustainable human development is next to impossible without quality higher education. Needless to say, higher education builds analytical and problem-solving skills/abilities, and develops the intellectual capacity and character of an individual. Stepping into higher education, a student gets the chance for himself or herself to choose different streams and set career goals as per desire thus gets engaged in chosen profession/occupation. Thus, a well-planned higher education set up paves the way for a student to get adjusted physically, socially and economically.

NEP 2020 and paradigm shift in higher education

Nowadays, the Indian Higher Education system visualizes a paradigm shift in terms of dynamic policy changes and integration of the latest innovations and technological advancements in the field of education. This transformed setting talks extensively of inclusive development of the learners which finds its reflection in recently implemented New Education Policy 2020. The said policy has marked a paradigm shift as to how we define and nurture talent. Apparently, the policy aims to promote multidisciplinary, inclusive and technology-based learning approaches, skill development, research infrastructure and funding in the education sector so as to contribute to our country's advancement. At this juncture, the present research article is bent upon dwelling on the wide impact and implications of the education policy on the higher education sector while appreciating its qualitative, holistic, flexible and inclusive approach in education curriculum irrespective of several impending challenges ahead. Undoubtedly, the transformation of education is not merely a government initiative rather a national mission that demands our collective commitment and shared perspectives. Definitely the goals would be achieved when effective collaboration and partnership between government and the civil society define our policies and actions.

Methodology

Researcher's methodology employs a secondary mode of data collection in terms of gathering relevant information.

Highlights of The NEP 2020 in Respect of Higher Education

- Increase in Gross Enrolment Ratio in higher education to 50% by 2035.
- Addition of five crore seats in higher education.
- Establishment of the National Research Foundation meant to fund and promote interdisciplinary research.
- Replacement of multiple regulatory bodies with a single regulatory body for higher education, namely the Higher Education Commission of India.
- Introducing a four-year multidisciplinary undergraduate degree with multiple exit options and viable opportunities for skill development.
- National Educational Technology Forum for promoting the use of technology in higher education.
- Development of a credit - based system for degree programs, thus, enabling students to simultaneously do various degrees and programs.
- The National Academic Pending Compliance Credit Bank for facilitating and transferring the accumulation of academic credits across institutions.

Salient Features of The New Education Policy 2020 in Respect of Higher Education

- The new education policy aims to follow interdisciplinary education by encouraging universities to offer multidisciplinary courses to students wherein they are provided with options to explore subjects and streams.
- The policy stands for recommending a curriculum which is flexible in nature and promotes academic excellence through credit transfer mode. Importantly, students are at their discretion to select courses and subjects suited to their interests and career goals.
- The policy prioritizes activities related to research and innovation and opt for establishing the National Research Foundation to support and fund the same across all the disciplines.
- The policy emphasizes vocational education and work-integrated learning programs for skill development among students.
- The policy places much importance on the digitized and technology based educational framework in higher education, wherein artificial intelligence (AI) and machine learning has been integrated and emphasized.
- The policy stands for promoting inclusivity and equity in education so that disadvantaged sections of society, students with disabilities would be benefitted. Side by side, it provides equal opportunity to students coming from different socio-economic backgrounds.
- The policy focuses on the individual's holistic development.
- The policy covers the internationalization of education by means of which transfer of knowledge will take place through extensive collaboration with foreign universities and facilitating student and faculty exchanges.
- The policy seeks for greater autonomy and decentralization of decision making to

improve the quality and effectiveness of higher education. Also, it suggests a transparent accountable regulatory mechanism to supervise the institutions on the parameters of quality standards.

- The policy throws light on developing competent and committed teaching faculty by providing a culture of continuous professional development.

The foregoing discussions on the NEP 2020 clearly shows that it is a progressive policy addressing many developmental needs of our country. In fact, as assumed through this policy, India is all set to attain goal #4 of the 2030 agenda for sustainable development in which the inclusion and quality education will go a long way to provide lifelong learning opportunities for learners. But some stakeholders view that proper implementation of such a comprehensive policy in the Indian educational scenario will take sufficient time to adjust with the same. So, considering this reality, given below are some major challenges supposed to be encountered by Indian Higher Education and which altogether needs intelligent deliberations.

Major Challenges for Higher Education in The Wake of New Education Policy 2020

- **Problem in overhauling the higher education system: Complete overhaul:** Indeed, a well-regulated and effective system of higher education can be speculated in India as the NEP2020 comes forward with a major overhaul in this regard. All the same, such a transition in the higher education system may not be altogether free from certain challenging problems.
- **Funding Problem:** Restructuring of the higher education system as proposed by NEP 2020 requires the setting up and management of a huge infrastructure that requires the establishment of many new universities, and also making the online education functional in full swing. To operationalize all this, the government may face the financial problem in some way or the other.
- **Problem in making online education universally accessible:** The policy intends to focus on widespread online education with the sole aim to make the same accessible to each and every individual irrespective of the locale one belongs to. Nevertheless, this would be a challenging task to bridge the digital divide between urban people and those living in remote areas where they lack even basic internet connectivity.
- **Challenge for making full-fledged faculty development:** Although the policy has a strong proposal for training and development of the faculty, but, in reality, higher education in India is running an acute shortage of skilled, competent and qualified staff. Thus, it is to be seen remarkably how long the higher education institutions take to build the said capacity.
- **Challenge for teachers in using blended learning tools and AI tools in technology-based learning environments:** The policy gives attention to education

which is technology-driven. Notably, it is silent on aspects pertaining to managing screen-time and effects of digitalization on the social and psycho-motor dimensions of learning. Again, teachers' readiness for using blended learning tools must be assured as they will have to mind and manage massive tasks associated with continuous assessment and online examinations. Further, they will have to be trained in using AI tools efficiently in education. These technical opportunities being created should be made available to the marginalized communities also.

- **Problem in introducing equity and inclusion in higher education:** NEP 2020 has launched a comprehensive document wherein the needs of disadvantaged groups and provision of equal opportunities to all students from different socio-economic strata have been taken care of. To achieve this, promoting equity and inclusion in the area of higher education has been greatly emphasized. However, it turns out to be a matter of major concern that disabled students or those from marginalized communities may not be benefitted by certain proposed policy measures like the four-year undergraduate program, rather the same may prove to be a disadvantage to them.

Conclusion

The new education policy 2020 incorporates all the aspects of quality education so as to enrich the students with knowledge, creativity, critical thinking and make them learn to apply skills in real life situations and offers a promising vision. Being comprehensive in nature, it is inclined towards bringing transformation and reforms in the higher education system in India. By and large, the policy widely assumes its importance in respect of following a multidisciplinary approach towards education, facilitating research activities, emphasizing vocational education, quality teacher education, and large application of technology in higher education, and thereby, equipping students to adjust smartly in the world job market through internationalization of education. Furthermore, it has opened the doors for students to explore their passions and develop skills for the future. Needless to say, in a populated country like India implementing this policy will no doubt take sufficient time, energy, effort and finance from the stakeholders of education. In this context, it is pertinent to note that the educational institutions vehemently need to adapt to this change. Over and above, the goal of NEP 2020 in positively transforming India's education system in the light of the modern demands of the globalized world in coming days will be realized only when financial support, strict regulation and governance is ensured through greater understanding and collaboration from central as well as state level bodies involving private sector stakeholders in consultation with educational institutes, trainers, technology as well industrial partners.

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5

THE FUTURE OF HIGHER EDUCATION: LONG-TERM IMPLICATIONS OF THE MERGING POLICY

Jaswinder Kaur*

Abstract

The higher education landscape is undergoing significant transformations, driven by factors such as technological advancements, shifting demographics, and evolving workforce needs. One of the key strategies being explored is the merging of institutions, aimed at enhancing efficiency, improving quality, and increasing competitiveness. This paper examines the long-term implications of merging policy on the future of higher education. A comprehensive review of existing literature and case studies reveals that while mergers can bring about benefits such as increased resources and improved governance, they also pose significant challenges, including cultural clashes, job losses, and potential diminution of academic autonomy. The paper concludes that the success of merging policy depends on careful planning, stakeholder engagement, and a commitment to preserving academic excellence and diversity.

Keywords: Higher education, merging policy, institutional transformation, academic autonomy, sustainability.

Introduction

The higher education sector is facing unprecedented challenges, including rising costs, changing student demographics, and increasing competition from alternative providers (Christensen et al., 2018). In response, institutions are exploring innovative strategies to remain relevant and sustainable. One approach gaining traction is the merging of institutions, aimed at achieving economies of scale, improving quality, and enhancing competitiveness (Harman & Meek, 2012). This paper examines the long-term implications of merging policy on the future of higher education, with a focus on the potential benefits and challenges. The landscape of higher education is undergoing significant transformation due to policy mergers. As governments and institutions seek to streamline regulations, funding mechanisms, and governance structures, the long-term implications of these changes warrant careful analysis.

* Department of Political Science, PCMSD College for Women, Jalandhar.

This paper explores the potential benefits, challenges, and overall impact of merging policies in higher education.

Benefits of Policy Mergers

1. **Enhanced Resource Allocation:** Policy mergers allow institutions to pool financial, human, and physical resources, reducing inefficiencies. For example, instead of multiple universities investing in the same high-cost equipment or research facilities, they can share these resources. This leads to better infrastructure development, faculty hiring, and student support services.
2. **Improved Academic Quality:** When higher education institutions operate under unified policies, academic standards become more consistent. This can lead to: Standardized accreditation and evaluation processes, Uniform faculty qualifications and hiring criteria, A streamlined credit transfer system for students across merged institutions, This ultimately improves the reputation and credibility of institutions.
3. **Greater Institutional Efficiency :** Bureaucracy is a major challenge in higher education. A merged policy framework can reduce redundant administrative layers. Improve decision-making by centralizing governance structures. Minimize inter-institutional conflicts regarding regulations and resource distribution.
4. **Expanded Student Opportunities:** Mergers often result in a more diverse range of academic programs and research opportunities. For example, Students can access a wider range of courses across institutions. More scholarships and funding opportunities become available. Exposure to a larger faculty base with varied expertise enhances learning outcomes.
5. **Stronger Global Competitiveness:** Many top-ranked global universities benefit from having a large, well-funded, and unified structure. Merged institutions can improve their rankings by increasing research output and international collaborations. Attract international students due to standardized and globally recognized degrees. Align themselves with global best practices in higher education policy.
6. **Cost Savings:** Mergers help cut costs by eliminating redundancies, such as: Multiple administrative units handling similar functions. Overlapping academic programs that could be consolidated. Excess infrastructure maintenance costs. This allows institutions to redirect savings toward student services, faculty development, and research initiatives.
7. **Research and Innovation Boost:** Collaboration is crucial for research growth. A merged policy framework can: Increase access to grants and funding for large-scale projects. Foster interdisciplinary research by integrating departments and faculties, strengthen industry partnerships and technology transfer initiatives.
8. **Equity and Inclusion:** Unified policies can bridge gaps between institutions that previously had varying levels of funding, faculty quality, and student access. This can

improve education accessibility for underprivileged students. Reduce disparities in educational quality across urban and rural areas. Ensure equal opportunities for all students, regardless of their institution of enrollment.

9. **Improved Governance:** A centralized governance model resulting from policy mergers leads to greater transparency in decision-making, stronger accountability mechanisms for faculty and administrators and better long-term strategic planning for institutional growth.
10. **Adaptability to Changing Needs:** The global economy and job market are evolving rapidly. A merged policy structure makes higher education institutions more adaptable by allowing quicker curriculum updates based on industry demands. Integrating digital learning and modern pedagogical approaches. Responding effectively to crises (e.g., pandemics, economic downturns)

Challenges and Risks

1. **Loss of Institutional Autonomy:** Merging policies may limit universities' ability to tailor programs to their unique strengths and mission. A uniform approach to curriculum design could stifle creativity and prevent institutions from addressing specific community or industry needs.
2. **Bureaucratic Complexity:** While the goal is to streamline processes, policy mergers could inadvertently introduce new layers of regulation, complicating compliance. Universities may face difficulties adapting to new reporting requirements and administrative structures.
3. **Equity Concerns:** A one-size-fits-all approach may not adequately address the needs of diverse student populations or regional economic conditions. Institutions in different regions may require specialized policies to support local development and workforce needs.
4. **Resistance to Change:** Faculty, administrators, and students may resist policy changes due to concerns about job security, academic freedom, and shifts in institutional priorities. Effective change management strategies will be necessary to gain stakeholder buy-in.
5. **Implementation Challenges:** Coordinating policy changes across multiple institutions requires careful planning, adequate funding, and stakeholder engagement. Delays and conflicts may arise as different entities negotiate their roles within the new framework.

Long-Term Impact

- **Reshaping Institutional Identity:** Universities may need to redefine their roles, particularly those with niche programs that could be affected by standardization. Some institutions may pivot toward specialization in research, vocational training, or interdisciplinary studies to differentiate themselves.
- **Evolving Pedagogical Models:** Merged policies may drive a shift toward competency-

based education, interdisciplinary programs, and digital learning platforms. Institutions may increasingly adopt hybrid or fully online programs to accommodate diverse learning needs.

- **Data-Driven Decision Making:** The integration of policies will likely lead to enhanced data collection and analytics, informing strategic planning and resource allocation. Universities may use performance metrics to track student outcomes, optimize course offerings, and improve faculty development initiatives.
- **Global Integration:** Harmonized policies can support transnational education partnerships, dual-degree programs, and international research collaboration. This can lead to increased student exchanges, cross-border funding opportunities, and the development of globally relevant curricula.
- **Sustainability and Innovation:** A more coordinated approach to policy can foster long-term sustainability in higher education, promoting research and development in emerging fields. Universities can focus on green technologies, artificial intelligence, and social innovation to address pressing global challenges.

Conclusion

The merging of policies in higher education presents both opportunities and challenges. While efficiency, accessibility, and global competitiveness are clear advantages, concerns about institutional autonomy, equity, and complexity must be carefully managed. Strategic implementation, stakeholder engagement, and continuous assessment will be essential to ensuring that policy mergers lead to a more resilient and innovative higher education system. Universities must remain adaptable, leveraging new policies to enhance learning experiences while preserving their unique identities and contributions to society. To mitigate these risks, institutions must engage in careful planning, stakeholder engagement, and a commitment to preserving academic excellence and diversity.

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6

ROLE OF NEW EDUCATION POLICY IN ENHANCING WELL-BEING OF HIGHER EDUCATION STUDENTS

Dr. Manu Chadha* & Mamta Gupta**

Abstract

National Education Policy, 2020 (NEP) provides valuable insights and recommendations on various aspects of higher education that include moving towards multidisciplinary and holistic education for overall well-being of students. Institutional autonomy, promotion of quality research through establishment of National Research Foundation, continuous professional development of teachers, integration of technology, internationalization of higher education, restructuring of governance and regulatory architecture, multidisciplinary curricula, engaging blended, pedagogy, valid reliable and blended assessment and availability of content in Indian languages. This policy is expected to bring a long-lasting positive impact on the education system and make India a global hub of skilled manpower during the 'Amrit Kaal', the next 25 years leading up to Developed India in 2047. Its implementation is not possible without the collective efforts of Centre, States, UTs, HEIs, Regulating Agencies / Regulatory Bodies and all other relevant stakeholders.

Keywords: *New Education Policy, Well-being, Higher Education Students*

Introduction

National Education Policy, 2020 (NEP) envisions a massive transformation in education through– “an education system rooted in Indian ethos that contributes directly to transforming India, that is Bharat, sustainably into an equitable and vibrant knowledge society, by providing high quality education to all, thereby making India a global knowledge superpower.” NEP 2020 is founded on the five guiding pillars of Access, Equity, Quality, Affordability and Accountability. It will prepare the students to meet the diverse national and global challenges of the present and future.

Vision for India's Higher Education System

Quality Universities and Colleges: Higher education plays an extremely important

* Associate Professor, GHG Khalsa College of Education, Gurur Sar Sadhar, Ludhiana

** Research Scholar, Punjab University, Chandigarh

role in promoting human as well as societal wellbeing of students. Higher education significantly contributes towards sustainable livelihoods and economic development of the nation as India moves towards becoming a knowledge economy and society, more and more young Indians are likely to aspire for higher education.

Requirements of 21st century: Quality higher education must aim to develop good, thoughtful, well-rounded, and creative youth. It must enable an individual to study one or more specialized areas of interest at a deep level. It aims to develop character, ethical and Constitutional values, intellectual curiosity, scientific temper, creativity, spirit of service. A quality higher education must enable personal accomplishment and enlightenment, constructive public engagement, and productive contribution to the society at large. It must prepare the youth for more meaningful and satisfying lives and work roles and enable economic independence.

Holistic development of individuals: It is demand of the hour that an identified set of skills and values will be incorporated at each stage of learning. At the societal level, higher education must enable the development of an enlightened, socially conscious, knowledgeable, and skilled youth that can find and implement robust solutions to its own problems. Higher education must form the basis for knowledge creation and innovation, contributing to a growing national economy.

National Prosperity: The purpose of quality higher education is not just the creation of greater opportunities for individual employment, it represents the key to more vibrant, socially engaged, cooperative communities and a happier, cohesive, cultured, productive, innovative, progressive, and prosperous nation.

Major Problems

Some of the major problems currently faced by the higher education system in India are as under:

- Severely fragmented higher educational ecosystem.
- Less emphasis on the development of cognitive skills and learning application.
- a rigid separation of disciplines, with emphasis on early specialisation.
- Streaming of students into narrow areas of study.
- Limited access particularly in socio-economically disadvantaged areas.
- Very few HEIs teach in local languages.
- Limited teacher autonomy for curriculum.
- Limited institutional autonomy.
- Inadequacy in mechanisms for merit-based career management and progression of faculty and institutional leaders.
- Lesser emphasis on research at most universities and colleges.
- Lack of competitive peer reviewed research funding across disciplines.

- Governance and leadership of HEIs is suboptimal.
- Regulatory system is ineffective.
- Low standards of undergraduate education because of large affiliating universities.

NEP (2020) envisions a complete overhaul and re-energising of the higher education system to overcome these challenges and deliver high-quality higher education, with equity and inclusion.

Re-Energising The Higher Education System

The policy's vision includes the following key changes to re-energising the higher education system:

Higher education institution (HEI) would mean to include a large, multidisciplinary universities and colleges, with at least one in or near every district, and with higher educational institutions (HEIs), across India that offer medium of instruction or programmes in local/Indian languages each of which will aim to have 3,000 or more students. The present complex nomenclature of HEIs in the country such as deemed to be university, affiliating university, affiliating technical university, unitary university shall be replaced simply by university on fulfilling the criteria as per norms.

Educational Courses: A university worldwide, will mean a multidisciplinary institution of higher learning that offers undergraduate, graduate, and Ph.D. programmes, with high quality teaching, research, and community engagement along with medium of instruction in local/Indian languages or bilingually.

Autonomous degree-granting College (AC) will be a large multidisciplinary institution of higher learning that grants undergraduate degrees and is primarily focused on undergraduate teaching though it would not be restricted to that. It would generally be smaller than a typical university.

Institutional autonomy: There will be a stage-wise mechanism for granting graded autonomy to colleges, through a transparent system of graded accreditation. Colleges shall be motivated, mentored, supported, and incentivized to gradually attain the minimum benchmarks required for each level of accreditation. Over a period of time, it is expected that every college would develop into either an Autonomous degree-granting College, or a constituent college of a university - in the latter case, it would be fully a part of the university.

Multidisciplinary education: By 2040, all higher education institutions (HEIs) shall aim to become multidisciplinary institutions with the aim to have larger student enrolments preferably in the thousands, for optimal use of infrastructure and resources, and for the creation of vibrant multidisciplinary communities. Since this process will take time, thereby all HEIs will firstly plan to become multidisciplinary by 2030, and then gradually increase student strength to the desired levels.

Other crucial responsibilities: In addition to teaching and research, HEIs will have

other crucial responsibilities also, which they will discharge through appropriate resourcing, incentives, and structures. These include community engagement and service, supporting other HEIs in their development, contribution to various fields of practice, faculty development for the higher education system, and support to school education.

Vision of growth: The aim will be to increase the Gross Enrolment Ratio in higher education including vocational education from 26.3% (2018) to 50% by 2035, both in public and private institutions, with a strong emphasis on developing a large number of outstanding public institutions. A fair and transparent system for determining increased levels of public funding support will be established. HEIs delivering education of the highest quality shall be incentivized in expanding their capacity.

Open Distance Learning: Institutions will have the option to run online programmes and Open Distance Learning (ODL), provided they are accredited to do so, in order to enhance their offerings, improve access, increase gross enrolment ratio, and provide opportunities for lifelong learning. All ODL programmes and their components leading to any diploma or degree will be of standards and quality equivalent to the highest quality programmes run on their campuses. Top institutions accredited for ODL will be encouraged and supported to develop high-quality online courses, which shall be suitably integrated into curricula of HEIs, and blended mode will be preferred.

Single-stream HEIs shall be phased out over a stipulated period of time, and all will move towards becoming vibrant multidisciplinary institutions or parts of vibrant multidisciplinary HEI clusters, in order to enable and encourage high-quality multidisciplinary and cross-disciplinary teaching and research across fields. Single-stream HEIs shall add departments across different fields that would strengthen the single stream that they currently serve. Through the attainment of suitable accreditations, all HEIs will gradually move towards full autonomy - academic and administrative. The autonomy of public institutions will be backed by adequate public financial support and stability and Private institutions with a public-spirited commitment to high-quality equitable education.

Learners with disabilities: There will be increased access, equity, and inclusion through a range of measures, including greater opportunities for outstanding public education; scholarships by private/philanthropic universities for disadvantaged and underprivileged students. Online education, and Open Distance Learning (ODL); and all infrastructure and learning materials will be accessible and available to learners with disabilities.

Multiple entry and exit points: Flexible curricular structures will enable creative combinations of disciplines for study, and would offer multiple entry and exit points, thus, removing currently prevalent rigid boundaries and creating new possibilities for life-long learning. Graduate-level, master's and doctoral education in large multidisciplinary universities, while providing rigorous research-based specialization, would also provide opportunities for multidisciplinary work, including in academia, industry, and government.

Degree programmes: The undergraduate degree be of either 3 or 4-year duration, with multiple exit options within this period, with appropriate certifications, e.g., a certificate after completing 1 year in a discipline or field including vocational and professional areas, or a diploma after 2 years of study, or a Bachelor 's degree after a 3-year programme or a 4-year programme may also lead to a degree 'with Research' if the student completes a rigorous research project in their major area(s) of study as specified by the HEI. An Academic Bank of Credit (ABC) shall be established which would digitally store the academic credits earned from various recognized HEIs so that the degrees from an HEI can be awarded taking into account credits earned.

Master's programmes: There may be a 2-year programme with the second year devoted entirely to research for those who have completed the 3-year Bachelor 's programme. For students completing a 4-year Bachelor 's programme with Research, there could be a 1-year Master's programme. There may be an integrated 5-year Bachelor's/Master's programme. Undertaking a Ph.D. shall require either a Master's degree or a 4-year Bachelor's degree with Research. M.Phil. programme shall be discontinued.

Model public universities at par with IITs, IIMs, etc., called MERUs (Multidisciplinary Education and Research Universities) will be set up and will aim to attain the highest global standards in quality education. They will also help to set up the highest standards for multidisciplinary education across India.

Financial support for students: Financial support to students shall be made available through various measures. Numerous efforts will be made to incentivize the merit of students belonging to SC, ST, OBC, and other SEDGs. The National Scholarship Portal will be expanded to support, foster, and track the progress of students receiving scholarships. Private HEIs shall be encouraged to offer larger numbers of free ships and scholarships to their students.

Infrastructure and facilities: All HEIs will be equipped with the basic infrastructure and facilities, including clean drinking water, clean working toilets, blackboards, offices, teaching supplies, labs, libraries, and pleasant classroom spaces and campuses. Every classroom shall have access to the latest educational technology for better learning experiences.

Physical and emotional well-being: In every education institution, there shall be counselling systems for handling stress and emotional adjustments. Furthermore, a systematized arrangement shall be created to provide the requisite support to students from rural backgrounds, including increasing hostel facilities as needed. All HEIs will ensure quality medical facilities for all students in their institutions.

While studying the NEP (2020), we find that the overall vision and aim of the policy is to achieve the overall well-being of higher education students. Now let us go through the concept of well-being.

Concept of Well-Being

Well-being can be defined as the balanced working of the physical as well as psychological aspects of the personality, giving satisfaction to the self and benefit to the society at large. Well-being refers to the internal or personal sense of joy, a person's place in the world of work, feeling of attainment, usefulness, attachment, contentment with experiences of life and absence of distress, dissatisfaction and worry. Well-being is the contented condition of feeling healthy, happy and successful in life. Well-being unites mental health (mind) and physical health (body) which results in more general approaches to disease prevention and health promotion among students. Well-being is a term which involves the existence of positive emotions and moods (e.g. contentment, happiness.), the absence of negative emotions (e.g. depression, anxiety, stress) satisfaction with life, fulfillment and positive functioning. It is the positive state of an individual or group. An individual's or group's positive condition in some sense refers to the high level of well-being.

Melamed (2000) described that another name for well-being is wellness. The idea of wellness includes the aspects of beliefs and sentiments, attitudes and behaviors. These aspects can increase a subjective sense of well-being and can have an impact upon the individual's awareness of self-care.

Blalock and Blalock (2002) described that well-being is a condition which includes the capacity to balance working and personal life and is linked with physical, social, psychological and spiritual wellness.

Dunn (2002) stated that well-being involves intellectual and emotional elements. Comparable private interactions in view of an individual's self-perceived characteristics of life are included in well-being.

Shah and Marks (2004) stated that well-being is not merely happiness. It is more than that. It is the feeling of satisfaction and happiness. It means the development of a satisfied person who can make his contribution in the wellness of the society.

McGregor (2007) described that well-being means how a person thinks about what he can do and what he has. It can be perceived as the interchange of the resources which a person has the ability to mandate, with the help of these resources what he is capable to achieve, and what aims and needs he is able to meet in particular.

Kloep, Hendry and Saunders (2009) explained that a person who has the capacity to face the peculiar psychological, physical and social problems means that he has the physical, psychological and social resources which are required for his complete wellness.

According to Davis (2019). Well-being is just feeling well. Well-being is the experience of health, happiness, and prosperity. It includes having good mental health, high life satisfaction, a sense of meaning or purpose, and ability to manage stress.

Different individuals consider well-being according to their different situations but in fact, well-being is a multi-dimensional interwoven structure. The total physical, psychological,

intellectual, spiritual, occupational, environmental and social wellness of the individual is balanced by these dimensions. Below is given the classification of the dimensions of well-being.

Dimensions of well-being- Well-being is the sum total of its dimensions. Dimensions represent how well-being is formed. Without going through dimensions it is difficult to understand its true essence. So let us go through different dimensions of well-being as follows:

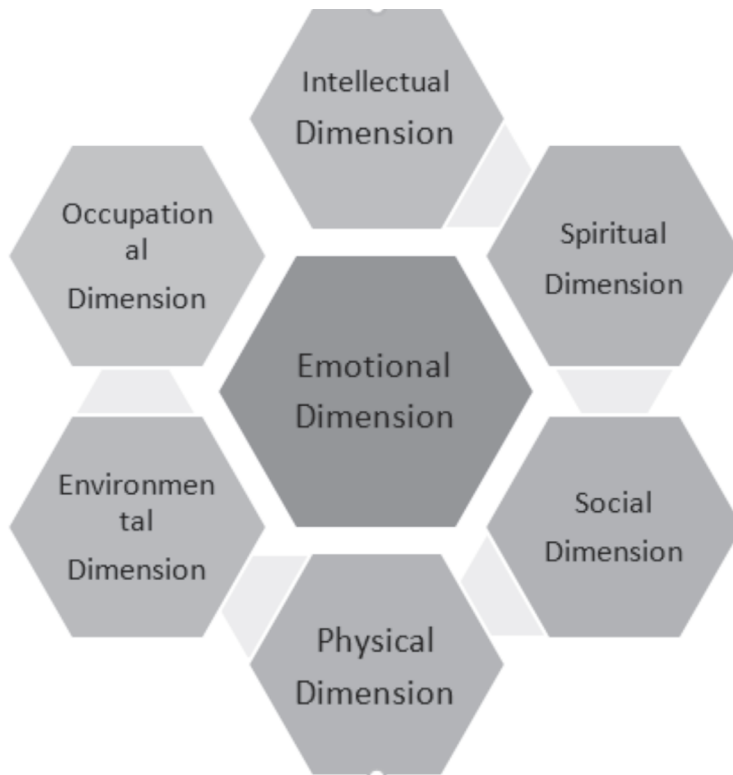


Figure 1.5 Dimensions of well-being

- **Emotional dimension:-** Emotional dimension refers to presence of positive effect, the ability to perceive emotions, power to handle emotions in order to manage stress and adapt to changes in difficult times.
- **Social dimension:-** Good relationships, social stability and peace while having meaningful authentic interactions with others, show social well-being.
- **Intellectual dimension:-** Intellectual well-being refers to the absence of mental illnesses, presence of active mind, ability to use available resources to expand knowledge. It includes learning, creative thinking, and problem solving ability.
- **Physical dimension:-** Proper nutrition, practicing self-care for the needs of the body, absence of harmful habits shows physical well-being.

- **Spiritual dimension:-** Spiritual well-being means to imply and embrace the fundamental principles of different religions, faiths and role models of spirituality. Expanding a sense of purpose and meaning in life, including one's morals and ethics. It may or may not involve religious activities.
- **Occupational dimension:-** Occupational well-being means making use of skills and talents to gain purpose and happiness in your life and maintaining a positive attitude to your work. It is the ability to achieve a balance between work and leisure in a way that promotes a sense of personal satisfaction and financial reward in work life.
- **Environmental dimension:-** Environmental well-being means the awareness of a safe environment, a spirit to protect the environment and living in harmony with the physical and social environment.

Well-being is concerned with all the aspects of human development similar to the holistic development aim of New Education Policy 2020. Vision of NPE 2020 is the overall well-being of students of all grades and age groups. Flexibility in curricular structure, entry and exit points, financial support, infrastructure and facilities to ambit the rigidity and boundaries with the aim to enhance the well-being of students is appreciable.

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7

FUTURE OF HIGHER EDUCATION IN INDIA: LONG-TERM IMPLICATIONS OF THE MERGING POLICIES

Nitika Saggar*

Abstract

Higher education in India is at a crucial juncture with the introduction of transformative policies aimed at addressing existing challenges such as fragmentation, lack of interdisciplinary learning, regulatory bottlenecks, and limited global competitiveness. The National Education Policy (NEP) 2020, along with various structural reforms, seeks to consolidate institutions, enhance multidisciplinary education, and streamline governance mechanisms. The merging of regulatory bodies, the push toward institutional autonomy, the integration of technology in education, and the promotion of global collaboration are expected to reshape India's higher education landscape in the long run. This paper critically analyses the long-term implications of these policies, exploring how they may influence the quality of education, research output, employability of graduates, and institutional sustainability. While these reforms hold immense potential, their success depends on effective implementation, financial investment, and overcoming resistance from traditional educational structures. The paper argues that while the merging policies can create a globally competitive and inclusive education system, their impact will ultimately be determined by the ability of institutions and policymakers to navigate the complexities of systemic change.

Keywords: Higher education, India, National Education Policy, regulatory reforms, digital learning, multidisciplinary education, globalisation.

Introduction

Higher education in India has witnessed significant expansion over the past few decades, evolving from an elite system to one that serves millions of students across diverse socio-economic backgrounds. Despite this growth, the sector has struggled with various structural and operational inefficiencies, including rigid disciplinary boundaries, outdated curricula, limited research output, poor employability of graduates, and an over-regulated yet fragmented governance framework. Recognising these issues, the Indian government has initiated a series of policy reforms, particularly through the National Education Policy

* Assistant Professor, PCM SD College for women, Jalandhar

(NEP) 2020, to transform the higher education landscape. These policies aim to establish multidisciplinary institutions, encourage institutional mergers, create a unified regulatory framework, and promote digital learning to make education more inclusive and globally competitive. One of the most significant reforms under NEP 2020 is the restructuring of higher education institutions to promote multidisciplinary learning. Traditionally, Indian universities and colleges have been structured around specialised fields, leading to rigid academic silos that limit students' ability to gain knowledge across disciplines. The policy proposes the establishment of large, multidisciplinary universities by merging smaller institutions and creating new ones that integrate arts, sciences, technology, and professional courses. This shift is expected to create a more holistic learning environment, improve critical thinking skills among students, and make graduates more adaptable to the changing job market. The long-term impact of this structural change is likely to be the creation of a more dynamic and flexible education system, similar to global models such as those in the United States and Europe. However, the challenge lies in the execution, as merging institutions require significant financial investment, faculty training, and curriculum restructuring.

Another major reform is the proposed merger of regulatory bodies such as the University Grants Commission (UGC), the All India Council for Technical Education (AICTE), and the National Council for Teacher Education (NCTE) into a single Higher Education Commission of India (HECI). This move is intended to eliminate overlapping regulations, streamline governance, and create a more transparent and efficient regulatory framework. The long-term implications of this consolidation are expected to include reduced bureaucratic inefficiencies, improved institutional autonomy, and a more uniform quality assurance mechanism. However, concerns remain about the centralisation of power and the risk of excessive governmental control, which could limit institutional freedom and innovation.

Digital transformation is another key pillar of the ongoing reforms in Indian higher education. The NEP 2020 emphasises the integration of digital technologies to expand access to quality education, especially in rural and underserved areas. The push for online and hybrid learning models, digital infrastructure development, and the establishment of virtual universities are expected to democratise education and make it more flexible. The long-term impact of this shift includes increased accessibility for students who cannot afford traditional higher education, a more personalized learning experience through AI-driven educational tools, and a greater emphasis on lifelong learning. However, challenges such as the digital divide, inadequate internet connectivity in remote areas, and the need for faculty training in digital pedagogy must be addressed to ensure equitable access to technology-driven education. Another important aspect of the merging policies is the internationalisation of Indian higher education. The reforms encourage foreign universities to set up campuses in India, promote global collaborations, and enable Indian institutions to compete internationally. This move is expected to enhance the quality of education by

fostering academic exchange, research collaborations, and exposure to global best practices. In the long term, this can improve India's standing in global university rankings and attract international students, making India a hub for higher education in South Asia. However, challenges such as regulatory complexities, funding constraints, and resistance from certain sections of academia could impact the pace of internationalisation.

A critical area affected by the merging policies is research and innovation. Historically, India's higher education system has been criticised for its weak research ecosystem due to inadequate funding, lack of interdisciplinary collaboration, and bureaucratic hurdles. The new policies seek to address these issues by integrating research across disciplines, providing more autonomy to institutions, and encouraging partnerships between academia and industry. The establishment of the National Research Foundation (NRF) is a step in this direction, aiming to provide funding and support for high-quality research. In the long run, these reforms have the potential to position India as a global leader in research and innovation, provided there is sustained investment and a shift in institutional culture to prioritise research over rote learning. While the merging policies promise significant improvements, their success depends on effective implementation. One of the biggest challenges is financial investment. Transforming higher education institutions into multidisciplinary universities, upgrading digital infrastructure, supporting research initiatives, and ensuring regulatory efficiency require substantial funding. Given India's budgetary constraints, reliance on public funding alone may not be sufficient, necessitating increased private sector participation, international funding collaborations, and innovative financial models. However, excessive privatisation could lead to commercialisation and issues of affordability, making higher education inaccessible to marginalised sections of society. A balanced approach that ensures inclusivity while attracting private investment will be crucial. Another challenge is faculty training and development. The shift toward multidisciplinary education and digital learning requires faculty members to adapt to new pedagogical approaches, integrate technology into teaching, and engage in interdisciplinary research. Many existing educators may resist these changes due to lack of training, fear of obsolescence, or reluctance to move away from traditional methods. Addressing these challenges through continuous professional development programs, incentivising research, and creating a supportive academic culture will be essential for the success of these reforms. The social and cultural dimensions of these reforms also warrant attention. India's higher education system is deeply rooted in traditional structures, and any large-scale transformation is likely to face resistance from various stakeholders, including universities, faculty associations, and students. The move toward institutional mergers, regulatory changes, and digital transformation must be accompanied by extensive consultations, awareness campaigns, and phased implementation to ensure stakeholder buy-in. Additionally, ensuring that the reforms do not compromise the diversity and inclusivity of the education system will be crucial in achieving equitable outcomes.

Conclusion

In conclusion, the future of higher education in India is being shaped by comprehensive policy reforms aimed at creating a more inclusive, multidisciplinary, and globally competitive system. The merging of institutions, integration of regulatory bodies, expansion of digital learning, and promotion of research and international collaborations are expected to yield long-term benefits in terms of improved quality, accessibility, and relevance of education. However, the success of these policies will depend on effective implementation, adequate financial support, faculty readiness, and the ability to address socio-cultural challenges. While the merging policies offer a transformative vision for higher education in India, their impact will ultimately be determined by the willingness of institutions and policymakers to navigate the complexities of systemic change and ensure that the benefits reach all sections of society. If executed strategically, these reforms have the potential to position India as a global education hub, fostering innovation, economic growth, and social progress.

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8

THE FUTURE OF HIGHER EDUCATION IN INDIA

Sarabjit Kaur Panesar*

Abstract

Technological breakthroughs, changing government regulations, and socioeconomic shifts are all driving revolutionary changes in India's higher education system. With an emphasis on significant trends, difficulties, and possible solutions, this essay examines the future course of higher education in India. It draws attention to how technology, legislative changes, and international cooperation may help create an inventive and inclusive educational system. The conversation also looks at how India can guarantee high-quality education for all while bridging the gap between academic learning and industry demands.

Keywords: *Higher education, India, National Education Policy (NEP) 2020, digital learning, online education, globalization, research and innovation, industry-academia collaboration, skill-based learning, accessibility, affordability, faculty development, accreditation, employability, interdisciplinary education, policy reforms, technological advancements, artificial intelligence (AI), virtual reality (VR), augmented reality (AR), university rankings, student financial aid, public-private partnerships (PPPs).*

Introduction

University enrollments in India, which has one of the biggest higher education systems in the world, have increased significantly. Nonetheless, a number of problems still exist, such as out-of-date curricula, insufficient industry connections, and quality challenges. Both public and private educational institutions have grown quickly in the nation, although many still struggle to maintain consistent standards. Through reforms like the National Education Policy (NEP) 2020, the country hopes to increase access, boost interdisciplinary education, and improve research output. This essay looks at how higher education is developing in India, what will shape it going forward, and how to get over enduring obstacles.

The Current State of Higher Education in India

Organizations like the All India Council for Technical Education (AICTE) and the

* Assistant Professor, Commerce, GTB National College Dakha

University Grants Commission (UGC) oversee the country's higher education system. The sector includes autonomous institutions, private universities, deemed universities, central and state universities, and more. Issues including employment inequalities and quality disparities persist despite the growth in institutions. Job chances are impacted by the fact that many graduates lack skills relevant to the business. Furthermore, just a small number of Indian universities rank in the top 200 worldwide, indicating that the country's position in university rankings needs to be improved. Low research output, antiquated teaching methods, and little cooperation with international academic communities are the main causes of this.

Key Trends Shaping The Future

- 1. Technology Integration and Online Learning:** Hybrid learning methods have become increasingly popular as a result of the COVID-19 epidemic and the growth of digital education. It is anticipated that augmented reality (AR), virtual reality (VR), and artificial intelligence (AI) would improve accessible and individualized education. Massive Open Online Courses (MOOCs), Learning Management Systems (LMS), and online platforms will be essential to increasing learning options. Ensuring equitable access to technology-driven education, especially in rural regions, would require the development of high-speed internet infrastructure and digital literacy.
- 2. Implementation of the National Education Policy (NEP) 2020:** NEP 2020 aims to transform higher education by using: Multidisciplinary methods and The removal of strict subject boundaries. The National Research Foundation (NRF) was established to support research; the Gross Enrollment Ratio (GER) was raised to 50% by 2035; and universities were given more autonomy. The goals of these policy adjustments are to increase overall educational quality and encourage innovation. The transition from rote learning to a flexible and comprehensive educational model has received a lot of attention. Students are encouraged to think critically, be creative, and pursue lifelong learning as a result of this change.
- 3. Globalization of Higher Education:** To raise academic standards, India is stepping up its partnerships with foreign universities. NEP 2020 makes it easier for prestigious international universities to enter India, facilitating research partnerships and knowledge sharing. These collaborations will raise India's educational system to a level that is competitive worldwide. In order to promote cultural interchange and worldwide knowledge sharing, Indian institutions are also urged to expand their enrollment of international students and establish international research partnerships.
- 4. Industry-Oriented and Skill-Based Learning:** Universities are increasingly adopting apprenticeship models and offering skill development certifications that meet the changing demands of the labor market, industries are taking a more active role in forming curricula and offering internship opportunities to close the employability gap,

and institutions are moving toward skill-based curricula in order to improve employability. Additionally, improved industry partnerships, vocational training, and entrepreneurship programs are being integrated to align academic training with real-world applications.

5. **Boosting Research and Innovation:** To compete internationally, India's research ecosystem needs to be improved. Innovation in biotechnology, AI, and renewable energy will be fueled by increased research funding, industry-university partnerships, and startup incubation initiatives. By promoting the filing of patents, establishing research parks, and offering financial incentives for research publications, universities may cultivate an innovative culture.

Challenges in The Future of Higher Education

1. **Assurance of Quality and Accreditation:** One of the important concerns is maintaining uniformity in the quality of education among institutions. It would be crucial to fortify accreditation procedures and adhere to global quality standards. Strict faculty qualification criteria, open assessment procedures, and frequent audits can all help to increase the legitimacy of higher education institutions.
2. **Cost-effectiveness and accessibility:** Access to higher education is still restricted by financial limitations. This shortfall will be filled in part by increasing student loan programs, income-based fee systems, and scholarships. Furthermore, encouraging public-private partnerships (PPPs) can help provide resources and infrastructure for kids from underserved neighborhoods.
3. **Development of Faculty:** The delivery of education is impacted by a lack of qualified faculty. To solve this issue, training activities, competitive pay, and faculty exchange programs will be essential. Enhancing teaching quality and increasing faculty retention rates can be achieved by offering incentives for increased education and ongoing professional development.
4. **Closing the Gap Between Urban and Rural Areas:** The majority of higher education options are found in cities. Rural students' access will be improved by the expansion of digital education, satellite campuses, and mobile learning platforms. Government programs have to concentrate on creating educational hubs in impoverished areas and providing financial aid to colleges so they can open outreach centers in rural areas.

Recommendations And Future Roadmap

1. **Making Use of Digital Resources in Education:** Wider acceptance of online learning will be made possible by making investments in reliable digital infrastructure and offering reasonably priced internet access, especially in rural regions. Learning possibilities can be democratized by growing government-led digital education programs like SWAYAM.

- 2. Strengthening ties between academia and industry:** Employability for graduates will be increased through industry-academia collaboration through mentorship programs, sponsored research, and internships. Universities can maintain the relevance and vibrancy of their programs by establishing industry advisory boards.
- 3. Improving Global Competitiveness:** India's position in the world of education would be improved by taking part in international university rating systems, encouraging cross-border research partnerships, and producing more research. Students can gain international exposure by forming dual-degree agreements and exchange programs with reputable overseas universities.
- 4. Growing Programs for Financial Aid:** Fair access to higher education will be ensured by a stronger emphasis on low-interest loans, education grants, and scholarships. The creation of need-based and merit-based funding schemes can guarantee that worthy students get the money they require.
- 5. Reforms in Institutions and Regulations:** Increasing institutional autonomy, lowering red tape, and streamlining regulations will promote creativity and high academic standards. Policies should provide accountability and transparency while encouraging autonomous institutional decision-making.

Conclusion

Policy changes, technology breakthroughs, and growing international involvement are all contributing to the fast development of India's higher education system. It will be essential to address issues like accessibility, quality control, and research development with well-considered financial and legislative measures. India can establish itself as a global leader in education and advance socioeconomic development by encouraging innovation, industrial collaborations, and diversity. If India can successfully transition into a knowledge-based economy by providing its students with necessary skills and a forward-thinking educational system, the next few decades will be crucial.

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DECONSTRUCTING NEP 2020: A CRITICAL DISCOURSE ANALYSIS OF ACADEMIC AND GOVERNANCE FRONT

Dr. Varun Goel*

Abstract

The National Education Policy (NEP) 2020 marks a significant shift in India's education landscape, with far-reaching implications for academic and governance structures. This study undertakes a critical discourse analysis of NEP 2020, deconstructing its academic and governance provisions to uncover the underlying power dynamics, ideological underpinnings, and potential consequences. Through a nuanced examination of policy texts, this research reveals the tensions between the policy's stated aims of equity, accessibility, and quality, and the underlying neoliberal and centralizing tendencies that threaten to exacerbate existing inequalities. The study also highlights the ways in which NEP 2020 reinforces and challenges dominant discourses around education, nationalism, and development.

Keywords- NEP 2020, Deconstruction, Critical Discourse Analysis, Education Policy, Governance, Academic Framework

Introduction

The National Education Policy (NEP) 2020, unveiled by the Government of India, heralds a new era in the country's education landscape. Billed as a transformative reform, NEP 2020 aims to revamp India's education system, bridging gaps in accessibility, quality, and equity. The policy's sweeping provisions encompass a broad range of issues, from pedagogical reforms to governance restructuring, and from early childhood education to higher education. The National Education Policy which was implemented by the Indian Government in July 2020 committed to make a paradigm shift in the entire education system of the country by 2020. The policy document shows the Indian government is determined to open up the barriers of traditional education mode by giving more importance to online mode education, maximum autonomy to higher educational institutions, leaning towards private funding and more focus on technical and vocational learning. It also claims to offer students more choice, make teachers more efficient and accountable and liberalize

* Assistant Professor Political Science, LRDAV College, Jagraon

‘education’. But in reality, the New Education Policy is ambitious and rhetorical on paper but will effectively harm public-funded education, growth of students and teachers. The NEP 2020 is restructuring education on two fronts, the academic and governance, and seeks to privatize education, impact the quality, make teachers dispensable and reduce universities to merely degree dispensing systems.

Section-I

Academic Front

The “Academic Front” under the National Education Policy (NEP) 2020 refers to the various reforms and initiatives aimed at transforming the academic ecosystem in India. This includes: Curriculum reforms, teaching-learning processes, assessment and evaluation, teacher education and training, institutional autonomy and accountability, promoting research and innovation and enhancing equity and inclusion. But the Academic Front under NEP 2020 has faced criticisms for its alleged overemphasis on vocational training, lack of clarity on curriculum implementation, and insufficient focus on critical thinking and creativity. Moreover, the policy’s provisions for teacher training have been deemed inadequate, and concerns have been raised about increased privatization and commercialization of education. Furthermore, critics argue that the policy does not adequately address the needs of marginalized groups and lacks clear strategies for promoting inclusivity. Overall, the Academic Front under NEP 2020 has been criticized for its potential to exacerbate existing inequalities and undermine the quality of education in India.

On the academic front it proposed three regulations; (a) the ABC (Academic Bank Credit) regulation, (b) SWAYAM Regulations, and (c) ‘Blended Mode of Teaching and Learning’.

1. **ABC** creates a “credit bank” under which a student can take 50% of their credits from any other university in India which are graded A or A+ and complete the course in seven years with multiple exit-entry points. ABC will reduce the teacher’s role in ensuring the quality learning as half of the study will be through online mode.
2. **The SWAYAM** platform is heavily promoting the MOOCs model, despite its unsuccessful track record globally, especially in the advanced industrial societies. As per the regulation of NEP, students are allowed to opt for almost half of the coursework from the SWAYAM portal. Therefore, half of the learning is out of the classroom teaching. The hidden message of this policy is that classrooms and teachers are no longer necessary. This policy will shunt out the sizable portion of the teachers.

A study by Massachusetts Institute of Technology’s (MIT) researchers Justin Reich and José A. Ruipérez-Valiente revealed that MOOCs have failed in the Western world due to declining enrollment and poor retention. The study analyzed MIT and Harvard MOOCs

from 2013-2018 and found: completion rates declined for all participants, including those who paid for verified courses. - Only 3.13% of MOOC participants completed their courses in 2017-18, down from 6% in 2014-15.- Verified students' completion rates dropped from 56% in 2016-17 to 46% in 2017-18. The study also highlighted the irregular commitment of students to MOOCs: - Of 1.1 million students who took their first MOOC in 2015-16, only 12% enrolled in another MOOC the following year. The percentage of first-time MOOC users who took another MOOC the following year has consistently declined since 2012-13, from 38% to 7% in 2016-17.

- 3. Blended Mode:** The third regulation provides that up to some percentage of each course opted by the student will be done through pre-prepared and pre-recorded lectures and the rest of the time the teachers will do mentoring and grading. This policy threatens to eradicate meaningful student-teacher interactions. Moreover, a system that integrates such a large proportion of online courses into a traditional degree program is unprecedented globally, especially in a country which is facing the challenge of great digital divide.

Section-II

Governance Front

The Governance Front of the National Education Policy (NEP) poses significant challenges, including a drastic consolidation of higher education institutions (HEIs). The NEP proposes reducing the number of HEIs from approximately 50,000 to 15,000, citing the need for larger, multi-disciplinary institutions. Specifically, the policy suggests that each HEI should have a minimum enrollment of 3,000 students, rendering smaller colleges like St. Stephen's, with its less than 3,000 students, is potentially viable under the new framework. Majority of the colleges in Punjab have student strength less than 3,000. These colleges will become unviable under this policy.

The policy sets the stage for private entities to acquire and consolidate struggling institutions, centralizing control under a single Board of Governors (BoG). This could lead to corporate giants like Ambani or Adani purchasing multiple small colleges, each with fewer than 3,000 students, and merging them into a single entity. Even a research-focused university like JNU is being forced to expand into unrelated fields, such as medicine and business studies, with the inclusion of a medical and a business college.

As per Section 10.3, all higher education institutions (HEIs) in India will be required to become multidisciplinary by 2040, phasing out single-stream institutions. Colleges will need to obtain suitable accreditations to become autonomous and unaffiliated from universities. Only constituent colleges will remain affiliated with universities. In simpler terms, colleges with low enrollment rates and poor accreditations will be phased out. The new system will

only have three types of HEIs: universities, autonomous colleges, and constituent colleges. This change will severely impact colleges in Punjab, as most are single-stream and struggling with low enrollment due to widespread migration of young people to the west. Consequently, many of these colleges are likely to face closure.

Changes and Challenges on The Governance Side

Presently, all higher educational institutions are regulated by the University Grants Commission (UGC) and adhere to its guidelines on service conditions. This ensures uniformity in infrastructure quality, student-teacher ratios, course quality, examinations, and more, across the country, resulting in standardized service conditions for teachers in all universities and colleges.

But the National Education Policy (NEP) introduces significant dramatic changes, abolishing the UGC's regulatory role. The affiliating system will be dismantled, and all colleges will become independent institutions. Each institution will have its own Board of Governance (BoG), replacing the governing bodies in universities and colleges, respectively. Presently Executive council members are mostly academics with some members from University and elected teacher representatives from colleges. With NEP-2020, 2/3rd of the members will be non-academics, representatives of corporations. The National Education Policy (NEP) implies a gradual shift away from public funding for education and puts the colleges on the mercy of private players. Institutions are expected to become self-financing by 2030. Furthermore, the Board of Governance (BoG) will omni-power wield significant authority, surpassing that of the UGC, with control over academic programs, curriculum, fees, staffing, and faculty appointments. Most concerning, however, is that the BoG will operate without any external oversight or accountability. This will have far-reaching and devastating consequences.

Conclusion

The New Education Policy (NEP) has sparked concerns that it may have a devastating impact on both academic and governance aspects of education. One major worry is that the policy's emphasis on online learning will replace traditional classroom teaching, which may not be beneficial for students and teachers. Moreover, the policy's proposal to consolidate institutions, reducing the number of higher education institutions (HEIs) from 50,000 to 15,000, poses a significant threat to governance. This could lead to college closures and the concentration of power in the hands of a Board of Governors, which may have the authority to hire and fire, further exacerbating the issue. Overall, the NEP's reforms may have far-reaching consequences that could undermine the quality and accessibility of education in India.

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Theme II

*Transforming Single-Stream Colleges into
Multidisciplinary Institutions: Challenges
and Opportunities*

DEVELOPMENT OF INTELLIGENT AND SUSTAINABLE MANUFACTURING THROUGH EDUCATION

Dr. Abhishek Chauhan*

Abstract

With advancement in science and technology there has been a massive increase in the adoption of modern technologies leading to increased production and manufacturing of a variety of goods which has given the customers the choice of selection. So, the need of the hour is to optimize the production process using intelligent and sustainable manufacturing. It will reduce the waste and enhance the efficiency of the process. This will not only strengthen the safety of community, employee, and product but also decrease the negative impact on the environment. There is an urgent need to conserve our natural resources for our future generations by adopting intelligent and sustainable manufacturing processes. Using Intelligent and sustainable manufacturing processes we can reduce the depletion of our resources and increase the efficiency of different processes. In the current scenario, where there is a lot of competition in the industry and market, there is an urgent need for developing processes and products that are sustainable to save our environment. Education can play an important part in the development of Intelligent and Sustainable manufacturing systems. Education through research can help in the development of technologies which can integrate with manufacturing processes and systems for optimum utilization of resources and minimum wastage which will lead to sustainable development and environment. The present paper is a theoretical review on the need for development of Intelligent and Sustainable Manufacturing. It also suggests the need for education for the development of Intelligent and Sustainable Manufacturing.

Keywords: Sustainable, Manufacturing, Intelligent, Environment, Education

Introduction

In today's world of competition in the industry and market, there is an urgent need for development of processes and products that are sustainable for the survival of the manufacturer (Khanfar, Iranmanesh, Ghobakhloo, Senali and Fathi, 2021). With rapid industrialization and modernization, our environment is being negatively affected by human activities to a large extent due to increase in pollution and high consumption of non renewable resources of

* Assistant Professor, Panjab University SSG Regional Centre, Hoshiarpur

energy. So, there is an urgent need to shift towards intelligent and sustainable manufacturing from the traditional manufacturing methods for high productivity and quality, decreasing the cost and increasing flexibility in manufacturing (He and Bai, 2021). Various opportunities and challenges have been brought for the manufacturing firms by the digital revolution (Bag and Pretorius, 2022). During the Sustainable Development Summit, 2015, India has signed the declaration along with other countries the Agenda for Sustainable Development by 2030 comprising 17 Sustainable Development Goals which is based on 5Ps: People, Prosperity, Peace, Planet and Partnership (Thakur, Dutt and Chauhan, 2021). These goals can only be achieved if manufacturing in industries are implemented intelligently and sustainably by using Artificial Intelligence, smart and digital technologies etc which are the outcome of our education and research. If we continue with the traditional methods of manufacturing, time is not far away when all our non-renewable sources of energy will be exhausted. Moreover, the traditional methods of manufacturing will affect our ecosystem, environment negatively and also give less productivity than digital intelligent and sustainable manufacturing methods. The implementation of artificial intelligence in the automotive industry, aviation sector, medical and pharmaceutical, food and sports industries etc. has revolutionized their development.

Sustainable manufacturing is also called green manufacturing or sustainable production which is based on a holistic approach for creating products with the aim to reduce negative impact on environment, society and economy. The current education system has led to the advancement of digital manufacturing technology. These technologies are easily deployable and capable of sustainable production.

Sustainability can be easily achieved by effective utilization of current technologies like the Internet of Things (IoT), Big Data, Artificial Intelligence (AI), Machine Learning (ML), Additive Manufacturing (AM) etc. by making people aware about these technologies through education. Proper understanding can be developed among people so that they will know pros and cons before implementing these modern technologies in manufacturing. Through proper education, people can be forced to use these technologies ethically and for the betterment of mankind. These technologies provide services at very low cost as there is optimum use of energy and less wastage. Manufacturers always look for ways which can reduce the operating cost of different production processes. Manufacturers are optimizing their manufacturing systems by adopting sustainability 4.0 technologies. Such technologies through proper education guide the manufacturers in selecting best facilities and employees, reducing cost of operations, effective utilization of resources and productivity with aim to reduce process gaps.

Objectives

In the present study, an attempt has been made to critically review the studies find:

- a. Explore the Development of Intelligent and Sustainable Manufacturing through Education.

- b. Role of Intelligent and Sustainable Manufacturing processes and systems for Environment Sustainability.

Methodology

The application, implications, recommendations and conclusions highlighted with regard to Intelligent and Sustainable Manufacturing processes in the present paper are based on the research studies published in journals, books, newspapers and websites.

Literature Review

The literature was reviewed from different studies and papers published to study the Development of Intelligent and Sustainable Manufacturing through Education and found that integration of business processes are very important for companies. There is an urgent need to collect and analyze large amounts of data (big data) to improve their processes. In this study the main focus was the use of big data for corporate environmental management (Beier, Kiefer and Knopf, 2022). Sustainability is a need and challenge in the modern world. The development of smart technologies can make manufacturing systems sustainable. It was studied that Blockchain technology of information technology can help to achieve sustainability in businesses and industries. It was also found that using blockchain for sustainable manufacturing can remove potential barriers to achieve sustainability in manufacturing systems and for the product lifecycle management (Leng, Ruan, Jiang, Xu, Liu, Zhou and Liu, 2020).. The development of sustainable products and processes are very important for manufacturers to survive in a competitive market as well as in industry 4.0. Their activities must be according to goals of sustainable development. The sustainable practices are difficult to implement in the supply chain because of globalization, outsourcing, and offshoring. These problems can be handled with the help of Blockchain technology and it was found that blockchain can lead to sustainability by developing transparency, traceability, information sharing in real time, and providing security of data (Khanfar, Iranmanesh, Ghobakhloo, Senali and Fathi, 2021).

Intelligent manufacturing can lead to better quality, increase productivity, low cost, and flexibility in manufacturing. In the study it was found that the digital twin technology can be used for intelligent manufacturing to get to know about intelligent manufacturing systems in real-time and to determine its failures (He and Bai, 2021). The development of manufacturing systems is influenced by change in products, technology, business strategies and production. In the study, the future of Adaptive Cognitive Manufacturing System (ACMS) for development of research, education, and work was studied with respect to development of manufacturing systems (ElMaraghy, Monostori, Schuh and ElMaraghy, 2021).

The digital revolution has created opportunities and problems for manufacturing industries. In the present study, Industry 4.0 technology impact on sustainable manufacturing

and circular economy was studied (Bag and Pretorius, 2022). Digital technological developments are based on artificial intelligence (AI) technology and can impact our energy supply, trade, and consumption. The power grids are controlled by smart software which affects decision-making and operations. The current study showed that AI can lead to better controllability, handling of Big Data, prevention of cyber attacks, use of smart grid, IoT and robotics, optimization of energy efficiency etc. over traditional method (Ahmad, Zhang, Huang, Zhang, Dai, Song and Chen, 2021). Digitalization provides big data which can benefit society and the environment. The smart systems along with the internet of things can resolve issues mentioned in the United Nations Sustainable Development Goals (SDGs) for equitable, sustainable environment, and healthier society. Smart technologies with their further integration can lead to sustainable food production, portability of clean and safe potable water and green energy production. Digital and sustainable manufacturing practices can solve the problems of planet biodiversity and climate change (Mondejar, et. al, 2021).

Role of Education in Development of Sustainable Intelligent & Manufacturing System

The intelligent and Sustainable Manufacturing systems are the need of the hour in the present scenario when there is limited availability of natural resources. Use of Intelligent and Sustainable Manufacturing system has following benefits:

- a. **Optimization:** Use and integration of Intelligent and sustainable manufacturing systems reduces the wastage of resources because of real-time monitoring. There is also the possibility of recycling different resources which lead to optimization of production.
- b. **Efficiency:** Using Intelligent and smart systems for manufacturing can increase the energy efficiency of any manufacturing process by identifying the areas which leads to energy wastage.
- c. **Better Supply Chain system:** Use of Intelligent systems for integration of data can automate the process of supply and purchase of any manufacturing unit.
- d. **Production planning and quality control:** Integration of Intelligent and sustainable manufacturing systems can lead to better planning of production and quality of product.
- e. **Sustainable Environment:** Use of Intelligent and integration of Intelligent and sustainable manufacturing systems can reduce waste, pollution etc. and conserve resources which is a must for a sustainable environment.

The development of Intelligent and Sustainable Manufacturing systems can also lead to better flexibility and adaptability of manufacturing process and its products, cost reduction etc. but all these benefits are not possible if the role of education system in promoting sustainable practices and environmental consciousness is not considered. The contribution of education in development of Intelligent and Sustainable Manufacturing system is as follows:

- a. **Need of Sustainability:** Education makes human beings aware about the need of sustainability. Education helps people to understand the gravity of the situation i.e. there is an immediate need of saving natural resources for our future generation. The different educational programmes at different levels of education can help in developing awareness about the development of intelligent and sustainable manufacturing systems which can save our depleting resources.
- b. **Environment consciousness:** Education can play an important role in developing environment consciousness among the people of the world. The importance of the environment for the sustainability of human beings can be generated by educating people about degrading the environment and further suggesting measures for environmental sustainability.
- c. **Research and development:** Education can lead to research in various fields which is helpful in the development of Intelligent and Sustainable systems which can save resources, time, cost etc.
- d. **Skills and Training:** Through different educational and training programmes, people can be trained to develop skills which can be helpful for integration of modern technologies with traditional methods which can lead to sustainability.

Conclusion

From this study it can be concluded that Humans have been exploiting nature for his needs which is a matter of great concern due regular depletion of our natural resources and increase in pollution. To address these concerns, there is a need for integration and development of Intelligent and Smart Manufacturing systems with traditional methods of production. These developments can reduce wastage of resources, cost of production, pollution etc. which will automatically lead to sustainable growth and development. The development of new technologies and their integration is only possible with the help of education which can help in research and development of Intelligent and Sustainable Manufacturing systems. Education promotes and enhances the understanding, knowledge, skills and values in an individual which is fundamental for any development and sustainable environment.

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OVERCOMING THE STRUCTURAL BARRIERS: TRANSITIONING FROM SINGLE STREAM COLLEGES TO MULTIDISCIPLINARY INSTITUTIONS

Amanpreet Kaur*

Abstract

The National Education Policy (NEP) 2020 outlines a transformative approach to higher education in India, advocating for a shift from rigid, single-stream educational models to more flexible, multidisciplinary institutions. This paper discusses the structural barriers faced by single-stream colleges in transitioning to multidisciplinary institutions and suggests strategies for overcoming these challenges. The study focuses on governance, curriculum design, faculty preparedness, infrastructure, and assessment systems. By addressing these key issues, this paper supports NEP 2020's vision of fostering holistic, interdisciplinary, and student-centered education.

Keywords: NEP 2020, multidisciplinary, higher education, student- centered

Introduction

The NEP 2020 aims to revolutionize India's higher education system by promoting interdisciplinary education and integrating multiple disciplines within academic institutions (Ministry of Education, 2020). However, transitioning from single-stream colleges to multidisciplinary institutions presents several structural challenges, such as outdated governance models, rigid curricula, and insufficient faculty development. Addressing these challenges is crucial for fulfilling the objectives set by NEP 2020, which emphasizes flexible, broad-based learning to prepare students for diverse careers. This paper explores the structural barriers to transitioning to multidisciplinary institutions and provides suggestions for overcoming these obstacles, ensuring that institutions can effectively adapt to NEP 2020's goals.

Understanding the Shift: From Single-Stream to Multidisciplinary Education

Multidisciplinary education integrates knowledge from various fields, fostering creativity, critical thinking, and problem-solving skills. These qualities are increasingly important for

* Assistant Professor, Khalsa College of Education, G.T. Road, Amritsar

students in today's interconnected, globalized world (Reddy, 2021). NEP 2020 emphasizes the need for higher education institutions to transition from specialized, single stream models to flexible, multidisciplinary ones. This would allow students to explore a variety of subjects and develop a holistic skill set (Jha, 2020). However, this transition is not without challenges. According to Ghosh (2020), the current structure of Indian colleges is largely based on traditional, discipline-specific teaching, which limits students' exposure to diverse fields.

Structural Barriers to Transitioning

- **Governance and Administrative Structures:** The governance structures of many single-stream colleges are based on traditional department models, where each academic department operates independently. This creates barriers to interdisciplinary collaboration, as departments are often more focused on their own disciplines than on fostering cross-departmental cooperation (Das and Gupta, 2020). To facilitate the shift toward multidisciplinary education, colleges need to reorganize their governance systems to promote collaborative decision-making and leadership (Ministry of Education, 2020). This approach would align with NEP 2020's call for more integrated institutional structures (Sharma and Patel, 2021).
- **Curriculum Design and Flexibility:** Traditional curricula in single-stream colleges are often rigid, focusing primarily on specialized subjects. NEP 2020 encourages institutions to offer flexible curricula that allow students to take courses from different disciplines, fostering a more holistic and integrated approach to learning (Singh and Kumar, 2021). The challenge lies in designing such curricula, as many colleges lack the resources or expertise to integrate multiple disciplines effectively. To address this, colleges can create flexible, modular curricula that allow students to choose electives across disciplines, providing a broad-based education. Additionally, the incorporation of liberal arts into specialized fields, as suggested by Reddy (2021), could enable students to engage in more well-rounded learning experiences.
- **Faculty and Pedagogical Preparedness:** Faculty members in single-stream colleges often lack the skills or training necessary for interdisciplinary teaching. Many educators are experts in one particular field and may find it difficult to teach courses that span multiple disciplines (Jain, 2022). Addressing this issue requires robust faculty development programs aimed at equipping educators with the skills needed to teach interdisciplinary courses. Faculty training programs should focus on collaborative teaching methods, interdisciplinary curriculum design, and strategies to encourage critical thinking (Sharma, 2021). Moreover, interdisciplinary research should be promoted to help faculty members broaden their knowledge and engage in collaborative academic endeavors (Singh and Kumar, 2021).

- **Infrastructure and Technological Support:** The infrastructure of traditional, single-stream colleges is often designed to support specific disciplines, such as science labs or humanities libraries. Transitioning to a multidisciplinary model requires the reconfiguration of physical spaces to support cross-disciplinary teaching and collaboration (Business Standard, 2021). Additionally, digital infrastructure is essential to facilitate multidisciplinary education. Online platforms, learning management systems (LMS), and digital collaboration tools can enable students and faculty to engage with a variety of subjects, even beyond the confines of the physical classroom (Financial Express, 2021).

Strategies to Overcome Structural Barriers

- **Curriculum Reform and Integration:** To transition to a multidisciplinary model, colleges must redesign their curricula to allow students to engage in interdisciplinary learning. This could involve offering elective courses from different disciplines, creating project-based learning opportunities, and integrating liberal arts education into technical programs (Ghosh, 2020). Modular courses that allow students to select subjects outside their main field of study would also foster a broader learning experience, in line with NEP 2020's goals (Reddy, 2021). Choudhury and Soni (2024) suggest that the introduction of cross-disciplinary project work can further strengthen the integration of subjects across the curriculum.
- **Faculty Empowerment and Development:** Faculty development programs are essential for preparing educators to teach across disciplines. These programs should include training in interdisciplinary teaching methodologies, collaborative research, and curriculum development (Jain, 2022). Encouraging faculty members to pursue interdisciplinary research will also help enhance their teaching and contribute to the overall educational experience (Sharma and Patel, 2021). Increased collaboration with industry experts in faculty training (Reddy and Singh, 2023) is recommended to expose faculty to current industry practices and real-world applications across disciplines.
- **Technology and Infrastructure Investment:** Investing in technology and infrastructure is vital to support the shift to multidisciplinary education. Colleges should create flexible learning spaces that foster collaboration, including multimedia classrooms and project-based labs. Moreover, institutions should invest in digital tools and platforms that enable students and faculty to engage with courses, materials, and peers across different fields (Business Standard, 2021; Financial Express, 2021). Institutions should also consider virtual classrooms and global academic exchanges (Kumar and Sharma, 2023) to further enhance global learning experiences and resource sharing.
- **Emphasis on Experiential Learning:** Experiential learning, through internships, fieldwork, and project-based assignments, is a key strategy to ensure that multidisciplinary

education is practical and grounded in real-world scenarios. This hands-on approach allows students to integrate theoretical knowledge from multiple disciplines and apply it to solve real problems (Jain and Sharma, 2024). Establishing industry-driven curriculum design (Soni, 2024) that includes case studies and real-life challenges will further enhance the interdisciplinary approach and prepare students for the job market.

- **Continuous Assessment and Feedback Mechanisms:** The transition to multidisciplinary education requires a shift in how students are assessed. Traditional exam-based assessments need to be complemented with continuous assessment methods such as project evaluations, peer reviews, and practical applications that encourage cross-disciplinary learning. Feedback mechanisms should be designed to help students understand the real-world relevance of what they are learning and how it applies to various fields (Singh and Kumar, 2021). Introducing peer-to-peer and cross-disciplinary assessment (Sharma, 2025) systems will help foster collaboration among students and enable them to see how knowledge from different domains can intersect.

Conclusion: The Path Forward

The transition from single-stream colleges to multidisciplinary institutions, as envisioned in NEP 2020, requires overcoming significant structural barriers. These include challenges in governance, curriculum design, faculty preparedness, and infrastructure. However, by reforming governance structures, redesigning curricula, investing in faculty development, enhancing infrastructure, and focusing on experiential learning, collaborative partnerships, and continuous assessments, institutions can create a more flexible, integrated educational environment. This transformation will not only align with NEP 2020's goals but will also provide students with the interdisciplinary education needed to thrive in an increasingly complex and dynamic world.

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12

TRANSFORMING SINGLE-STREAM COLLEGES INTO MULTIDISCIPLINARY INSTITUTIONS: CHALLENGES AND OPPORTUNITIES

Dr. Anjana Bisht*

Abstract

With the growth of single-stream institutions, the learning opportunities got narrowed over the centuries. Bound by the rigid disciplinary boundaries, many higher education institutions are domain-specific, stand-alone colleges and universities. With globalization, education is undergoing a massive transformation. Also, transformation is needed due to issues like mushroom growth of mono-field institutions, limited research funding, fake educational institutions, etc. The Indian tradition of knowledge (Bhartiya Gyan Parampara) transmission emphasizes the importance of holistic learning and the interconnectedness of all knowledge. It views knowledge (Gyan) as unified, rather than a collection of separate disciplines. Acknowledging the importance of a multidisciplinary approach in education, the government of India has introduced and implemented several initiatives (such as, PARAKH, MERUs, SWAYAM etc.) to foster a holistic academic excellence. The NEP 2020 is introduced to reform the education system and to encourage educational institutions to evolve into multidisciplinary institutions from traditional single-stream colleges. This shift is driven by the need to make India a global knowledge superpower and to provide students with a holistic education, foster interdisciplinary research, and prepare graduates for an increasingly complex, interconnected, and pluralistic world. In this article, we will explore the challenges and opportunities associated with transforming single-stream colleges into multidisciplinary institutions.

Key Words: Multidisciplinary, Higher Education, Single-Stream Colleges

Introduction

Aano Bhadra Krtavo Yantu Vishwatah (Let noble thoughts come to us from all directions). The verse from **the Rigveda** beautifully encapsulates the spirit of openness, inclusivity, and the pursuit of knowledge. It incites us to be open-minded and welcome wisdom from wherever it may come. Holistic education needs to flourish in a well-integrated manner, refining and cultivating all the capacities, i.e., social, mental, and emotional. Bhartiya Gyan

* Assistant Professor, Shri Guru Ramdas College of Education, Halwara, Ludhiana

Parampara, or the Indian way of learning & acquiring knowledge, has always been liberal and multidisciplinary. The rich tradition of the multidisciplinary approach has existed for ages, as exemplified by the ancient institutions such as Nalanda, Sharada Peeth, Takshashila, Vikramashila, Valabhi, etc. These institutions were centres of intellectual and cultural exchange. They made significant contributions to various fields of knowledge, including philosophy, medicine, astronomy, mathematics, literature, music, and art etc. Over the period proliferation of single-stream colleges has resulted in limited learning opportunities, which have become increasingly restrictive. Several single-stream institutions in disciplines like education, engineering, management, law, etc., exist in proximity. However, due to rigid disciplinary boundaries and lack of collaboration, these institutions deprive learners of the opportunities of multidisciplinary learning. To reform such an education system, NEP 2020 suggests several policy directions to evolve into multidisciplinary education. Based on these recommendations, the UGC Expert Committee has prepared a document on “Guidelines for Transforming Higher Education Institutions (HEIs) into Multidisciplinary Institutions.” The aim is to develop an individual in an integrated manner, thereby contributing directly to the transformation of the country and making India a global knowledge superpower. The establishment of large multidisciplinary higher institutes of learning in or near every district by 2030 is one of the most significant recommendations in the NEP 2020.

The UGC constituted a committee under the chairmanship of Prof. R. P. Tiwari to enable the transformation of higher institutes of learning into multidisciplinary institutions. The committee has suggested multiple ways, such as collaboration, merging, and clustering between institutions, to achieve the characteristics of a multidisciplinary institution. Despite sincere efforts to put a multidisciplinary approach into practice, it has its own set of difficulties, like lack of infrastructural facilities, lack of employment-oriented, innovative multidisciplinary curriculum, lack of qualified faculty across diverse disciplines, lack of faculty enrichment and training programs, resistance to change or adapting to changing demands, etc. However, cooperation, collaboration, and involvement of all stakeholders will resolve these difficulties. An ambitious policy of NEP, 2020, is to phase out the stand-alone, fragmented, and domain-specific higher education sector in India. The implementation of this ambitious and visionary policy has several challenges and opportunities, which are discussed below.

Challenges in Transforming Single-stream Colleges into Multidisciplinary Institutions:

- 1. Curriculum Redesign:** One of the primary challenges is redesigning the curriculum to incorporate multiple disciplines. This requires a significant overhaul of the existing curriculum, which can be time-consuming and resource-intensive. Hence, existing curricula to incorporate interdisciplinary approaches and course flexibility can be challenging. Traditional assessment methods also need to be redesigned, as they will

not be suitable for evaluating a multidisciplinary teaching-learning approach. Apart from this, transformation will arise many administrative challenges, as managing multidisciplinary institutions will lead to administrative complexities.

- 2. Faculty Development:** Faculty members may need training to teach interdisciplinary courses, which can be a challenge, especially for those who are accustomed to teaching within their specialized discipline. Ensuring and maintaining quality across diverse subject areas or disciplines will also be difficult due to a lack of qualified faculty or faculty development programs.
- 3. Regional Disparities:** In a multilingual and multicultural country like ours, regional disparities will impact access to quality multidisciplinary education. Thus, there are chances of institutional and cultural resistance.
- 4. Infrastructure and Resources:** Multidisciplinary institutions require state-of-the-art infrastructure, including laboratories, libraries, sports equipment, playgrounds, technology facilities, etc. Upgrading existing infrastructure and allocating resources can be a significant challenge, both in terms of time and money.
- 5. Accreditation and Regulatory Frameworks:** Complying with complex accreditation and regulatory frameworks or requirements poses a significant obstacle. This can be a hurdle in the transformation process.
- 6. Resistance to change or adapt to changing market demands:** There may be resistance from academic, non-academic staff as well as students and various other stakeholders to accept the change. As transformation means leaving the comfort zone. Thus no one will easily accept being disturbed from the established setting.
- 7. Fear of unemployability:** Transforming single-stream colleges into multidisciplinary institutions will give rise to the fear of unemployability. There are chances that many single-stream colleges may not sustain this transformation and will be closed or rendered non-functional in the future. Now the question arises: What will happen to the resources (human & non-human) of such institutions? How will the problem of unemployment generated due to this transformation be addressed? Apart from this, what will be the impact of this transformation on the stakeholders of existing single-stream institutions and how will they react to such transformation?
- 8. Challenges due to multiple entry and exit options:** To enhance the employability and skill development, multiple entry & exit options are proposed. This poses several challenges, such as, lack of qualified vocational faculty or trainers, lack of coordination and collaboration among various stakeholders (such as, industry, government, community etc.) involved in the design, delivery, and assessment of vocational education. The varied curriculum, duration, certification across the institutions will also affect quality assurance of the vocational courses and programmes.

Opportunities in Transforming Single-Stream Colleges into Multidisciplinary Institutions:

Despite various challenges in transforming single-stream colleges into multidisciplinary institutions, it creates various social and economic opportunities. It also provides opportunities to enhance inclusive education, innovation, research etc. in the higher education sector in India.

- 1. Interdisciplinary Research:** It will enhance the academic collaboration between institutions and will provide a unique opportunity for faculty members and students to engage in interdisciplinary research activities and capacity-building programs, leading to innovative solutions and new knowledge. Thereby strengthening the role of higher education in social and community services.
- 2. More inclusive and equitable education:** Transformation will create a more inclusive and equitable educational system to cater to the diverse needs, interests, and aspirations of the learners as well as stakeholders.
- 3. Collaboration and Communication:** Transforming single-stream colleges into multidisciplinary institutions will encourage collaboration and communication among faculty members, administrators, students, and stakeholders to ensure a smooth transition and to influence the potencies of diverse disciplines.
- 4. Faculty Development:** Transformation to multidisciplinary institutions will provide faculty members with training and resources to develop their interdisciplinary teaching and research skills.
- 5. Holistic Education:** By incorporating multiple disciplines, institutions can provide students with a holistic education, enabling them to develop a broader perspective and a more nuanced understanding of complex issues. Also facilitate the restructuring of degree programs to include skill courses, internships, etc.
- 6. Enhanced Employability:** It will enhance employability as multidisciplinary institutions will be better equipped to offer a wide range of skills and training programs. Graduates from multidisciplinary institutions will have a broad range of skills and knowledge. Thus, making students more employable.
- 7. Community Engagement:** Multidisciplinary institutions are the need of the hour not only to face complex challenges but also to foster stronger community engagement. These institutions will attract students from diverse backgrounds, fostering a more inclusive and vibrant campus. Collaboration with local communities can create positive social impact. Similarly, collaboration with industry to provide expertise and internship opportunities to enhance the relevance of multidisciplinary programs. Hence, transforming single-stream colleges into multidisciplinary institutions will develop critical thinking and analyse information from different

perspectives. It also enhances problem-solving skills, as learners learn to apply knowledge from different disciplines and connect them to real-world issues.

- 8. Optimal Resource Allocation:** By fostering a culture of innovation and entrepreneurship, multidisciplinary institutions can create economic opportunities and jobs. They can attract funding from a wider range of sources, such as government agencies, industries, philanthropic organizations, and various other stakeholders, etc.
- 9. Consolidation of Resources:** Collaboration with industries and consolidation of resources from different disciplines can lead to efficient use of infrastructure, such as libraries, laboratories, playgrounds, sports equipment, e-resources, etc. It will resolve the problems of resource crunch. Apart from this, resource consolidation will ease collaboration beyond geographical boundaries. It can also adopt sustainable practices and green technologies, reducing its environmental footprint. In other words, to cater to the problems of resource allocation and resource crunch and to make the best utilization of available infrastructural resources, multidisciplinary institutions are the need of the hour.

Conclusion

Single-stream colleges and multidisciplinary institutions are two different types of educational institutions that vary in their approach to education, curriculum, and research. Transforming single-stream colleges into multidisciplinary institutions is a complex process that presents both challenges and opportunities. Despite various challenges, a multidisciplinary approach has the potential to transform the education system. It can create a more holistic and inclusive learning environment. A multidisciplinary approach has the potential to develop a broader perspective and a more nuanced understanding of complex issues that prepare the learners for the challenges and opportunities of the rapidly changing world. This approach allows researchers to transcend disciplinary boundaries and empower them to explore novel frontiers, driving innovation, thereby ushering in a new era of academic excellence.

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NEP 2020 AND THE FUTURE OF HIGHER EDUCATION: THE CASE FOR MULTIDISCIPLINARITY OVER SINGLE-STREAM COLLEGES

Dr. Gurpal Singh Rana* & Varun Bharti**

Abstract

The National Education Policy (NEP) 2020 marks a transformative shift in India's higher education landscape by advocating for the transition from single-stream institutions to multidisciplinary universities. This paper critically examines the five key drivers of this transformation: holistic and multidisciplinary learning, enhanced research opportunities, addressing rigid disciplinary separations, preparing students for future job markets, and increasing the Gross Enrolment Ratio (GER). By fostering interdisciplinary collaboration, research-driven education, and industry-academia partnerships, NEP 2020 aims to equip students with adaptability, critical thinking, and problem-solving skills. The study underscores the need for policy implementation strategies, institutional restructuring, and digital learning integration. Future research should explore the long-term impact of these reforms on employability, innovation, and India's positioning as a global knowledge hub.

Keywords: multidisciplinary education, single-stream colleges, holistic learning, Higher Education Institutions (HEIs), interdisciplinary research, Gross Enrolment Ratio (GER)

NEP 2020 and the Future of Higher Education: The Case for Multidisciplinary over Single-Stream Colleges

“Single-stream HEIs will be phased out over time, and all will move towards becoming vibrant multidisciplinary institutions or parts of vibrant multidisciplinary HEI clusters, in order to enable and encourage high-quality multidisciplinary and cross-disciplinary teaching and research across fields.” (NEP 2020, Section 10.11).

Introduction

The aforementioned excerpt from the National Education Policy (2020) 65-page

* Principal, Young Scholars College, Barnala, Punjab

** Director, Young Scholars Group of Institutes, Barnala, Punjab

draft underscores the progressive transformation of higher education, wherein the rigid demarcation of single-stream institutions is gradually being dismantled. This shift paves the way for dynamic, multidisciplinary academic ecosystems that promote innovation, adaptability, and cross-disciplinary collaboration—critical components in addressing the multifaceted global challenges of the 21st-century knowledge economy. The transformation of Higher Education Institutions (HEIs) is a critical step toward aligning academic structures with the demands of the changing times. Recognizing the limitations of single-stream colleges, the NEP 2020 emphasizes the need to phase them out in favor of multidisciplinary institutions. This transition is expected to enhance holistic learning, interdisciplinary research, and student preparedness for future job markets. By fostering collaboration across diverse fields, multidisciplinary institutions aim to equip students with the critical thinking, adaptability, and problem-solving skills necessary for an evolving global landscape.

NEP 2020 identifies five key drivers for this structural transformation in higher education. First, holistic and multidisciplinary learning ensures the development of intellectual, aesthetic, social, and emotional competencies, creating well-rounded individuals. Second, enhancing research opportunities and interdisciplinary innovation fosters collaboration across domains, leading to breakthrough advancements in knowledge and technology. Third, addressing the rigid separation of disciplines mitigates early specialization constraints, allowing students greater flexibility in choosing academic paths. Fourth, preparing students for future job markets by aligning curriculum with emerging technological trends, such as artificial intelligence and data science, ensuring industry relevance. Finally, increasing the Gross Enrolment Ratio (GER) and access to quality higher education expand learning opportunities, particularly in underrepresented regions, thereby promoting educational equity.

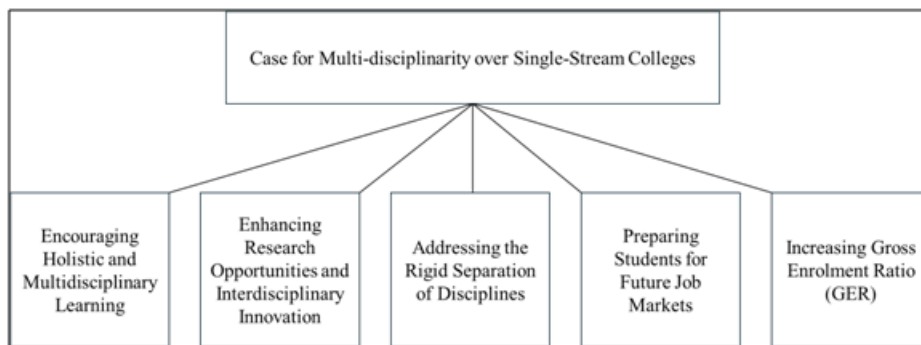


Figure 1

Key Drivers of Structural Transformation in Higher Education: NEP 2020 Framework

This paper critically examines these five key drivers of structural transformation in orientation of HEIs, drawing from University Grants Commission (UGC), All India Council for Technical Education (AICTE), National Assessment and Accreditation Council (NAAC),

and the Ministry of Education (MoE), among other authoritative sources, to investigate the reasoning provided in favour of this transition. By analysing policy directives, institutional strategies, and global benchmarks, it aims to establish a comprehensive framework for the successful implementation of multidisciplinary education in India.

Definitions

A Single-Stream College is an educational institution that offers degree programs in only one broad academic discipline, such as arts, sciences, commerce, or engineering, without integrating multiple fields of study. These colleges are typically affiliated with a university and do not have the autonomy “to provide degree on their own and are necessarily have to be attached with a University/University level institution for the purpose of awarding degree” (Ministry of Education, Government of India, 2011, Annexure-III) on the other hand, a Multidisciplinary Institution is a higher education entity that integrates multiple fields of study, allowing students to engage in holistic and flexible learning. As per the Ministry of Education, Government of India, multidisciplinary institutions combine sciences, social sciences, humanities, and professional disciplines to foster “intellectual, aesthetic, social, physical, emotional, ethical and moral facets of an individual in an integrated manner, thereby contributing directly to transformation of the country and making India a global knowledge superpower” (Ministry of Education, 2022, para. 2).

Explanation of the Title

The title of this paper highlights the policy-driven shift toward a flexible, interdisciplinary learning model. NEP 2020 envisions the phasing out of single-stream HEIs to create vibrant multidisciplinary institutions that foster holistic education, research, and innovation.

This transformation is necessary to bridge the gap between traditional academic structures and modern workforce demands especially with the arrival of modern-day technologies. Multidisciplinary institutions enable students to engage in cross-domain learning, develop critical thinking skills, and adapt to emerging global challenges. By increasing the GER and promoting industry-academia collaboration, this transition seeks to position India as a global knowledge hub in the current century.

NEP 2020 and The Future of Higher Education

NEP 2020 envisions a transformative shift in India’s higher education landscape, aiming to create a globally competitive and knowledge-driven society. Central to this vision is the transition from single-stream colleges to multidisciplinary institutions, fostering holistic learning, interdisciplinary research, and innovation. This emphasizes the importance of the “Citizen’s Charter of Higher Education” (Ministry of Education, 2022) in striving to fully realize India’s human resource potential in the higher education sector, with a focus on both equity and excellence. This sentiment is reflected in the current UGC Chairman’s message,

which vows to support the “aspirations of our universities to be world-class institutions” that nurture the next generation of talent and generate new knowledge for the benefit of both the nation and the world (University Grants Commission, n.d.).

The NEP recognizes that rigid specialization limits intellectual growth, and thus, it calls for integrating diverse disciplines sciences, social sciences, humanities, and vocational education into a unified educational framework and the case in point is well explained in a case study presented by a Vice Chancellor of Sai University where the set-up successfully tried “to integrate heretofore siloed programs in arts and sciences, technology, and law into an integral ecosystem at the undergraduate level” (Bharucha, 2024). In another noteworthy dimension of providing public good through private ownership, Khanna (2024) highlights the commendable role of Indian philanthropy in the establishment of three prestigious HEIs: Ashoka University in Sonapat, Haryana; Plaksha University in Mohali, Punjab; and Krea University in Sri City, Andhra Pradesh. These institutions are dedicated to fostering multidisciplinary learning environments, characterized by the creation of “multidisciplinary centres that are not siloed like departments” found in traditional academic structures. This approach reflects a progressive shift towards holistic education, aligning with contemporary global trends in higher education.

Multi-disciplinarity is essential for addressing real-world challenges, as effective solutions often require integrating knowledge across disciplines. The policy underscores the importance of dynamic learning environments that foster critical thinking, creativity, and adaptability, particularly in response to the evolving job market influenced by artificial intelligence, data science, and automation. Additionally, institutional restructuring aims to significantly enhance the GER, ensuring equitable access to quality education. Simultaneously, as per the latest NAAC announcement (February 10, 2025), and in accordance with the Dr. Radhakrishnan Committee’s recommendations, the performance assessment of HEIs will be conducted.

By emphasizing collaborative learning, research-driven pedagogy, and industry-academia partnerships, NEP 2020 sets the foundation for an inclusive, innovative, and future-ready higher education system. The transition from fragmented, single-discipline to multidisciplinary institutions is not merely an educational reform—it is a strategic national imperative that will shape India’s role as a global knowledge leader in the current century. Let us systematically examine each of the five drivers outlined in Figure 1 of the proposal individually.

Encouraging Holistic and Multidisciplinary Learning

“A holistic and multidisciplinary education would aim to develop all capacities of human beings intellectual, aesthetic, social, physical, emotional, and moral in an integrated manner.” (NEP 2020, Section 11.3).

This vision of education seeks to foster the comprehensive development of individuals

in a unified approach. This approach moves beyond rigid disciplinary boundaries, enabling students to acquire diverse skill sets that foster critical thinking, problem-solving, and adaptability. NEP 2020 envisions a transition from traditional subject silos to a more interconnected academic framework, where students can explore cross-disciplinary fields, blending arts, sciences, and vocational studies to enhance their learning experiences. Roy (2022) adopted a philosophical approach to research, seeking to analyze the philosophy of both education and life. The study emphasizes that education should not only contribute to the physical development of a child but also play a crucial role in fostering spiritual growth and well-being. Holistic education, as highlighted in the research, enables “students to differentiate the disciplines and provide regard and respect for all branches of education” thus in a way cultivating appreciation and respect for all fields of knowledge. NEP 2020 is closely aligned with the Sustainable Development Goals (SDGs) in HEIs. This alignment, as envisaged across the education spectrum in Radha & Arumugam (2023) work can be effectively realized by prioritizing interdisciplinary education, a framework that is increasingly being embraced by several higher education institutions across India.

Multidisciplinary learning addresses key workforce demands in an era shaped by artificial intelligence, automation, and data-driven decision-making. Education systems worldwide are increasingly designed to align with the demands of the new-age industrial revolution, emphasizing STEM disciplines Science, Technology, Engineering, and Mathematics. However, policy reforms must ensure equal emphasis across all fields, fostering greater flexibility in education. HEIs can leverage their multidisciplinary nature to attract private-sector collaborations, strengthening industry-academia partnerships for skill development and innovation and a study by Kaicker, Mathur, Kandula and Kaur, (2023) provided an example from Punjab where Chandigarh Group of Colleges, Landran has maintained strategic partnerships with Oracle, Dell Services, and Wipro, facilitating industry-integrated training programs thus readying students for better employment opportunities. This is a self-evident fact that employers today seek individuals who possess both deep expertise in a discipline and the ability to collaborate across fields. NEP 2020 supports this shift by introducing flexible curricular structures, an Academic Bank of Credits (ABC), and multiple entry and exit options to facilitate lifelong learning. Furthermore, by promoting experiential learning, research opportunities, and industry-academia collaboration, students gain practical insights that improve employability and innovation.

A significant feature of holistic education is its emphasis on socio-emotional development. The integration of ethics, teamwork, communication, and leadership skills ensures that students are not just academically proficient but also socially responsible and emotionally resilient. Shukla, Joshi, Sujatha, Beena and Kumar, (2022) is a significant study under the leadership of the Vice Chancellor of Amity University, exploring the impact of holistic and multidisciplinary education on career opportunities, as introduced in NEP 2020. The

research involved 52 focus group discussions with principals across India, analyzing their action plans for implementing these educational reforms. It highlighted Amity University's successful execution of NEP 2020 principles, including flexibility in curricula, industry-oriented courses, and mentorship systems and the same can be emulated by HEIs. NEP 2020 incorporates value-based education, competency-driven assessment models, and an emphasis on sustainability and environmental responsibility, preparing students for a dynamic and evolving world.

To implement holistic and multidisciplinary education effectively, institutions must create diverse learning environments. NEP 2020 advocates for the establishment of Multidisciplinary Education and Research Universities (MERUs), flexible credit transfer systems, and increased accessibility through online and distance learning. These reforms are designed to increase the GER close to 50% by 2035, ensuring inclusive and equitable education for all learners (Ministry of Education, 2024).

Enhancing Research Opportunities and Interdisciplinary Innovation

“Large multidisciplinary universities and colleges will facilitate the move towards high-quality holistic and multidisciplinary education.... Pedagogy will have an increased emphasis on communication, discussion, debate, research, and opportunities for cross-disciplinary and interdisciplinary thinking.” (NEP 2020, Section 11.6).

This vision of education visualises large multidisciplinary universities as pivotal institutions fostering high-quality holistic education through enhanced engagement, research, and interdisciplinary collaboration. This shift, from single-college to multidisciplinary HEIs, seeks to eliminate academic compartmentalization and foster collaborative research environments where knowledge from diverse disciplines converges to address global challenges. By integrating humanities, sciences, and technology, NEP 2020 promotes critical thinking, creativity, and problem-solving skills essential for research-driven innovation. NAAC has reinforced its commitment to research and innovation by emphasizing interdisciplinary and collaborative efforts, including publications and patents. These initiatives represent key transformative reforms aimed at enhancing the assessment and accreditation of HEIs, as outlined in the Dr. Radhakrishnan Committee Report.

An interesting example of a foreign study also adds to the case in point. Giltmier (2024) presented a compelling case study on John Martinson Honors College at Purdue University, highlighting the success of interdisciplinary education through visual documentation of campus programs and attendee testimonials. The study emphasizes an inclusive, team-based academic approach that fosters flexible, creative thinking by integrating diverse disciplines, promoting collaboration, and synthesizing expertise across fields within coursework, events, and institutional initiatives.

True to its nature, interdisciplinary research strengthens innovation and academic

excellence by encouraging scholars to engage in cross-domain collaborations. Studies also suggest that interdisciplinary teams enhance knowledge creation, improve research outcomes, and drive innovation in higher education. Additionally, collaborative research frameworks, such as joint faculty-student projects and industry-academia partnerships, improve knowledge application and research funding accessibility. NEP 2020 further advocates for establishing research clusters and research-intensive universities, ensuring that India's research ecosystem aligns with global standards. To uphold global research standards, corporate entities should be engaged in funding research initiatives from HEIs.

A study by Bi and Yang (2014) highlights the collaborative innovation platform, where resources such as funds, manpower, and equipment from state, industry, and society converge thus fostering economies of scale and reducing innovation risks. While interdisciplinary university research organizations involve diverse interests, they remain mutually compatible, enabling universities to secure financial support, commercialize research, and enhance scientific output. This collaboration advances technological research, talent cultivation, and institutional research capacity, reinforcing academic-industry synergy in a competitive global environment.

Moreover, structured research management methodologies play a crucial role in streamlining interdisciplinary research efforts. Studies indicate that formal research project management techniques improve research coordination, efficiency, and impact. By leveraging technology, digital tools, and collaborative learning models, institutions can bridge research gaps and facilitate innovative problem-solving. NEP 2020 underscores the necessity of interdisciplinary research frameworks that encourage faculty-student engagement and knowledge dissemination. Lynch and Bowen (2023) conducted a study on an interdisciplinary summer fellowship program focused on social innovation for graduate students in social work, business, humanities, and social sciences. Using qualitative and quantitative evaluations, the study found that the program's classroom instruction, field learning, and teamwork approach enhanced students' communication skills, practical application of academic concepts, and career trajectories, inspiring them to pursue careers dedicated to social progress and innovation.

To implement these reforms, NEP 2020 recommends greater research funding, global collaborations, and the establishment of specialized research institutions. By fostering a dynamic, research-driven ecosystem, multidisciplinary universities can significantly contribute to scientific progress, technological advancement, and economic growth.

Addressing The Rigid Separation of Disciplines

“Some of the major problems currently faced by the higher education system in India include:... (c) a rigid separation of disciplines, with early specialization and streaming of students into narrow areas of study.” (NEP 2020, Section 9.2).

This vision of education highlights the pressing challenges within India's higher education system, necessitating a transformative approach toward interdisciplinary learning and academic flexibility. Traditionally, students have been confined to specific academic streams, restricting opportunities for cross-disciplinary exploration. NEP 2020 aims to eliminate these barriers by encouraging multidisciplinary learning, flexible curricula, and academic mobility. Menon, Suresh and Raghu, (2022) emphasized the need for curriculum reforms to dismantle rigid academic silos in Indian higher education. Outdated curricula, traditional pedagogy, and low graduate employability necessitate agile academic strategies to align education with industry and societal needs. Institutional introspection can drive meaningful curricular transformations for future-readiness.

A group of international researchers Schijf, Van der Werf and Jansen, (2023) conducted a study on measuring interdisciplinary understanding in higher education at one of the largest comprehensive research universities in the Netherlands, with 32,000 students across all academic disciplines. As part of a longitudinal study on high-performing Bachelor's students, the Interdisciplinary Understanding Questionnaire (IUQ) was administered to 1,020 first-year students in 2019. The IUQ assessed knowledge of disciplinary paradigms, interdisciplinarity, critical reflection, communication, and collaboration skills using 27 self-reported items on a 5-point Likert scale. The findings provide a promising foundation for evaluating interdisciplinary education outcomes and excellence programs in higher education where students have multiple options to choose rather than limited learning opportunities.

These studies indicate that interdisciplinary education enhances creativity, problem-solving, and adaptability, enabling students to tackle complex global challenges. Many universities worldwide have adopted liberal education models, allowing students to combine sciences, humanities, and professional studies thus offering options according to their preference of interest. NEP 2020 supports similar initiatives, advocating for broad-based education in the first year of undergraduate programs, thereby preventing premature specialization. The policy also promotes credit transfer systems and multidisciplinary research, ensuring that students gain expertise across fields while pursuing their primary discipline. Kidron and Kali (2015) explore students' development of interdisciplinary understanding in higher education and propose technology-enhanced methods to support this process. Challenging traditional compartmentalization, pedagogy, and hierarchical expertise structures, they introduced the "Boundary Breaking for Interdisciplinary Learning (BBIL) model", which leverages technology to facilitate cross-disciplinary connections. Their study, involving 36 undergraduate students in an interdisciplinary online course, demonstrated significant improvements in interdisciplinary comprehension, highlighting the transformative potential of accessible digital tools in higher education.

Moreover, bridging academic disciplines fosters innovation and research collaboration. A study mentioned below on interdisciplinary learning environments revealed that students

exposed to project-based interdisciplinary education exhibit higher critical thinking and collaborative skills. Berasategi, Aróstegui, Jaureguizar, Aizpurua, Guerra and Arribillaga-Iriarte, 2020) examine the impact of interdisciplinary learning experiences using the case study method to enhance interdisciplinary thinking, participation, motivation, and collaboration among university students. The study involved student teams from Social Education, Primary Education, and Psychology, working on real-world interdisciplinary problems under the guidance of a diverse, interdisciplinary teaching team. Findings highlight the importance of structured interdisciplinary collaboration in fostering holistic problem-solving skills and preparing students for future socio-educational challenges. NEP 2020 supports institutional reforms that allow faculty and researchers to work across disciplines, enabling knowledge-sharing and deeper engagement with real-world issues.

To implement these reforms, NEP 2020 emphasizes establishing Multidisciplinary Education and Research Universities (MERUs), providing flexible course structures, and encouraging cross-institutional partnerships. By breaking disciplinary silos and fostering an interconnected learning ecosystem, India's education system can equip students with holistic competencies for the future workforce.

Preparing Students for Future Job Markets

“With various dramatic scientific and technological advances, such as the rise of big data, machine learning, and artificial intelligence, many unskilled jobs worldwide may be taken over by machines, while the need for a skilled workforce, particularly involving ... multidisciplinary abilities across the sciences, social sciences, and humanities, will be increasingly in greater demand.” (NEP 2020, Introduction Page 3).

This vision of education underlines the urgent need for education systems to prepare students for evolving job markets shaped by emerging technologies and AICTE “Revision of Model Curriculum” is a sure signpost of adopting the same into classroom teaching. The policy states that many unskilled jobs worldwide may be taken over by machines, while the need for a skilled workforce, particularly involving multidisciplinary abilities across the sciences, social sciences, and humanities, will be increasingly in greater demand. This shift necessitates a paradigm change in education, fostering flexible, industry-aligned curricula and skill-based learning approaches. Siddiky and Akter (2021) explored factors influencing students' career choices and job preparedness strategies, proposing a social-environmental theory of career decision-making. Analyzing data from 120 students at NSTU, Bangladesh, the study found career decisions were shaped by professional development opportunities in their HEI recommending career guidance initiatives to enhance students' employability.

An international research highlights the integration of interdisciplinary learning, digital literacy, and problem-solving skills in augmenting student employability in dynamic job markets. Rana, Galligan, Fard and McCredie, 2023) developed an employability embedding

framework for a three-year bachelor's program in an Australian university, integrating ePortfolios to assess and enhance graduate employability through a structured, scaffolded approach, supporting skill demonstration and career readiness in higher education. NEP 2020 promotes experiential learning, including internships, apprenticeships, and hands-on projects that bridge academic knowledge with practical application. By strengthening collaborations between industry and academia, students can develop critical thinking, analytical reasoning, and adaptability, essential for future employment. The ABC proposed in NEP 2020 allows students to pursue modular learning pathways, ensuring that they acquire relevant skills across disciplines and UGC notification dated 28th December, 2021 made it operational through a gazette notification.

Furthermore, automation and artificial intelligence are reshaping labor markets, increasing the demand for professionals proficient in data science, machine learning, and computational thinking. NEP 2020's multidisciplinary education model ensures that students are equipped with a diverse skill set rather than being confined to a single domain. Warrner (2023) examined how a university academic program adapted to enhance career readiness and employability skills ensuring students' workplace preparedness in a dynamic job market. Grant, Hanlon and Young, (2024) explored how workplace experiences enhance graduate employability, proposing a three-phased "Graduate Employability Cycle of Learning" where it examined preparation, experiential learning, and employability signaling, emphasizing higher education-industry collaboration to align academic disciplines with evolving workforce demands. This approach fosters lifelong learning, creativity, and adaptability, key traits for future employment in a rapidly changing economy.

To successfully implement these reforms, educational institutions must embrace digital learning, skill-based training, and research-driven education. NEP 2020 recommends enhancing vocational education, promoting entrepreneurship, and integrating emerging technologies into higher education. These strategic changes will prepare students to navigate the complexities of the Fourth Industrial Revolution and ensure India's competitiveness in the global job market.

Increasing Gross Enrolment Ratio (GER)

"The aim will be to increase the Gross Enrolment Ratio in higher education, including vocational education, from 26.3% (2018) to 50% by 2035." (NEP 2020, Section 10.8). This vision of education aims to transform India's higher education landscape by increasing the Gross Enrolment Ratio in higher education, including vocational education, considerably by 2035. This goal emphasizes expanding access to quality education, promoting lifelong learning, and ensuring equitable opportunities for students across socio-economic backgrounds. The All India Survey on Higher Education (AISHE) dashboard provides comprehensive statistics on India's higher education landscape, reporting 1,326 universities,

52,582 colleges, 16,456 standalone institutions, 121 R&D institutes, and 158 institutes of national importance, as retrieved from the portal on February 20, 2025. The Ministry of Education emphasizes increasing the GER in higher education by expanding institutional capacity, establishing new institutions, and incentivizing State Governments and NGOs focus on inclusion of marginalized communities, promoting women's and minority education, and addressing regional imbalances by setting up institutions in underserved areas (Ministry of Education, n.d.).

The similar voices echo internationally as well and ideas can be implemented here in Indian HEIs. Allais et al. (2020) examined Sustainable Development Goal Target 4 and its role in raising GER by analyzing higher education access, affordability, and quality in Ghana, Kenya, Nigeria, and South Africa, advocating for public-good contributions over conventional output-based metrics to ensure inclusive, equitable, and impactful tertiary education. NEP 2020 envisions a flexible and inclusive education system that incorporates online learning, open distance education, and vocational training to bridge the gap between traditional and modern learning models.

Research highlights that higher GER contributes to national economic growth, workforce development, and innovation. NEP 2020 proposes multidisciplinary institutions, credit-based learning frameworks, and multiple entry-exit systems to encourage higher participation in higher education. Moreover, industry-academia collaborations play a vital role in making higher education skill-driven, employment-oriented, and globally competitive. The policy also emphasizes strengthening vocational education through integrated skilling programs and community college models to create a job-ready workforce. Mittal et al. (2020) highlighted GER as a key education metric, advocating for reimagining higher education beyond traditional degrees by elevating vocational education's status, enhancing employment opportunities, and bridging blue- and white-collar education to strengthen national development and global competitiveness in an evolving workforce landscape. Joshi and Ahir (2019) highlight India's low GER of 25.8%, despite having the world's largest higher education network. They attribute this to equity, quality, and efficiency challenges, emphasizing the need for policy reforms to enhance global competitiveness, inclusivity, and employability in Indian higher education.

Anand and Lall (2022) provided a comprehensive analysis of Indian education policy, tracing its evolution from Nehruvian ideals to contemporary reforms. The study examines key policy shifts, the Kothari Commission, NEP 1986, post-1991 economic reforms, and privatization, highlighting access, equity, and quality challenges. It underscores state-private sector collaboration, the GER expansion, and the role of higher education in India's socio-economic transformation.

Additionally, technology-driven learning solutions are crucial for expanding higher education access. NEP 2020 promotes blended learning models, AI-driven adaptive

education, and digital infrastructure enhancements to cater to diverse student populations. The National Digital University (NDU) initiative is a key step toward scaling online education, making higher learning more accessible and flexible for students from remote and underserved regions. Furthermore, financial assistance programs, scholarships, and affirmative action policies ensure that marginalized groups receive equitable access to quality education.

To achieve a 50% GER by 2035, NEP 2020 calls for increased public investment, institutional autonomy, and global academic partnerships. By prioritizing equity, accessibility, and quality, India can reshape its higher education ecosystem to meet the demands of a rapidly evolving global economy.

Conclusion

The transformation of India's higher education landscape under NEP 2020 is a decisive step toward fostering multidisciplinary learning, innovation, and holistic student development. The five key drivers listed in Figure 1 holistic and multidisciplinary education, enhanced research opportunities, dismantling rigid disciplinary boundaries, workforce preparedness, and increasing GER serve as the foundation for this paradigm shift. By integrating diverse fields of study, bridging academia-industry collaborations, and promoting flexible curricular structures, multidisciplinary institutions will equip students with critical thinking, adaptability, and problem-solving skills essential for a dynamic global economy.

Future research should explore the efficacy of interdisciplinary education models in India, assess policy implementation challenges, and examine the long-term impact on employability and innovation. Additionally, studies on digital learning integration, AI-driven education, and global best practices can further enhance India's positioning as a global knowledge leader in higher education.

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TRANSFORMING SINGLE-STREAM COLLEGES INTO MULTIDISCIPLINARY INSTITUTIONS: CHALLENGES AND OPPORTUNITIES

Prerna Shukla**

Abstract

The transformation of single-stream colleges into multidisciplinary institutions is a crucial step toward fostering a holistic and integrated education system. This paper explores the challenges and opportunities associated with this transition. Key challenges include infrastructure development, faculty recruitment, curriculum redesign, regulatory approvals, and resistance to change. On the other hand, opportunities arise in the form of enhanced employability of graduates, interdisciplinary research prospects, improved institutional reputation, and increased student enrollment. The study also highlights policy frameworks and global best practices that can facilitate this transformation. The paper concludes with strategic recommendations for higher education institutions, policymakers, and stakeholders to ensure a smooth and sustainable transition toward multidisciplinary education.

Keywords: *Multidisciplinary education, single-stream colleges, higher education transformation, curriculum redesign, policy frameworks*

Introduction

The contemporary educational landscape is undergoing a significant shift, with an increasing emphasis on multidisciplinary learning. Single-stream colleges, which traditionally offer specialized education in a single discipline, are being encouraged to diversify their academic offerings. This transformation aligns with global trends and national education policies that prioritize holistic and integrated learning experiences.

The transition, however, presents both challenges and opportunities that require careful consideration and strategic planning.

Review of Literature

The transformation of single-stream colleges into multidisciplinary institutions has been explored in various academic and policy-oriented studies. According to the National Education

* Department of Commerce, Young Scholars College, Barnala

Policy (NEP) 2020, multidisciplinary education enhances critical thinking, innovation, and adaptability among students. Studies by Altbach and Knight (2007) emphasize the role of globalization in shaping higher education, advocating for interdisciplinary approaches to meet evolving market demands. Additionally, Marginson (2016) discusses how universities worldwide are shifting toward multidisciplinary models to improve research output and institutional rankings. Empirical research by Mishra (2021) highlights that institutions adopting multidisciplinary frameworks report higher student engagement and better employment outcomes. Despite these benefits, scholars such as Singh and Kumar (2019) note structural and financial constraints as major barriers to transformation. These findings underscore the need for strategic policy interventions and institutional restructuring to facilitate a smooth transition.

Research Methodology

Survey Design- This study employs a survey-based primary data collection method to assess teachers' perspectives on transforming single-stream colleges into multidisciplinary institutions. The survey was conducted among 50 faculty members from various institutions to gauge their opinions on the benefits, challenges, and readiness for this transition.

- General perception of multidisciplinary education
- Key benefits and challenges
- Institutional preparedness
- Need for faculty training
- Policy and administrative support

Sample Selection

- The sample consisted of **50 teachers** from different higher education institutions.
- Participants were selected through **random sampling** to ensure diversity in responses.
- The survey was conducted both online and offline.

Findings and Discussion

Support for Transformation

- **85% (42 teachers)** believe the transition is beneficial.
- **10% (5 teachers)** were neutral.
- **5% (3 teachers)** were against the transition due to concerns over faculty workload and institutional challenges.

Perceived Benefits

- **80% (40 teachers)** highlighted increased student opportunities as a key benefit.
- **65% (32 teachers)** saw better research collaborations as a major advantage.
- **60% (30 teachers)** mentioned enhanced institutional reputation.
- **50% (25 teachers)** believed job prospects for students would improve.

Major Challenges Identified

- **72% (36 teachers)** cited infrastructure limitations as a significant hurdle.
- **60% (30 teachers)** pointed to faculty workload as a key concern.
- **50% (25 teachers)** identified regulatory and accreditation hurdles.
- **40% (20 teachers)** raised concerns about the need for extensive curriculum redesign.

Institutional Preparedness

- **40% (20 teachers)** felt their institution was somewhat prepared.
- **35% (17 teachers)** believed they are not prepared for the transition.
- **25% (13 teachers)** said their institution is fully prepared.

Faculty Training Needs

- **75% (38 teachers)** agreed that additional training is required.
- **15% (8 teachers)** were unsure.
- **10% (4 teachers)** believed existing faculty expertise is sufficient.

Chi-Square Analysis

To examine the relationships between key variables, a **Chi-Square test of independence** was conducted:

- **Hypothesis 1:** Faculty support for transformation is independent of institutional preparedness (**p-value < 0.05**). Teachers from institutions perceived as prepared were more likely to support the transition.
- **Hypothesis 2:** Faculty training needs are independent of support for multidisciplinary education (**p-value < 0.05**). Teachers who supported multidisciplinary education were more likely to advocate for additional training programs.
- **Hypothesis 3:** Workload concerns and readiness for change are independent (**p-value > 0.05**). Faculty members concerned about workload had mixed views on institutional readiness.

The survey results provided valuable insights into faculty perspectives on transitioning single-stream colleges into multidisciplinary institutions. Key findings include faculty support, perceived benefits, major challenges, institutional preparedness, and faculty training needs.

Conclusion

The findings suggest that while most faculty members support the transition to a multidisciplinary institution, they recognize significant challenges that need to be addressed. Key recommendations include investing in faculty development programs, improving infrastructure, ensuring regulatory support, and fostering industry-academic collaborations. The study underscores the importance of a strategic, phased approach to ensure a smooth transition that benefits both faculty and students alike.

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TRANSFORMING SINGLE-STREAM COLLEGES INTO MULTIDISCIPLINARY INSTITUTIONS: CHALLENGES AND OPPORTUNITIES

Shivam Sharma* & Dr. Bikramjit Kaur**

Abstract

The emergence of multidisciplinary institutions from single-stream colleges is an important angle of discussion in the changing world of higher education. The nature of this transition poses a myriad of challenges, as well as opportunities, to academic institutions, yet still calls for unique academic settings and experience that entail holistic methods to learning. Universities focused on a single stream of studies tend to be slow to respond to changing industry needs, and the shift toward a job market that requires interdisciplinary thinking, creativity and innovation. Among them, resistance to change and the implication for modifications in curriculum, training of faculty and adjustments in infrastructure. Nonetheless, this transition also comes with opportunities -the potential for interdisciplinary collaboration, greater student engagement, and research that builds upon systemic global challenges. The paper describes both the challenges and opportunities presented by the transition from single-stream to multi-disciplinary colleges. It explores how the transition can serve to improve educational experience, the quality of the graduates and their employability. Further, it identifies key elements that have contributed to their success in transitioning from a more traditional model to a multidisciplinary one, such as supportive leadership, opportunities for faculty development, and innovative curriculum design.

Keywords: Multidisciplinary Institutions, Single-Stream Colleges, Challenges, Opportunities

Introduction

There have been cries for significant changes in the higher education landscape as the global economy, technology, and society evolve at a rapidly increasing pace, necessitating that colleges and universities adapt accordingly. Probably, one of the most notable transformations in this area is the transition from single-stream colleges to interdisciplinary universities. With the rapid changes in the field of education, single-stream colleges, which

* Research Scholar, RIMT University, Mandi Gobindgarh, Punjab

** Associate Professor, Department of Education, RIMT University, Mandi Gobindgarh, Punjab

are generally further education in a particular academic stream or indulge in the concept of one academic stream have been critiqued more often than not for their incompetence in moulding students for responsibilities in the real world. Considered essential and valuable in producing well-rounded graduates who are better able to think critically, work across disciplines, and solve complex, real-world problems, multidisciplinary education integrates various fields of study.

Purpose of the Study

This research aims to investigate the approaches surrounding the transformation of single-stream colleges into multidisciplinary institutions, specifically it seeks to:

- Investigate what challenges institutions face during this transformation.
- Analyze the opportunities that are made available to the students and other academic institutions through this multidisciplinary approach.
- Consider the influence of faculty members, administrative staff, and other stakeholders on this shift and its facilitation or blocking.
- Offer an empirically based approach rounded on case studies.

The goal of this research is to provide valuable information for policymakers, academic leaders, and other educational stakeholders in creating institutions that are more adaptable, forward-thinking, and responsive to the global job market.

Methodology

This is a qualitative study that uses case study, interview, and document analysis as tools to delve into the subject matter. The study is based on both primary and secondary data sources.

1. **Case Studies:** An examination of a selection of multidisciplinary institutions that adopted the single-stream model was undertaken. The institutions that were the focus of this study were selected on the basis of their prominence, their success towards provision of a wide range of disciplines, and their acumen towards changing contemporary educational paradigms. The institutions represented in the case studies span a wide range from small regional and community colleges to large and established universities.
2. **Document scrutiny:** Institutional reports, academic plans, and curriculum gaps documents were analysed to assess the nature of the change that was planned and how it was operationalized. These documents highlighted some of the formal measures taken to enable the change such as curriculum development, new staff development initiatives, and alterations of facilities.
3. **Community Analysis:** The data collected was processed by thematic analysis. Major areas that surfaced, including difficulty with curriculum integration, change

resistance, and collaboration possibilities, were identified and grouped for detailed understanding of the transformation process.

Discussion

- **Obstacles to Change:** The development of a single-stream college into a multidisciplinary institution is a complex process as it presents numerous problems.
- **Resistance from the Institutions:** One of the prominent problems is resistance from the institutions. Single-stream traditional colleges are locked into the practice of certain specific disciplines, and there is often an emotional attachment to the norms that have been followed and the systems and the cultures in place. Employees, administrators, and even learners may be resistant because of the loss of employment opportunities, academic identity, and shift anxiety.
- **Curriculum Redesign:** It can be challenging and tedious to redesign a curriculum to include multidisciplinary approaches. Colleges operating on a single-stream basis often provide specialized subjects because of primary focus on a certain discipline. Additionally, merging numerous disciplines poses an even greater challenge. The curriculum should be adaptable to include a large variety of fields without compromising core competencies. Academic staff must adjust their training and discipline specific courses as well as be trained on how to teach interdisciplinary courses.
- **Funding Challenges:** Multidiscipline institutions are often hard to fund due to the investment required for the infrastructure and resources of a wide range of subjects. This entails priming the laboratories, classrooms, and libraries. Faculty training programs are also critical for instructors having cross-discipline teaching. Emerging interdisciplinary funding also proves to be a challenge as the multi-level obstacles prove difficult financial burdens for most institutions.
- **Professional Development and Training:** Faculty development is one of the more demanding challenges institutions face. Faculty members of a multidisciplinary institution may face challenges outside their area of expertise while this can be daunting for many, there is often resistance which is not ideal. Along with being prepared, they require continuous support. This is moldable with reliance on professional development programs, ensuring the faculty are before taught how to teach effectively in multidisciplinary setups.
- **Integration of Technology in Assessment Strategies:** Teachers are then confronted with the other challenge of evaluation where students are assessed in a multidisciplinary context. Appropriate verifiable learning outcomes in an integrated curriculum has to think outside the box to cater to capture further than the conventional set books and essays. Moreover, there can be predetermined standards set forth by accrediting bodies and these can be in direct conflict within a multi-centred approach.

- **Possibilities within Multidisciplinary Education:** The move toward a more multidisciplinary approach has its challenges, but it also leads to a number of opportunities for students and academic institutions.
- **Enhanced Student Learning:** Adopting a multi-disciplinary curriculum enables a scholar to acquire an in-depth understanding by including information from different disciplines. This also trains students to think critically, solve problems and address issues from different perspectives. Students in multidisciplinary contexts often benefit from being exposed to different ideas, ways of doing, and researching.
- **Increase in Employability:** Multidisciplinary education is designed to appropriately train students in various skills that make them employable. Graduates with multi-disciplinary training are flexible and self-sufficient and can perform effectively within cooperative interdisciplinary teams. This is of greatest importance in a time when there is a pressing need to develop employees capable of handling multi-faceted problems.
- **Preparing Institutions to be Hubs for Innovation and Inquiry:** Multidisciplinary institutions can focus on innovation and research. Outstanding emerging problems like global warming and diabetes require real world approaches. Combating these issues can be brought forth through traditional institutional imagination. By breaking through the norms of academics, those institutions are guaranteed to nurture creative imagination and non-restrictive problem solving approaches.
- **Enhanced Networking and Collaboration:** Multidisciplinary Institutions benefit both students and staff by allowing them to work across different departments leading to enhancement of their creativity. Collaborative efforts promote the academic climate through leading innovative new developments, research projects, and broadening educational atmosphere. The academic experience in turn is further enriched through interdisciplinary networking.
- **Anticipate Complex Problems:** Professionals capable of providing interdisciplinary solutions are growing in demand parallel with the escalation of the world's problems. Multidisciplinary students are capable of dealing with issues that otherwise wouldn't fit into a logical academic paragraph. This is even more significant while dealing with issues in areas like AI, sustainability, health care, and entrepreneurship as they highly depend on interdisciplinary cooperation.

Conclusion

The switch from single-stream colleges to multidisciplinary institutions has debilitating hindrances and anything but unrivalled benefits. In as much as lack of willingness to adapt, changing the curriculum and allocating funds is a challenge to this change, the advantages of multidisciplinary education which include learners' development, employment opportunities, and even research creativity endeavours are overwhelmingly positive. Educational institutions

need to develop a strategy for integration, particularly where empowering faculty, efficient resource allocation, and training responsive and flexible curricula for the future is concerned.

This study indicates what is critical in the transformation processes: the people themselves, leadership and planning, and sustained evaluation. Institutions will be able to mitigate the complex real-world issues with prepared students who have undergone wonderful changes through a problem solving approach sophisticated by collaboration, innovation, and flexibility.

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TRANSFORMING SINGLE-STREAM COLLEGES INTO MULTIDISCIPLINARY INSTITUTIONS: CHALLENGES AND OPPORTUNITIES

Dr. Varinder Kaur*

Abstract

In order to achieve the important objective outlined in the National Education Policy (NEP) 2020 and supported by suggestions from the University Grants Commission (UGC), this paper addresses the complex process of converting single-stream colleges in India into multidisciplinary institutions. As India works to develop a higher education system that is more resilient and competitive to a worldwide extent, multidisciplinary education is seen as pivotal to promoting creativity, critical thinking, and students' overall progress. The study critically evaluates the significant obstacles that stand in progress, examines the possible advantages for students, faculty, and society, and thoroughly examines the policy framework guiding this change. Some obstacles are financial restraints, staff shortages in developing fields, curriculum design difficulties, and infrastructure limits. The study also looks into particular transformational prospects about foreign connections, community involvement, research collaborations, and student diversity. In order to successfully transform single-stream colleges into thriving multidisciplinary centres of learning, the paper ends with a list of valuable suggestions that centre on curriculum integration techniques, faculty development programs, collaborative resource sharing, phased implementation strategies, and ongoing assessment mechanisms.

Keywords: *Nep 2020, Higher Education, Multidisciplinary, Single Stream, UGC*

Introduction

The Indian higher education system used to encompass single-stream colleges, the arts, sciences, or commerce. Despite providing focused information, this specialization has often been targeted for limiting students' exposure to diverse perspectives and preventing them from acquiring rounded skill sets. A clear vision for changing higher education institutions towards a multidisciplinary approach has been outlined in the National Education Policy (NEP) 2020, which acknowledges these limits, along with encouraging guidance from the

* Principal, GTB Khalsa College for Women, Dasuya, Hoshiarpur

University Grants Commission (UGC). This approach fosters students' overall growth, sharpens their critical thinking skills, and gives them more choices for their future academic and career paths. Transitioning from single-stream to multidisciplinary institutions is a significant undertaking that calls for strategic preparation, careful resource allocation, and a thorough understanding of the advantages and disadvantages of the change. This paper will analyze these points in detail to completely evaluate the future.

Policy Context: NEP 2020 and UGC Guidelines

The National Education Policy (NEP) 2020, which significantly emphasizes the benefits of multidisciplinary and holistic learning, has completely changed India's approach to education. The goal of NEP 2020 is to establish "broad-based, multidisciplinary, holistic education with flexible curricula, creative combinations of subjects, integration of vocational education and multiple entry and exit points." (Paragraph 11.5, NEP 2020). To inspire higher education institutions (HEIs) to provide a greater variety of subjects and fields of study, this policy requires a shift away from strict disciplinary silos. The purpose of NEP 2020 is to establish an educational setting that encourages interdisciplinary research, encourages students who want to pursue a wide range of academic interests, and gives them the tools they need to succeed in a world that is changing quickly.

The University Grants Commission (UGC), which offers adequate rules and frameworks for higher education institutions that are important for implementing multidisciplinary structures and pedagogical strategies, is of NEP 2020. UGC's efforts include supporting faculty development programs that emphasize multidisciplinary teaching, encouraging the establishment of interdisciplinary centres, encouraging flexible curriculum design, and offering incentives for interdisciplinary research collaborations. For example, to promote student mobility and provide freedom in course selection among institutions, the UGC suggested the idea of the Academic Bank of Credits (ABC) (UG, 2021). India's goal to establish itself as a knowledge-based economy and a world-renowned hub for top-notch higher education is highlighted by this policy environment.

Benefits of Multidisciplinary Education

There are numerous advantages to implementing multidisciplinary education for students, organizations, and society:

- 1. Holistic Development:** Students' perspectives are widened, and well-rounded personal development is fostered by exposure to various subjects. Students better comprehend intricate socioeconomic concerns and improve communication skills and cultural sensitivity (AAC and U., 2015). An engineering student who also takes sociology classes, for instance, can be well equipped to understand how their engineering designs influence society.

- 2. Critical Thinking:** Exposure to various issues and viewpoints stimulates the development of critical thinking, problem-solving, and decision-making skills. Students are encouraged to examine data from several perspectives, question presumptions, and create creative answers to challenging issues through multidisciplinary learning (Arum and Roksa, 2011).
- 3. Flexibility and Employability:** Students can tailor their educational pathways and consider a greater variety of employment opportunities with a multidisciplinary curriculum. Students who acquire knowledge and abilities from various subjects are better equipped for occupations that demand multidisciplinary expertise, making them more competitive and adaptive in the labour market (National Research Council, 2012).
- 4. Interdisciplinary Research:** Collaborative research projects that cut across disciplinary boundaries are encouraged by multidisciplinary institutions, which results in more thorough and creative answers. In order to handle intricate matters like public health, climate change, and sustainable development, researchers might use this approach to integrate methods and expertise from many disciplines (Klein, 2010).
- 5. Innovation and Entrepreneurship:** Awareness of different fields can encourage an entrepreneurial mindset and ignite creativity. When students can use their knowledge and abilities from various professions, they are more likely to recognize unmet needs and create creative solutions (Florida, 2002).

Challenges in Transforming Single-Stream Colleges

The conversion of single-stream colleges into interdisciplinary establishments poses several important issues that require careful consideration and resolute:

- 1. Infrastructure Deficiencies:** Many single-stream universities lack the technological and physical infrastructure to support new disciplines and fields of study, such as software, internet access, and laboratories and libraries. Significant financial outlays and meticulous planning are necessary for infrastructure upgrades (Altbach, 2015).
- 2. Faculty Shortages:** It can be challenging to find and keep talented professors with a wide range of subject-matter expertise, especially in cutting-edge sectors like biotechnology, data science, and artificial intelligence. Attracting and keeping bright academics requires competitive pay, research opportunities, and a positive work atmosphere (Ehrenberg, 2004).
- 3. Functionality of Curriculum Design:** It can be challenging to develop a coherent, consistent, well-rounded curriculum that covers a variety of academic subjects and considers a wide range of student interests. Special consideration

should be given to learning objectives, pedagogical strategies, evaluation methods, and course scheduling (Lattuca, 2001). Discovering an equilibrium between diversity, of course, provides another confrontation.

4. **Financial Restrictions:** High-quality education, modernizing current buildings, and establishing new departments can all have a significant influence on the budget. It might be difficult for single-stream universities to get the money they need to support this change; they will need more money from the government, private donors, and other sources (Johnstone, 2006).
5. **Opposition to Transform:** Professors and administrators may oppose the proceeding to multidisciplinary education due to concerns about their responsibilities, departmental autonomy, and the possibility of losing disciplinary knowledge. Practical change management measures are required to solve these difficulties and get the support of all stakeholders.

Opportunities for Changes

When single-stream colleges transform into multidisciplinary institutions, there are numerous opportunities for growth and innovation despite the challenges:

1. **Attracting Diverse Students:** A multidisciplinary approach improves class discussions and focuses on promoting cross-cultural understanding by attracting a larger student body with a variety of interests, backgrounds, and points of view. This diversity may create a more lively and welcoming learning environment (Gurin, Dey, Hurtado and Gurin, 2002).
2. **Encouraging Interdisciplinary Collaboration:** Once teachers and students from different fields collaborate, important research findings, innovative ideas, and creative breakthroughs can be produced. Diverse viewpoints and skill sets can be applied to complicated issues by interdisciplinary teams (National Academies of Sciences, Engineering, and Medicine, 2018).
3. **Improving Community Engagement:** Multidisciplinary institutions can better interact with their communities by addressing regional organizations and coalitions with organizations and governments. In addition to offering students worthwhile opportunities for experiential learning, this involvement can support the community's social and economic advancement (Bringle and Hatcher, 1996).
4. **Creating Global Connections:** Multidisciplinary institutions can attract international faculty and students, participate in collaborative research projects, and promote intercultural communication by partnering with universities and research facilities worldwide. In addition to giving students the chance to study and work overseas, this partnership can improve the university's standing internationally (Knight, 2004).

5. **Creating niche Specialization** Colleges can create specific niches by fusing new fields that meet changing societal demands with their current strengths. For instance, to develop a curriculum in creative technology, a college with a strong arts program can include entrepreneurship and digital media courses.

Recommendations

The following suggestions must be taken into account in order to convert single-stream colleges into multidisciplinary establishments successfully:

1. **Phased Implementation:** Implement new disciplines gradually to give ample time for curriculum creation, faculty training, resource allocation, and cautious planning. Launch pilot projects first, then progressively expand them in light of lessons learnt (Fullan, 2007).
2. **Strategic Collaboration:** Establish alliances with businesses, academic institutions, research groups, and community members to pool resources, exchange knowledge, and provide faculty and students with opportunities. Research funds, internships, and specialized facilities may be specialized through these collaborations (Etzkowitz and Leydesdorff, 2000).
3. **Targeted Faculty Development:** Fund workshops and training courses to assist instructors in embracing interdisciplinary teaching approaches, adjusting to new disciplines, and becoming authorities in cutting-edge topics. Encourage faculty members to conduct interdisciplinary research and collaborate across disciplines (Boyer, 1990).
4. **Strategies for Curriculum Integration:** Create a coherent curriculum that promotes interdisciplinary learning, challenges students to draw connections between various courses, and allows them to be relevant to contemporary concerns. Use case studies, project-based learning, and other active learning techniques (Prince, 2004).
5. **Continuous Assessment and Improvement:** Monitor key performance indicators such as student enrolment, graduation rates, research output, and alums employment regularly, evaluate implementation progress, identify obstacles, and make required adjustments. Utilise data to guide choices and guarantee ongoing development (Satin, 1993).

Conclusion

The future of Indian higher education depends on the difficult but necessary task of converting single-stream schools into interdisciplinary establishments. Despite various barriers, society, educators, and students stand to benefit greatly. Higher education institutions can successfully modify the changing landscape of Indian higher education by

thoroughly addressing these issues, taking a phased and cooperative approach, investing in faculty development, and fostering a culture of continuous improvement, as envisioned by the NEP 2020 and UGC guidelines. This change will help India become a global leader in innovation and knowledge creation while also giving students the abilities and information they need to thrive in a world that is changing quickly.

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Theme III

*Institutional Readiness for ITEP:
Proven Practices and Strategic Insights*

A STUDY ON INSTITUTIONAL SUPPORT AND FACULTY PERSPECTIVES IN INTEGRATED TEACHER EDUCATION PROGRAMS

Ankita Nanda* & Prof. Rekha Rani**

Abstract

In the 21st century, education systems globally are undergoing transformative changes to meet the evolving needs of students and stakeholders. These changes include curriculum innovation, modern teaching methods, strategic management, advanced evaluation systems, and technology integration. Integrated education programs have emerged as a progressive alternative to traditional fragmented models, fostering meaningful and connected learning experiences. Aligned with NEP 2020, these programs aim to prepare teachers for the Foundational, Preparatory, Middle, and Secondary stages, attracting talented individuals to the teaching profession. They emphasize Indian values, languages, cultural heritage, and tribal traditions while equipping educators with cutting-edge pedagogy, 21st-century skills, and advancements in education to meet the demands of modern learning. The present study explores institutional support and faculty perspectives among teacher educators at a teacher education institute of Panjab University, Chandigarh. While some educators have successfully adapted to the changes, others are still in the process of transition. They perceive the introduction of ITEP as a significant and much-needed reform; however, they also acknowledge challenges such as an extensive curriculum, increased workload, faculty shortages, and infrastructural constraints. As the program is still in its early stages, educators continue to navigate these adjustments, making it premature to draw definitive conclusions.

Keywords- *Integrated programs, curriculum innovation, faculty perspectives, institutional support*

Introduction

Teachers are the cornerstone of any education system, serving as the vital link in the transmission of knowledge, skills, and values. Recognized as the backbone of education, their quality plays a pivotal role in shaping both overall educational standards and student learning

* Senior Research Fellow, Department of Education, Panjab University, Chandigarh

** Professor, Institute of Educational Technology and Vocational Education, Panjab University, Chandigarh

outcomes. Globally, teacher competence is acknowledged as a key determinant of educational excellence (Pandey, 2011). In today's rapidly expanding knowledge landscape, the role of teachers has become increasingly complex, shaped by emerging pedagogical and psychological theories, philosophical and sociological perspectives, and the forces of globalization. This complexity underscores the need for thoughtfully designed and innovative teacher education programs. Teacher education refers to the professional preparation in pedagogy for individuals aspiring to join the teaching profession. It can follow either a traditional, closed approach with an objectivist focus on the outcomes of learning or a progressive, open approach that emphasizes the subjectivity of learners and prioritizes the learning process (Sagar, 2019). These programs must be critiqued, reimagined, reformed, and reoriented to meet the demands of modern education. Improving teacher education is a multidimensional challenge: it is a national imperative to prepare competent and effective teachers; it raises critical concerns about declining values and the evolving purpose of education in society; and it serves as a pressing area of research, addressing educational issues, challenges, and changing conditions (Kumar & Azad, 2016). The Integrated Teacher Education Programme (ITEP) in India can be a landmark initiative introduced by the National Council for Teacher Education (NCTE) as part of the Draft National Education Policy (NEP) 2019.

Exploring the Integrated Teacher Education Programme (ITEP)

India's education sector has been a priority since independence, yet teacher education continues to lag behind other nations. To address this, the National Education Policy 2020, introduced by the National Council for Teacher Education (NCTE) under the Ministry of Education, outlines new guidelines for the effective implementation of the Integrated Teacher Education Programme (Chakraborty, 2022). The Integrated Teacher Education Programme (ITEP), introduced under NEP 2020, revolutionizes teacher education by combining undergraduate studies and professional training into a four-year program. Unlike the traditional pathway requiring a three-year degree followed by a two-year B.Ed., ITEP allows direct entry after school, offering multiple exit options: a certificate after one year, a diploma after two years, and a Bachelor's degree with honors and B.Ed. after four years. Developed by the National Council for Teacher Education (NCTE) under the Ministry of Education, the ITEP curriculum integrates subject specialization (e.g., history, science, commerce) with pedagogy while promoting Indian values, traditions, and holistic development. Admission is through the NCET conducted by the NTA. With its multidisciplinary and globally aligned framework, ITEP prepares educators for modern challenges while fostering cultural and moral grounding (Khan, 2021).

ITEP, a four-year program combines undergraduate education with teacher training, creating a seamless pathway for aspiring teachers while enhancing the overall quality of

teacher education in the country. A key highlight of ITEP is its dual-major approach, which enables students to specialize in their chosen academic discipline while concurrently acquiring essential pedagogical skills and knowledge, preparing them for effective and impactful teaching. The four-year Integrated Teacher Education Programme (ITEP) aims to develop passionate, motivated, and highly qualified teachers who are professionally trained and well-equipped to design and implement developmentally appropriate learning experiences for students across various stages of school education. ITEP strives to provide aspiring teachers with the highest quality education, focusing on content mastery, pedagogical expertise, core values, and practical application (National Council for Teacher Education, n.d.). The Integrated Teacher Education Programme (ITEP), introduced under NEP 2020, revolutionizes teacher education by combining undergraduate studies and professional training into a four-year program.

The current paper examines the institutional support and faculty perspectives on the Integrated Teacher Education Program (ITEP) at one of the colleges under Panjab University. The study delves into the experiences and insights of six faculty members actively involved in teaching the program through a structured group discussion. The discussion explored their opinions on various aspects of ITEP, including its objectives, curriculum design, teaching methodologies, institutional infrastructure, and the challenges and opportunities it presents. The study aims to highlight the strengths, gaps, and potential areas of improvement within the ITEP framework to better align it with the goals of holistic teacher education and the demands of the National Education Policy (NEP) 2020.

Research Questions

A Study on Institutional Support and Faculty Perspectives in Integrated Teacher Education Programs focuses on understanding how institutional policies, resources, and support systems influence faculty perceptions and practices within these programs. The research questions for the present study are: -

- How do faculty members understand the objectives and structure of ITEP?
- What kind of institutional support is provided for the effective implementation of Integrated Teacher Education Programs (ITEP)?
- What are the key challenges faced by institutions and faculty in delivering the ITEP?

Methodology

This descriptive research investigates teacher educators' perspectives on institutional support and faculty experiences within Integrated Teacher Education Programs (ITEP). The study focuses on six teachers from a department at Panjab University involved in teaching the four-year ITEP course. Participants were selected using purposive sampling, a method in which individuals are intentionally chosen based on predefined criteria (Budiyo, 2018).

The targeted selection ensured a focused study context, with teacher educators' chosen for their expertise in teaching ITEP. Most participants, holding doctorate degrees in education, provided valuable insights into present study.

Participants Characteristics

A. Demographic Details

Age- The teacher educators were teachers aged between 30 and 50 years, accounting for 6 individuals. Four teachers fell within the 40 to 50-year age range, while two were in the 30-to 40-year group.

Gender Distribution- All the teachers' educators were females reflecting the predominance of women in the teaching profession within this sample.

Academic Qualifications- Among the teacher educators in the department, one held the position of Professor, one served as an Associate Professor, another as an Assistant Professor, and three were appointed as Guest Faculty.

Years of Teaching Experience- The majority of teacher educators (4) had between 15-20 of teaching experience. Two teacher educators had between 7-10 years of experience.

Geographic Location- The participating teacher educators were drawn from a Union Territory, Chandigarh in northern India, serving as the shared capital of the states of Punjab and Haryana.

Tool Used

Structured questionnaire was developed, with each primary question further broken down into multiple sub-questions to ensure a comprehensive exploration of the topic during focused group discussion. The questionnaire encompassed a variety of relevant topics, including personal background, academic qualifications, and faculty perceptions of ITEP, focusing on institutional support and their individual perspectives on the program.

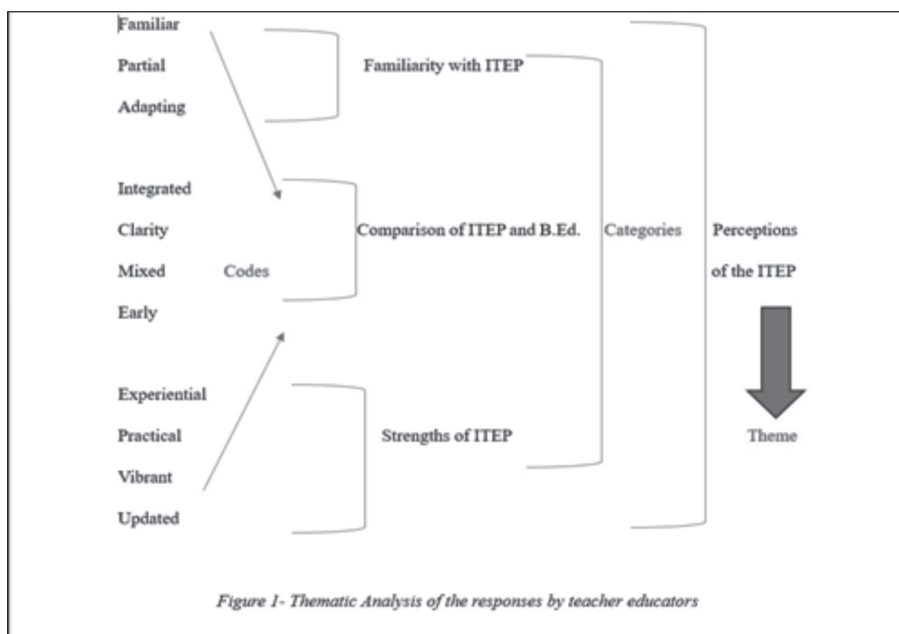
Data Analysis

A qualitative analysis approach was employed to gain deeper insights from the data. Responses from teacher educators in the open-ended questionnaire were transcribed and analyzed using thematic analysis. This method facilitated a detailed exploration of the data, uncovering underlying concepts and themes while providing a rich, exploratory framework for the study (Guest, MacQueen, & Namey, 2012). Thematic analysis involved systematically organizing the data collected from respondents into three levels: codes, categories, and themes. The codes were directly extracted from the participants' responses.

Findings

How do faculty members understand the objectives and structure of ITEP?

Teacher educators were asked about their familiarity with the objectives and structure of the Integrated Teacher Education Program (ITEP). They were also invited to compare ITEP with the traditional two-step teacher education model (e.g., pursuing a B.Ed. after graduation) and share their insights on the key strengths of ITEP. Among the six senior educators, two expressed being familiar with the objectives and structure of ITEP, while the remaining four reported being somewhat familiar. When asked to compare the traditional two-year B.Ed. program with the four-year ITEP, responses were mixed. Some educators favoured the four-year program, highlighting its integrated approach, while others preferred the two-year B.Ed., emphasizing that by that stage, students are more certain about their career choices. They pointed out that in a four-year program, students might still be unsure about pursuing teaching as a career, as many are also preparing for civil services. Additionally, two educators stated that it is too early to determine which program is more effective. According to the teacher educators, a key strength of the Integrated Teacher Education Program (ITEP) lies in its emphasis on experiential learning, which fosters a more hands-on and practical approach to teacher training. However, they also acknowledged that the program is still in its early stages, making it difficult to assess its overall impact or effectiveness at this point. Many educators mentioned that they are adapting to the new structure and observing its outcomes as the program progresses, indicating a cautious yet open attitude towards its potential. They found it to have quite a vibrant syllabus and said change in syllabus was long due. Figure 1 below shows thematic analysis of the responses given by teacher educators.



What kind of institutional support is provided for the effective implementation of Integrated Teacher Education Programs (ITEP)?

This question encompassed several sub-questions, such as the institution's readiness to effectively implement ITEP, the adequacy of its infrastructure to support the program, the level of satisfaction with various aspects of the institution's preparedness, and the extent to which faculty members are equipped to teach within the ITEP framework. One of the senior teacher educators mentioned that while the institute was ready to implement ITEP, the lack of adequate infrastructure remained a significant challenge. She said *"the course is divided into three parts but we don't have trained teachers for that"*. They highlighted issues such as insufficient classrooms and, more critically, a shortage of teachers to effectively handle the three courses required by the program. A guest faculty member expressed a different perspective, stating that infrastructure is not always a major concern since classes could even be conducted in open spaces, if necessary, but emphasized that having enough qualified teachers is essential. She mentioned that *"we have enough space outside the classroom to teach"*. Another teacher described the introduction of ITEP as a *"positive and welcome change for the institution"*. A senior professor suggested that they collaborate with faculty from other departments to enhance student learning. This collaboration would allow them to utilize shared resources, such as library facilities and classrooms, thereby addressing challenges related to infrastructure and faculty shortages. According to all the teacher educators their institution was ready for implementing ITEP.

What are the key challenges faced by institutions and faculty in delivering the ITEP?

The teacher educators had much to share about the challenges they face. Faculty members expressed concerns about the heavy workload, noting that the content to be taught is extensive, and the lack of proper course books adds to the burden. Teachers often spend extra time searching for relevant material, making it a struggle for both educators and students. They also highlighted that the curriculum places greater emphasis on graduate-level subjects than on teaching pedagogy. The examination system was criticized for its reliance on rote memorization, with educators advocating for more practical and application-based assessments. They also found the course to be demanding, sometimes struggling to align their teaching with the mental level of students. An economics professor remarked that much of what they had learned during their postgraduate studies was now being taught in the program, reflecting a disconnect between the content and the needs of future teachers. Figure 2 below shows the word cloud which depicts the responses of the teacher educators in a pictorial form.



Discussion and Conclusion

The Integrated Teacher Education Program (ITEP) marks a significant shift in teacher education, aiming to provide an experiential and integrated approach to training future educators. However, its implementation has brought forth diverse perspectives and challenges. Faculty members exhibit varied levels of familiarity with the program's objectives and structure, with some expressing confidence while others remain in the process of adapting. The shift from the traditional two-year B.Ed. the program to a four-year integrated model has sparked mixed opinions. While the integrated approach is valued for its hands-on and practical orientation, some educators believe the two-year model better aligns with students' career clarity and readiness for teaching. Institutional challenges remain prominent, including inadequate infrastructure and a shortage of qualified teachers. While some educators view infrastructure issues as manageable, the lack of sufficient teaching staff poses a more critical barrier. The program's curriculum, though described as vibrant and long overdue for an update, has been criticized for being overly content-heavy, focusing more on graduate-level subjects than teaching pedagogy. Additionally, the absence of proper course books and reliance on rote-based examinations further hinder effective teaching and learning. Faculty members have called for a shift toward practical, application-based assessments to better prepare future educators.

Despite these challenges, there is cautious optimism among educators, who view the introduction of ITEP as a positive and necessary change. Addressing concerns related to infrastructure, faculty readiness, and curriculum alignment will be critical to its success. By

fostering collaboration between institutions, policymakers, and educators, ITEP has the potential to become a transformative and sustainable model for teacher education, ensuring that future educators are better equipped to meet the needs of a dynamic educational landscape

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INTEGRATED TEACHER EDUCATION PROGRAMME (ITEP): A JUSTIFIED DECISION

Dr. Gurjit Kaur* & Dr. Nirmaljit Kaur**

Abstract

Teacher Education refers to a program of education, research and training to teach from pre-primary to higher education level. Experience has shown that the duration of one or two academic years conventionally provided for B Ed course is insufficient for proper education of the teachers for the role he is called upon to play in his profession in the altered circumstances. So to prepare teachers to play their role well as envisioned in NEP 2020 there is a dire need to reorganize teacher education with a focus on replacing the stereotyped one year or two year B Ed programme with a four year Teacher Education Integrated Programme (ITEP) by the year 2030. The present paper will throw light on the justification of introduction and implementation of ITEP which would go a long way in producing teachers who will be encouraging, supporting and humane facilitators in altered teaching learning situations.

Keywords: Teacher Education, ITEP Programme

Introduction

Not the building, equipment, instructional material, well-designed curriculum, computers and the internet services-but it is the teacher who can make the educational process a success. A highly motivated, spirited with zeal and a qualified & experienced teacher is always at the heart the core of entire educational work and thus act as an axial in the wheel of educational chariot, which can carry the society to its desired destination. In the NPE (1986) it is rightly said that a nation can rise above the level of its teachers. Therefore, teacher education becomes all the more significant for national development & progress. This was recognized almost 40 years back even by the Kothari Education Commission (1964-66) which said, “A sound programme of professional education of teachers is essential for the qualitative improvement of education.” However it has also pointed out that “Unfortunately, the professional education of teachers have been comparatively neglected in the post independence period.”

The concern for quality in Teacher Education surfaced quite strongly in the post

* Associate Professor, Khalsa College of Education, Amritsar

** Associate Professor, Khalsa College of Education, Amritsar

independence period. Several measures were undertaken including (i) expanding the pre-service Teacher Education programmes, (ii) opening alternative channels for clearing the backlog of untrained teachers and (iii) stabilizing the in-service Teacher Education.

But all these efforts remained more or less confined to the quantitative aspect of Teacher Education whereas the qualitative aspect of Teacher Education remained dissipated. There were three vital causes for low quality in Teacher Education in India. Firstly, at the entry point for the B.Ed. course, the far too general and diluted content of the graduate degree did not give candidates the real “Readiness” level of learning since what is required is an in depth knowledge of school subjects with all their practical application to life situation : but the short duration of one year with a lot of practical work did not permit any suitable bridge course initially to bring the students on the ‘Learning Readiness Lines’. Thus, violating the first law of Learning namely ‘Readiness’. The content covered through practice teaching was like instant ‘Fast Food’, not good for health. And this type of Teacher Education resulted in producing mediocre to poor teachers. Secondly, the mushroom growth of sub-standard Teacher Education colleges in India created due to unprecedented upsurge for education, resulted in a triple tragedy-large scale unemployment of trained teachers, low quality of training, and corruption at all levels.

Thirdly, all professional pursuits like Engineering, Medicine, Agriculture & Law have an in-depth, professionally oriented, integrated four to five year course each. To such courses, the students are selected admitted who have either necessary aptitude or sufficient content knowledge in the respective fields. However, there was absolutely no such indepth long duration professionally oriented course for the so called ‘Noble Profession’ of teaching as harangued from all platforms by all & sundry who gave a call to teachers to give quality education to the nation. It was as ridiculous as giving a call to the half starved beggars to give a grand feast to others. So, if all other professional courses have sound duration then why shouldn’t the Teacher Education programme should have sound time duration, the main objective of which is to make a “man”.

Experience has shown that the duration of one academic year conventionally provided for B.Ed course was insufficient for proper education of the teacher for the role he is called upon to play in his profession. The period of one academic session might have been adequate sixty years back when teacher training was conceived of in simple practical terms requiring general acquaintance with principles of education; rule-of-thumb methods of practical teaching and a little knowledge of school hygiene and school management. Times have since changed radically. In the context of rapid change in socio Cultural/Political/Techno-economical concerns, revolution in the field of information technology, crisis of moral & ethical values and complexities of the classroom of 21st Century, the traditional types of teacher education programme, have quite failed to provide justice to teacher trainees. In such a scenario, the teacher cannot now afford to remain a passive class-room entity carrying out dictates from

remote authorities who prescribe what he should teach and what he should evaluate. According to the Justice J.S. Verma Commission (2012) constituted by the Supreme Court, a majority of stand-alone TEIs-over 10,000 in number are not even attempting serious teacher education but are essentially selling degrees for a price. Regulatory efforts so far quality, and in fact have had the negative effect of curbing the growth of excellence and innovation in the sector. The sector and its regulatory system are, therefore, in urgent need of revitalization through radical action, in order to raise standards and restore integrity, credibility, efficacy, and high quality to the teacher education system.

In the altered circumstances the teacher has to share a much larger responsibility of active and intelligent participation in the educational process. Above all he must cultivate sensitivity to the significance of his work in shaping the destiny of the generation in his care and confidence to initiate change when necessary.

So the only remedy for these maladies of Teacher Education as envisioned in NEP (2020) is to reorganize Teacher Education with a focus on replacing the stereotyped one year or two years B.Ed. Programme with four year integrated B.Ed. programme.

The 4-year integrated B.Ed. offered by such multidisciplinary HEIs will, by 2030, become the minimal degree qualification for school teachers. The 4-year integrated B.Ed. will be a dual-major holistic Bachelor's degree, in Education as well as a specialized subject such as a language, history, music, mathematics, computer science, chemistry, economic, art, physical education, etc. Beyond the teaching of cutting-edge pedagogy, the teacher education will include grounding in sociology, history, science, psychology, early childhood care and education, foundational literacy and numeracy, knowledge of India and its values/ethos/art/traditions, and more.

In order to maintain uniform standards for teacher education, the admission to pre-service teacher preparation programmes shall be through suitable subject and aptitude tests conducted by the National Testing Agency, and shall be standardized keeping in view the linguistic and cultural diversity of the country.

The long term integrated course would be compelling all sub-standard Teacher Education Institutions/Training Institutions to automatically close within a short span or alternatively to develop into quality institutions for training to escape closure.

It would play an important role in resuscitating the quality of Teacher Education programmes.

Defining quality in Teacher Education is much more challenging. Teacher Education is neither mere pedagogy nor acquisition of a training qualification. It is shaping people for the multi sided development of the younger generations. It is the inculcation of commitment and generation of a strong will to contribute at the highest level of efficiency through a value-based approach. Teacher Education is a systematic process of unearthing 'The Treasure Within' each and every teacher and subsequently every learner in each & every learning situation. It

is the continuous process, which makes the individual realize the magnitude & potentialities, if nurtured & inculcated in the right perspective can make a tremendous contribution in every aspect of the society. The Four-Year Integrated B.Ed. Programme (ITEP) would include both the sound theoretical base as well as the practicum focusing on the development of requisite competencies & skills, thus, yielding very rich dividends in terms of producing effective teachers resulting in the overall improvement of education of millions.

The envisioned Teacher Education programmes would be more responsive to changes in the school system as it visualizes a significant paradigm shift. It would address the emerging demands, needs & the changes of the school system. The thrust of these programmes would be on:

- The active involvement of learners in the process of knowledge construction
- Shared context of learning
- Teacher as a facilitator of knowledge construction
- Multidisciplinary nature of knowledge of teacher education within the context of education
- Integration of theory and practice dimensions
- Engagement with issues and concerns of contemporary Indian society from a critical perspective.
- Approaches for integration of national concerns across the curricular subjects (national concerns that address the problems of scheduled caste and scheduled tribe children, gender issues, education of children with special needs, education for peace, Health and Physical Education, Early Childhood Education and Work and Education)
- Strategies for multigrade and Multi-level teaching situations
- Approaches for addressing the plurality and diversity in the classrooms
- Reforms required in conducting examinations at different levels of school education
- Proper use of educational technology in teaching learning situations
- The concerns that emerged in the light of national development goals and educational priorities
- Development of capacities for self-directed learning and the ability to think, to be self-critical and to work in groups.

The integrated Teacher Education programmes (ITEP) have been introduced with a justification to produce highly motivated teachers of quality by integrating the subject matter with professional education and training them in pedagogies and subject areas for a fairly long time. Integrated Teacher Education programmes, if implemented properly, would go a long way in teaching teachers who are encouraging, supportive & humane facilitators in teaching learning situations to enable learners to bring out their talents, to realise their physical

& intellectual potentialities to the fullest, to develop character and desirable social & human values to function as responsible citizens.

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INSTITUTIONAL READINESS FOR THE INTEGRATED TEACHER EDUCATION PROGRAMME (ITEP): PRACTICES AND STRATEGIC INSIGHTS

Dr. Nishta Rana & Sandeep Kumar***

Abstract

The Integrated Teacher Education Programme (ITEP) aims to transform teacher education by integrating subject knowledge with pedagogy in a structured four-year framework. This study assesses Institutional readiness for ITEP implementation by exploring key dimensions such as curriculum alignment, faculty preparedness, technological infrastructure, policy compliance, and student engagement. Using a quantitative approach, data has been collected from 65 students and 10 teachers by administering a self-prepared questionnaire through a survey method. The study highlights strong institutional readiness for ITEP, with effective policy compliance, student-centered learning models, and blended education systems in place. However, continuous curriculum reform, structured faculty training, and enhanced technological infrastructure are essential for ensuring that all institutions can fully realize the vision of ITEP and NEP 2020. Moving forward, institutions should focus on strengthening curriculum reforms to integrate experiential and interdisciplinary learning effectively, expanding faculty development programs to ensure regular, in-depth training on competency-based education and boosting administrative coordination to ensure smooth policy alignment, accreditation, and institutional governance. Encouraging collaborative initiatives between institutions, policymakers, and educational bodies for effective policy implementation and sustainable improvements in teacher education. The study's outcomes offer actionable insights for policymakers, teacher educators, and Institutions aiming to align their programs with national education reforms.

Keywords: *Institutional Preparedness and Policy Compliance, Curriculum and Pedagogical Alignment, Faculty Development Programmes, ICT Infrastructure.*

Introduction

Teacher education plays a pivotal role in shaping the quality of school education, necessitating continuous reforms to align with evolving pedagogical and policy needs. The Integrated Teacher Education Programme (ITEP) is a four-year undergraduate initiative designed to bridge subject expertise and pedagogical training, as envisioned in the National

* Professor & Head, School of Education, MIER College of Education (Autonomous), Jammu

** Assistant Professor, School of Education, MIER College of Education (Autonomous), Jammu

Education Policy (NEP) 2020. ITEP emphasizes competency-based learning, multidisciplinary education, and digital pedagogy to enhance teacher preparedness.

Institutional readiness is a key determinant of ITEP's success, encompassing several critical components: curriculum restructuring, faculty training, digital integration, policy compliance, and student engagement. Institutions face challenges such as limited faculty development programs, financial constraints, and technological inadequacies, which impact the effective adoption of ITEP. Therefore, evaluating institutional preparedness is essential for identifying gaps and formulating strategies to ensure the smooth implementation of ITEP. This study aims to assess institutional readiness through research, providing insights into best practices and challenges while proposing strategic interventions for improving the teacher education landscape in India.

Review of Literature

- **ITEP and Teacher Education Reforms:** The transition to an integrated teacher education model represents a significant policy shift. Sharma (2021) highlights that combining subject knowledge with pedagogical training enhances teacher preparedness. Mukherjee and Roy (2022) emphasize the NEP 2020's focus on multidisciplinary education, requiring institutions to align curriculum with competency-based learning principles.
- **Curriculum Alignment and Pedagogical Strategies:** Curriculum restructuring is fundamental to ITEP implementation. Kumar (2020) asserts that blended learning, competency-based assessment, and inclusive education are crucial elements of modern teacher training programs. However, institutions often struggle with updating curricula to meet these requirements. Das and Gupta (2021) found that many institutions lack structured mechanisms for aligning their curricula with national education reforms, leading to inconsistencies in policy compliance.
- **Faculty Preparedness and Professional Development:** Faculty training is critical to the success of ITEP. Patel (2022) indicates that professional development programs must equip educators with digital pedagogy skills and interdisciplinary teaching methodologies. Saxena and Verma (2023) highlight a gap in structured faculty training, as many institutions lack regular workshops and collaborations with regulatory bodies like NCERT and NCTE.
- **Technological Infrastructure and Digital Integration:** The integration of Information and Communication Technology (ICT) in teacher education enhances pedagogical effectiveness. Joshi (2021) underscores the benefits of digital tools in engaging teacher trainees. However, institutions frequently face challenges such as inadequate ICT infrastructure and resistance to technology adoption (Reddy & Sharma, 2022). Addressing these barriers is essential for ensuring seamless digital pedagogy integration.

- **Accreditation and Policy Compliance:** Accreditation ensures the quality of teacher education programs. Mishra (2022) notes that obtaining accreditation from agencies like NCTE requires adherence to stringent policies and resource allocation. Bose (2023) found that institutions often encounter financial and administrative challenges in meeting accreditation requirements, delaying ITEP implementation.

Research Gaps

Despite existing literature on teacher education reforms and NEP 2020, several research gaps remain:

1. **Empirical Studies on Institutional Readiness:** While theoretical discourse on ITEP implementation exists, there is limited empirical research assessing institutional preparedness in terms of faculty training, curriculum alignment, and infrastructure.
2. **Challenges in Digital Pedagogy Integration:** Existing studies focus on digital pedagogy benefits but lack insights into practical challenges institutions face in integrating ICT.
3. **Financial Sustainability of ITEP:** Research on financial models for sustaining ITEP implementation is scarce, particularly concerning government funding, private partnerships, and internal resource allocation.
4. **Teacher-Trainees' Perceptions and Preparedness:** Most studies focus on institutional perspectives, whereas limited research explores teacher trainees' confidence and readiness for competency-based education.
5. **Accreditation and Policy Alignment:** There is a need to explore how institutions can streamline their policies to meet accreditation standards efficiently.

Based on these research gaps in the literature review and personal interest, an effort has been made to understand the ground reality with the help of teacher trainees and faculty in the context of ongoing teacher training institutes.

Objectives

1. To evaluate the institutional preparedness for implementing the Integrated Teacher Education Programme (ITEP), focusing on strategic planning, policy compliance, and accreditation status.
2. To analyze the effectiveness of curriculum alignment with NEP 2020, faculty training initiatives, and technological infrastructure in supporting ITEP implementation.
3. To identify key challenges faced by institutions in ITEP adoption, including curriculum restructuring, faculty development, student engagement, and administrative alignment, and propose strategic interventions.

Research Methodology

- **Method:** The study employs a descriptive research design using a survey-based approach to assess the institutional readiness for implementing the Integrated Teacher Education Programme (ITEP). A quantitative approach was used to gather insights into policy compliance, curriculum alignment, faculty preparedness, technological infrastructure, and student engagement.
- **Population:** The population for this study includes teacher educators and student-teachers from various institutions which are planning to offer teacher education programmes under ITEP. The study focuses on institutions that are in the process of starting ITEP to capture a broad perspective on institutional readiness and perceived challenges.
- **Sample:** A purposive sampling technique was used to select the participants. The sample consists of 10 teacher educators from a selected institution which is planning to implement ITEP and 65 student-teachers enrolled in teacher education programmes (B.Ed. and M.Ed.) in the same institution. This diverse sample ensures a comprehensive understanding of faculty perspectives, student preparedness, and institutional support mechanisms.
- **Data Collection:** Data was collected using structured questionnaire and rating scale. The questionnaire focused on institutional policies, faculty training, technological access, student engagement, and challenges in ITEP implementation. The responses were measured using a Likert scale to quantify institutional readiness.
- **Statistical Techniques Used-**The collected data was analyzed using descriptive statistical methods such as frequency and percentage analysis to determine the distribution of responses.

Findings

Objective 1. To evaluate the institutional preparedness for implementing the Integrated Teacher Education Programme (ITEP), focusing on strategic planning, policy compliance, and accreditation status.

Table 1: Institutional Preparedness and Policy Compliance

Response	Yes (Number, %)	No (Number, %)
Institution has a strategic plan for ITEP	68 (90.7%)	7 (9.3%)
Institution conducted readiness assessment	67 (89.3%)	8 (10.7%)
Policies to support ITEP integration	73 (97.3%)	2 (2.7%)
Accreditation for ITEP (NCTE/other agencies)	In Progress: 62 (82.7%), Planning to Apply: 12 (16.0%)	No: 1 (1.3%)

Table 1 provides insights into the **institutional preparedness and policy compliance** for implementing the Integrated Teacher Education Programme (ITEP). The findings indicate that the majority of institutions have taken significant steps to align with ITEP guidelines.

1. Strategic Planning for ITEP Implementation:

- A high percentage (90.7%) of institutions have a well-defined strategic plan for ITEP, demonstrating strong institutional commitment to policy reforms.
- However, 9.3% of institutions lack a strategic plan, which could hinder the systematic adoption of ITEP.

2. Readiness Assessment Conducted:

- 89.3% of institutions have conducted a self-assessment of their readiness, suggesting proactive evaluation of strengths and areas needing improvement.
- The remaining 10.7% have not yet assessed their preparedness, which may result in challenges during ITEP implementation.

3. Policy Support for ITEP Integration:

- 97.3% of institutions have established institutional policies to support ITEP, ensuring a structured framework for teacher education.
- The 2.7% that lack such policies may face difficulties in aligning teacher education programs with NEP 2020 and ITEP guidelines.

4. Accreditation for ITEP Implementation:

- A large proportion (82.7%) of institutions are already in the process of obtaining accreditation, while 16.0% are planning to apply.
- However, 1.3% of institutions have no plans for accreditation, which raises concerns about the recognition and legitimacy of their ITEP programs.

Overall Interpretation

The data reflects a high level of institutional preparedness for ITEP, with strong policy compliance, readiness assessments, and accreditation efforts. However, institutions that lack strategic plans, self-assessments, or accreditation initiatives may struggle to meet ITEP standards effectively. Moving forward, institutions should focus on closing these gaps through structured planning, policy strengthening, and accreditation applications to ensure a smooth transition to competency-based teacher education.

Objective 2. To analyze the effectiveness of curriculum alignment with NEP 2020, faculty training initiatives, and technological infrastructure in supporting ITEP implementation.

Table 2: Curriculum and Pedagogical Alignment

Response	Yes (Number, %)	No (Number, %)
Institution updates curriculum as per NEP 2020	Annually: 56 (74.7%), Every 2-3 Years: 19 (25.3%)	0 (0.0%)
Inclusive education and digital pedagogy courses included	75 (100%)	0 (0.0%)
Multidisciplinary and experiential learning integration	Extensively: 49 (65.3%), To some extent: 26 (34.7%)	0 (0.0%)
Competency-based and formative assessment implemented	72 (96.0%)	3 (4.0%)

Table 2 evaluates the extent to which institutions have aligned their curriculum and pedagogical practices with the requirements of the Integrated Teacher Education Programme (ITEP). The findings indicate that most institutions have integrated competency-based, experiential, and multidisciplinary learning, but certain areas still require improvement.

1. Curriculum Updates in Alignment with NEP 2020

- 74.7% of institutions update their curriculum annually, ensuring that their programs remain aligned with NEP 2020 and ITEP guidelines.
- 25.3% update their curriculum every 2-3 years, which may delay the incorporation of evolving pedagogical advancements.
- No institution reported **rare or no curriculum updates**, highlighting a commitment to regular revision.

2. Inclusion of Courses on Inclusive Education and Digital Pedagogy:

- 100% of institutions have incorporated inclusive education and digital pedagogy into their teacher training programs, reflecting a strong emphasis on equity, accessibility, and technology integration in education.

3. Integration of Multidisciplinary and Experiential Learning:

- 65.3% of institutions extensively implement multidisciplinary and experiential learning, ensuring that future educators are trained through real-world applications and cross-disciplinary knowledge.
- 34.7% implement these approaches to some extent, indicating that while progress has been made, some institutions may still rely on traditional subject-specific teaching methods.

4. Implementation of Competency-Based and Formative Assessments:

- 96.0% of institutions have shifted towards competency-based and formative

assessments, which focus on skill development, critical thinking, and continuous evaluation rather than rote memorization.

- 4.0% of institutions have not yet implemented such assessments, suggesting potential resistance to change or challenges in modifying existing evaluation frameworks.

The data indicates a strong commitment to curricular reforms, with annual updates, integration of digital and inclusive pedagogies, and adoption of competency-based assessments in most institutions. However, a significant proportion (34.7%) have yet to fully embrace experiential and multidisciplinary learning, and some (4.0%) still rely on traditional assessment methods. Moving forward, institutions should focus on accelerating the shift towards multidisciplinary approaches and competency-based evaluation, ensuring that all aspects of ITEP are effectively implemented.

Table 3: Faculty Readiness and Professional Development

Response	Yes (Number, %)	No (Number, %)
Faculty regularly trained on ITEP	Yes, Regularly: 53 (70.7%), Occasionally: 22 (29.3%)	0 (0.0%)
Institution has partnerships with NCERT/ NCTE for faculty training	68 (90.7%)	7 (9.3%)

Table 3 assesses the **readiness of faculty members** to implement the Integrated Teacher Education Programme (ITEP), focusing on **training frequency and institutional collaborations for capacity building**. The findings indicate that while a **majority of faculty members receive regular training**, there is still scope for improvement in ensuring comprehensive and continuous professional development.

1. Regular Faculty Training on ITEP Guidelines

- 70.7% of institutions provide regular training for faculty members, ensuring that educators are well-equipped with competency-based teaching methodologies and ITEP-aligned pedagogical strategies.
- 29.3% of institutions offer faculty training only occasionally, which may limit educators’ ability to stay updated with evolving educational reforms.
- No institution reported a complete lack of training, reflecting a positive commitment to faculty development.

2. Institutional Partnerships for Faculty Training (NCERT, NCTE, etc.)

- 90.7% of institutions have collaborations with national educational bodies such as NCERT and NCTE for faculty training, indicating strong external support and access to standardized training resources.

- 9.3% of institutions do not have such partnerships, which could limit faculty members’ exposure to best practices in teacher education.

The data indicates that most institutions actively engage in faculty training, with over 70% conducting regular training sessions and 90% leveraging national partnerships. However, institutions that provide training only occasionally (29.3%) may face challenges in ensuring that faculty members stay updated with ITEP requirements. Additionally, the lack of partnerships in 9.3% of institutions suggests that some institutions may not have access to standardized professional development opportunities.

Recommendations

- Increase the frequency of faculty training sessions, ensuring that educators receive continuous professional development rather than periodic updates.
- Strengthen partnerships with NCERT, NCTE, and other regulatory bodies to provide faculty with access to structured, high-quality training programs.
- Encourage faculty participation in action research and workshops to enhance their understanding of competency-based education, experiential learning, and digital pedagogy.

Table 4: Technological Infrastructure and Digital Readiness

Response	Yes (Number, %)	No (Number, %)
Institution’s ICT infrastructure rating	Excellent: 41 (54.7%), Good: 29 (38.7%), Fair: 5 (6.6%)	0 (0.0%)
Blended learning opportunities available (online + offline)	75 (100%)	0 (0.0%)
Digital access and stable internet ensured	71 (94.7%)	4 (5.3%)

Table 4 evaluates the technological preparedness of institutions for implementing the Integrated Teacher Education Programme (ITEP), focusing on ICT infrastructure, blended learning opportunities, and digital accessibility. The findings suggest that while most institutions have embraced technology integration, there are variations in infrastructure quality and internet accessibility that need to be addressed.

1. ICT Infrastructure for Teacher Education

- 54.7% of institutions rate their ICT infrastructure as excellent, indicating well-equipped smart classrooms, digital teaching tools, and robust e-learning platforms.
- 38.7% rate their infrastructure as good, suggesting that while functional, there may be room for improvement in areas like internet speed, digital resources, and hardware availability.

- 6.6% rate their infrastructure as fair, indicating significant gaps in technological access, digital tools, and overall ICT support.
2. **Availability of Blended Learning Opportunities (Online + Offline Modes)**
- 100% of institutions provide blended learning opportunities, reflecting a strong commitment to integrating digital and in-person learning experiences.
 - This ensures that students have access to flexible learning environments, online resources, and interactive teaching methodologies, which are essential for competency-based education under ITEP.
3. **Digital Access and Stable Internet Connectivity**
- 94.7% of institutions ensure stable internet connectivity and adequate digital access, enabling seamless e-learning, virtual assessments, and digital collaboration.
 - 5.3% of institutions face challenges in providing reliable digital access, which could hinder the effective use of technology-driven pedagogical strategies.

The data indicates strong technological preparedness in most institutions, with universal adoption of blended learning (100%) and stable digital access in 94.7% of cases. However, infrastructure quality varies, with only 54.7% rating it as excellent and 6.6% rating it as fair, suggesting disparities in resource availability.

Recommendations

- Upgrade ICT infrastructure in institutions where it is rated as fair or good, ensuring all institutions have access to state-of-the-art digital resources.
- Improve internet connectivity in the 5.3% of institutions facing issues, ensuring uninterrupted access to online teaching-learning platforms.
- Enhance digital literacy training for faculty and students to optimize the use of e-learning tools, virtual simulations, and interactive learning technologies.

Objective 3. To identify key challenges faced by institutions in ITEP adoption, including curriculum restructuring, faculty development, student engagement, and administrative alignment, and propose strategic interventions.

Table 5: Student Readiness and Engagement

Response	Yes (Number, %)	No (Number, %)
Orientation provided on ITEP objectives	75 (100%)	0 (0.0%)
Internships/field-based learning opportunities available	75 (100%)	0 (0.0%)
Support for multilingual and communication skills	75 (100%)	0 (0.0%)

Table 5 assesses the preparedness of students for the Integrated Teacher Education

Programme (ITEP), focusing on orientation sessions, internships, and multilingual skill development. The findings suggest that institutions have made significant progress in ensuring student engagement and competency development, with all institutions (100%) meeting key indicators for student readiness.

1. **Orientation on ITEP Objectives**

- 100% of institutions provide orientation sessions on ITEP, ensuring that teacher trainees understand the goals, structure, and competency-based learning approach of the program.
- This highlights a proactive approach in familiarizing students with ITEP's interdisciplinary and skill-focused framework.

2. **Opportunities for Internships and Field-Based Learning**

- 100% of institutions offer internships and field experiences, reflecting a strong emphasis on practical, hands-on training for future educators.
- This aligns with NEP 2020's focus on experiential learning, ensuring that teacher trainees gain real-world classroom exposure before entering the profession.

3. **Support for Multilingual and Communication Skills Development**

- 100% of institutions provide structured support for multilingual and communication skill enhancement, which is crucial for inclusive and diverse classroom teaching.
- This ensures that pre-service teachers develop effective communication strategies, language proficiency, and culturally responsive teaching practices.

Overall Interpretation

The data indicates exceptional student readiness and engagement, with all institutions (100%) actively implementing orientation programs, internships, and multilingual support. These findings suggest that institutions have successfully aligned their student training initiatives with ITEP's objectives, fostering competency-based teacher education.

Recommendations

- Enhance the quality of internships by incorporating structured mentoring, reflective teaching practices, and digital teaching tools to prepare students for 21st-century classrooms.
- Strengthen multilingual education by integrating language labs, cross-cultural exchange programs, and digital language-learning resources.
- Introduce student feedback mechanisms to continuously assess the effectiveness of internship experiences and skill development programs.

Table 6: Challenges in Implementing ITEP

Challenges	Number (%)
Curriculum Restructuring	12 (16.0%)
Faculty Training & Capacity Building	9 (12.0%)
Student Awareness & Participation	8 (10.7%)
Technology Integration	6 (8.0%)
Administrative & Policy Alignment	4 (5.3%)

Table 6 identifies the key challenges institutions face in successfully implementing the Integrated Teacher Education Programme (ITEP). The findings indicate that while institutions have made significant progress in curriculum alignment, faculty training, and technological integration, several structural and operational barriers remain that may hinder full-scale implementation.

1. Curriculum Restructuring (16.0%)

- 16.0% of institutions cite curriculum restructuring as a major challenge, indicating difficulties in aligning existing programs with ITEP's competency-based, multidisciplinary approach.
- Resistance to change, lack of clear implementation guidelines, and the time-consuming process of revising course structures may be contributing factors.

2. Faculty Training & Capacity Building (12.0%)

- 12.0% of institutions report faculty development as a challenge, suggesting that while training programs exist, they may not be sufficiently frequent, in-depth, or accessible to all educators.
- The transition to innovative pedagogies, experiential learning, and digital integration requires continuous upskilling and professional development for faculty.

3. Student Awareness & Participation (10.7%)

- 10.7% of institutions struggle with student engagement, indicating that some teacher trainees may not be fully aware of ITEP's objectives, competency-based learning models, and long-term benefits.
- The shift from rote-based learning to a more interactive, research-oriented approach may require additional orientation programs and academic support.

4. Technology Integration (8.0%)

- 8.0% of institutions cite technological integration challenges, which could stem from inadequate ICT infrastructure, lack of faculty digital literacy, or inconsistent internet access.

- Institutions with fair or limited ICT facilities may struggle to fully incorporate e-learning, digital assessments, and online teaching methodologies.

5. **Administrative & Policy Alignment (5.3%)**

- 5.3% of institutions face difficulties in aligning institutional policies with ITEP implementation guidelines, suggesting issues related to governance, financial constraints, or bureaucratic delays.
- Effective ITEP execution requires strong administrative support, policy clarity, and smooth coordination between institutions, regulatory bodies, and accreditation agencies.

The data highlights curriculum restructuring (16.0%) and faculty capacity building (12.0%) as the most pressing challenges in ITEP implementation. Additionally, student engagement, technology adoption, and administrative alignment require focused interventions. These findings suggest that while institutions are making progress, targeted strategies are needed to overcome these barriers and ensure seamless integration of ITEP objectives.

Recommendations

1. Accelerate curriculum restructuring by providing institutions with clearer guidelines, faculty support, and structured transition plans.
2. Enhance faculty training by increasing the frequency of hands-on workshops, digital literacy sessions, and peer mentoring programs.
3. Boost student awareness and engagement through interactive orientation programs, career guidance sessions, and mentorship initiatives.
4. Invest in technological infrastructure to ensure equitable access to digital tools, stable internet, and e-learning platforms for all institutions.
5. Strengthen administrative coordination by promoting collaboration between institutions, accreditation agencies, and government bodies to facilitate policy alignment and smoother ITEP execution.

Conclusions

The findings from the assessment of Institutional Readiness for ITEP Implementation reveal a high level of preparedness among institutions, with significant strengths in policy compliance, student engagement, and technology integration. However, challenges persist in curriculum restructuring, faculty development, and administrative coordination, which need to be addressed for the seamless execution of ITEP.

1. **Institutional Preparedness and Policy Compliance:** Most institutions have strategic plans (90.7%), have conducted self-assessments (89.3%), and have supportive policies (97.3%) for ITEP implementation. Additionally, 82.7% have

already initiated the accreditation process, ensuring alignment with national regulatory frameworks. However, a small percentage of institutions lack strategic planning and accreditation efforts, which may hinder smooth adoption.

2. **Curriculum and Pedagogical Alignment:** A majority of institutions (74.7%) revise their curriculum annually, demonstrating a commitment to continuous improvement. Furthermore, 100% of institutions have incorporated courses on inclusive education and digital pedagogy, and 96.0% have adopted competency-based assessments. However, 34.7% of institutions have yet to fully implement multidisciplinary and experiential learning, which is crucial for achieving ITEP's holistic vision.
3. **Faculty Readiness and Professional Development:** While 70.7% of institutions provide regular faculty training, nearly 30% offer training only occasionally, highlighting the need for continuous capacity-building programs. Additionally, 90.7% of institutions have partnerships with NCERT/NCTE, ensuring access to standardized professional development. Institutions must focus on scaling up faculty training initiatives to ensure that all educators are equipped to deliver competency-based, technology-integrated instruction.
4. **Technological Infrastructure and Digital Readiness:** All institutions (100%) have integrated blended learning, and 94.7% ensure stable internet connectivity, demonstrating strong technological preparedness. However, only 54.7% rate their ICT infrastructure as excellent, while 6.6% rate it as fair, indicating disparities in access to advanced digital tools. Institutions with weaker technological capabilities should prioritize infrastructure upgrades to enhance the effectiveness of digital pedagogy.
5. **Student Readiness and Engagement:** Institutions are fully prepared in terms of student engagement, with 100% offering orientation programs, internships, and multilingual skill development. These findings indicate strong institutional efforts in fostering experiential learning and communication skills among teacher trainees, ensuring that students are well-prepared for ITEP's competency-based framework.
6. **Challenges in ITEP Implementation:** The most critical barriers include curriculum restructuring (16.0%), faculty training gaps (12.0%), and student awareness issues (10.7%). Additionally, 8.0% of institutions face technology integration challenges, and 5.3% struggle with administrative alignment. These challenges must be addressed through targeted interventions, increased institutional collaboration, and policy-level support.

Discussion

The findings of this study underscore the strong institutional preparedness for the

implementation of the Integrated Teacher Education Programme (ITEP). The results align with prior research (Sharma, 2021; Mukherjee & Roy, 2022) that emphasize the critical role of integrating subject knowledge with pedagogical training to enhance teacher preparedness. The study highlights that most institutions have made significant strides in policy compliance, faculty training, and technological infrastructure, which are crucial components of ITEP readiness. However, challenges persist in curriculum restructuring, faculty development, and administrative alignment, as noted in existing literature (Das & Gupta, 2021; Saxena & Verma, 2023).

A key aspect of institutional preparedness is curriculum alignment with the objectives of NEP 2020. The study found that 74.7% of institutions update their curriculum annually, ensuring that courses remain relevant and aligned with competency-based learning principles. This is consistent with Kumar (2020), who asserts that blended learning and competency-based assessment are crucial elements of modern teacher training programs. However, the 34.7% of institutions that have not yet fully embraced experiential and multidisciplinary learning may struggle to meet ITEP's holistic vision. This finding supports the argument by Das and Gupta (2021) that institutions often lack structured mechanisms for aligning their curricula with national education reforms, leading to inconsistencies in policy compliance.

Faculty preparedness remains a vital factor in successful ITEP implementation. The study indicates that 70.7% of institutions conduct regular faculty training, while 29.3% provide training only occasionally. Patel (2022) emphasizes the importance of structured professional development programs to equip educators with digital pedagogy skills and interdisciplinary teaching methodologies. The gap in faculty training identified in this study aligns with Saxena and Verma (2023), who highlight that many institutions lack systematic workshops and collaborations with regulatory bodies like NCERT and NCTE. To address this, institutions must enhance faculty development programs through continuous professional learning and collaboration with accreditation bodies.

Technological infrastructure plays a pivotal role in ITEP implementation, with 100% of institutions offering blended learning opportunities and 94.7% ensuring stable internet connectivity. This supports Joshi (2021), who underscores the benefits of digital tools in engaging teacher trainees. However, only 54.7% of institutions rate their ICT infrastructure as excellent, which is a concern given Reddy and Sharma's (2022) findings that institutions often struggle with inadequate technological facilities and resistance to digital adoption. Investing in ICT infrastructure and digital literacy training will be crucial in bridging these gaps.

The study also highlights challenges in accreditation and policy compliance. While 82.7% of institutions are in the process of obtaining accreditation, a small percentage lack strategic planning and accreditation initiatives, which may hinder smooth ITEP adoption. Mishra (2022)

notes that obtaining accreditation from agencies like NCTE requires adherence to stringent policies and resource allocation, which can be a barrier for some institutions. Additionally, Bose (2023) found that financial and administrative constraints often delay ITEP implementation, a challenge corroborated by the findings of this study.

In conclusion, the findings validate existing research on the importance of structured faculty training, curriculum alignment, and technological infrastructure in supporting ITEP implementation. While institutions demonstrate strong policy compliance and student engagement, targeted interventions in faculty development, ICT upgrades, and curriculum restructuring are necessary to fully realize ITEP's vision. Future research should explore financial sustainability models for ITEP, the effectiveness of digital pedagogy in teacher education, and the long-term impact of competency-based learning on teacher preparedness.

Educational Implications

The study highlights strong institutional readiness for ITEP, with effective policy compliance, student-centered learning models, and blended education systems in place. However, continuous curriculum reform, structured faculty training, and enhanced technological infrastructure are essential for ensuring that all institutions can fully realize the vision of ITEP and NEP 2020. Moving forward, institutions should focus on:

1. Strengthening curriculum reforms to integrate experiential and interdisciplinary learning effectively.
2. Expanding faculty development programs to ensure regular, in-depth training on competency-based education.
3. Enhancing ICT infrastructure to bridge digital access gaps and support technology-driven learning.
4. Boosting administrative coordination to ensure smooth policy alignment, accreditation, and institutional governance.
5. Encouraging collaborative initiatives between institutions, policymakers, and educational bodies for effective policy implementation and sustainable improvements in teacher education.

By addressing these areas, institutions will be better positioned to successfully implement ITEP and transform teacher education in alignment with NEP 2020's objectives.

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ELEVATING TEACHER EDUCATION THROUGH INSTITUTIONAL STRATEGIES FOR SEAMLESS ITEP INTEGRATION

Prabhjyot Kaur*

Abstract

The evolving landscape of teacher education necessitates institutional preparedness to implement the Integrated Teacher Education Program (ITEP) effectively. This paper explores strategic institutional approaches that facilitate the seamless integration of ITEP, ensuring alignment with contemporary educational demands. The primary purpose of this study is to examine proven institutional strategies that enhance the quality and effectiveness of ITEP implementation. The key objectives include identifying best practices adopted by institutions, analyzing structural and pedagogical adaptations, and evaluating the role of policy frameworks in supporting ITEP integration. The study follows a secondary research methodology, drawing insights from a comprehensive review of existing literature, policy documents, and research papers that highlight institutional readiness, challenges, and successful models of ITEP execution. The findings indicate that institutions that embrace innovative pedagogical frameworks, robust faculty development programs, and technology-driven learning ecosystems demonstrate higher efficiency in ITEP integration. Additionally, administrative preparedness, curriculum restructuring, and collaborative networks among stakeholders are critical enablers of success. The study underscores the necessity for strategic foresight and institutional adaptability to foster excellence in teacher education. These insights provide a roadmap for educational institutions striving to enhance teacher preparation and contribute to the broader goal of elevating teacher education standards.

Keywords: *Institutional Preparedness, Integrated Teacher Education Program (ITEP), Pedagogical Adaptations, Faculty Development, Strategic Foresight*

Introduction

Teacher education serves as the cornerstone of an effective education system, shaping the competencies, pedagogical skills, and professional ethics of future educators. The dynamic landscape of education in the 21st century demands a comprehensive and well-structured teacher preparation framework that equips aspiring teachers with subject expertise,

* Senior Research Fellow, Department of Education, Panjab University, Chandigarh

practical teaching methodologies, and experiential learning opportunities. Traditionally, teacher education in India has followed a segmented approach, where candidates complete a general undergraduate degree before pursuing a Bachelor of Education (B.Ed.). However, this disjointed model often fails to provide the continuity and coherence needed for holistic teacher preparation (Sing, Sing and Bhoi, 2023). In response to this gap, the Integrated Teacher Education Program (ITEP) has emerged as a transformative initiative aimed at redefining teacher education by integrating academic learning, pedagogical training, and field experience into a single four-year curriculum (Chakraborty, 2022).

As an interdisciplinary program, ITEP seeks to synchronize theoretical knowledge with practical application, fostering a progressive and competency-based teacher education framework. The introduction of ITEP represents a paradigm shift, requiring institutions to undergo structural and pedagogical transformations to ensure its effective implementation. Research highlights that institutional readiness, strategic curriculum restructuring, faculty upskilling, and infrastructural enhancements play a critical role in the seamless integration of ITEP (Jabbar & Barkati, 2023). Institutions that proactively embrace experiential learning models, interdisciplinary teaching approaches and mentorship-driven training are better positioned to implement ITEP successfully. The transition to ITEP demands comprehensive institutional strategies that address both curricular innovation and administrative preparedness. One of the fundamental shifts involves the redesigning of curricula to maintain a balance between subject specialization, pedagogical training, and school-based internships. Unlike the conventional B.Ed. program, which often separates theory from practice, ITEP emphasizes a simultaneous and immersive learning experience, where teacher trainees engage in progressive classroom exposure from the early stages of their training. Institutions that have successfully incorporated ITEP stress the importance of modular curricula, interdisciplinary coursework, and technology-enhanced teaching methodologies to enhance teacher preparedness (Sing, Sing and Bhoi, 2023).

The faculty training and professional development are critical components of institutional readiness. Faculty members must be equipped with modern pedagogical techniques, including active learning strategies, competency-based assessments, and digital teaching tools (Jabbar & Barkati, 2023). Research indicates that institutions that invest in faculty workshops, collaborative teaching models, and mentorship-driven training programs significantly enhance the effectiveness of ITEP implementation (Sultana and Pandey, 2023).

The technology integration is pivotal in modern teacher education. The adoption of blended learning, virtual teaching platforms, digital resource libraries, and AI-driven assessment tools can enhance learning outcomes, promote self-paced learning, and bridge theoretical-practical gaps (Sing, Sing and Bhoi, 2023). Institutions that have embraced e-learning solutions, online pedagogical training, and classroom simulation tools report higher levels of engagement and preparedness among teacher trainees. Despite its potential, the implementation of ITEP

is not without challenges. One of the key concerns is the perception of teacher trainees, who often express apprehensions regarding the program's intensity, extended duration, and rigorous assessment structure (Sultana and Pandey, 2023). Unlike traditional B.Ed. programs, which offer a relatively shorter timeframe, ITEP requires greater commitment and adaptability, which can sometimes discourage enrollment. Additionally, institutional constraints, such as faculty shortages, lack of infrastructure, and the need for collaborative school partnerships, pose significant obstacles to seamless integration.

The alignment of ITEP with school education systems remains a crucial factor. While the program emphasizes progressive classroom exposure, many schools lack the necessary ecosystem to support trainee teachers effectively. Research suggests that stronger collaboration between teacher education institutions and K-12 schools is needed to facilitate structured internship programs, mentor-based supervision, and real-time classroom engagement (Jabbar and Barkati, 2023). To ensure the successful adoption of ITEP, institutions must adopt multi-dimensional strategies that address the curricular, infrastructural, technological, and administrative aspects of implementation. Faculty upskilling initiatives, enhanced mentorship models, and school-based partnerships must be prioritized to create a conducive learning environment for teacher trainees. Additionally, institutions should emphasize research-driven pedagogical innovations, including the use of AI, data analytics, and competency-based assessments, to enhance teacher preparation (Sing, Sing and Bhoi, 2023).

This research explores institutional strategies for integrating ITEP, examining policy frameworks, best practices, and case studies to optimize teacher education. It aims to identify barriers, strategic interventions, and solutions for creating a supportive ecosystem. The study contributes to teacher education reform by providing practical recommendations to enhance institutional readiness and education quality.

Research Question

How can institutional strategies elevate teacher education for seamless ITEP integration?

Methodology

This study employs a qualitative research approach based on secondary data sources to analyze institutional strategies for the seamless integration of the Integrated Teacher Education Program (ITEP). The research primarily relies on an in-depth review of existing scholarly articles, policy documents, peer-reviewed journal articles, government reports that explore the challenges, best practices, and institutional readiness for ITEP integration. and empirical studies related to teacher education and ITEP implementation. A thematic analysis is conducted to identify patterns, strategies, and institutional challenges in ITEP implementation. Key themes include curriculum restructuring, faculty preparedness, administrative support and policy compliance.

Results

The findings of this study reveal that the seamless integration of the Integrated Teacher Education Program (ITEP) is largely dependent on well-structured institutional strategies. A key aspect is curriculum restructuring, where institutions align their programs with national education frameworks to incorporate multidisciplinary learning, experiential pedagogies, and competency-based training. Research indicates that structured subject specialization, digital pedagogies, and practice-based teaching enhance the professional preparedness of teacher trainees (Sing, Sing and Bhoi, 2022; Jabbar and Barkati, 2023). Another crucial strategy is faculty readiness and development, as institutions that invest in continuous professional development, mentorship models, and training in innovative teaching methods ensure that educators are well-equipped to guide trainees effectively (Sultana and Pandey, 2023). Furthermore, administrative support plays a significant role in ensuring smooth program execution. Institutions that establish dedicated ITEP committees, streamline admission processes, and enhance coordination among departments demonstrate greater efficiency in program implementation. Additionally, policy compliance and accreditation alignment are essential for the long-term sustainability of ITEP, as institutions that adhere to national teacher education standards and regulatory frameworks ensure program credibility. Infrastructure and technological advancements also contribute significantly, with institutions integrating smart classrooms, digital learning platforms, and blended learning models to enhance training quality. Overall, the study highlights that a comprehensive approach, combining curriculum innovation, faculty training, governance reforms, policy alignment, and technological integration, plays a pivotal role in elevating teacher education and ensuring the successful implementation of ITEP.

Discussion of Results

The implementation of the Integrated Teacher Education Program (ITEP) is a transformative step in the restructuring of teacher education, as envisioned by NEP 2020. Institutional strategies play a crucial role in ensuring that ITEP is not just introduced but effectively integrated into the teacher training ecosystem. The alignment of ITEP with NEP 2020 is necessary for enhancing teacher preparation, ensuring policy compliance, and fostering a multidisciplinary and experiential learning approach. One of the core objectives of NEP 2020 is to redefine teacher education through a holistic, integrated, and practice-based framework. ITEP, as a four-year undergraduate program, is structured to provide prospective teachers with a comprehensive understanding of pedagogy, subject knowledge, and real-world teaching experiences. Institutions implementing ITEP must focus on curriculum innovation by blending theoretical learning with hands-on experiences such as internships, field engagement, and digital pedagogies.

A significant institutional challenge in aligning ITEP with NEP 2020 is the adoption of a multidisciplinary approach. NEP 2020 emphasizes that teacher education should not be limited to traditional pedagogical studies but should incorporate liberal arts, sciences, and technology to develop well-rounded educators. Institutions can achieve this by collaborating across departments, integrating courses from multiple disciplines, and fostering a research driven learning culture. The policy mandates digital integration and experiential learning as key components of modern teacher education. To meet these requirements, institutions need to invest in smart classrooms, learning management systems (LMS), and blended learning models. This ensures that teacher trainees gain digital competency, a crucial skill for future educators in an evolving academic landscape. The school-based internships and experiential projects must be embedded within ITEP to strengthen the practical teaching competencies of trainees.

Another critical area of institutional preparedness is faculty training and professional development (Nial, Rout and Nag, 2024). Institutions must ensure that faculty members undergo continuous upskilling in emerging pedagogies, assessment techniques, and student engagement strategies to align with the evolving requirements of NEP 2020. Capacity-building workshops, peer mentoring programs, and engagement with national education regulatory bodies can help bridge the gap between policy expectations and practical implementation. Standardization and accreditation are also vital for ensuring seamless ITEP integration. Institutions must align their teacher education programs with the National Council for Teacher Education (NCTE) guidelines, ensuring that ITEP meets the national quality benchmarks. Regular audits, accreditation compliance and feedback-driven curriculum modifications can contribute to the sustained success of ITEP. The institutional governance and policy adaptation play a central role in the successful implementation of ITEP. Institutions must adopt flexible governance models that facilitate collaboration between policymakers, educators, and education researchers to continuously refine and enhance ITEP's execution. Strategic planning, policy mapping, and stakeholder engagement can ensure that institutional efforts remain aligned with the broader objectives of NEP 2020. So, bridging the gap between policy mandates and practical implementation requires institutions to develop structured, adaptable, and technology-driven strategies for ITEP. By fostering interdisciplinary learning, digital literacy, experiential teaching and regulatory compliance, institutions can elevate teacher education, making it more inclusive, effective, and future-ready (Ministry of Human Resource Development, 2020).

Educational Implications

The successful integration of ITEP within institutions requires a strategic approach to curriculum design, faculty development, and policy alignment. Ensuring its effective implementation will not only enhance teacher preparation but also improve overall educational

outcomes. These considerations have significant educational implications that must be addressed for sustained impact.

- **Institutional Preparedness for ITEP:** Institutions must adopt structured strategies to align with NEP 2020's vision of integrated teacher education. Establishing dedicated committees for ITEP implementation can enhance coordination and curriculum structuring. Regular capacity-building programs for faculty and administrative staff are essential for effective execution.
- **Curriculum Innovation and Multidisciplinary Approach:** ITEP curricula should blend pedagogical training with subject expertise and experiential learning. Encouraging interdisciplinary coursework by integrating humanities, sciences, and digital literacy ensures well-rounded teacher preparation. Modular learning and competency-based assessments can improve the effectiveness of teacher education programs.
- **Technology Integration in Teacher Education:** Adoption of digital tools, AI-driven assessments and blended learning models can enhance teacher training. Smart classrooms, virtual teaching platforms, and simulation-based teaching experiences can bridge the gap between theory and practice.
- **Strengthening Faculty Development:** The Faculty up-skilling initiatives should focus on modern pedagogical techniques, digital teaching tools and competency-based training. Peer mentoring, collaborative teaching models and workshops can foster continuous professional development.
- **Enhancing School-College Collaborations:** Stronger partnerships between teacher education institutions and K-12 schools are crucial for effective field training. Structured internship models with mentor-based supervision can improve practical teaching competencies among trainees.
- **Addressing Institutional Challenges:** Overcoming faculty shortages, infrastructure constraints, and resource limitations requires proactive institutional planning. Financial and policy support from government bodies can help bridge gaps in technology access and administrative readiness.
- **Ensuring Policy Compliance and Accreditation:** Institutions must align with NCTE guidelines and national teacher education standards to maintain quality and credibility. Regular audits, accreditation reviews and stakeholder engagement can support continuous improvement in ITEP implementation.

Conclusion

The implementation of the Integrated Teacher Education Program (ITEP) represents a pivotal advancement in teacher education, requiring institutions to adopt strategic approaches that ensure its effectiveness. By restructuring curricula, integrating digital tools, fostering faculty

development, and strengthening school-based training, institutions can create a dynamic and competency-driven framework for teacher preparation. This study highlights the necessity of bridging the gap between theory and practice, encouraging interdisciplinary collaboration, and promoting research-driven innovation to enhance teaching methodologies. A well-executed ITEP model not only prepares future educators to navigate the complexities of modern classrooms but also contributes to the overarching goal of improving educational quality at all levels. As education systems evolve, institutions must remain proactive in refining pedagogical strategies and integrating emerging technologies to meet contemporary challenges. Ultimately, a well-integrated and research-backed ITEP will play a crucial role in cultivating reflective, adaptable, and future-ready educators, ensuring the long-term sustainability and advancement of quality education.

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OBSTACLES TO INSTITUTIONAL READINESS FOR ITEP IN HIGHER EDUCATION OF INDIA: A QUALITATIVE STUDY ON STUDENTS

Shiva Sharma* & Dr. Amritpal Kaur**

Abstract

For the successful implementation of an educational policy or programme, institutional readiness to accept the upcoming changes plays a vital role. The teacher education institutions have also primed themselves since the introduction of the Integrated Teacher Education Programme (ITEP) which was launched by NCTE. ITEP is one of the major initiatives of NEP 2020 which allows a student who has cleared 10+2 exam to do a dual degree in one attempt. ITEP aims to equip the students with all the necessary skills and professional education which will make them a qualified teacher. However, institutions have faced numerous issues in implementing the program which have to be resolved. This research aims to study such issues and obstacles to institutional readiness, particularly focusing on the experiences of the students studying under ITEP institutions. The study delves into the issues and insights provided by the students studying in ITEP higher education institutions, which will shed light on the areas of improvement while implementing such a programme. The study embraced the qualitative research methodology and collected the data with the help of the semi structured scheduled questionnaire prepared by the researcher(s). Interviews with students were conducted and simple statistical techniques were used to analyze the data. The study highlights the issues and experiences of students studying in the ITEP implied higher education institutions so that timely solutions to tackle such barriers can be found which will ensure seamless implementation of ITEP programs in HEIs.

Keywords: ITEP, Institutional Readiness, Higher Education, Students, Teacher Education

Introduction

The education policies are framed by the government to achieve several objectives like promotion of social mobility, improvement in quality of education, better allocation of resources and enhancement of professional development in teachers etc. Such goals and objectives set by the government could only be achieved when all the stakeholders take their role diligently

* Research Scholar, Department of Education, Panjab University, Chandigarh

** Chairperson, IETVE, Panjab University, Chandigarh

and the initiatives and strategies are properly implemented. The recent educational policy in India, NEP 2020, also included numerous initiatives, one of the initiatives which caused a stir in the education sector of the country was the Integrated Teacher Education Programme (ITEP) which was launched by NCTE. ITEP is one of the major initiatives of NEP 2020 which allows a student who has cleared 10+2 exam to do a dual degree in one attempt. ITEP aims to equip the students with all the necessary skills and professional education which will make them a qualified teacher. However, institutions have faced numerous issues in implementing the program which have to be resolved. This research aims to study such issues and obstacles to institutional readiness, particularly focusing on the experiences of the students studying under ITEP institutions. Institutional readiness refers to the preparedness of any organization to implement new changes in the organization. The study aims to identify the key barriers while studying and exploring such obstacles in higher education institutions implying ITEP.

Literature Review

There exists a huge gap between the campus and school based components, the disconnect never lets the successful implementation of the policies framed by the government. Among several factors which play a vital role in the successful implementation of educational reforms, studies have pointed out that the existing inertia of the institutions at times hinders the embracement of such transition of policies and strategies (Fullan, 2007; Darling-Hammond, 2017).

There are external and internal factors which can be stated as accountable agents to ensure the quality of education in the country. Higher education organizations are referred to as physical spaces where knowledge, competency and skills are inculcated in the student of that discipline (Abay and Marishane, 2023). Time and again scholars have emphasized the importance of experiential learning and mentorship of pre-service teachers during their period of training under which their professional teaching skills are significantly polished (Zeichner, 2010; McGlinn, 2003). It is evident that new teacher education programs like ITEP need to be adopted with utmost attention otherwise the institutions might face issues in smooth transition.

ITEP in India is in its very initial stages thus it becomes even more important to explore the obstacles and hurdles faced during the transition of course in institutions. The one who is supposed to be most impacted by the success of such a course is the youth of the country enrolled under such courses, thus, this study aims to take into account the challenges faced by the students studying in such HEIs so that steps can be taken on time.

Methodology

This study has adopted a qualitative research methodology to study the institutional readiness and experiences of the students studying in ITEP-offering institutions. The data was

collected with the help of semi structured interviews conducted with the students currently enrolled in the ITEP program. The common trends and patterns were identified from the collected data with the help of simple statistical techniques.

Findings and Discussion

One of the major concerns mentioned by students was the lack of appropriate infrastructure to access the successful execution of ITEP courses in institutions. About 73% of students have mentioned that their institutions either don't have model classrooms which play a pivotal role in their teacher training or the curriculum was not completely developed before their enrollment which has led to inconsistencies in their training and learning. The institutions need to pay attention and invest in the laboratories, especially for science students, digital resources in classrooms, arrangement of model classrooms used for simulation teaching and collaborative learning spaces for the students.

Effective transaction of Curriculum and Training in schools turned out to be the second sizable issue mentioned by the students during interviews. Many students felt that they felt pressured to balance the theoretical and practical parts of the course. One student A mentioned that "I was notified only a few days before the actual on field school internship, I was nervous in front of students as I prepared haphazardly for the internship. My queries left unattended." Teaching is not an easy task, one must be fully prepared before entering such a field. It is the responsibility of the institutions to plan in advance for such training and internships. Students should be timely informed and a proper time table shall be maintained according to the curriculum to be followed so that there is no coherence between the practical and theoretical parts. When students feel burdened then it means that institutions are not adopting a student-centric approach while transacting the curriculum.

Some students have also raised the issue of faculty preparedness and guidance by their mentors, the major percentage of students interviewed were satisfied with the topics taught or lectures delivered in classrooms but a few mentioned that few appointed faculty members were not fully prepared for the newly introduced topics in the curriculum. A teacher can only help his students to navigate their path if he has accustomed himself to the new structure of the ITEP course. Continuous faculty development programs seemed to be the best solution in order to update the knowledge of the faculty members teaching in the higher education institutes running ITEP courses.

To avoid the general administrative hurdles the permissions should be granted in time to run the courses in an efficient manner. Enhanced student support will equip the students with the necessary skills, better confidence and knowledge of their respective pedagogies which will ultimately lead to enhanced learning outcomes for the students studying ITEP courses.

Conclusion

To contribute to the broader goals of NEP 2020 it is important to implement ITEP courses in the institutions as it aims to improve teacher education in the country. The institutions need to have a comprehensive approach and must diligently address the institutional readiness, proper guidance for students, arrangement of faculty development programs for its staff and support system for students studying ITEP courses.

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Theme IV

*Globalization of Indian Higher Education:
Enhancing Global Rankings and
Competitiveness*

GLOBALIZATION OF INDIAN HIGHER EDUCATION: A TRANSFORMATIVE JOURNEY

Anju Sharma*

Abstract

India has been in the forefront of the globalisation of higher education, which has changed the face of research and learning everywhere. Higher education institutions in India have broadened their perspectives during the past several decades by interacting with the international academic community, adopting innovative teaching strategies, and giving teachers and students the chance to take part in the most innovative educational processes on the planet. In addition to student mobility, cooperation, curricular development, research innovation, and the worldwide recognition of Indian institutions are all aspects of the globalisation of higher education in India. This trip represents an important turning point in the development of education in the country. India's educational institutions are adopting globalization at a never-before-seen rate, as evidenced by the growth of global ranking systems and an increase in international collaborations. This article examines the complex history of Indian higher education in the context of globalisation, stressing its successes, setbacks, and prospects.

Keywords: Globalization, Higher Education, Innovation, Academic, Research

The Globalization Trend: A Historical Overview

The integration of international systems, economies, cultures, and technology is referred to as globalisation in its widest definition. It describes the expanding cross-border flow of teachers, students, research, and knowledge in the context of higher education. Since the late 20th century, India, which has a vast and varied educational system, has been progressively assimilating into the international academic system.

Higher education in early post-independence India was centred on meeting national requirements and promoting self-sufficiency. Higher education establishments such as the Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs) prioritised domestic growth, largely meeting local requirements.

Education in the Context of Globalization

- **Strategic Partnerships and International Collaborations:** The establishment

* Research Scholar, Department of Education, Panjab University, Chandigarh

of strategic alliances with universities and other organisations worldwide marked the beginning of India's involvement in international academics. These partnerships have been essential in raising Indian universities' profile internationally. Memorandums of understanding (MOUs) have been signed by universities for dual-degree programs, student exchanges, and research partnerships. The globalisation of Indian higher education has been further aided by the existence of prestigious foreign universities that offer combined programs with Indian colleges.

For instance, prestigious international universities like MIT, Stanford, and Harvard now frequently work with organisations like the Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs). These collaborations promote cross-cultural academic interactions while raising the standard of instruction and research.

- **The Growth of International Academic Institutions in India:** India has also welcomed international universities in response to the rising demand for top-notch education. Numerous well-known foreign universities have set up campuses or partnerships in India, providing degrees that are accepted around the world. In addition to drawing students, these collaborations improve the academic calibre of higher education in India. For example, the SP Jain School of Global Management offers internationally renowned business programs, while the University Of Chicago Booth School Of Business offers executive programs in India. These initiatives further integrate India into the world academic system by drawing in overseas students in addition to serving Indian students.
- **Outbound and Inbound Student Mobility:** This is a key aspect of the globalisation of Indian higher education. With aspirations for higher education, better career prospects, and global exposure, millions of Indian students travel abroad each year to pursue studies in countries like the United States, the United Kingdom, Canada, and Australia. This outward mobility has not only facilitated the exchange of knowledge but also allowed Indian students to immerse themselves in international cultures and networks. At the same time, India is growing in popularity as a study abroad location. India has seen a rise in the number of overseas students enrolling in its schools because of its rich cultural variety, affordable cost of living, and excellent technical education. Foreign enrolments at IITs, IIMs, and institutions such as Jawaharlal Nehru University (JNU) have been steadily increasing, particularly from South Asian, Middle Eastern, and African nations.
- **Curriculum Reform and Internationalization:** India's higher education curriculum has seen substantial modifications as a result of the drive for globalisation. International best practices for curriculum building are being embraced by Indian colleges more and more. Indian educational institutions are more in line with the global academic framework by incorporating contemporary, interdisciplinary approaches. Students can now pursue

specialised programs that are recognised globally thanks to the shift towards more flexible and adaptive curricula.

To satisfy the needs of international enterprises, programs including data science, artificial intelligence, and liberal arts are being implemented. In addition to guaranteeing that Indian students can compete internationally, the expansion of English-medium teaching draws students from non-English speaking nations.

- **The Role of Technology and Online Education:** The globalisation of Indian higher education has been greatly affected by the digital revolution. Students all around India now have access to international learning possibilities because of online education platforms like Coursera, edX, and Udacity. In response, several Indian colleges have started providing online degree programs and MOOCs (Massive Open Online Courses) in partnership with worldwide platforms, allowing students to obtain internationally recognised certificates from the convenience of their homes.

Innovative ed-tech platforms and enterprises have also emerged in India, assisting institutions in connecting with instructors and specialists throughout the world. The finest of both Indian and international educational resources are now available to Indian students through virtual classrooms, digital libraries, and online partnerships with foreign universities.

- **Research Collaboration and Innovation:** The increasing significance of research is another important factor in the globalisation of Indian higher education. Indian academics are helping to address global issues, and Indian universities and research institutes are taking part in international research projects more and more. Scholars and organisations from all over the world participate in collaborative research projects, especially in fields like healthcare, sustainable development, and climate change.

Numerous research institutions in India, such as the Department of Biotechnology (DBT) and the Indian Council of Scientific and Industrial Research (CSIR), work with international scientific communities. Research mobility programs and foreign conferences also stimulate information sharing and networking among Indian and global researchers, enhancing India's prominence in the worldwide academic community.

- **Government Policies and Initiatives:** The Indian government has taken a number of actions to raise the standard and accessibility of education after realising the significance of globalisation in higher education. The goal of programs like the Study in India Program, the Atal Innovation Mission (AIM), and the National Institutional Ranking Framework (NIRF) has been to raise the profile of Indian institutions internationally.

Challenges Faced by Indian Higher Education in the Globalized World

Despite the numerous benefits, the globalization of higher education in India comes with

its set of challenges:

- **Quality vs. Quantity:** India has a lot of universities, but there is a big difference in the quality of education at the best ones compared to the others, and closing this gap is still a major problem for the nation.
- **Brain drain:** which occurs when a large number of graduates from prestigious Indian universities decide to settle and work abroad because of better career opportunities and research facilities, has long been a concern. This phenomenon makes it more difficult for India to retain its intellectual capital.
- **Equity and Accessibility:** Although India's higher education system has expanded quickly, students from underprivileged backgrounds still face barriers to receiving a top-notch education. Low-income students find it challenging to compete on a global scale due to rising tuition costs, a dearth of scholarships, and inadequate support networks.
- **Cultural and Linguistic Barriers:** Students may have difficulties with language competency and cultural differences when participating in foreign academic contexts, despite the fact that English is extensively used in Indian higher education.

The Future of Indian Higher Education in the Global Context

- As India continues to embrace the forces of globalization, its higher education sector is poised for further transformation. The next steps should involve addressing existing challenges while capitalizing on emerging trends to stay competitive in the global arena.
- **Innovative Pedagogy and Technology Integration:** One of the main forces behind globalisation is the incorporation of technology in the classroom. To keep up with international trends, Indian universities must implement new teaching strategies like blended learning, AI-powered tools, and virtual classrooms.
- **Focus on Research and Innovation:** India's emphasis on research and development must expand if it is to make a difference on the world scene. Increased finance, industry-academia partnership, and an emphasis on research quality may move India's higher education institutions toward worldwide greatness.

Conclusion

Indian higher education's globalisation is a revolutionary process that is influencing education both domestically and internationally. A new generation of leaders, innovators, and thinkers will be cultivated by Indian institutions as they embrace technology, integrate international standards, and promote global partnerships. India's higher education system is poised to become a truly global player with additional investments in research, infrastructure, and academic autonomy, enabling both students and teachers to prosper in a world that is changing quickly.

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INDIAN HIGHER EDUCATION: CHALLENGES AND OPPORTUNITIES ON A GLOBAL STAGE

Gurveer Singh*

Abstract

India now boasts one of the biggest education systems in the world thanks to its substantial expansion in the higher education sector. Nevertheless, enduring problems with quality, accessibility, and global competitiveness still impede its advancement in spite of this expansion. In contrast to international standards, this article explores the historical development, current trends, significant obstacles, and potential future of Indian higher education. It also assesses the strategic changes and governmental policies required to improve India's reputation in the international academic community.

Keywords: *Indian higher education, global competitiveness, quality standards, international collaboration, National Education Policy 2020.*

Introduction

Innovation in technology, social advancement, and economic growth are all based on higher education. With a sizable and youthful population, India boasts a vast network of colleges and institutions offering a wide range of academic programs. However, the country has a lot of obstacles to overcome in order to rank highly in international university rankings, research output, and international partnerships. In addition to offering strategic insights for turning India into a globally competitive education powerhouse, this paper includes a thorough overview of the country's higher education system.

Evolution of Higher Education in India

The higher education system in India has changed in several stages:

- **Ancient Learning Centers:** Among the first formalized institutions of higher learning in history, universities like Takshashila and Nalanda drew students from all over Asia and beyond.
- **Reforms of the Colonial Era:** To meet colonial administrative demands, the British established Western-style universities, such as the University of Bombay, the University of Madras, and the University of Calcutta.

* Assistant professor, Political Science, G.T.B. National College, Dakha

- **Post-Independence Expansion:** Under the direction of the University Grants Commission (UGC), India established prestigious institutions like the Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), and All India Institute of Medical Sciences (AIIMS) in order to prioritize education after gaining independence in 1947.
- **Privatization Era (1990s–Present):** As a result of liberalization measures, more private universities opened up, increasing educational access but also igniting worries about commercialization and inequalities in quality.

Indian Higher Education's Present Situation

With more than 40 million students enrolled in more than 1,000 universities and 42,000 institutions, India's higher education system is distinguished by:

- **Diverse Institutional Framework:** The system includes autonomous colleges, deemed-to-be universities, private universities, and central and state institutions.
- **Growing Enrollment:** Although the Gross Enrollment Ratio (GER) has increased to about 27%, it is still below that of industrialized countries such as China (51%), and the United States (88%).
- **Limited International Recognition:** Only a small number of Indian universities, including IITs and IISc, routinely appear in international rankings.
- **Inadequate Research Ecosystem:** Although India produces around 5% of the world's research publications, its financing and citation impact are still quite low.
- **Internationalization Gap:** India's competitiveness in the global education market is lowered by a lack of foreign instructors and a low enrollment of international students.

Comparing Higher Education Models Worldwide

- **United States:** Thanks to robust research funding, state-of-the-art facilities, and industry-academia partnerships, the US tops international university rankings.
- **China:** Chinese universities, including Tsinghua and Peking, have achieved world-class status thanks to strategic government investment.
- **Europe:** Countries like the UK and Germany place a strong emphasis on multidisciplinary research, academic autonomy, and generous public support.
- **Emerging Asian Models:** To improve employability and innovation, Singapore and South Korea have redesigned their educational systems to closely match industrial demands.

Indian Higher Education's Obstacles

India's higher education system is facing obstacles that hinder its ability to compete globally

at this critical juncture. Even though it is one of the biggest educational networks in the world, problems including uneven quality standards, a lack of research, complicated regulations, difficulty with employability, little international cooperation, and financial limitations still exist. A complex strategy including strategic investments, policy reforms, and a dedication to quality improvement is needed to address these issues.

- **Inconsistent Quality Standards:** There is a noticeable difference in the quality of education between institutions. Many universities struggle with out-of-date curricula, inadequate faculty development, and inadequate facilities, despite the strict standards upheld by prestigious institutions like the Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs). On the international front, this discrepancy damages India's higher education system's reputation.
- **Research Deficit:** Compared to the USA and China, where R&D expenditures account for 2.7% and 2.1% of GDP, respectively, India's R&D investment is still relatively low at around 0.7%. Scientific innovation and technological advancement—two crucial elements for international academic recognition—are hampered by this inadequate funding.
- **Regulatory Complexities:** The University Grants Commission (UGC), All India Council for Technical Education (AICTE), and Medical Council of India (MCI) are among the several regulatory agencies that keep an eye on the higher education industry. This diversity stifles institutional autonomy and innovation by frequently causing bureaucratic delays and impeding the prompt implementation of policies.

The lack of practical skills and real-world exposure leaves many graduates unprepared for the job market, contributing to high unemployment rates among educated youth. **Employability Concerns:** Due to a disconnect between academic curricula and industry requirements, a significant portion of Indian graduates experience underemployment. **Limited International Collaboration:** India's higher education institutions have relatively few partnerships with international universities, and the lack of foreign faculty and limited student exchange programs hinder the internationalization of Indian campuses, affecting their ability to compete globally.

Funding Restrictions: Despite prior education programs' recommendations, India's public spending on higher education has fallen short of the 6% GDP threshold. This deficiency makes gaps in educational quality and access worse, especially when combined with the commercialization inclinations of private sector involvement.

The Indian Government has Introduced Key Policies to Address these Challenges:

- **National Education Policy (NEP) 2020:** By encouraging interdisciplinary learning, increasing institutional autonomy, and supporting research initiatives, this policy seeks to transform the educational landscape. In line with the demands of the twenty-first century, it places an emphasis on an all-encompassing, adaptable, and multidisciplinary approach to education.

- **Institutions of Eminence (IoE):** By giving them more autonomy and funding, this program aims to turn a few Indian universities into world-class institutions capable of competing on a global scale.
- **Study in India Initiative:** In order to improve cultural variety and international cooperation inside Indian universities, this program seeks to establish India as a top global education destination and draw in international students. By replacing several supervisory organizations, the Higher Education Commission of India (HECI), which is being proposed as a single regulatory body, seeks to simplify governance, lower administrative barriers, and create an atmosphere that is more favorable for innovative education.
- **National Research Foundation (NRF):** By allocating sufficient funds and resources, the NRF seeks to support research in all fields and promote an innovative and inquisitive culture.

Strategic Suggestions for an Internationally Competitive Framework

- **Enhancing Research Infrastructure:** Establishing state-of-the-art research facilities, expanding R&D funding, and fostering public-private partnerships can encourage scientific discoveries and technical advancements.
- **Strengthening International Collaborations:** Forging collaborations with recognized worldwide institutions, supporting faculty and student exchanges, and encouraging joint research initiatives can increase academic quality and global exposure.
- **Industry-Aligned Curriculum Development:** One way to close the knowledge gap between education and employability is to regularly update curricula to reflect industry changes, incorporate hands-on training, and encourage entrepreneurship.
- **Simplifying Regulatory Mechanisms:** An educational environment that is more dynamic and responsive can be achieved by streamlining approval procedures, giving institutions more autonomy, and guaranteeing transparent governance.
- **Leveraging Digital Education:** Learning outcomes can be improved and education made more accessible by embracing online learning platforms, incorporating technology into instructional strategies, and increasing access to digital resources.

Conclusion

At this critical juncture, deliberate reforms, significant investments, and international partnerships have the potential to make India's higher education system a globally competitive force. By supporting interdisciplinary education, research advancement, and institutional autonomy, the National Education Policy (NEP) 2020 has established a strong basis. The ambitious goal of a 50% Gross Enrollment Ratio (GER) by 2035 requires a paradigm shift toward quality and inclusivity in addition to infrastructure expansion.

The research ecosystem in Indian institutions is a crucial area that requires attention.

Research and development (R&D) spending in India is currently around 0.7% of GDP, which is much less than that of the world's top countries. Building industry-academia cooperation is crucial to closing this gap. Another crucial aspect is the internationalization of Indian higher education. An example of the reverse flow of educational achievement is the recent trend of prestigious international universities, like the University of Southampton, opening campuses in India. In addition to giving Indian students access to top-notch education at a fraction of the price of studying overseas, this trend encourages healthy competition among domestic universities to raise their quality. Moreover, by providing high-quality education domestically, such programs help stop the brain drain.

In conclusion, a diversified strategy is essential to transforming India's higher education system into a force to be reckoned with on a worldwide scale. This involves embracing worldwide cooperation to raise educational standards, making sure that educational expansion is in line with economic opportunities, and strengthening research capacities through strategic investments and partnerships. India can capitalize on its demographic dividend and establish itself as a global leader in the knowledge economy by resolutely putting these policies into practice.

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GLOBALIZATION OF INDIAN EDUCATION: LONG-TERM IMPLICATIONS OF THE EMERGING POLICY LANDSCAPE

Mona Sharma*

Abstract

The globalization of Indian education presents both significant opportunities and challenges. This paper explores the long-term implications of this evolving landscape, analyzing the potential benefits and inherent risks for various stakeholders. Driven by technological advancements, evolving economic landscapes, and aspirations for global citizenship, Indian education is undergoing a transformation, with the National Education Policy (NEP) 2020 emphasizing internationalization. While globalization offers enhanced quality and relevance through exposure to international best practices and collaborations, it raises concerns about increased inequality and access. The potential for brain drain necessitates creating attractive opportunities within India. Preserving Indian culture and values alongside global perspectives requires a balanced approach. Robust quality assurance mechanisms for international programs and faculty development are crucial. Ultimately, the success of globalization hinges on building a robust research ecosystem. Navigating these complexities will determine whether India can leverage globalization to transform its education system into a global powerhouse.

Keywords: *Globalization, Indian Education, National Education Policy (NEP) 2020*

Introduction

The globalization of Indian education is no longer a distant prospect but a rapidly unfolding reality. Driven by a confluence of factors – including technological advancements, evolving economic landscapes, and a growing aspiration for global citizenship – Indian education is undergoing a significant transformation. This essay will explore the long-term implications of this emerging policy landscape, examining both the potential benefits and the inherent challenges. It will delve into the impact on various stakeholders, including students, faculty, institutions, and the nation as a whole, while considering the ethical and socio-cultural dimensions of this evolving paradigm.

Historically, Indian education has been largely inward-focused, shaped by national priorities and historical legacies. The emphasis has been on providing access to education

* Lecturer, M.G.M. Junior College Science, Nerul, Navi Mumbai

for a vast and diverse population, often within resource constraints. However, the forces of globalization are compelling Indian education to look outwards, to engage with international standards, and to prepare students for a globally interconnected world. This shift is reflected in recent policy initiatives, such as the National Education Policy (NEP) 2020, which emphasizes internationalization as a key pillar of educational reform. The NEP envisions Indian universities becoming global players, attracting international students and faculty, and fostering collaborations with institutions abroad. It also encourages the development of programs that incorporate global perspectives and prepare students for international careers.

One of the most significant long-term implications of the globalization of Indian education is the potential for enhanced quality and relevance. Exposure to international best practices, curriculum frameworks, and research methodologies can drive improvements in the quality of teaching and learning. Collaboration with foreign universities can facilitate the exchange of knowledge and expertise, leading to the development of innovative programs and research initiatives. Furthermore, a globalized education system can better equip Indian students with the skills and competencies needed to thrive in a globalized job market. Fluency in foreign languages, intercultural understanding, and exposure to diverse perspectives become invaluable assets in an increasingly interconnected world. This can lead to improved employability for Indian graduates, both domestically and internationally.

The influx of international students into Indian universities can also have a positive impact on the academic environment. It can foster a more diverse and vibrant campus culture, enriching the learning experience for all students. Exposure to different cultures and perspectives can broaden students' horizons and promote intercultural understanding, which is crucial in today's globalized world. Furthermore, international students can contribute to the research ecosystem in India, bringing new ideas and perspectives. This can lead to increased research output and innovation, benefiting the nation as a whole.

However, the globalization of Indian education also presents significant challenges. One of the primary concerns is the potential for increased inequality. Access to globalized education, with its associated benefits, may be limited to a privileged few, exacerbating existing disparities. The cost of studying in international programs or at foreign universities can be prohibitive for many Indian students, particularly those from disadvantaged backgrounds. This can create a two-tiered system, where only the affluent have access to global education, while the majority are left behind. Addressing this challenge requires careful policy interventions, such as scholarships, financial aid programs, and the development of affordable international programs within India.

Another challenge is the potential for brain drain. As Indian students gain access to global education and opportunities, there is a risk that many may choose to stay abroad after graduation, seeking better career prospects and higher standards of living. This can lead to a loss of talent and expertise for India, hindering its economic and social development. To

mitigate this risk, it is crucial to create attractive opportunities for graduates within India, by fostering a vibrant research ecosystem, promoting innovation, and creating a supportive environment for entrepreneurship.

The globalization of Indian education also raises concerns about the preservation of Indian culture and values. Exposure to Western educational models and cultural influences can lead to a homogenization of education, potentially eroding local traditions and knowledge systems. It is important to ensure that the process of globalization does not lead to the neglect of Indian languages, literature, and cultural heritage. A balanced approach is needed, one that embraces global perspectives while preserving and promoting India's rich cultural diversity. This requires incorporating Indian knowledge systems and cultural values into the curriculum, alongside global perspectives, creating a truly inclusive and culturally relevant education.

Furthermore, the quality assurance mechanisms for international collaborations and programs need careful consideration. It is essential to ensure that partnerships with foreign universities are based on mutual benefit and adhere to high academic standards. Robust accreditation processes are needed to maintain the quality and credibility of international programs offered in India. This requires a strong regulatory framework that protects the interests of students and ensures that they receive a high-quality education.

The role of faculty in the globalization of Indian education is also crucial. Faculty members need to be equipped with the skills and competencies needed to teach in a globalized environment. This includes developing intercultural competence, familiarity with international best practices, and the ability to incorporate global perspectives into their teaching. Faculty exchange programs and collaborations with foreign universities can play a vital role in faculty development. Investing in faculty development is essential to ensure that Indian universities are able to attract and retain high-quality faculty, who can contribute to the globalization of education.

Finally, the long-term success of the globalization of Indian education depends on the development of a robust research ecosystem. A strong research base is essential for attracting international students and faculty, fostering innovation, and contributing to global knowledge creation. Investing in research infrastructure, promoting interdisciplinary research, and fostering collaborations with international research institutions are crucial steps in building a world-class research ecosystem in India.

Conclusion

In conclusion, the globalization of Indian education presents both immense opportunities and significant challenges. It has the potential to enhance the quality and relevance of education, prepare students for a globalized world, and contribute to the development of a vibrant research ecosystem. However, it also raises concerns about inequality, brain drain, the preservation of Indian culture, and the need for robust quality assurance mechanisms.

Addressing these challenges requires a comprehensive and nuanced approach, involving policymakers, institutions, faculty, and students. A balanced approach is needed, one that embraces global perspectives while preserving and promoting India's rich cultural heritage. By carefully navigating the complexities of globalization, India can leverage its demographic dividend and transform its education system into a global powerhouse, preparing its citizens for the challenges and opportunities of the 21st century. The long-term implications of the emerging policy landscape will depend on the choices we make today, and the vision we have for the future of Indian education.

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INDIAN HIGHER EDUCATION IN A GLOBALIZED WORLD AND THE NEED FOR CULTURAL LITERACY

Preksha*

Abstract

The globalization of Indian higher education has opened pathways for international collaborations, student mobility and academic reforms. However, this transition also presents challenges related to cultural adaptation, linguistic diversity and the preservation of indigenous knowledge systems. This study explores the role of cultural literacy in enhancing the globalization of Indian higher education, emphasizing its significance in bridging local traditions with global academic standards. Through a descriptive research design, the study examines the challenges and opportunities associated with integrating cultural literacy into university curricula. The findings reveal that cultural literacy fosters global competencies, improves intercultural communication and strengthens students' adaptability in international academic environments. However, policy gaps, inadequate faculty training, language barriers and the dominance of Western-centric curricula hinder its effective implementation. The study also highlights opportunities for reform, particularly through the National Education Policy (NEP) 2020, which promotes multidisciplinary learning, indigenous knowledge integration and international collaborations. Leveraging technology, faculty development programs and cross-cultural learning initiatives can further enhance cultural literacy in Indian universities. The study concludes that cultural literacy is essential for ensuring a balanced and inclusive globalization of Indian higher education. Strengthening its integration into curricula, institutional policies and teaching methodologies will not only equip students with global competencies but also preserve India's rich academic and cultural heritage in an interconnected world.

Keywords: Cultural Literacy, Globalization of Higher Education, Indian Universities, National Education Policy 2020, Intercultural Competence.

Introduction

The globalization of higher education has transformed academic landscapes, creating a dynamic exchange of knowledge, culture and ideas across borders. Indian higher education, traditionally rooted in diverse linguistic and cultural traditions, is now increasingly integrated into the global academic framework (Altbach and Knight, 2007). While this shift provides

* Research Scholar, Department of Education, Panjab University, Chandigarh

opportunities for academic collaboration, research advancement and student mobility, it also raises challenges related to cultural adaptation, linguistic diversity and the preservation of indigenous knowledge systems (Mukherjee, 2021). A study by Agarwal (2019) discusses how Indian universities are adapting to global trends by integrating international curricula, establishing partnerships with foreign institutions and adopting digital learning platforms. However, it emphasizes the need to safeguard local knowledge traditions and ensure that globalization does not lead to cultural erosion.

Cultural literacy, as defined by Holliday (2018), is the ability to engage meaningfully with diverse cultural perspectives and contexts. In the realm of higher education, it plays a crucial role in fostering global competence while maintaining local identity (Choudhury, 2020). Studies by Banks and Banks (2021) suggest that universities that integrate cultural literacy into their teaching methods produce graduates who are better equipped to navigate global work environments. Research by Sharma and Gupta (2022) indicates that cultural literacy can enhance intercultural communication skills, reduce biases and promote inclusivity in classrooms. Their study highlights that culturally responsive teaching methodologies lead to improved student engagement and a deeper appreciation of diversity.

The National Education Policy (NEP) 2020 has placed significant emphasis on both globalization and cultural literacy in Indian higher education. According to the Ministry of Education (2020), NEP aims to internationalize Indian universities while preserving India's cultural heritage. It advocates for multidisciplinary education, the inclusion of Indian languages and the promotion of global citizenship values. Rao (2021) argues that while NEP 2020 provides a strong foundation for integrating cultural literacy, its success depends on the effective implementation of policy frameworks. Universities need to develop culturally inclusive curricula that blend global perspectives with indigenous knowledge systems.

Despite the recognized importance of cultural literacy, several challenges hinder its implementation in Indian higher education. Studies by Kumar (2022) and Patel (2023) identify key barriers such as:

- Lack of institutional focus on cultural literacy due to an emphasis on technical and professional education.
- Inadequate faculty training in integrating cultural literacy into pedagogy.
- Language barriers that limit cross-cultural communication in academic settings.

Future research suggests that addressing these challenges requires a collaborative approach involving policymakers, educators and international stakeholders (Verma & Singh, 2023). By embedding cultural literacy into higher education frameworks, India can strengthen its global academic presence while preserving its rich cultural heritage.

Significance of the Study

This study is significant as it highlights the critical role of cultural literacy in the globalization of Indian higher education, ensuring that students and educators can engage with global academic standards while preserving their cultural identity. As Indian universities expand their international collaborations and adopt globalized curricula, there is a growing need to integrate cultural literacy into pedagogy to enhance intercultural competence, inclusivity and holistic education (Choudhury, 2020). The study aligns with the National Education Policy (NEP) 2020, which emphasizes the internationalization of higher education alongside the promotion of indigenous knowledge systems (Government of India, 2020). By addressing challenges such as language barriers, curriculum reforms and faculty training, this research provides valuable insights into how cultural literacy can act as a bridge between tradition and modernity, fostering globally competent graduates who remain rooted in India's rich cultural heritage. The findings will be useful for policymakers, educators and academic institutions in developing strategies for curriculum innovation, faculty development and institutional policies that balance globalization with cultural preservation.

Objectives of the Study

- A. To examine the role of cultural literacy in enhancing the globalization of Indian higher education.
- B. To analyze the challenges and opportunities in integrating cultural literacy into the curriculum of Indian universities.

Methodology of the Study

This study adopted a descriptive research design to examine the role of cultural literacy in enhancing the globalization of Indian higher education. A qualitative approach was used to analyze data from various sources, including policy documents, academic literature and expert opinions. Primary data were collected through semi-structured interviews with faculty members, education policymakers and academic administrators to gain insights into the challenges and opportunities of integrating cultural literacy into university curricula. The interviews were conducted using an open-ended format to allow for in-depth discussions on the subject. Secondary data were obtained through document analysis of relevant materials such as the National Education Policy (NEP) 2020, university reports and previous research studies related to cultural literacy and higher education globalization. The collected qualitative data were analyzed using thematic analysis, identifying key patterns and recurring themes relevant to the study. This methodology ensured a comprehensive understanding of the significance of cultural literacy in the globalized Indian higher education landscape while highlighting areas for policy improvement and academic reform.

Findings of the Study

A. The Role of Cultural Literacy in Enhancing the Globalization of Indian Higher Education

The study identified several key findings regarding the impact of cultural literacy on the globalization of Indian higher education:

I. Cultural Literacy Enhances Global Competency Among Students

- The findings suggest that students with higher cultural literacy exhibit better adaptability in international academic and professional settings (Holliday, 2018). They are more proficient in cross-cultural communication, which enhances their ability to collaborate with peers and faculty from diverse backgrounds (Singh and Sharma, 2022).
- Universities that emphasize cultural literacy through curriculum design, exchange programs and multicultural exposure prepare students for global mobility and employment in multinational organizations (Choudhury, 2020).

II. Bridging the Gap Between Indigenous Knowledge and Global Standards

- Institutions that incorporate cultural literacy frameworks into their pedagogy successfully integrate traditional Indian knowledge systems with modern global educational practices (Mukherjee, 2021).
- The study found that students and educators who engage with cultural literacy-based curricula are more likely to value and promote India's cultural heritage while participating in global academic discourses (Banks & Banks, 2021).

III. Improved Student Engagement and Academic Performance

- Universities that integrate cultural literacy in their educational policies witness higher student engagement and participation in international collaborations (Altbach and Knight, 2007).
- The findings indicate that when students are encouraged to connect their cultural backgrounds with global learning perspectives, they demonstrate a greater sense of academic confidence and inclusivity (Sharma and Gupta, 2022).

IV. Challenges in Implementing Cultural Literacy in Higher Education

- Despite its benefits, cultural literacy is not uniformly implemented across Indian higher education institutions. The study found that faculty members often lack training in culturally responsive teaching methods, limiting the integration of global and local perspectives (Patel, 2023).
- Language barriers and the dominance of Western academic frameworks sometimes hinder the effective incorporation of cultural literacy in Indian universities (Kumar, 2022).

V. Alignment with National Education Policy (NEP) 2020

- The findings reinforce that the National Education Policy (NEP) 2020 encourages the inclusion of cultural literacy to enhance global competence while preserving India's educational heritage (Government of India, 2020).
- Universities that actively align with NEP 2020's vision for internationalization while integrating regional languages, cultural knowledge and global awareness show better student preparedness for global academic and professional opportunities (Rao, 2021).

VI. Recommendations for Strengthening Cultural Literacy in Higher Education

- The study suggests that Indian universities should integrate cultural literacy into teacher training programs, curriculum development and student exchange initiatives to improve global engagement (Verma and Singh, 2023).
- Establishing multicultural learning environments, international collaborations and culturally responsive pedagogies will further enhance India's position in the global higher education landscape (Agarwal, 2019).

B. Challenges and Opportunities in Integrating Cultural Literacy into the Curriculum of Indian Universities

The study examined the challenges and opportunities associated with integrating cultural literacy into the curriculum of Indian universities. The findings reveal key factors that impact the effective implementation of cultural literacy in higher education.

Challenges in Integrating Cultural Literacy into Indian University Curricula

I. Lack of Institutional Framework and Policy Implementation

- Despite the National Education Policy (NEP) 2020 emphasizing multidisciplinary and culturally inclusive education, many universities lack clear institutional policies to integrate cultural literacy into their curricula (Government of India, 2020).
- There is inconsistent adoption of cultural literacy programs across universities due to variations in institutional autonomy and state-level education policies (Rao, 2021).

II. Limited Faculty Training and Awareness

- The study found that many educators lack adequate training in culturally responsive teaching methods, making it difficult to incorporate cultural literacy into pedagogy (Patel, 2023).
- Faculty members often prioritize technical and professional education over cultural literacy due to a lack of institutional incentives and structured training programs (Sharma and Gupta, 2022).

III. **Language Barriers and Dominance of English-Medium Instruction**

- The preference for English as the medium of instruction in higher education poses challenges for students from regional language backgrounds, creating disparities in cultural literacy engagement (Mukherjee, 2021).
- The absence of multilingual education frameworks in many institutions limits students' ability to connect with diverse cultural perspectives (Kumar, 2022).

IV. **Western-Centric Curricula and Knowledge Systems**

- Many Indian universities adopt Western academic models, often overlooking indigenous knowledge systems and regional cultural heritage (Choudhury, 2020).
- The dominance of global ranking systems and accreditation requirements pressures universities to align with Western pedagogies rather than developing culturally inclusive curricula (Singh and Sharma, 2022).

V. **Limited Cross-Cultural Exposure and Student Mobility**

- While international student exchange programs can enhance cultural literacy, the study found that only a small percentage of Indian students participate in global mobility programs due to financial constraints and limited access to scholarships (Agarwal, 2019).
- There is a lack of collaboration between Indian universities and international institutions to develop culturally integrated curricula (Verma and Singh, 2023).

Opportunities for Integrating Cultural Literacy into Indian Higher Education

I. **Alignment with NEP 2020 and Multidisciplinary Learning**

- NEP 2020 promotes holistic and multidisciplinary education, providing a strong policy framework for incorporating cultural literacy in university curricula (Government of India, 2020).
- The emphasis on value-based education, regional languages and indigenous knowledge systems offers universities an opportunity to design culturally inclusive learning experiences (Rao, 2021).

II. **Technology and Digital Learning for Cultural Awareness**

- Digital learning platforms and technology-driven educational tools can be leveraged to promote cultural literacy (Sharma and Gupta, 2022).
- Online courses, virtual exchange programs and AI-driven language translation tools can help students engage with diverse cultural perspectives and overcome language barriers (Patel, 2023).

III. **Global Collaborations and Cross-Cultural Programs**

- Universities can enhance student mobility programs and international collaborations to provide cross-cultural exposure (Altbach and Knight, 2007).
- Establishing joint-degree programs, faculty exchange initiatives and cross-cultural research projects can foster global cultural competencies among students and educators (Singh and Sharma, 2022).

IV. **Incorporating Indigenous Knowledge and Cultural Heritage**

- The study found that integrating Indian philosophical traditions, literature and indigenous knowledge systems into university curricula can enhance cultural literacy while preserving India's academic heritage (Mukherjee, 2021).
- Offering courses on Indian history, cultural studies and regional literatures as part of general education requirements can strengthen students' cultural awareness and global adaptability (Choudhury, 2020).

V. **Faculty Development and Training Initiatives**

- Universities can implement faculty development programs focused on culturally responsive pedagogy, equipping educators with tools to integrate cultural literacy into their teaching methodologies (Verma and Singh, 2023).
- Collaborative learning workshops and multicultural awareness seminars can promote cultural inclusivity in higher education (Agarwal, 2019).

Conclusion

The study highlights the critical role of cultural literacy in enhancing the globalization of Indian higher education, ensuring that students and educators can engage with global academic standards while preserving India's cultural and linguistic heritage. The findings indicate that cultural literacy strengthens global competencies, improves intercultural communication skills and facilitates a balanced integration of indigenous knowledge with global learning frameworks. However, challenges such as policy gaps, faculty training limitations, language barriers and the dominance of Western-centric curricula hinder its widespread implementation. Despite these challenges, significant opportunities exist for integrating cultural literacy into Indian higher education. The National Education Policy (NEP) 2020 provides a strong foundation for this integration by advocating for multidisciplinary learning, regional language promotion and global engagement. The adoption of technology-enhanced learning, global collaborations, cross-cultural programs and faculty training initiatives can further enhance cultural literacy in universities. For Indian higher education to thrive in a globalized world, a holistic approach is required—one that values cultural diversity, promotes inclusive education and fosters international collaboration while retaining India's rich academic and cultural legacy. Strengthening cultural literacy in curriculum design, institutional policies and pedagogical

strategies will not only equip students with the skills needed for global success but also position India as a leader in culturally inclusive higher education.

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THE INFLUENCE OF GLOBALIZATION ON HIGHER EDUCATION IN INDIA: KEY CHALLENGES

*Dr. Ramandeep Kaur Sidhu**

Abstract

We are currently witnessing a transition from an industrial society to an information society, a shift that is profoundly influencing higher education. The integration of modern technology is globally transforming education systems, and the Indian higher education system is facing numerous challenges in the wake of globalization. Weaker institutions, in particular, face significant threats to their acceptance, existence, and survival. To address these challenges, the Indian higher education system must establish clear, achievable goals. Higher education plays a crucial role in the overall development and growth of a nation, making it essential to ensure the quality of education within the system. This paper critically examines the current state of the Indian education system, highlighting the challenges posed by international competition and advancements in information technology, while also exploring potential solutions and suggesting steps to create a new paradigm for higher education.

Keywords: *Globalization, Higher Education, Challenges, Indian Education System, Education level*

Introduction

In the process of human evolution the idea of living in groups with mutual understanding, knowledge sharing became a very successful idea which transformed the ancient civilization to modern civilization (Geetanjali, 2019). Education evolved in different civilizations and societies. Education is the process of facilitating learning or acquisition of knowledge, skill, values, habits and beliefs. New day education emerged as a field like history, philosophy, psychology, science etc. and a lot of study and research is going on across the globe (Bamrara, 2019). To understand the current study we should go through some basic terms. Educational methods include interaction, storytelling discussions, teaching, training and research. The methodology of teaching is called pedagogy. Common education is divided into three stages: primary (or preschool), secondary school and tertiary education (higher education or college and university education) (Chandra, 2019).

India boasts the third-largest higher education system in the world, following the United States and China. The country is home to approximately 864 universities, including 45 central

* Assistant Professor, GHG Khalsa College of Education, Gurusar Sadhar, Ludhiana

universities, 540 state universities, 112 deemed universities, 313 private universities, and 100 Institutions of National Importance (Pharswan, 2019). In addition to these universities, there are 40,026 colleges, both government and private, as reported by the University Grants Commission (UGC) in 2016. In terms of specialization, India has 488 general universities, 114 technical institutions, 67 in agriculture and allied sciences, 52 in medical fields, 19 law universities, 13 Sanskrit universities, and 9 language universities, along with 63 universities in other categories (Juyal, 2019). Open and Distance Learning (ODL) systems also play a significant role in Indian higher education, mirroring practices in Europe and other countries. Indira Gandhi National Open University (IGNOU) is the largest university in the world by student enrollment (Mishra, 2019). Additionally, India has 13 state open universities and 112 dual-mode universities offering education through ODL. Despite this vast and diverse higher education system, Indian Higher Education Institutions (HEIs) and universities continue to lag behind in global rankings.

Conceptual Framework

The path forward requires assessing the current realities of the system and setting achievable goals. Both international and national bodies offer a foundational framework to guide the future direction of the education system. The United Nations' Sustainable Development Goals (SDG) emphasize education, stating the objective to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all by 2030." Similarly, the National Education Policy (NEP) 2016 outlines the vision of a credible and high-performing education system that ensures inclusive quality education and lifelong learning opportunities, while producing graduates equipped with the knowledge, skills, attitudes, and values needed to lead productive lives, contribute to national development, and adapt to the demands of a rapidly changing, globalized, knowledge-based economy and society.

Despite these ambitious goals, the current realities on the ground present challenges. The Indian higher education system must focus on setting basic, achievable goals. Higher Education Institutions (HEIs) in India require essential infrastructure, qualified teaching staff, and sufficient support staff. Only by addressing these fundamental needs can further modernization be pursued. Without these basics in place, it becomes impossible to provide quality education, and the broader goals of inclusive and equitable education cannot be fully realized (Ravi, Pandey, Dangwal and Dangwal, 2019).

The Present State of Higher Education

The All India Survey on Higher Education (AISHE) for the year 2016-17 reported a notable improvement in the Gross Enrollment Ratio (GER), which increased from 19.4% in 2011 to 25.2% in 2016-17. This achievement reflects a significant rise in student enrollment across the country. Tamil Nadu leads with the highest GER at 46.9%, while Bihar remains at the bottom with a GER of 14.9%. The estimated total enrollment in higher education is

approximately 35.7 million students, with 19 million boys and 16.7 million girls. Of this, Open and Distance Learning (ODL) accounts for about 11.45% of the total enrollment.

While the Indian higher education system has expanded rapidly in terms of student numbers and Higher Education Institutions (HEIs), the quality of education remains a major concern. It is essential to distinguish between “access to education” and “access to quality education.” Ensuring quality education for all sections of society, particularly for the marginalized, is still a critical issue that needs immediate attention.

Several HEIs in India, such as the Indian Institutes of Science (IISc), Indian Institutes of Technology (IITs), National Institutes of Technology (NITs), All India Institutes of Medical Sciences (AIIMS), Delhi University (DU), Jawaharlal Nehru University (JNU), and various institutions of national importance, along with some state and central universities and agricultural institutions, are performing well and have gained global recognition for their educational standards. However, these prestigious institutions are few, and a small fraction of students benefit from their high-quality education. The majority of students are enrolled in lower-tier HEIs, including many public and private universities and colleges, which often provide substandard education.

As a result, many graduates lack confidence, innovation, motivation, and necessary skills, making them ill-prepared for national and international competition. This undermines their ability to contribute effectively to national progress. Addressing these issues is crucial for the overall development of students and HEIs.

Moreover, Indian universities still lag behind in global rankings. In the Times Higher Education World University Ranking 2018, no Indian institution ranked among the top 250 globally. IISc Bangalore was the highest-ranked Indian university, falling within the 251-300 range. Other Indian institutions were ranked between 300 and 1000, further highlighting the need for significant improvements in education quality.

Key Questions to Address in the Current State of Higher Education

1. Do all Higher Education Institutions (HEIs) have adequate infrastructure to meet their needs?
2. Are all HEIs providing quality education?
3. Are the policies and practices in higher education ensuring inclusive access for all sections of society?
4. Are the number of teachers in HEIs sufficient to meet the requirements?
5. Are the programs and curricula of higher education aligned with the developmental needs of society?
6. Are HEIs effectively utilizing technology and ICT in teaching, learning, student support systems, governance, and maintenance?
7. Can a graduate from an average Indian HEI compete in national and international markets?

8. Are average HEIs capable of achieving the expected outcomes in terms of student development and societal contributions?

The Path Forward for Higher Education in India

Despite the numerous challenges facing higher education in India, there is significant potential for progress. To navigate these challenges, we must take a strategic approach based on a realistic understanding of the current situation, our strengths, and weaknesses. It is essential to reform our Higher Education Institutions (HEIs) to maximize their potential and help them adapt to rapid societal changes. The following key steps are recommended to address the most pressing issues in the sector.

- **Infrastructure Development:** The infrastructure in many HEIs has seen some improvement, but there is still a long way to go. Some institutions lack sufficient space, with many not even having enough classrooms or basic facilities for both students and teachers. Though there are existing norms regarding infrastructure, many institutions fail to comply, and state governments sometimes grant relaxations in norms, leading to the establishment of colleges with inadequate infrastructure. For instance, in the state of Uttarakhand, there are colleges operating with as little as two rooms. To address this issue, both the government and private sectors must invest in building world-class infrastructure in HEIs. Attention should also be given to modernizing existing institutions to ensure that they are equipped to meet the demands of contemporary education.
- **Teaching and Non-Teaching Staff:** While the number of teachers in HEIs has increased, the student-teacher ratio is still far from ideal in many institutions. In some cases, there is a significant shortage of teachers and supporting staff, which affects the quality of education. This issue primarily lies within the jurisdiction of state governments. For example, at G.P.G.C. Pithoragarh in Uttarakhand, the required number of teachers is 416 to maintain the appropriate student-teacher ratio, but only 122 posts have been sanctioned. The lack of sufficient faculty makes it difficult to ensure quality education. Private sector HEIs also face similar issues, where the number of teachers fluctuates, and quality teaching is often compromised. This shortage of staff has contributed to the declining learning outcomes in many HEIs over the past decade, despite numerous government initiatives. Therefore, reforms are needed to address the staffing shortages in HEIs across India, with special focus on states like Uttarakhand.
- **Curriculum Development:** The National Policy on Education (NPE) aims to promote and modify education in India, and efforts have been made through the New Education Policy (NEP) 2016 to modernize higher education. However, there are still gaps in the curriculum development process. The syllabus and curriculum of HEIs need to be regularly updated to reflect global advancements. While the University Grants Commission (UGC) has introduced model curricula, a choice-based credit system (CBCS), and other reforms, many HEIs are slow to implement these changes. Some institutions wait for

strict regulations before modifying their syllabus. To foster relevant education, HEIs should proactively modernize their curriculum to align with global trends and industry needs. There must be a system in place to ensure that curriculum updates occur regularly, facilitating the integration of emerging fields and methodologies into the education system.

- **Technological Infrastructure:** The National Knowledge Commission (2007) and the UGC have emphasized the importance of creating robust ICT infrastructure in HEIs. The Government of India has launched several initiatives such as the National Program on Technology Enhanced Learning (NPTEL), SWAYAM, Ekalavya, and others to promote e-learning and digital education. Open universities and platforms like SWAYAM have contributed significantly to the development of online courses, including Massive Open Online Courses (MOOCs) for both students and faculty. As teaching and learning are increasingly becoming technology-driven, HEIs must prioritize the development of ICT infrastructure. This includes providing access to digital resources, virtual classrooms, online libraries, and e-books. By incorporating technology, institutions can enhance the learning experience and provide access to quality education for students across the country.
- **Adoption of New Approaches to Teaching and Learning:** In response to the diverse needs of students, especially in globalized settings, HEIs should adopt modern pedagogical approaches that emphasize open learning environments, access to technology, and the use of open educational resources (OER). Open universities have successfully adopted these methods to deliver education to a dispersed student base, and conventional HEIs should also consider integrating these strategies. Adopting digital tools such as video lectures, online courses, and MOOCs can improve educational accessibility. By embracing these new approaches, HEIs can better serve a wide range of student groups, preparing them to thrive in a globalized world.
- **Ensuring Quality Education:** While India's higher education system has expanded significantly, there is still a gap in terms of quality. Increasing access to education without ensuring quality does not fully benefit society or the nation. Some HEIs in India are renowned for their high standards of education, but a large number still struggle to deliver quality education. To address this, quality assurance mechanisms should be strengthened. The National Assessment and Accreditation Council (NAAC), established by the UGC in 1994, has played a crucial role in assessing the quality of HEIs. However, HEIs must also develop their own systems for performance evaluation and continuous improvement. Internal self-regulation and transparent disclosure of performance are critical to ensuring accountability and encouraging quality at all levels.
- **Regulation and Norms for Development:** Regulations and norms are an integral part of managing and maintaining standards in higher education. The UGC is responsible for promoting and coordinating higher education, setting standards for teaching, examinations, research, and monitoring development. Various councils, including the

CSIR, AICTE, ICAR, MCI, and VCI, also regulate their respective fields. However, there are instances where HEIs do not fully adhere to regulations, which can lead to misuse of autonomy. To ensure consistent quality, HEIs must follow established regulations and norms. At the same time, these regulations should be periodically reviewed and refined to better serve the evolving needs of the education system. HEIs should also work on building their own internal regulatory systems to ensure transparency and self-accountability.

Conclusion

The future of higher education in India depends on the successful implementation of these steps to address infrastructure gaps, staffing shortages, outdated curricula, and technological challenges. By focusing on these key areas, we can transform HEIs into institutions capable of providing high-quality education that prepares students to meet the demands of a rapidly changing global landscape. Strengthening marginalized and underdeveloped HEIs is also essential to ensure equitable access to quality education across all regions of the country.

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GLOBALIZATION OF INDIAN HIGHER EDUCATION

Shilpi Deol* & Gurbinder Kaur**

Abstract

Globalization of Indian Higher education enhancing global ranking and competitive globalization in education means increased opportunities for students to study abroad and provide global platforms. This helps students to know different cultures, exchange ideas, knowledge of academic diversities, use of the internet, digital libraries, web-based learning, and electronic literacy are the examples. The main objective of educational globalization in higher education is to develop quality education and skills in all area of education and made approachable to the citizens of the one country to another. We also know that the globalization is to first introduced at Nalanda University in Buddha Period. Global changes high education system such as education policies, gate pass for foreign country, evaluation, curriculum, distance education. There are some downsides of globalization in higher education such as traditional values and ethics, increasing the gap between rich and poor commercialization of education. In recent years, the globalization of higher education has emerged as a key driver in transforming universities worldwide. This phenomenon, fueled by advancements in technology, international collaborations, and cross-border student mobility, has significantly enhanced the global rankings of institutions while also increasing their competitiveness.

Keywords: Global, rankings, academic institutions, Integrated, Technology,, higher Education.

Globalization and its Impact on Higher Education

Globalization in higher education refers to the increasing interconnectedness and interdependence of universities around the world. The rise of technology and the internet has made it easier for institutions to collaborate, share research, and provide online education, which transcends geographical boundaries. International partnerships have also led to the exchange of knowledge and resources, contributing to more diverse and enriched learning environments.

- A large number of people can be empowered with higher education.
- Global trends can enrich higher education curriculum.
- An environment of electronic learning.
- It provides a framework for a global approach to higher education.

* Assistant Professor, Guru Hargobind College of Education, Gondwal, Raikot

** Assistant Professor, Guru Hargobind College of Education, Gondwal, Raikot

- Reshape the landscape of academics.
- Globalization fastens cultural exchange and allows students to learn about different cultures.
- Globalization in education reduced discrimination and racism.
- Spread of technology and innovation.
- The integration of technology in education has been a significant outcome of globalization.
- With increased foreign investment and collaborations, private schools and universities have flourished.
- Globalization has influenced the job market and created a demand for individuals with global competencies.

Enhancing Global Rankings

One of the most visible outcomes of the globalization of higher education is the rise in global university rankings. Prominent ranking systems, such as the QS World University Rankings and the Times Higher Education (THE) rankings, evaluate universities based on a combination of factors, including academic reputation, research output, international collaboration, and teaching quality. As universities embrace globalization, they improve in these areas, boosting their overall rankings.

Research is perhaps the most significant factor in determining a university's ranking. Globalization has provided institutions with access to international research funding and collaborative opportunities, increasing their research output and impact. Universities that actively engage in global research networks are better positioned to publish in prestigious international journals, which is a key metric in most rankings.

Furthermore, the recruitment of top-tier faculty members and students from around the world has allowed universities to enhance their academic reputation. International collaborations and partnerships with industry leaders also contribute to higher education institutions' standing. Universities that effectively leverage global resources and networks are better able to maintain their position at the top of global rankings.

Key Aspects of Globalizing Indian Higher Education to Improve Rankings

- **Curriculum internationalization:** Incorporating globally relevant subjects, teaching methodologies, and case studies into the curriculum, ensuring students are equipped with knowledge and skills required in a global market.
- **Faculty diversity:** Recruiting international faculty members to bring diverse perspectives and expertise to the classroom, enhancing the quality of research and teaching.
- **International collaborations:** Partnering with top universities worldwide for joint research projects, student exchange programs, and dual degree programs.

- **Offshore campuses:** Establishing campuses in other countries to cater to international students and expand reach.
- **Global accreditation:** Seeking recognition from international accreditation bodies to validate the quality of education offered.
- **Research focuses on global issues:** Prioritizing research areas that address global challenges like climate change, healthcare, and sustainability.
- **Student mobility programs:** Encouraging students to participate in semester abroad programs to gain international exposure and cross-cultural understanding.
- **Language proficiency:** Promoting English language skills among students and faculty to facilitate international communication and collaboration.
- **Digital learning platforms:** Utilizing online learning technologies to connect students with global experts and facilitate cross-border learning.
- **Marketing and branding:** Actively promoting Indian universities on the international stage to attract high-quality students and researchers.

Benefits of Globalizing Indian Higher Education

- **Improved global rankings:** Increased visibility and recognition of Indian institutions on international ranking platforms.
- **Enhanced research capabilities:** Access to broader research networks and funding opportunities through international collaborations.
- **Attracting international students:** Bringing diverse perspectives to the campus and boosting the Indian economy.
- **Developing globally competent graduates:** Equipping students with the skills and knowledge needed to thrive in a globalized job market.

Disadvantages of Globalizing Indian Higher Education

- **Increasing Competitiveness**

Globalization has led to increased competition among universities, pushing them to innovate and continuously improve their offerings. Universities that once operated in a relatively insular environment are now competing with institutions worldwide for students, faculty, research funding, and global partnerships. This competition has created a culture of excellence where universities are more focused on improving their educational quality, research output, and global engagement.

To remain competitive, institutions are investing in technology, infrastructure, and the development of new academic programs that cater to the evolving needs of the global job market. Online education has been a key area of growth, allowing universities to offer flexible learning options to a wider audience. The growth of online programs has also allowed universities to engage with students from different parts of the world, increasing their global reach.

Moreover, universities are focusing on building strong international networks through partnerships with other institutions, research centers, and industries. These partnerships provide opportunities for joint research projects, exchange programs, and global internships, which enhance the employability of graduates and provide valuable experience in a globalized job market.

- **Competing with Internationals University**

Globalization has heightened competition within the global higher education sector, placing Indian institutions in the position of vying with well-established international universities to attract students, faculty, and research funding. To remain competitive, Indian universities must showcase academic excellence, cutting-edge facilities, and robust research initiatives. As students increasingly seek education abroad, the imperative for Indian universities to distinguish themselves becomes evident. Furthermore, the significance of global university rankings has grown as a benchmark for institutional quality. Indian universities aspire to enhance their rankings but encounter challenges stemming from disparities in funding, infrastructure, and research opportunities compared to their global counterparts. The current context places considerable pressure on these institutions to compete internationally while simultaneously addressing resource constraints. This predicament underscores the complex challenges faced by Indian universities in the globalized higher education landscape.

- **Lack of Qualified Faculty**

Globalization has resulted in increased global mobility for faculty and researchers, intensifying competition for top talent. Indian institutions encounter difficulties in recruiting and retaining qualified faculty due to the allure of superior compensation and research opportunities abroad. This faculty shortage adversely affects the quality of education and research, hindering the provision of specialized courses, effective student mentorship, and impactful research engagement. Addressing these challenges necessitates a comprehensive strategy, encompassing improved faculty development programs, competitive compensation packages, and the creation of an environment conducive to cutting edge research.

- **Cultural and Pedagogical Differences**

Globalization fosters interaction among individuals with diverse cultural backgrounds, presenting both enriching opportunities and communication challenges. For Indian institutions collaborating with foreign partners, navigating these differences is essential for fostering a harmonious and inclusive learning environment. Collaboration with international partners may introduce new teaching methodologies that, at times, conflict with local educational philosophies. Achieving the right balance between preserving indigenous teaching practices and integrating innovative global methods requires careful adaptation. In summary, globalization brings cultural diversity to educational collaborations, demanding effective

navigation of communication challenges and the integration of diverse teaching methodologies for a balanced and inclusive learning environment.

● **The Commercialisation of Education**

Globalization has contributed to the commercialisation of education, where private institutions prioritize profit over quality and equity, leading to the exclusion of marginalised groups and undermining public education systems. This is why it is important that you choose a school like the K.R. Mangalam World School, Panipat, that focuses on offering quality education without prioritising profit making.

Role of Government

The government plays a crucial role in shaping the impact of globalization on education. Policies should aim to promote inclusivity, regulate the quality of private educational institutions, and ensure affordable education for all segments of society. Government regulations should address issues such as accreditation, curriculum standards, faculty qualifications, and infrastructure requirements for foreign universities seeking to establish a presence in India. The government has introduced several policies aimed at improving the quality and global standing of Indian higher education. For example, the National Institutional Ranking Framework (NIRF) aims to assess and improve the quality of institutions, while the University. The government has encouraged Indian universities to set up branches abroad and vice versa, enabling Indian institutions to have a presence in global educational markets. The government has granted more autonomy to reputed institutions like IITs, IIMs, and AIIMS to improve their academic standards and attract international attention.

- Establishment of Institutions of Eminence (IOEs)
- UGC Learning Outcome-based Curriculum Framework (LOCF)
- Education Quality Upgradation and Inclusion Programme (EQUIP)
- Revitalizing of Infrastructure & Systems in Education (RISE)
- Global Initiatives Academic Network (GIAN)
- National Institutional Ranking Framework (NIRF)

Conclusion

In conclusion, the globalization of higher education has had a profound impact on the global rankings and competitiveness of universities. By fostering international collaborations, attracting top-tier talent, and enhancing research output, universities are able to improve their standing in global rankings while remaining competitive in an increasingly interconnected world. While challenges exist, the opportunities presented by globalization far outweigh them, allowing higher education institutions to thrive and contribute meaningfully to the global knowledge economy. As universities continue to navigate the complexities of globalization, they must remain committed to providing high-quality education, research, and innovation,

ensuring their continued success on the global stage. Globalization is primarily a perceived set of changes that include the shaping of new, global forms in culture, the media and technologies of communication that nations have to accept and follow in order to be able to embrace global competition and respond positively (Carnoy, 1999; Van Damm, 2001). In addressing the concerns of global competition, in part, as a response to the impacts of globalization, education is becoming one of the important sectors, and the restructuring of educational policy and organizing educational achievement are being demanded. The globalization of Indian higher education has opened up significant opportunities for growth, innovation, and international recognition. While the government has played a vital role in driving this process through policy reforms, funding, and creating a conducive environment, challenges remain in terms of improving infrastructure, faculty quality, and consistency in academic standards.

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Theme V

*Strengthening Research Infrastructure and
Funding in Higher Education*

FOSTERING A CULTURE OF INNOVATION: THE IMPORTANCE OF STRENGTHENING RESEARCH INFRASTRUCTURE AND FUNDING IN HIGHER EDUCATION

Dr. Guru Trisha Singh*

Abstract

Fostering a culture of innovation in higher education is crucial for advancing knowledge, solving global challenges and driving economic growth. This paper explores the critical role that research infrastructure and funding play in nurturing a dynamic and productive academic environment. By examining current trends, challenges and best practices, the study highlights the need for robust investments in state-of-the-art facilities, cutting-edge technologies and sustained financial support. Emphasizing the importance of interdisciplinary collaboration, faculty development and industry partnerships, the paper argues that strengthening research infrastructure and funding will enable institutions to cultivate a thriving ecosystem of innovation, promote ground breaking discoveries and enhance the educational experience for students and faculty alike.

Keywords: Innovation, Research, Funding, Higher Education, Global Competitiveness

Introduction

In today's rapidly evolving global landscape, innovation has become the cornerstone of societal progress. Higher education institutions play a pivotal role in this process by generating new ideas, fostering critical thinking, and addressing complex challenges that impact both local and global communities. However, the ability of universities and colleges to drive meaningful innovation depends heavily on the strength of their research infrastructure and the availability of adequate funding. Without these critical resources, even the most promising ideas may never come to fruition.

This paper explores the importance of strengthening research infrastructure and funding within higher education institutions as a means to foster a culture of innovation. As research-driven institutions, universities are expected not only to teach but also to lead the

* Assistant Professor, Swami Vivekanand College of Education, Tarkwari, Himachal Pradesh

way in generating new knowledge, technologies, and solutions that can transform society. To fulfill this mission, they require access to state-of-the-art research facilities, cutting-edge technologies, and sustainable financial support. These resources enable faculty and students to conduct high-impact research that pushes the boundaries of current knowledge, contributes to societal advancement, and addresses global challenges (Dutz, 2017; Horta, 2018).

Investment in research infrastructure is particularly important in an era where interdisciplinary research is increasingly essential for addressing complex, multifaceted problems. Institutions that prioritize infrastructure development create environments conducive to collaboration, where ideas from diverse fields can intersect and lead to groundbreaking solutions (Katz & Martin, 1997). Furthermore, research funding allows universities to attract top talent, maintain high-quality faculty, and offer students opportunities to engage in meaningful, high-impact research. Without adequate funding, even the most promising academic endeavors can be stalled, limiting the institution's ability to contribute to knowledge creation and innovation (OECD, 2019).

This paper emphasizes the need for a holistic approach to strengthening research infrastructure and funding. By examining the interdependence of these elements with academic success, we argue that higher education institutions must receive sustained, strategic investment to build the resources necessary for fostering a culture of innovation. Such an environment will not only enhance academic research but will also contribute to economic growth, workforce development, and the advancement of technological and scientific discoveries. In this context, fostering innovation within higher education is not merely an institutional goal, but a critical component of societal advancement.

Literature Review

Innovation in higher education is essential for addressing global challenges and advancing knowledge. Research infrastructure and funding play a critical role in enabling universities to drive this innovation, as highlighted in a variety of studies. Research infrastructure includes the physical, technological, and organizational resources that support academic research activities. Institutions with state-of-the-art research facilities, advanced technological tools, and well-organized research centers create an environment that fosters innovative breakthroughs (Horta, 2018). As universities face increasing pressure to contribute to societal progress, their ability to support cutting-edge research depends significantly on these resources (Sokhanvar, Amini and Sohrabi, 2020). The availability of interdisciplinary research spaces allows for collaboration across fields, leading to innovative solutions for complex global problems (Jaffe and Lerner, 2011). Additionally, well-equipped institutions tend to retain high-quality faculty members, whose expertise is critical to advancing research (Katz and Martin, 1997). Research funding is equally crucial for fostering a culture of innovation.

Funding supports a variety of research activities, from data collection and analysis to hiring skilled researchers and purchasing necessary equipment. Studies consistently show that higher levels of funding correlate with greater research productivity, enhanced publication rates, and higher societal impact (Dutz, 2017). Both public and private funding sources contribute significantly to these efforts. Government grants, in particular, allow universities to tackle large-scale research projects that have far-reaching implications (O'Neill and Berryman, 2015). Industry partnerships also provide universities with additional financial support while aligning research goals with real-world applications (Bok, 2003). However, disparities in funding can hinder innovation, especially when lower-funded institutions lack access to necessary resources, thus deepening inequalities in research outputs (OECD, 2019). Despite the known benefits of strong research infrastructure and funding, universities face significant challenges in securing these essential resources. A key issue is the competition for limited research funding, where well-established institutions often have an advantage over newer or less prestigious ones (Jaffe and Lerner, 2011). In conclusion, the existing literature highlights the central role that research infrastructure and funding play in fostering a culture of innovation in higher education. These elements provide the foundation for cutting-edge research, faculty development, and interdisciplinary collaboration, all of which contribute to societal advancement. However, challenges such as funding disparities and the instability of public funding require strategic approaches to ensure that universities can create sustainable, innovative environments. Further research into the types of infrastructure that best support innovation, the long-term effects of funding models, and the role of institutional leadership will be essential to fully understanding how to foster a thriving culture of innovation within higher education.

Methodology

To investigate the role of research infrastructure and funding in fostering a culture of innovation in higher education, this study employs a mixed-methods approach, combining qualitative and quantitative research techniques. Semi-structured interviews were conducted with key stakeholders, including university administrators, faculty members, and industry partners, across 10 diverse institutions. A purposive sampling strategy will be used to select participants who have significant experience and insight into the management and impact of research resources within their institutions. A survey will be distributed to these 10 institutions to capture data on the types of research infrastructure (e.g., labs, technology, collaborative spaces) and funding sources (e.g., government grants, private sector partnerships) available at these institutions. Descriptive statistics will be used to assess the relationships between infrastructure investment, funding levels, and the reported innovation outcomes.

Objectives

1. To assess the impact of investments in research infrastructure and diverse funding

sources on fostering a culture of innovation and enhancing research productivity within higher education institutions.

2. To identify the challenges universities face in managing and allocating research infrastructure and funding to support innovation, and to explore the best practices that lead to sustainable and effective innovation ecosystems.

Research Questions

1. How do investments in research infrastructure and diverse funding sources contribute to fostering a culture of innovation and enhancing research productivity in higher education institutions?
2. What challenges and best practices do universities face in managing research infrastructure and funding to support interdisciplinary collaboration, industry partnerships, and sustainable innovation?

Results

1. How do investments in research infrastructure and diverse funding sources contribute to fostering a culture of innovation and enhancing research productivity in higher education institutions?

The results for this research question are organized into the following dimensions:

- i) Research Infrastructure
- ii) Funding Sources

Each of these dimensions was assessed based on the data collected from the case studies, interviews, and surveys.

Research Infrastructure: Research infrastructure, including state-of-the-art laboratories, technology, and collaborative spaces, was found to be a significant factor in fostering a culture of innovation. Institutions with well-equipped research facilities saw higher levels of interdisciplinary collaboration, greater research productivity, and a stronger focus on innovative solutions.

Dimension	Key findings	Impact on innovation
Research laboratories	Institutions with modern labs saw increased project outputs.	Facilitates cutting-edge research and collaborative experiments.
Technological resources	Access to advanced technology (e.g., high-performance computing) boosted data analysis and simulation.	Enhances capacity for research across multiple disciplines.
Collaborative spaces	Availability of co-working spaces promoted cross-disciplinary work.	Stimulates creative problem-solving and idea exchange.

Funding sources: The availability of diverse funding sources, such as government

grants, private sector partnerships, and internal institutional funding, was essential for supporting long-term innovation initiatives. Adequate funding allowed universities to invest in infrastructure, hire top-tier researchers, and support high-cost research projects.

Dimension	Key findings	Impact on innovation
Government Grants	Public funding helped finance large-scale, long-term research projects.	Enabled large interdisciplinary research projects with societal impact.
Private Sector Partnerships	Industry collaborations provided funding and practical application for research.	Bridged the gap between academic research and market needs.
Institutional Funding	Funding-Internal funds were crucial for supporting smaller-scale but innovative research initiatives.	Allowed for flexibility in supporting diverse research areas.

The findings demonstrate that investments in modern research facilities, cutting-edge technologies, and collaborative spaces significantly enhance a university’s capacity for groundbreaking research and interdisciplinary collaboration. Equally important, diverse funding sources—ranging from government grants to private sector partnerships—are essential for supporting both large-scale, high-impact projects and smaller-scale innovative initiatives. By strengthening both infrastructure and funding, higher education institutions can create an environment that encourages creativity, supports faculty and student research, and leads to meaningful innovations with real-world applications.

2. What challenges and best practices do universities face in managing research infrastructure and funding to support interdisciplinary collaboration, industry partnerships, and sustainable innovation?

Managing and maintaining research infrastructure presents several challenges for universities, particularly in ensuring that facilities remain up-to-date and adaptable to evolving research needs. Key challenges include:

- **Financial Constraints:** Many institutions face budget limitations that prevent them from consistently upgrading facilities or acquiring the latest technologies. This can hinder the ability to support high-level, interdisciplinary research.
- **Siloed Infrastructure:** In some cases, research infrastructure is not designed with collaboration in mind, making it difficult for departments or disciplines to work together effectively. For example, specialized labs and resources may be confined to a single department, limiting their broader use.
- **Maintenance and Operational Costs:** The ongoing costs of maintaining and operating

complex research facilities are often overlooked, which can result in underutilization of infrastructure or the inability to sustain it long-term.

Challenges in Managing Funding for Innovation—Securing and managing funding for research and innovation is a critical challenge faced by many universities. The main challenges in this area include:

- **Unpredictable Funding Sources:** Universities often rely on a mix of government grants, private partnerships, and institutional funds, but these sources can be inconsistent and subject to changes in policy, economy, and funding priorities.
- **Competing Priorities:** Research funding is often spread thin across multiple projects and departments, leading to competition for limited resources. This can result in some high-potential research projects being underfunded or overlooked.
- **Complex Grant Application Processes:** Securing external funding, especially from government agencies or private corporations, can be a lengthy and complex process that requires significant administrative support, making it difficult for researchers to access resources quickly.

Conclusion

This study underscores the pivotal role that research infrastructure and funding play in fostering a culture of innovation within higher education institutions. The findings highlight that while universities face significant challenges in managing and maintaining research infrastructure—such as financial constraints, siloed resources, and maintenance costs—investments in state-of-the-art facilities, technology, and collaborative spaces are crucial to creating an environment conducive to interdisciplinary collaboration and innovative research. Similarly, challenges in securing and managing diverse funding sources, including the unpredictability of government grants, competition for resources, and complex application processes, can hinder the sustainability of research initiatives. However, universities that successfully navigate these challenges employ best practices, such as strategic partnerships, centralized resource management, flexible funding models, and continuous assessments of infrastructure needs, to maximize their research potential and drive innovation.

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STRENGTHENING RESEARCH INFRASTRUCTURE AND FUNDING IN INDIAN HIGHER EDUCATION: A COMPREHENSIVE ANALYSIS

Dr. Jasleen Kaur*

Abstract

The evolving landscape of Indian higher education, driven by the National Education Policy (NEP) 2020, emphasizes strengthening research infrastructure and funding to foster innovation and global competitiveness. Research is the cornerstone of academic excellence, policy implementation, and economic progress. However, Indian universities face critical challenges, including inadequate funding, limited access to advanced laboratories, insufficient digital resources, and a lack of industry collaboration. This paper explores the current state of research infrastructure in India, identifies key deficiencies, and presents strategies for enhancement based on successful global models. A comparative analysis of international research universities, such as the University of Cambridge and the University of Sydney, highlights the importance of diversified funding sources, industry-academia partnerships, and performance-based funding mechanisms. The role of funding agencies such as ICSSR, DST, and UGC in strengthening research is examined, along with policy recommendations for improving intellectual property rights (IPR), promoting gender equity in research, and establishing Research Development Offices (RDOs) within institutions. By integrating best practices, leveraging technology, and fostering a robust research culture, India can transition towards a globally competitive higher education system. This study underscores the need for collaborative efforts from policymakers, academia, and industry stakeholders to ensure sustainable research growth in India.

Keywords: Indian Higher Education, Research, Funding, Infrastructure

Introduction

India's higher education system is undergoing significant reforms aimed at aligning with global standards and addressing contemporary challenges. The National Education Policy

* Assistant Professor, GHG Khalsa College of Education, Gurusar Sadhar

2020 serves as a comprehensive framework guiding this transformation, with a strong emphasis on research and innovation (Ministry of Education, 2020). The policy envisions the establishment of a robust research culture, integration of research and teaching, and the creation of a National Research Foundation (NRF) to oversee research funding and infrastructure development.

Current State of Research Infrastructure in Indian HEIs

Despite being the world's third-largest higher education system, India's research output and quality have not reached their full potential. Several studies have identified key challenges:

- **Fragmented Research Ecosystem:** The research landscape in India is characterized by limited collaboration among academia, industry, and government sectors, leading to isolated efforts and suboptimal outcomes (EY, 2023).
- **Inadequate Funding:** India's investment in research and development (R&D) stands at approximately 0.65% of its GDP, significantly lower than countries like the United States (2.8%) and South Korea (4.2%) (EY, 2023). This underinvestment hampers the development of advanced research facilities and the procurement of cutting-edge equipment.
- **Infrastructure Constraints:** Many HEIs, particularly state universities, face challenges such as outdated laboratories, insufficient digital resources, and inadequate access to high-performance computing facilities (NITI Aayog, 2023). These limitations restrict the scope and quality of research conducted.

Importance of Robust Research Infrastructure

A well-developed research infrastructure is pivotal for:

- **Advancing Knowledge:** High-quality research facilities enable scholars to explore complex scientific and societal questions, contributing to the global knowledge base.
- **Economic Development:** Research-driven innovation leads to the development of new technologies and industries, fostering economic growth and job creation.
- **Policy Formulation:** Empirical research provides evidence-based insights that inform policy decisions, leading to effective governance and societal welfare.

Existing Research Funding Mechanisms

Several agencies and initiatives support research in India:

- **Department of Science & Technology (DST):** The DST's R&D Infrastructure Division aims to strengthen the country's scientific infrastructure by establishing well-equipped laboratories and fostering research collaborations (Department of Science & Technology, 2022).
- **University Grants Commission (UGC):** The UGC offers development assistance

to universities, focusing on enhancing infrastructure and basic facilities to promote research activities (University Grants Commission, n.d.).

- **Indian Council of Social Science Research (ICSSR):** ICSSR provides grants for research projects in social sciences, encouraging studies that address societal challenges (Indian Council of Social Science Research, n.d.).

Feedback From The Academic Community

Empirical studies and expert analyses have highlighted several concerns:

- **Limited Industry-Academia Collaboration:** The lack of strong partnerships between industry and academia results in research that is often disconnected from practical applications (EY, 2023).
- **Bureaucratic Hurdles:** Complex administrative procedures and regulatory barriers can delay research projects and deter innovation (NITI Aayog, 2023).
- **Talent Retention Issues:** Inadequate funding and infrastructure contribute to brain drain, with talented researchers seeking opportunities abroad (EY, 2023).

Strategic Measures for Enhancement

To address these challenges, the following strategies are proposed:

- **Increase R and D Investment:** Elevating R and D spending to at least 2% of GDP would align India with global standards and provide the necessary resources for research excellence (EY, 2023).
- **Foster Industry-Academia Partnerships:** Establishing collaborative research centers and incentivizing joint projects can bridge the gap between theoretical research and practical applications (EY, 2023).
- **Simplify Administrative Processes:** Streamlining grant application procedures and reducing bureaucratic red tape can expedite research activities and encourage innovation (NITI Aayog, 2023).
- **Develop Digital Infrastructure:** Investing in high-speed internet, advanced computing facilities, and access to global research networks is essential for modern research endeavors (The Higher Education Review, n.d.).
- **Enhance Capacity Building:** Organizing workshops, training programs, and international collaborations can improve the skill sets of researchers and faculty members (NITI Aayog, 2023).

Role of NEP 2020 in Transforming Research Landscape

The NEP 2020 outlines several initiatives to bolster research:

- **Establishment of the National Research Foundation (NRF):** The NRF aims

to provide a robust platform for funding and mentoring research across disciplines, fostering a culture of innovation (Ministry of Education, 2020).

- **Integration of Research and Education:** The policy advocates for embedding research components into undergraduate programs, nurturing a research mindset from early stages (Ministry of Education, 2020).
- **Promotion of Multidisciplinary Research:** Encouraging research that spans multiple disciplines can lead to holistic solutions for complex societal issues (Ministry of Education, 2020).

Case Studies and Practical Examples

Several initiatives exemplify successful enhancement of research infrastructure in India. These case studies highlight the role of strong institutional support, government funding, and industry collaboration in advancing research capabilities.

Indian Institutes of Technology (IITs): Pioneers in Research Excellence

The Indian Institutes of Technology (IITs) are known for their advanced research facilities, strong industry linkages, and significant contributions to innovation and technology development.

- **IIT Madras:** Home to the Centre for Innovation (CFI) and Advanced Manufacturing Technology Development Centre (AMTDC), IIT Madras has made significant contributions to engineering research. The IIT Madras Research Park, the first of its kind in India, fosters industry-academia collaboration, enabling startups and multinational corporations to work alongside researchers (IIT Madras, 2023).
- **IIT Delhi:** The Haryana Biotech Cluster at IIT Delhi is an example of government-supported infrastructure aimed at advancing biotechnology research. Additionally, the Cyber-Physical Systems Innovation Hub (IHUB) is revolutionizing AI and data science research (IIT Delhi, 2023).
- **IIT Bombay:** Recognized for its National Centre for Aerospace Innovation and Research (NCAIR), this institute collaborates with Boeing and other international companies to develop cutting-edge aerospace technologies. The establishment of the Desai Sethi Centre for Entrepreneurship also promotes translational research and startup culture (IIT Bombay, 2022).

These IITs showcase the impact of targeted investments and policy support in fostering research excellence.

Indian Institute of Science (IISc): A Model for Scientific Research

The Indian Institute of Science (IISc), Bangalore, consistently ranks as India's top research university. The Centre for Brain Research (CBR) at IISc is a leading institute in neuroscience,

funded by the Pratiksha Trust, demonstrating the role of philanthropy in research. IISc has also been designated an Institution of Eminence (IoE) by the Government of India, receiving substantial financial support to enhance its research output (IISc, 2023).

Jadavpur University: Strengthening Research Despite Limited Resources

Jadavpur University in West Bengal, despite limited government funding compared to IITs, has built a strong research culture. With support from UGC-Special Assistance Program (SAP) and Department of Science & Technology (DST-FIST) funding, the university has developed advanced laboratories in engineering and social sciences. The Global Change Programme, an interdisciplinary initiative, highlights the potential for state universities to conduct impactful research with strategic investment (Jadavpur University, 2022).

Private Universities and Industry Collaboration: Ashoka and Shiv Nadar University

- **Ashoka University:** The Trivedi Centre for Political Data at Ashoka University provides high-quality, data-driven research in political science, supported by international grants and philanthropic contributions.
- **Shiv Nadar University:** This university has invested heavily in interdisciplinary research centers focusing on artificial intelligence, material sciences, and environmental sustainability. Industry collaboration with HCL Technologies has strengthened its research funding and infrastructure (Shiv Nadar University, 2023).

Government-Led Initiatives: IMPRINT and STRIDE

- **IMPRINT (Impacting Research Innovation and Technology):** A government initiative aimed at boosting research in key areas such as energy, healthcare, and security, IMPRINT provides financial support for translational research in higher education institutions (MHRD, 2023).
- **STRIDE (Scheme for Trans-Disciplinary Research for India's Developing Economy):** Launched by UGC, STRIDE promotes research in humanities and social sciences by providing funding to universities that integrate multi-disciplinary research approaches (UGC, 2023).

Lessons Learned and Recommendations

Strategic investments in infrastructure significantly enhance research output. IITs and IISc showcase how targeted government and industry support create world-class research facilities.

State universities need increased funding to compete globally. Jadavpur University demonstrates that even with limited resources, strong institutional policies can drive high-impact research.

Private sector participation and philanthropic funding can bridge gaps in government support, as seen in Ashoka and Shiv Nadar University.

Interdisciplinary and translational research must be prioritized, as demonstrated by programs like IMPRINT and STRIDE.

By integrating these lessons, India can further strengthen its research ecosystem and align with global best practices.

Learning From International Models

Examining successful research infrastructure and funding models from international universities offers valuable insights for enhancing India's higher education system.

The University of Cambridge: Renowned for its robust research ecosystem, the University of Cambridge has made significant economic and societal contributions. The institution's success is attributed to substantial investments in research facilities and a culture that fosters innovation. Professor Deborah Prentice, Vice-Chancellor of the university, emphasizes the importance of viewing research universities as essential partners in driving economic growth and advocates for increased investment to tackle major societal challenges (Prentice, 2024).

The University of Sydney: This Australian institution has demonstrated a strong commitment to research partnerships, bringing together researchers and external collaborators to address global challenges. Significant investments, such as the establishment of a biomedical accelerator, have fostered multidisciplinary collaborations and enhanced research capabilities. Vice-Chancellor Mark Scott highlights the importance of talent, infrastructure, and internal coordination for research success (Scott, 2024).

European Research Institutes: A study analyzing the organization and culture of successful research institutes in Europe identifies key attributes contributing to their success, including effective organizational structures, supportive governance, and sustainable funding mechanisms. These factors collectively create an environment conducive to high-quality research and innovation (Science Europe, 2020).

Policy Recommendations For India

Building upon insights from international models and existing challenges, the following policy recommendations are proposed to strengthen research infrastructure and funding in Indian higher education:

- **Diversify Funding Sources:** Encourage HEIs to seek funding from multiple channels, including government grants, industry partnerships, philanthropic contributions, and international collaborations. This approach can reduce dependency on a single source and enhance financial stability (NITI Aayog, 2024).
- **Establish Research Development Offices (RDOs):** Implementing RDOs within

universities can improve grant funding success and help achieve research goals. These offices can manage internal grant programs, provide project management support, and offer grant writing workshops to build research capacity (SRA International, 2019).

- **Enhance Intellectual Property Rights (IPR) Processes:** Streamlining IPR procedures can encourage innovation by ensuring that researchers and institutions can efficiently protect and commercialize their inventions. Improved IPR processes can attract industry collaborations and boost confidence in research investments (EY, 2023).
- **Promote Gender Equity in Research:** Implement policies and programs that support the inclusion of women in research activities, such as mentorship programs, flexible work arrangements, and recognition of institutions that demonstrate gender inclusivity. These measures can enhance diversity and innovation within the research ecosystem (NITI Aayog, 2024).
- **Implement Performance-Based Funding:** Allocate research funds based on performance metrics such as research output quality, societal impact, and successful industry collaborations. This approach can incentivize excellence and ensure that resources are directed towards high-impact research activities (RAND Corporation, 2012).

Conclusion

Strengthening research infrastructure and funding in Indian higher education is imperative for fostering innovation, economic growth, and societal well-being. By learning from successful international models and implementing targeted policy measures, India can enhance its research capabilities and align with global standards. A collaborative effort involving government agencies, academic institutions, industry partners, and the broader community is essential to realize this vision and propel India's higher education system into a new era of excellence.

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Theme VI

*Role of accreditation Bodies in Driving
Institutional Excellence*

EMPOWERING EXCELLENCE IN INDIAN HIGHER EDUCATION: EXPLORING THE ROLE OF ACCREDITATION BODIES

*Dr. Aarti Bhatt**

Abstract

Indian higher education is undergoing a period of significant transformation, with a growing emphasis on quality and global competitiveness. Accreditation, as a mechanism for quality assurance, plays a crucial role in this process. This paper explores the multifaceted role of accreditation bodies in driving institutional excellence within the Indian context. It examines the historical evolution of accreditation in India, analyzes the current accreditation landscape, discusses the impact of accreditation on institutional performance, identifies challenges and criticisms, and proposes future directions for strengthening the accreditation system to foster a culture of continuous improvement and excellence in Indian higher education. This includes a focus on the National Education Policy (NEP) 2020 and its implications.

Keywords: Higher education, Accreditation, National Education Policy

Introduction

India's higher education system is one of the largest globally, serving millions of students. The Indian higher education sector is facing unprecedented challenges, driven by the need for quality, accountability, and excellence. With over 900 universities and 40,000 colleges, the sector is characterized by diversity, complexity, and uneven quality (MHRD, 2020). Accreditation bodies, such as the National Assessment and Accreditation Council (NAAC) and the National Board of Accreditation (NBA), play a crucial role in promoting institutional excellence, ensuring that higher education institutions meet rigorous standards of quality. Accreditation has emerged as a key strategy for addressing these concerns and driving institutional excellence. This paper examines the role of accreditation bodies in this context, focusing on their contribution to enhancing the quality of higher education in India. The paper argues that while accreditation has made progress, a new dawn is possible with the

* Assistant Professor, Govt. College of Education Sector 20 D Chandigarh

implementation of the NEP 2020. This policy provides a framework for a more robust and outcome-oriented accreditation system.

Historical Evolution of Accreditation in India

The concept of accreditation in India is relatively recent compared to other countries. Initially, universities were primarily responsible for setting their own standards. The establishment of the University Grants Commission (UGC) in 1956 marked a significant step towards regulating and coordinating higher education (UGC, 2023). However, a formal accreditation system only began to take shape in the late 20th century. The National Assessment and Accreditation Council (NAAC) was established in 1994 to assess and accredit institutions, while the All India Council for Technical Education (AICTE) was mandated to accredit technical programs (NAAC, 2023; AICTE, 2023). This era saw the gradual development of accreditation frameworks and methodologies.

The Current Accreditation Landscape in India

The Indian accreditation landscape is currently characterized by a dual system, with NAAC focusing on institutional accreditation and various professional bodies, like AICTE, NBA (National Board of Accreditation), and others accrediting specific programs. NAAC's assessment framework covers various aspects of institutional functioning, including curriculum, teaching-learning processes, research, infrastructure, governance, and student support services. The process involves self-study reports submitted by institutions, followed by peer team visits and final grading. The accreditation granted by NAAC is valid for a period of five years. Similarly, professional bodies have their own criteria for program accreditation. The National Education Policy (NEP) 2020 envisions a more streamlined and integrated accreditation system, moving towards a unified framework (NEP, 2020).

The Impact of Accreditation on Institutional Performance

Accreditation has had a positive impact on Indian higher education institutions in several ways:

- **Improved Quality:** The accreditation process encourages institutions to focus on improving the quality of their teaching, learning, and research (Suskie, 2018).
- **Enhanced Institutional Effectiveness:** It prompts institutions to strengthen their governance, management, and resource allocation, leading to greater effectiveness (Bogue and Saunders, 1992).
- **Increased Accountability:** Accreditation enhances institutional accountability by requiring institutions to demonstrate their performance and meet established standards.
- **Greater Transparency:** The process promotes transparency by making information about accredited institutions publicly available.

- **International Recognition:** NAAC accreditation is increasingly being recognized internationally, facilitating student mobility and collaborations.
- **Funding Opportunities:** Accreditation can be a prerequisite for institutions to access certain funding opportunities.
- **Increased Credibility:** Accreditation enhances an institution's reputation and credibility, both nationally and internationally °.
- **Better Student Outcomes:** Accreditation promotes student-centered approaches, leading to higher graduation rates, employability, and career progression °.
- **Access to Funds and Grants:** Accreditation opens up funding opportunities and grants, enabling institutions to improve infrastructure, pedagogies, and instructional resources.
- **Higher Placement Chances:** Accreditation increases placement chances, as employers prefer graduates from accredited institutions.

However, the impact of accreditation is not uniform across all institutions. Some institutions may view accreditation as a mere formality, while others genuinely use it as a tool for continuous improvement. The effectiveness of accreditation depends on the commitment of the institution to using the feedback and recommendations provided by the accreditation bodies.

Challenges and Criticisms of The Indian Accreditation System

Despite its benefits, the Indian accreditation system faces several challenges:

- **Bureaucracy and Complexity:** The accreditation process can be bureaucratic, time-consuming, and complex, especially for smaller institutions.
- **Limited Resources:** Accreditation bodies face challenges in terms of limited resources, including funding, personnel, and infrastructure.
- **Focus on Inputs rather than Outcomes:** There is a concern that accreditation often focuses on inputs (e.g., infrastructure, faculty qualifications) rather than outcomes (e.g., student learning, research impact) (Breneman, 1994).
- **Subjectivity and Bias:** The peer review process can be subjective and susceptible to bias, potentially leading to inconsistent evaluations.
- **Lack of Transparency:** While information about accredited institutions is available, the detailed evaluation reports are not always readily accessible to the public.
- **Limited Capacity of Accreditation Bodies:** The accreditation bodies may face capacity constraints in terms of resources and personnel, making it difficult to conduct timely and thorough evaluations.
- **Gaming the System:** Some institutions may try to manipulate the system to achieve accreditation without making genuine improvements (Ewell, 2010).
- **Overemphasis on Quantitative Metrics:** The accreditation system places too much

emphasis on quantitative metrics, such as student-faculty ratios and infrastructure, rather than qualitative factors, such as teaching and learning outcomes.

The National Education Policy (NEP) 2020 and Its Implications for Accreditation

The NEP 2020 presents a significant opportunity to revamp the Indian accreditation system and make it more effective. The policy envisions a more outcome-oriented, transparent, and simplified accreditation framework. Key features of the NEP 2020 related to accreditation include:

- **A National Accreditation Council (NAC):** The NEP proposes the establishment of a NAC as an overarching body to oversee and coordinate all accreditation activities. This aims to bring greater coherence and uniformity to the system (NEP, 2020).
- **Outcome-Based Accreditation:** The policy emphasizes a shift towards outcome-based accreditation, focusing on student learning outcomes, research impact, and other measures of institutional effectiveness (NEP, 2020).
- **Technology-Enabled Accreditation:** The NEP advocates for the use of technology to streamline the accreditation process, enhance data collection and analysis, and improve transparency (NEP, 2020).
- **International Accreditation:** The policy encourages institutions to seek international accreditation to enhance their global standing (NEP, 2020).
- **Linking Accreditation to Funding:** The NEP suggests linking accreditation to funding, providing incentives for institutions to achieve high accreditation grades (NEP, 2020).
- **Institutional Autonomy and Accountability:** The policy promotes institutional autonomy and accountability, which are critical aspects of accreditation.
- **Multi-Disciplinary Education and Research Universities (MERUs):** NEP 2020 proposes the establishment of MERUs, which will require accreditation to ensure quality and standards (NEP, 2020).
- **Transparent and Credible Accreditation Process:** NEP 2020 emphasizes the need for a transparent and credible accreditation process, which will ensure accountability and quality in higher education institutions (NEP, 2020).

Future directions for accreditation in india:

To realize the vision of the NEP 2020 and strengthen the Indian accreditation system, the following steps are crucial:

- **Establishment of the NAC:** The NAC should be established expeditiously and given the necessary authority and resources to effectively oversee accreditation activities.
- **Development of a Robust Outcome-Based Framework:** A clear and measurable

outcome-based framework should be developed, focusing on student learning outcomes, research impact, and other relevant indicators (CHEA, various publications).

- **Leveraging Technology:** Technology should be effectively utilized to streamline the accreditation process, enhance data collection and analysis, and improve transparency.
- **Capacity Building:** Accreditation bodies should invest in capacity building and training programs for accreditation agencies, institutions, and stakeholders to enhance their skills and knowledge, to ensure they have the necessary expertise and resources to conduct thorough evaluations.
- **Strengthening Peer Review Processes:** Measures should be taken to enhance the objectivity and transparency of peer review processes, minimizing bias and ensuring consistency.
- **Promoting a Culture of Continuous Improvement:** Institutions should be encouraged to use accreditation as a tool for continuous improvement, rather than simply a means to an end.
- **Public Awareness and Engagement:** Greater public awareness and engagement are needed to ensure that accreditation information is used effectively by students, parents, and other stakeholders.
- **International Collaboration:** Collaboration with international accreditation bodies can help to benchmark Indian standards and promote global recognition of Indian qualifications (INQAAHE, various publications).
- **Encouraging Institutional Innovation and Diversity:** Encourage institutional innovation and diversity, enabling institutions to experiment with new models of education, research, and community engagement.
- **Focus on Emerging Areas:** Develop accreditation frameworks for emerging areas such as online and distance learning, vocational education, and skill development.
- **Strengthening Accreditation Agencies:** Strengthen accreditation agencies, such as NAAC and NBA, to ensure their independence, autonomy, and effectiveness.

Accreditation and The Pursuit of Institutional Excellence

Accreditation plays a vital role in the pursuit of institutional excellence in higher education. It ensures that institutions meet certain standards of quality, promoting continuous improvement and accountability. Accreditation encourages institutions to engage in self-assessment and reflection, identifying areas for improvement and implementing changes to enhance quality. This process fosters a culture of excellence, driving institutions to strive for superiority in teaching, learning, and research. By meeting accreditation standards, institutions demonstrate their commitment to quality and excellence, enhancing their reputation and credibility. Accreditation also promotes transparency, providing stakeholders with access to information about institutional performance and quality. Furthermore,

accreditation encourages institutional autonomy, enabling institutions to take ownership of their quality assurance processes and pursue excellence. Effective accreditation processes lead to improved student outcomes, increased employability, and enhanced research and innovation. Institutions that pursue accreditation demonstrate their dedication to providing high-quality education and preparing students for success.

Accreditation, when implemented effectively, can be a powerful driver of institutional excellence. It provides a framework for institutions to assess their strengths and weaknesses, identify areas for improvement, and implement strategies to enhance their quality. However, accreditation is not a magic bullet. It is only one piece of the puzzle. Other factors, such as strong leadership, committed faculty, adequate resources, and a supportive policy environment, are also essential for achieving institutional excellence. Accreditation should be seen as a continuous process of self-reflection and improvement, rather than a one-time event.

Conclusion

The Indian higher education system is at a critical juncture. The NEP 2020 provides a roadmap for transforming the system and achieving greater quality and relevance. Accreditation, as a key mechanism for quality assurance, has a crucial role to play in this transformation. By addressing the challenges and implementing the recommendations outlined in this paper, India can create a robust and effective accreditation system that drives institutional excellence and prepares students for success in the 21st century. The establishment of the NAC, the shift towards outcome-based accreditation, and the leveraging of technology are particularly promising developments. With a renewed focus on quality and a commitment to continuous improvement, a new dawn for Indian higher education is within reach. This new dawn will be characterized by institutions that are not only nationally recognized but also globally competitive, producing graduates who are equipped with the knowledge, skills, and competencies needed to thrive in a rapidly changing world. Further research should focus on measuring the long-term impact of the NEP 2020 on accreditation and institutional performance, as well as exploring best practices for implementing outcome-based accreditation in diverse institutional contexts.

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THE ROLE OF ACCREDITATION BODIES IN DRIVING INSTITUTIONAL EXCELLENCE

Dr. Vipinder Nagra & Jaswant Kaur***

Abstract

Accreditation bodies play a vital role in ensuring institutional excellence by establishing quality benchmarks, fostering continuous improvement, and enhancing global recognition. This paper explores the significance of accreditation in higher education, healthcare, and professional organizations, highlighting how accreditation drives quality assurance, innovation, and accountability. It also discusses challenges faced by accreditation bodies and the future of accreditation in a rapidly changing world. This paper examines the role of accreditation bodies in driving institutional excellence by focusing on their functions, impact, challenges, and future trends.

Keywords: *Accreditation Bodies, Institutional Excellence, quality benchmark*

Introduction

The term *Accreditation* is widely recognized as a key quality indicator. According to Lee (2004), accreditation represents the status of an institution or program that meets established minimum standards. Chea (2010) expands on this by defining accreditation as both a process and a status. In the context of education, accreditation refers to the process by which an association or agency evaluates an educational institution or program of study and formally acknowledges that it meets or exceeds specific predetermined standards of educational quality. These accrediting bodies establish fundamental criteria that reflect the qualities of a robust educational program, and they develop procedures to assess whether institutions and programs meet these standards. In addition to setting criteria, accrediting agencies are also responsible for conducting site visits, evaluating institutions, and granting accreditation to those that fulfill the required standards.

Accreditation, when properly understood and implemented, serves two primary

* Associate Professor, D.A.V.College of Education,Hoshiarpur

** Research Scholar, P U, Chandigarh

purposes: assuring the quality of the institution or program, and contributing to its ongoing improvement. There are two main types of educational accreditation: (1) institutional accreditation and (2) specialized accreditation.

The goal of the accreditation process is to foster a quality-conscious system in technical education, ensuring excellence, relevance to market needs, and involvement from all stakeholders. The process emphasizes the creation of a professional education system that produces skilled human resources, supporting national growth objectives, economic competitiveness, and societal development. Accreditation seeks to ensure a teaching and learning environment that aligns with best practices, ensuring that institutions possess the essential features for delivering quality professional education. For institutions, the process highlights their strengths, weaknesses, and opportunities for future development. For industry and infrastructure providers, it offers insight into the quality of institutional capabilities (Sahay and Thakur, 2007).

In higher education, accreditation serves as a mechanism for evaluating institutions and their academic programs to ensure they meet established quality standards. External accreditation agencies perform this evaluation, considering various aspects such as governance, faculty qualifications, infrastructure, curriculum design, and student outcomes. Accreditation ensures that institutions provide education that adheres to both national and international standards.

Some top Accreditation Bodies in the Regulation of Higher Education

Higher education accreditation bodies in India play a crucial role in determining the credibility and value of degrees awarded by institutions. Accreditation ensures that higher learning institutions and their programs meet established standards of quality and excellence. Here are some of the key accreditation bodies in India:

- 1. University Grants Commission (UGC):** Established in 1956, the UGC is the apex body responsible for providing recognition to universities in India. It advises universities on measures to improve the quality of higher education and ensures compliance with educational standards.
- 2. Association of Indian Universities (AIU):** AIU evaluates and equates the courses, standards, syllabi, and credits of foreign universities with those offered by Indian universities. It also serves as the implementing agency for agreements made under Cultural Exchange Programmes between India and other countries.
- 3. National Assessment and Accreditation Council (NAAC):** Founded by the UGC in 1994, NAAC is an autonomous body that assesses and accredits colleges and universities across India. It plays a pivotal role in evaluating institutions based on their academic performance, infrastructure, governance, and student outcomes.
- 4. National Board of Accreditation (NBA):** NBA is responsible for accrediting

technical education programs, including those in management, engineering, pharmacy, architecture, and other specialized fields. It ensures that these programs meet national and international standards.

5. **Bar Council of India (BCI):** BCI is a statutory body that regulates legal education and practice in India. It accredits universities and colleges that offer law programs at diploma, undergraduate (UG), and postgraduate (PG) levels.
6. **National Council for Teacher Education (NCTE):** NCTE oversees all aspects of teacher education in India. It sets standards, procedures, and processes for teacher training programs and ensures their quality across the country.
7. **Indian Nursing Council (INC):** INC is the regulatory body for nursing education in India. It accredits nursing colleges and ensures that nursing programs comply with required quality standards.
8. **All India Council for Technical Education (AICTE):** Established in 1987, AICTE is the regulatory body for technical education in India. It is responsible for planning, development, and maintaining the norms and standards for technical institutions offering programs in engineering, technology, and other disciplines.
9. **Indian Council of Agricultural Research (ICAR):** ICAR is the leading research organization for coordinating, guiding, and managing agricultural education and research in India. It works under the Ministry of Agriculture and Farmers Welfare and ensures that agricultural education meets national standards.

Functions of Accreditation Bodies in Driving Higher Education

Accreditation bodies play a pivotal role in the development and enhancement of higher education by fostering a culture of excellence, accountability, and continuous improvement within institutions. Their contributions are essential in maintaining the integrity and quality of education across the education system. Below are some of the primary aims and objectives of accreditation bodies:

1. **Ensuring Quality Education:** Accreditation bodies establish and enforce rigorous academic and operational standards, ensuring that institutions consistently provide high-quality education that meets the expectations of students, employers, and society.
2. **Promoting Continuous Improvement:** By encouraging institutions to adopt best practices and innovative approaches, accreditation bodies drive the continuous enhancement of educational offerings, ensuring that they remain relevant and impactful in an ever-evolving world.
3. **Accountability and Transparency:** Accreditation bodies ensure that educational institutions operate with integrity and transparency, fostering trust and confidence among stakeholders, including students, faculty, and employers. This accountability helps institutions maintain high standards in their operations and outputs.

- 4. Recognition and Credibility:** Through formal recognition, accreditation enhances the credibility of institutions, which in turn provides students with greater career opportunities. Accreditation acts as a mark of quality that signals to employers and the public that the institution adheres to established academic and operational standards.
- 5. Facilitating Student Mobility:** Accreditation ensures that degrees and qualifications are recognized both nationally and internationally. This recognition allows students to transfer credits, pursue higher education abroad, and have their qualifications accepted across different borders, thereby enhancing their mobility and opportunities.
- 6. Benchmarking Against Global Standards:** By aligning institutional practices with international best practices, accreditation bodies help institutions maintain global competitiveness and relevance. This benchmarking ensures that institutions not only meet national standards but also excel on the global stage.
- 7. Protecting Public Interest:** Accreditation bodies safeguard the public interest by ensuring that educational institutions act ethically and responsibly. This includes prioritizing student welfare, maintaining quality standards, and ensuring that institutions contribute positively to societal development.
- 8. Enhancing Institutional Governance:** Accreditation bodies promote strong leadership, effective strategic planning, and sound policy implementation within higher education institutions. This ensures that institutions are well-governed, sustainable, and able to adapt to the changing needs of students, employers, and society.
- 9. Encouraging Research and Development:** By supporting institutions in advancing knowledge through research initiatives and fostering innovation, accreditation bodies help drive progress in various academic disciplines. This contributes to the overall advancement of society and the global body of knowledge.
- 10. Fostering Industry Collaboration:** Accreditation bodies play a key role in strengthening partnerships between academia and industry. By ensuring that curricula are relevant and aligned with industry needs, accreditation helps enhance the employability of graduates and facilitates a smoother transition from education to the workforce.

In conclusion, accreditation bodies are essential to the ongoing advancement of higher education. They contribute to the creation of institutions that are not only academically rigorous but also responsive to the needs of students, industries, and the global community. Through their efforts, accreditation bodies ensure that institutions remain accountable, innovative, and capable of delivering high-quality education that benefits both individuals and society at large.

Impact of Accreditation on Higher Education Institutions

Accreditation bodies play a crucial role in establishing and enforcing quality standards

that institutions must meet in order to receive accreditation. These standards cover several key areas that ensure the overall quality and effectiveness of educational programs:

- 1. Curriculum Design and Delivery:** Institutions are required to offer programs that are not only academically rigorous but also aligned with industry needs and regulatory standards. The curriculum must be designed to equip students with relevant knowledge and skills.
- 2. Faculty Qualifications and Development:** Accreditation requires institutions to employ qualified faculty members and to support their ongoing professional development through opportunities for training, research, and career advancement. This ensures that educators remain current with advancements in their fields.
- 3. Infrastructure and Learning Resources:** Institutions must provide adequate physical and technological infrastructure, including libraries, laboratories, classrooms, and digital tools, to create a conducive learning environment that supports student success.
- 4. Student Support Services:** Comprehensive student support services, such as career counseling, academic advising, and mental health services, are essential for fostering student well-being and helping them succeed both academically and personally.
- 5. Enhancing Educational Quality:** By adhering to accreditation standards, institutions continuously enhance their academic programs and student services, which leads to improvements in educational outcomes and overall institutional performance.
- 6. Facilitating Student Mobility:** Accredited institutions offer degrees that are widely recognized, both nationally and internationally. This recognition enables students to pursue further studies or career opportunities in various regions and industries.
- 7. Building Institutional Reputation:** Accreditation elevates an institution's credibility, attracting high-quality students, faculty members, and funding opportunities. A strong reputation helps the institution establish itself as a leader in education.
- 8. Ensuring Accountability:** Regular accreditation reviews require institutions to maintain transparency and demonstrate their commitment to continuous improvement. These evaluations hold institutions accountable for upholding their educational standards and meeting the evolving needs of students and society.

In summary, accreditation bodies ensure that institutions meet rigorous standards that promote academic excellence, support student success, and foster continuous improvement, ultimately enhancing the overall quality of higher education.

Challenges Faced by Accreditation Bodies in Higher Education

Accreditation bodies play a crucial role in ensuring quality and excellence in higher education institutions. However, they face numerous challenges that impact their effectiveness and ability to maintain high academic standards. These challenges stem from

bureaucratic complexities, institutional resistance, evolving educational models, technological advancements, and political and financial pressures.

- One of the most significant challenges is the bureaucracy and administrative burden associated with accreditation. The process often involves extensive documentation, self-assessments, and multiple rounds of evaluation, making it time-consuming and costly for institutions. Smaller institutions with limited resources may struggle to meet these requirements, leading to disparities in accreditation access. Additionally, the rigid and lengthy nature of accreditation cycles can sometimes hinder innovation, as institutions may focus more on compliance rather than meaningful improvements in education quality.
- Another major hurdle is institutional resistance to change. Many universities and colleges may be reluctant to adopt new accreditation standards due to concerns about increased scrutiny, additional workload, and potential negative evaluations. Institutions that have been operating with traditional models for years may resist adapting to new pedagogical approaches, such as competency-based education or digital learning, fearing that these changes could disrupt their established processes. This resistance can slow down efforts to enhance educational quality and align programs with modern workforce demands.
- Accreditation bodies also face challenges in balancing standardization with institutional diversity. Higher education institutions vary significantly in their missions, structures, and teaching methodologies. While research universities focus on innovation and knowledge creation, teaching-oriented colleges prioritize student engagement and skill development. Applying uniform accreditation criteria across such diverse institutions can be difficult, as a one-size-fits-all approach may not accurately reflect the strengths and contributions of each institution. Striking a balance between maintaining rigorous standards and allowing institutional flexibility remains a constant challenge.
- The rapid advancement of technology in education has added another layer of complexity. Online learning, artificial intelligence-driven education tools, and hybrid models have transformed higher education, requiring accreditation bodies to develop new assessment methods. Traditional accreditation frameworks, designed for in-person education, may not fully capture the effectiveness of digital and remote learning environments. Ensuring cybersecurity, data privacy, and the credibility of online degrees further complicates the evaluation process. Accreditation agencies must continuously update their standards to keep pace with technological innovations while ensuring educational quality.
- Another pressing issue is the measurement of learning outcomes and employability. While accreditation aims to ensure high academic standards, evaluating the actual impact of education on students' knowledge, skills, and job readiness is challenging. Relying solely on metrics such as graduation rates or faculty qualifications may not provide a complete picture of institutional effectiveness. Employers and policymakers

increasingly demand that accreditation bodies assess real-world competencies and graduate employability, requiring a shift toward more dynamic and outcome-based evaluation methods.

- Lastly, the globalization of higher education has made accreditation more complex. With students increasingly seeking international education opportunities, there is a growing need for mutual recognition of accreditation across countries. However, differences in accreditation standards, regulatory frameworks, and educational systems make cross-border recognition difficult. Collaborative efforts between national and international accreditation bodies are essential to ensuring consistency and credibility in global higher education accreditation.

Conclusion

Accreditation bodies serve as indispensable guardians of institutional excellence, ensuring quality assurance, promoting accountability, fostering continuous improvement, enhancing global competitiveness, and strengthening public trust. Their rigorous evaluation and validation processes enable institutions to uphold high standards of education, governance, and service delivery, benefiting students, employers, and society at large. As educational and professional landscapes continue to evolve, accreditation will remain a cornerstone of institutional credibility and excellence, shaping the future of learning, research, and professional development. By addressing emerging challenges and embracing innovative assessment approaches, accreditation bodies can further enhance their role in advancing institutional and societal progress.

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Theme VII

*Role of Artificial Intelligence and Automation
in Reshaping Higher Education*

ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Anita Devi*

Abstract

Artificial Intelligence (AI) and automation are transforming higher education by enhancing personalized learning, automating administrative processes and revolutionizing research methodologies. AI-powered applications such as automated grading, chatbots and predictive analytics are improving student engagement, accessibility, and academic outcomes. Additionally, AI-driven data analytics and campus management systems are optimizing institutional decision-making and operational efficiency. However, challenges like data privacy, algorithmic bias, digital divide and ethical concerns must be addressed to ensure equitable and responsible AI implementation. As AI continues to shape the future of education, a balanced approach integrating human-AI collaboration, faculty upskilling and ethical governance is crucial to fostering innovation while maintaining inclusivity and fairness. This article discusses the role of AI and automation in higher education, explores future trends, recommends strategies for AI integration and advocates for responsible AI use, promoting transparent, fair and inclusive education systems.

Keywords: *Artificial Intelligence, Automation, Higher Education, Personalized Learning, Human-AI Collaboration, Challenges, Recommendations*

Introduction

Artificial intelligence (AI) and automation are driving significant technological advancements in the 21st century, including in education. AI enables computer programs to simulate cognitive processes like creativity, learning, problem-solving and decision-making, while automation reduces human intervention by automating repetitive tasks. These technologies are revolutionizing individualized learning, simplifying administrative procedures, and changing conventional educational approaches. Applications powered

* Assistant Professor (Pedagogy of Science), Department of Education, D.A.V. College of Education, Hoshiarpur

by AI, such as chatbots, automated grading, predictive analytics and intelligent tutoring systems, are improving student accessibility, efficiency and participation in higher education worldwide.

The Role of AI and Automation in Higher Education

- **Personalized Learning:** AI-powered personalized learning platforms analyse student performance, adapt content, provide real-time feedback, use chatbots for instant answers, enhance engagement, retention and self-paced learning.
- **AI's transformative potential:** By altering teaching strategies, enhancing student learning, and raising academic standards, AI is transforming higher education.
- **Automated Grading and Assessment:** AI-driven automation enhances grading by reducing faculty workload and ensuring objective assessments but raises concerns about evaluating creativity and critical thinking in student work.
- **Administrative Support:** AI is capable of managing administrative duties including parent communications, scheduling, and attendance monitoring. Teachers have less administrative work to do as a result of the streamlined procedures.
- **Engagement and Interaction:** Chatbots and other AI-powered solutions may respond to students' enquiries beyond school hours, offering immediate assistance and freeing up instructors' time for more difficult problems.
- **Predictive Analytics for Student Success:** AI in higher education uses predictive analytics to identify at-risk students, provide early intervention and offer personalized academic advice, preventing dropouts and enhancing student retention.
- **Research and Knowledge Discovery:** AI is enhancing research in higher education by analysing vast datasets, identifying trends, and generating insights. Tools like Iris.ai and Semantic Scholar automate literature reviews, process complex datasets and generate content, raising ethical concerns.
- **Campus Management:** AI and automation are enhancing university administration by streamlining processes like admissions, student services, campus security, reducing administrative workload and operational costs.
- **Language Learning:** AI-powered language learning tools like Duolingo, Google Translate, SayHi, Elsa Speak, Speechling, ChatGPT, Mitsuku, Grammarly, QuillBot, LingQ, and Memrise improve engagement, pronunciation accuracy and language learning.
- **Inclusive Education:** AI tools can help students with impairments. For example, students who are hearing-impaired can use speech-to-text, while students who are visually impaired can use text-to-speech. This guarantees that every student has access to high-quality instruction.
- **Student Support:** Using student data profiles, AI systems may suggest majors, courses

and career choices. They can also provide various support services, early warning systems for pupils who are at risk and financial help.

- **Data-Driven Decision Making:** By facilitating the gathering and processing of enormous volumes of data, artificial intelligence (AI) assists administrators and educators in recognising patterns, allocating resources effectively and making well-informed judgements.
- **Natural Language Generation or NLP:** Self-paced, interactive learning environments are created using NLP algorithms. Tasks including semantic analysis, translation, speech recognition and summarisation are made easier by NLP. By converting text into data, AI helps computers express concepts effectively and provide summaries and reports.
- **Smart Campus:** A network of interconnected devices known as the Internet of Things (IoT) boosts automation and productivity on smart campuses. It improves the educational experience by enabling automated facilities management, networked classrooms, energy efficiency, security and personalised learning.
- **Robotic Process Automation:** AI supports and enhances human talents by simulating human jobs to automate business and educational procedures.
- **Dynamic Teacher Roles:** As AI is included, teachers' responsibilities change from providing direct instruction to facilitating, collaborating and innovating.

Challenges and Ethical Concerns of AI in Higher Education

Data Privacy and Security Concerns

- **Data privacy:** Educational institutions are required to make sure that student data is collected, stored, and used responsibly in order to preserve their privacy and avoid abuse.
- **Cybersecurity Risks:** AI-powered systems need strong security measures since they are prone to hacking and data leaks.

Digital Divide

- **Access to Technology:** The digital gap may worsen as a result of the broad use of AI-powered technologies, which would disadvantage pupils who do not have access to dependable internet, digital literacy or technology. It is crucial to guarantee fair access to technology and instruction in digital literacy.
- **Affordability:** The high cost of AI-powered learning materials and platforms may put institutions or students with less funding at a disadvantage. Investigating accessible and reasonably priced options is essential.

Ethical Concerns

- **Algorithmic Bias:** AI systems have the potential to reinforce or even magnify social

biases if the data they are trained on reflects those biases. For some student groups, this may result in unfair or discriminating outcomes. It is essential to guarantee justice and fairness in AI systems.

- **Explainability and Transparency:** Since many AI systems function as “black boxes,” it might be challenging to comprehend how they make judgements. Concerns regarding responsibility and trust may arise from this lack of transparency, particularly when AI is utilised for crucial functions like student evaluation or tailored learning suggestions.
- **Possibility of Surveillance:** AI-powered technologies may be employed to monitor pupils’ actions and behaviour. Concerns regarding student autonomy and the possibility of information misuse are brought up by this.

Impact on Human Interaction

- **Diminished Human Connection:** When students and teachers rely too much on AI-powered technologies, there may be less human engagement, which might have an effect on the social and emotional components of learning. It’s critical to keep technology and interpersonal relationships in balance.
- **Teachers’ Changing Roles:** As a result of AI integration, educators must adjust to new duties and obligations. This might entail a change in teaching practices, professional development, and upskilling. It is essential to assist instructors during this shift.
- **Job displacement:** Automation may result in the loss of human teachers and administrative personnel, raising concerns.

Quality and Validity of AI Systems

- **Accuracy and Reliability:** Because AI systems are not flawless, they occasionally make mistakes or give false information. For learning to be effective, AI-powered products must be accurate and dependable.
- **Relevance and content Quality:** Artificial intelligence (AI) systems have the potential to provide content that isn’t necessarily correct, pertinent or in line with learning goals. It’s critical to preserve human oversight and quality control.

Implementation Challenges

- **Integration with Existing Systems:** It can be difficult and complex to integrate AI-powered solutions with existing institutional procedures and systems.
- **Cost and Resources:** Infrastructure, software, and training are only a few of the resources and financial outlays that may be necessary for implementing AI solutions.
- **Resistance to Change:** Some teachers or students could be reluctant to adopt new technology, necessitating the use of efficient change management techniques.
- **Administrators and Teachers’ Skill Gaps:** The majority of faculty members are

not technically proficient enough to use AI-driven systems. Additionally, there are few training programs available to help teachers adjust to AI-enhanced teaching methods.

- **Balancing AI and Human Instruction:** Although AI helps with some parts of instruction, mentoring and human interaction are still crucial. It is critical to integrate AI with human training in a balanced manner.

Future Trends in AI and Automation in Higher Education

- **AI-Enhanced Virtual and Augmented Reality (VR/AR):** AI-powered VR/AR simulations, virtual labs, and augmented reality textbooks offer immersive learning experiences in fields like medicine, engineering, history and physics, enabling students to conduct experiments without physical equipment.
- **AI-Powered Lifelong Learning and Micro-Credentials:** AI will enhance lifelong learning by providing personalized experiences and certifications, with platforms like LinkedIn Learning and edX suggesting courses tailored to career goals.
- **Ethical AI Development and Governance in Higher Education:** Institutions are implementing AI ethics frameworks, AI ethics committees, and transparent AI policies to ensure responsible AI use in academics, ensuring fairness and accountability.

Recommendations

- **Professional Development for Teachers:** Ongoing training and development for educators is crucial.
- **Future Directions:** Further research is needed to understand AI's long-term effects on education and develop effective teacher training programs.
- **Customization of Learning Experiences:** AI-powered adaptive learning systems and AI tutors can provide personalized student support.
- **Automation of Administrative Procedures:** AI can automate enrollment, assignment tracking, and attendance management.
- **Enhancing Student Support & Engagement:** AI-powered virtual assistants can provide career and academic guidance.
- **Clear AI Strategy:** Align AI adoption with institution's objectives and obstacles.
- **Integration of AI into Research and Innovation:** AI-driven resources can aid content creation, plagiarism detection, and data analysis.
- **AI Literacy:** Training sessions and seminars can enhance AI literacy.
- **Ethical & Transparent AI Use:** Guidelines for transparency, data privacy, and AI bias mitigation are needed.
- **AI-Powered Learning Platforms:** Collaboration with EdTech businesses can include AI-powered learning tools.
- **Inclusivity and Cultural Responsiveness:** AI systems should be inclusive and culturally sensitive.

Conclusion

AI and automation are revolutionizing higher education by enhancing personalized learning, automating administrative processes and transforming research methodologies. AI has the ability to collaborate with people, developing their skills and fostering their creativity. Human-AI cooperation has the potential to greatly benefit society and education is essential to preparing the future generation for these developments. However, challenges like data privacy, bias and accessibility need to be addressed for ethical AI implementation, promoting equity and inclusivity.

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THE EMERGING ROLE OF AI CHATBOTS IN HIGHER EDUCATION

Ashutosh Sharma*

Abstract

The fast development of artificial intelligence (AI) has brought transforming tools into higher education; among them, AI chatbots represent a major invention. This research article investigates how free versions of prominent chatbots ChatGPT, Deepseek, Grok, Google Gemini, and Microsoft Copilot might improve administrative procedures, teaching, and learning in higher education institutions (HEIs). Inspired by current research and real-world case studies, the paper investigates the advantages, difficulties, and moral consequences of including these easily available technologies into learning environments. Results imply that free artificial intelligence chatbots provide administrative efficiency, personalized learning, and increased accessibility; nevertheless, they also generate questions regarding academic integrity, data privacy, and fair access. The report ends with suggestions for teachers and legislators to properly use these instruments while overcoming their constraints. Within mostly the past three years, delimitations include an emphasis on free chatbot versions and higher education environments.

Keywords: Artificial Intelligence (AI), AI Chatbots, Higher Education, Plagiarism, Critical Thinking, Institutional Policies, Digital Literacy, Human Oversight.

Introduction

Artificial intelligence (AI) has emerged as a fundamental element of contemporary technological advancement, infiltrating numerous areas, including education. In higher education, AI chatbots software applications engineered to replicate human dialogue have gained significance owing to their capacity to deliver instantaneous, scalable assistance. The complimentary versions of prominent chatbots, such ChatGPT (Open AI), Google Gemini, and Microsoft Copilot, have democratised access to AI tools, allowing students, educators, and

* Assistant Professor in English, Government College of Commerce and Business Administration, Chandigarh.

institutions to utilise them without cost constraints. As of 25 February 2025, these instruments are progressively included into educational systems, necessitating an assessment of their impact. This article examines the evolving function of AI chatbots in higher education, emphasising the use of their complimentary variants. It tackles three key research enquiries: How do free AI chatbots improve education and learning? What challenges emerge from their utilisation? What ethical considerations need to be addressed? The study seeks to deliver a thorough analysis to assist higher education institutions in the responsible adoption of these tools.

Literature Review

The incorporation of AI chatbots in education has been widely documented in recent years. Research underscores its capacity to customize education by providing individualised feedback and resources (Labadze, Grigolia and Machaidze, 2023). Complimentary versions of chatbots, including ChatGPT, have received acclaim for their natural language processing abilities, facilitating assistance with activities such as essay composition, language practice, and problem resolution (Liu, Ren, Nyagoga, Stonier and Yu, 2023). These tools alleviate administrative responsibilities for educators by automating responses to frequently asked questions and facilitating course design (Michel-Villarreal, Vilalta-Perdomo, Salinas-Navarro, Thierry-Aguilera and Gerardou, 2023). Moreover, AI chatbots can enhance student engagement by delivering immediate, interactive assistance, which is especially advantageous in large classrooms where personalised attention from instructors may be constrained. They facilitate self-directed learning, permitting students to review topics and hone abilities at their own pace, thus accommodating varied learning requirements and preferences.

However, issues persist. Concerns regarding academic integrity, especially plagiarism, have intensified since the release of ChatGPT in November 2022 (King, 2023). The simplicity with which students may produce essays, code, or solutions with AI technologies has prompted concerns regarding the validity of their work and the possible decline of critical thinking abilities. Moreover, the dependability of free chatbot responses, which may harbour mistakes, presents hazards to educational outcomes (Ilieva, Yankova, Klisarova-Belcheva, Dimitrov, Bratkov and Angelov, 2023). Students that depend on AI-generated content without validating its authenticity may assimilate erroneous information, resulting in knowledge deficiencies. Ethical concerns, such as data privacy and the digital divide, exacerbate their adoption (Kelly, Kaye and Oviedo-Trespalacios, 2022). Numerous complimentary AI products gather user data, prompting apprehensions regarding the storage and utilisation of this information. Furthermore, unequal access to technology and internet connectivity intensifies existing gaps, as kids from disadvantaged backgrounds may not equally benefit from these improvements. Educators and governments must formulate explicit rules for the ethical implementation of AI in education to tackle these difficulties. This encompasses the creation of effective plagiarism detection systems, the advancement of digital literacy to enable students to critically assess

AI-generated content, and the assurance of fair access to technology. By addressing these issues, the promise of AI chatbots to revolutionise education can be completely actualised while mitigating threats.

Methodology

The methodology emphasises the examination of AI chatbot utilisation in higher education. It utilises a systematic literature review methodology. Relevant studies are sourced from scholarly databases. The inclusion criteria focus on empirical studies conducted since the publication of ChatGPT. Exclusion criteria eliminate non-educational or obsolete publications. Data is obtained regarding advantages, obstacles, and utilisations. The analysis integrates information from students and educators. Findings guide further research trajectories. This methodological approach was developed for thorough coverage. Various academic databases were utilised for sourcing material. Google Scholar functioned as an ancillary resource. Grey literature was analysed when applicable. This method guaranteed a comprehensive collection of pertinent research. The search approach utilised particular keywords. These encompassed “ChatGPT,” “AI chatbots,” and “higher education.” Boolean operators enhanced the search criteria. Tracking citations revealed supplementary pertinent studies.

Rigorous inclusion criteria were implemented. Publications must have occurred subsequent to November 2022. This date signifies the public release of ChatGPT. Research must concentrate explicitly on higher education settings. Only empirical studies utilising original data were deemed acceptable. Theoretical articles were acknowledged but examined independently. The exclusion criteria were equally significant. Studies pertaining to basic or secondary schooling were excluded. Research involving outdated chatbot technologies was omitted. Research without explicit methodological descriptions was dismissed. Papers not published in English were excluded as well. Subsequent to the filtering process, 76 publications were retained for comprehensive study.

The data extraction adhered to a systematic process. A template was created to guarantee uniformity. Essential information was systematically classified. Student experiences were recorded independently from educator viewpoints. Implementation difficulties were observed in conjunction with documented advantages. Pedagogical uses were meticulously documented. Quality evaluation employed recognised frameworks. Every paper was assigned a methodological quality score. Inferior studies were identified during the investigation. This methodology precluded the undue influence of methodologically defective publications on findings. The analysis step utilised theme coding methodologies. Preliminary coding revealed persistent patterns. Secondary coding enhanced these motifs. A third researcher confirmed the correctness of the coding. Contradictory findings were emphasised rather than concealed. Cross-case analyses identified patterns among several institutions.

This stringent process guarantees the dependability of results. It delineates the present status of AI chatbot integration in higher education. The method discerns both agreement and disagreement within the literature. The results establish a robust basis for subsequent research avenues.

Findings and Discussion

Pedagogical Benefits

Complimentary AI chatbots are significantly influencing higher education. They provide customised education, which is quite beneficial. Students perceive essay drafting as far more manageable with support. Language practice also becomes more adaptable. Examine ChatGPT, a widely utilised instrument. It accommodates the individual requirements of each student. This customisation enhances educational results. Continuous access to resources is an additional benefit. This advantages students unable to participate in conventional classes. This is very beneficial for non-traditional learners. Educators are observing favourable transformations. The assessment and response to enquiries require reduced time. This enables them to concentrate more on genuine instruction. Time is, ultimately, a precious resource. These tools are getting further integrated. They are transforming the methods of student learning and educator instruction. The availability of these chatbots is essential. They offer assistance to a broader spectrum of students. This inclusion is a fundamental feature. The advantages are evident and diverse. They are transforming the educational landscape.

Operational Challenges

Free chatbots provide several advantages; yet, they also present specific disadvantages. A notable problem is the inconsistency in their outputs. This necessitates that users often check and validate the information presented to confirm its accuracy. The bandwidth constraints inherent in the free versions may also hinder their overall functionality, impeding users from fully leveraging the chatbot's capabilities. A further risk is the possibility of users becoming excessively dependent on these chatbots. This may hinder the cultivation of critical thinking skills, since users could rely on chatbots for replies without thoroughly assessing the information independently. Technical difficulties such as server outages may disrupt access to the chatbot, resulting in inconvenience and irritation. These constraints underscore the necessity of employing chatbots as an auxiliary resource rather than a principal source of information. Users should exercise caution and adopt a critical mind set to maximise their engagement with free chatbots.

Ethical Implications

Ethical concerns encompass academic integrity, as students may utilise chatbots to circumvent the learning process (King, 2023). Data privacy becomes a significant concern,

as free tools frequently gather user data without explicit consent (Kelly, Kaye and Oviedo-Trespalacios, 2022). The digital gap intensifies disparities, as not all students possess dependable online access to exploit these resources. Educational institutions encounter difficulties in formulating suitable policies. Numerous universities currently utilize AI detection software. This engenders a technological arms race between detection and evasion. Educators indicate dedicating extra hours to validate student assignments. The psychological effects on learning are troubling. Students may cultivate a reliance on AI tools. Critical thinking abilities may decline over time. Genuine learning experiences are supplanted by AI-generated content.

Regulatory frameworks are significantly deficient. Technological advancement outpaces legislative development. Corporations value profit above educational integrity. Student consent for data utilisation is infrequently acquired appropriately. Personal information is transformed into corporate property. AI-generated responses frequently perpetuate prevailing biases. Marginalised viewpoints are being omitted from conversation.

Educational equity is compromised as affluent pupils utilise superior AI resources. Pupils in rural and low-income areas encounter technological obstacles. The disparity in quality between AI-assisted and traditional work increases. Some educators advocate for AI inclusion, while others vehemently oppose it. This contradiction engenders perplexity among students. Explicit institutional guidelines are urgently required. Professional development for educators is insufficient compared to technological progress.

Delimitations

This study only examines the complimentary versions of prevalent AI chatbots, including ChatGPT, Google Gemini, Deepseek, Grox, Claude and Microsoft Copilot. It examines the application of these tools in higher education environments. The analysis excludes paid versions of these chatbots. The study additionally omits their application in K-12 educational settings. Furthermore, it excludes applications in non-English-speaking contexts.

The study's duration extends from 2022 to 2025. This timeframe guarantees the inquiry encompasses the most recent developments in AI chatbot technology. The objective is to comprehend how these complimentary tools facilitate teaching and learning in higher education institutions. It evaluates their availability to students and educators free of charge. The study examines how these chatbots improve academic activities such as research and writing. It also examines their significance in promoting interactive learning experiences.

Nonetheless, it refrains from exploring premium features that necessitate subscriptions. Likewise, it does not consider the operational dynamics of these technologies in elementary or secondary educational institutions. The emphasis is exclusively on English-language higher education environments. Establishing these boundaries delineates a precise scope for the inquiry. It underscores contemporary trends and advancements in the use of AI chatbots.

The period from 2022 to 2025 signifies a pivotal stage of accelerated advancement in this domain. This period facilitates a current assessment of their influence.

The research aims to offer insights pertinent to university professors and students. It emphasises the practical use of open AI tools in academic settings. Its primary objective is to enhance discourse around technology in higher education.

Conclusion and Recommendations

Complimentary AI chatbots possess considerable potential to revolutionise higher education. They offer scalable solutions capable of reaching numerous pupils simultaneously. These tools enhance accessibility to learning for many groups. In addition to instruction, they can optimize administrative functions within universities. Nonetheless, their utilisation presents significant obstacles.

Accuracy is a primary concern, as chatbots may disseminate erroneous information. Academic integrity is a concern, with potential for exploitation by students. Equity presents an additional challenge, as not all kids possess equal access to technology. These difficulties necessitate meticulous attention and oversight. Specific proposals can be proposed to remedy them. Initially, the integration of chatbots with human supervision is necessary. This guarantees that faults are identified and rectified by instructors. Secondly, colleges ought to establish explicit institutional policies. These policies must prioritise the ethical utilisation of AI tools. They ought to instruct students and staff on acceptable practices. Third, investment in digital infrastructure is essential. This facilitates universal access to chatbot technology for all pupils. In its absence, gaps in educational opportunity may exacerbate. Collectively, these measures can optimize advantages while mitigating dangers.

Future study is required to enhance comprehension. Longitudinal research may elucidate the effects of chatbots on schooling over time. This research may monitor student performance or involvement. It could also evaluate the impact of chatbots on teaching workloads. Cross-cultural applications represent an additional domain for investigation. Various nations may employ these instruments in distinct manners. Cultural perceptions of AI may influence their efficacy. Analysing these variations would expand the global perspective. Free AI chatbots do not constitute a comprehensive solution. They are most effective when combined with human input and comprehensive systems. Their revolutionary potential is in augmenting, rather than supplanting, conventional education.

Universities must judiciously adapt to this technology. Policies must adapt in accordance with the advancements in chatbot capabilities. Equity continues to be a focus to prevent the marginalisation of pupils. Research will be crucial in directing this process. It can reveal enduring tendencies and unforeseen results. By proactively addressing difficulties, higher education may effectively leverage AI. The interval from 2022 to 2025 signifies a crucial

juncture for this integration. The proposals seek to guarantee that chatbots augment learning in a responsible manner.

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HIGHER EDUCATION IN THE AGE OF AI AND AUTOMATION: OPPORTUNITIES AND OBSTACLES

Dr. Bindu Dua, Dr. Bharti Tandon** & Arpana Koul****

Abstract

The rapid advancement of Artificial Intelligence (AI) and automation is transforming higher education, reshaping traditional teaching methodologies, administrative processes, and student learning experiences. AI-driven technologies, such as adaptive learning systems, automated grading, and virtual tutors, enhance engagement and offer personalized education tailored to individual needs. Automation also improves efficiency by streamlining administrative tasks, enabling educators to dedicate more time to student interaction and research. However, these advancements come with challenges, including ethical concerns, data privacy risks, faculty adaptation, and the widening digital divide. The potential displacement of academic roles and the over-reliance on AI-based decision-making further complicate the integration of these technologies. To ensure equitable access and ethical implementation, strategic policies, faculty development, and infrastructure investment are crucial. This paper explores both the opportunities and challenges posed by AI and automation in higher education, emphasizing the need for a balanced, human-centered approach to technology adoption. Collaboration among educators, policymakers, and technology developers is essential to harness AI's potential while safeguarding the core values of education. By addressing these challenges proactively, AI can serve as a powerful tool to enhance accessibility, efficiency, and innovation in higher education.

Keywords: Artificial Intelligence (AI), Automation in Education, Higher Education Transformation, Personalized Learning, Intelligent Tutoring Systems, Digital Learning Technologies

Introduction

The rapid advancement of Artificial Intelligence (AI) and automation is fundamentally reshaping higher education. From adaptive learning systems to automated administrative

* Assistant Professors, MIER College of Education (Autonomous). B.C. Road Jammu (J & K)

** Associate Professor, MIER College of Education (Autonomous). B.C. Road Jammu (J & K)

*** Assistant Professors, MIER College of Education (Autonomous). B.C. Road Jammu (J & K)

processes, AI-driven technologies are transforming traditional teaching methodologies, student engagement, and institutional efficiency. These innovations offer numerous benefits, such as personalized learning experiences, automated grading, and virtual tutoring, which enhance academic accessibility and effectiveness (Luckin et al., 2018). However, AI's integration also presents significant challenges, including ethical concerns, data privacy risks, faculty adaptation issues, and the potential displacement of academic roles. Additionally, the digital divide could widen, exacerbating inequalities in education (Selwyn, 2019). Therefore, a strategic, human-centered approach is necessary to balance technological advancements with the core values of higher education. Collaboration among educators, policymakers, and technology developers is crucial to ensuring ethical implementation, faculty development, and infrastructural investment. This paper examines the historical evolution of AI in education, its opportunities and challenges, and the collaborative efforts required to maximize its potential while preserving the integrity of academic institutions.

Historical Background

The historical development of Artificial Intelligence (AI) in higher education dates back to the 1960s when early computer-assisted instruction systems, such as PLATO (Programmed Logic for Automated Teaching Operations), were developed to enhance learning experiences. During the 1970s and 1980s, AI research in education expanded, leading to the emergence of Intelligent Tutoring Systems (ITS) that could provide adaptive feedback based on student responses.

In the 1990s, advancements in machine learning and natural language processing facilitated the creation of more sophisticated educational software capable of analyzing student behavior and personalizing instruction. This period saw the rise of AI-driven learning management systems, marking the transition from traditional classroom-based teaching to digital education.

The early 21st century witnessed the integration of AI in various educational domains, including automated grading, plagiarism detection, and predictive analytics for student performance. Massive Open Online Courses (MOOCs) emerged as a prominent AI-enabled platform, allowing large-scale remote learning. Additionally, AI-powered chatbots and virtual tutors gained traction, offering real-time academic support to students.

The COVID-19 pandemic in 2020 accelerated the adoption of AI-driven educational technologies. Universities worldwide transitioned to online learning, relying on AI-powered tools for remote instruction, assessment, and engagement. AI applications in higher education now include adaptive learning platforms, data-driven decision-making, and intelligent campus management systems.

Despite these advancements, concerns regarding data privacy, ethical AI use, and the digital divide remain significant. The historical trajectory of AI in education highlights the

ongoing need for responsible implementation and collaborative efforts among educators, policymakers, and technology developers to maximize its benefits while addressing potential challenges. AI's role in education dates back to the development of early computer-assisted instruction in the 1960s. Over the decades, technological advancements have expanded AI's applications in higher education. The emergence of machine learning, natural language processing, and big data analytics has enabled the creation of intelligent tutoring systems and personalized learning platforms (Woolf, 2010). By the early 21st century, AI-powered adaptive learning tools and automation in administrative tasks became more prevalent, revolutionizing student assessment, institutional operations, and research facilitation (Zawacki-Richter, Marin, Bond and Gouverneur, 2019). The integration of AI in higher education has accelerated in recent years, particularly in response to the COVID-19 pandemic, which necessitated digital learning solutions (Zhao, Liu and Zhang, 2021). Despite these advancements, the historical trajectory of AI in education underscores the need for ethical considerations and balanced implementation to maximize its benefits while mitigating potential drawbacks.

Need and Importance of AI and Automation in Higher Education

The integration of AI in higher education is essential to enhance learning efficiency, accessibility, and institutional effectiveness. AI-driven personalized learning adapts to individual student needs, fostering deeper engagement and improved academic performance. Automation streamlines administrative tasks, reducing faculty workload and enabling a greater focus on student interaction and research. Virtual tutors and AI-powered chatbots provide continuous academic support, expanding access to quality education beyond traditional classroom settings. Furthermore, AI enhances research capabilities by enabling advanced data analysis, predictive modeling, and knowledge synthesis. In an increasingly digitized world, AI ensures scalability and inclusivity in education, particularly through online learning platforms. However, the effective adoption of AI requires investment in infrastructure, faculty training, and ethical safeguards to address privacy concerns and prevent bias. Thus, embracing AI in higher education is not merely an option but a necessity for fostering an innovative, student-centered, and globally competitive academic ecosystem.

Opportunities of AI in Higher Education

- 1. Personalized Learning and Adaptive Education:** AI-driven systems can analyze student performance data to create customized learning pathways, ensuring that learners receive instruction tailored to their individual needs and learning speeds (Holmes, Bialik, M and Fadel, 2019).
- 2. Automated Grading and Assessment:** AI-powered tools can evaluate assignments, exams, and essays with high accuracy, providing quicker feedback and reducing faculty workload while maintaining consistency in grading (Baker and Smith, 2019).

- 3. AI-Powered Virtual Tutors and Chatbots:** These tools offer 24/7 academic assistance, helping students resolve queries, access learning materials, and receive instant feedback, thereby enhancing engagement and accessibility (Roll and Wylie, 2016).
- 4. Administrative Efficiency and Streamlined Operations:** AI can optimize administrative processes such as student enrollment, faculty scheduling, and resource allocation, enabling institutions to run more efficiently (Luckin, Holmes, Griffiths, and Forcier, 2018).
- 5. Enhanced Research Capabilities:** AI facilitates large-scale data analysis, predictive modeling, and literature reviews, allowing scholars to conduct more complex and interdisciplinary research with greater efficiency (Zawacki-Richter, Marin, Bond and Gouverneur, 2019).
- 6. Increased Accessibility and Inclusion:** AI tools, such as speech-to-text applications, real-time translations, and assistive technologies, help bridge learning gaps for students with disabilities and non-native language speakers, promoting inclusivity (Zhao, Liu and Zhang, 2021).
- 7. Early Intervention and Predictive Analytics:** AI-powered analytics can identify at-risk students based on their academic progress and engagement levels, allowing institutions to provide timely interventions and support to improve retention rates (Baker & Smith, 2019).
- 8. Gamification and Interactive Learning:** AI-driven gamified learning platforms enhance motivation, engagement, and skill acquisition by incorporating interactive simulations and personalized challenges into the educational experience (Holmes, Bialik and Fadel, 2019).

Challenges of AI In Higher Education

- 1. Ethical and Privacy Concerns-** AI-driven educational tools rely heavily on data collection and analysis, raising significant concerns about student privacy, data security, and ethical usage. Institutions must ensure compliance with data protection laws such as the General Data Protection Regulation (GDPR) and Family Educational Rights and Privacy Act (FERPA), preventing unauthorized access to sensitive student information (Selwyn, 2019).
- 2. Faculty Adaptation and Resistance-** Many educators lack the technical expertise to effectively integrate AI into their teaching methods. Resistance to AI adoption often stems from concerns about job security, loss of traditional pedagogical control, and inadequate professional development opportunities (Holmes, Bialik, M and Fadel, 2019). To maximize AI's benefits, universities must invest in faculty training and continuous skill development programs.

- 3. Risk of Academic Displacement-** The automation of grading, tutoring, and administrative functions raises fears of academic job displacement. While AI can enhance teaching and assessment, excessive dependence on AI-driven systems may undermine the human aspects of education, such as mentorship, critical thinking, and emotional intelligence (Zhao, Liu and Zhang, 2021). Striking a balance between automation and human interaction is essential.
- 4. Widening Digital Divide-** The implementation of AI in education is not uniform across institutions and regions, leading to disparities in access. Underfunded institutions and students from low-income backgrounds may lack the infrastructure, devices, and internet connectivity required for AI-enhanced learning, exacerbating educational inequalities (Baker and Smith, 2019).
- 5. Bias and Decision-Making Risks-** AI systems are only as unbiased as the data they are trained on. If AI tools are developed using biased datasets, they may perpetuate discrimination in admissions, grading, and student support services. Institutions must establish ethical AI frameworks to mitigate bias and ensure fair decision-making (Roll and Wylie, 2016).
- 6. Over-Reliance on AI-Based Decision-Making-** While AI can improve efficiency, an over-reliance on automated decision-making may lead to a lack of transparency and accountability. Complex student needs require human judgment and adaptability, which AI may struggle to replicate. Educational institutions must maintain a hybrid approach, where AI complements but does not replace human oversight (Luckin, Holmes, Griffiths, and Forcier, 2018).
- 7. Pedagogical Challenges and Loss of Critical Thinking-** AI-driven personalized learning platforms may create an over-reliance on automation, reducing opportunities for students to engage in independent problem-solving and critical thinking. If AI is used primarily for efficiency rather than cognitive development, it risks limiting deeper learning experiences (Holmes, Bialik and Fadel, 2019).
- 8. Financial and Infrastructure Constraints-** AI integration in higher education requires substantial investment in infrastructure, software, and faculty training. Many universities, especially in developing countries, struggle with budget constraints, making it difficult to implement and maintain AI-driven educational technologies effectively (Zawacki-Richter, Marin, Bond and Gouverneur, 2019).

Strategies For Effective AI Integration in Higher Education

- 1. Ethical AI Governance:** Institutions must establish policies and ethical guidelines to ensure responsible AI use while protecting student data privacy and academic integrity.
- 2. Faculty Training and Development:** Universities should invest in comprehensive AI

literacy programs, workshops, and certifications to help educators effectively integrate AI tools into their teaching methodologies.

- 3. Bridging the Digital Divide:** Governments and institutions must provide technological resources, affordable internet access, and AI-powered learning tools to disadvantaged communities, ensuring inclusivity in AI adoption.
- 4. Balancing Human and AI Interaction:** AI should complement, rather than replace, human educators, preserving critical thinking, mentorship, and the emotional aspects of learning.
- 5. Bias Reduction and Algorithm Transparency:** Institutions should continuously monitor AI-driven decision-making processes in grading, admissions, and evaluations to prevent biases and ensure fairness.
- 6. Infrastructure Investment and Research Development:** Universities must allocate funding for AI research, digital infrastructure enhancement, and collaborative partnerships with technology firms to ensure sustainable and effective AI integration.

Conclusion

The integration of Artificial Intelligence (AI) and automation in higher education presents both transformative opportunities and significant challenges. As AI technologies evolve, they offer personalized learning experiences, streamline administrative processes, and enhance research capabilities, fostering an innovative and inclusive academic environment. However, the potential risks, including ethical concerns, data privacy issues, and the widening digital divide, necessitate a cautious and strategic approach. To harness AI's benefits while mitigating its drawbacks, collaboration among educators, policymakers, and technology developers is essential. This collective effort should focus on ethical governance, faculty training, and equitable access to resources. By prioritizing a human-centered approach, institutions can ensure that AI complements, rather than replaces, the invaluable human elements of education, such as mentorship and critical thinking. Ultimately, the successful integration of AI in higher education will depend on a balanced strategy that aligns technological advancements with the core values of academic integrity and inclusivity.

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ROLE OF ARTIFICIAL INTELLIGENCE IN RESHAPING HIGHER EDUCATION

Dr Deepika Kohli*

Abstract

AI is fundamentally changing the way higher education institutions teach, support students and manage themselves. AI-powered tools—including intelligent tutoring systems, personalized learning platforms, and predictive analytics—help to optimize the learning process through personalization, feedback, and analytics. Britz (2018) adds that this is because the purpose of AI in higher education is to raise results, boost accessibility, expand retention, cut costs, and accelerate completion times. Such developments enable administrative efficiency, nominal streamline of admission channels and upfront improvement in student retention programs.

However, as promising as these prospects are, the use of AI also presents challenges in terms of data privacy, algorithmic bias, digital inequality and an over-reliance on automated solutions. AI's decision-making processes, particularly in terms of grading, admissions, and student evaluations, raise ethical questions that require thoughtful governance. In addition to ethical dilemmas, AI integration into academia is often impeded by faculty resistance, lack of technical know-how and other infrastructural issues (Zawacki-Richter, Marin, Bond and Gouverneur, 2019).

With A.I. in higher education rapidly evolving, institutions will need to find the right balance between technological advancements and education that puts the needs of individuals at the center, ensuring fairness, transparency and academic integrity. This article reviews the significance, challenges, and future perspectives of artificial intelligence in higher education.

Keywords: Artificial Intelligence, Higher Education, Digital Learning, Personalized Learning, AI in Education, Future Directions

Introduction

With artificial intelligence at the center of development, modern technologies fundamentally change higher education. Tools driven by artificial intelligence improve decision-making, automate administrative chores, and rethink educational opportunities.

* Assistant Professor, Khalsa College of Education GT Road Amritsar

One definition has been put forward by the High-Level Expert Group on Artificial Intelligence (AI HLEG) of the European Commission (EC): “Systems that display intelligent behaviour by analyzing their environment and taking actions with some degree of autonomy to achieve specific goals.” This definition highlights the autonomous and goal-oriented nature of AI systems, which play an increasingly significant role in transforming the education sector.

In an effort to enhance the effectiveness, adaptability, and inclusion of their teaching practices, educational institutions all around the world are adopting solutions that are based on artificial intelligence. Bates (2018) have listed the following goals for Artificial Intelligence in higher education:

- increase outcomes
- increase access
- increase retention
- lower cost
- decrease time to completion

Although AI improves efficiency and personalization, it simultaneously presents considerable challenges that institutions must confront. It is impossible to overlook ethical, privacy, and fair access issues raised by including artificial intelligence technologies into more advanced education. The present research paper addresses the main roles artificial intelligence plays in the revolution of higher education, its advantages, difficulties, and future directions.

How is Artificial Technology used in Higher Education?

In his article, “The Future of Higher Education: We Need to Educate the Whole Student,” Steven (2024) argues that higher education institutions must take on a more comprehensive role in supporting students. He emphasizes that universities should address not only academic instruction but also students’ basic needs, including housing, food, transportation, and physical and mental health. Mintz advocates for facilitating students’ emotional and social development, as well as enhancing their metacognitive skills, to foster a more holistic educational experience. While Mintz does not explicitly focus on artificial intelligence (AI) and technology, integrating AI into higher education can significantly contribute to realizing this vision. AI-powered tools can personalize learning experiences by tailoring educational content to individual needs, ensuring that students receive adaptive and targeted academic support. Advanced AI-based Early Warning Systems can proactively mine data from students to identify those at risk of falling behind because of financial pressures, mental distress or academic performance and support interventions. Institutions can also use AI for administrative automation, so that faculty and staff can devote more time and resources

to well-being initiatives for students, such as career guidance, psychological counseling, and financial aid assistance.

A study by Heffernan and Heffernan (2019) highlights how predictive analytics powered by AI can be used by educators to identify at-risk students and adjust instructional strategies proactively. The authors argue that data-driven insights empower teachers to optimize their teaching effectiveness.

A review by Holmes, Bialik and Fadel (2019) discusses the transformative effects of AI in student support services. Their research indicates that chatbots and virtual assistants significantly improve service efficiency while providing 24/7 support to students, ultimately enhancing the overall educational experience.

In their systematic review, Aydin and Kolcak (2020) explore various AI applications within higher education, including personalized learning systems, intelligent tutoring systems, and predictive analytics for student success. They emphasize that AI tools can adapt to individual learning styles, enhancing student engagement and performance. The study highlights significant benefits and challenges associated with implementing AI in educational institutions.

Zhang, Wu and Wang (2020) discuss the applications of AI in managing research resources, including funding allocation and project management. They argue that AI can analyze research trends and needs, helping universities to allocate resources effectively and support high-impact projects.

In a comprehensive analysis, Dawadi, Alzahrani and Terziogl (2020) examine how AI tools streamline administrative processes in higher education institutions. They note that AI can support tasks such as admissions processing, grading, and scheduling, thus allowing faculty and staff to focus more on student interaction and curriculum development.

Macfadyen, Dawson and Koutropoulos (2021) present a comprehensive literature review examining how AI-driven learning analytics influence teaching strategies and student outcomes in higher education. Their findings suggest that AI enhances data visualization and provides educators with actionable insights, which can refine pedagogical approaches.

Research conducted by Perkins, Chai and Chiu (2021) illustrates how AI-driven chatbots can assist higher education institutions in managing enrollment inquiries, guiding prospective students through application processes, and answering common questions. This service improves both efficiency and the overall applicant experience.

Based on recent research, the following points illustrate how artificial intelligence (AI) is being utilized in higher education to enhance learning experiences, improve efficiencies, and support administrative tasks:

- **Personalized Adaptive Learning-** Learning platforms powered by AI customize content according to the students' speed and grasp of the subject, leading to personalized

learning experiences. Systems such as Carnegie Learning's MATHia and Squirrel AI provide real-time feedback and personalized instruction. Research has demonstrated the efficacy of adaptive learning concerning improved levels of student engagement and retention (Xu and Warschauer, 2020).

- **AI-Enabled Intelligent Tutoring Systems (ITS)**- The AI tutors collate this data and provide immediate feedback, aiding both the problem solving and informing students with recommendations to fit their unique learning. Examples include IBM Watson Tutor and ALEKS, both of which specialize in STEM subjects. Research shows that ITS can enhance student performance by successfully closing learning gaps (VanLehn, 2019).
- **Automated Assessment and Grading-AI** makes grading faster and fairer. Tools like Gradescope and Turnitin help check essays, spot cheating, and give helpful feedback. A study found that using AI for grading lessens the workload for teachers and makes grading more accurate. A study found that AI-assisted grading reduces faculty workload while improving assessment accuracy (Jordan and Mitchell, 2020).
- **AI in Student Support and Retention-Chatbots** like Pounce at Georgia State University help students with questions about school stuff. They also use data to find students who might need extra help. Research shows that AI can keep more students engaged and in school. Research suggests AI significantly improves student retention and engagement (Brooks and Gibson, 2020).
- **AI in College Administration** -AI simplifies things like admissions, enrollment, and scheduling. It also helps with budgeting and recruiting students. This way, schools can make smarter decisions. Machine learning models help optimize financial planning, student recruitment, and resource allocation, underscoring AI's important role in enhancing institutional decision-making (Baker and Inventado, 2021).
- **AI in Research and Publishing**-AI helps researchers by finding relevant studies, analyzing data, and aiding in writing. Tools like Semantic Scholar make it easier to find research. AI also improves peer review and checks for plagiarism.
- **Resource Management**-AI helps schools use their resources better. By looking at data, it can help manage budgets and predict what facilities or services will be needed based on how many students enroll. This ensures that both teachers and students have what they need.
- **Support for Different Learning Needs**-AI tools help create a supportive learning environment for everyone. For example, speech-to-text helps students with disabilities, and translation tools help non-native speakers. AI can also adjust teaching methods to fit different learning styles.
- **AI in Virtual Learning**-AI enhances virtual classrooms with features like live transcription and summaries, making learning easier. Platforms like Microsoft Teams and Zoom use

AI to help with these features. Studies show that AI helps students work together better online.

- AI for Career Guidance-AI tools help students find training that fits job market needs. Platforms like LinkedIn Learning and Coursera offer recommendations based on what skills are in demand. Studies show that AI helps students plan their education to match future job opportunities.

To sum up, AI in higher education helps improve teaching, streamline tasks, enhance student experiences, and get students ready for jobs. Still, it's important to think about ethics and fairness when using AI.

New possibilities for data-driven decision-making and individualized education have arisen with the growing use of AI-powered tools including intelligent tutoring systems (ITS), machine learning algorithms, and natural language processing (NLP). However, the incorporation of AI in academic settings raises significant concerns regarding ethical implications, digital equity, and the role of human educators in AI-mediated learning environments (Selwyn, 2019).

The following points will identify key challenges in its implementation, and discusses future directions to ensure responsible and effective AI integration in higher institutions:

- Ethical Considerations: Implementing AI technologies can create ethical dilemmas around privacy and bias. Such algorithms can reinforce existing bias present in data, resulting in further unfair treatment of certain student demographics (Binns, 2018). In addition, AI systems's collection of personal data can violate the students' privacy rights, as it raises the issue of consent and data protection (2016 O'Neil). AI collects vast amounts of student data, raising concerns about privacy violations and data misuse.
- Resistance from Faculty and Staff: Teachers might resist AI solutions out of worry for appearing redundant or doubt the success rates of technology systems. This resistance can challenge the adoption of innovative tools, given that faculty members may be reluctant to shift their traditional pedagogical practices (Lim, Chai and Sho, 2020).
- The absence of Infrastructure and Educational Support: The technological infrastructure is lacking in several institutions to propel AI initiatives. Moreover, teachers need professional development to grasp the nuances of AI and use it effectively in the classroom. A lack of sufficient training programmes will leave teaching staff ill-prepared to embed the AI tools into their curricula (Almalki and Karim, 2020).
- Data Management Problems: Successful AI projects are predicated on high-quality data. But data collection, storage, and analysis present formidable hurdles for many educational institutions. Low data quality reduces the accuracy of AI predictions and decreases the overall effectiveness of AI applications (Zawacki-Richter, Marin, Bond and Gouverneur, 2019).

- **Concerns Regarding AI Use-Student Equity and Access:** Concerns are being raised that AI technologies could compound existing inequities in education. Students from disadvantaged backgrounds may not have as much access to AI resources or the internet, which would only serve to further deepen the digital divide (Frey & Osborne, 2017).
- **Real-World Implications:** ChatGPT data makes you unable to select courses that are relevant to the job market. Dependence on AI-generated answers may also mean that content does not challenge students deeply enough, and the development of vital analytical skills is compromised.
- **Algorithmic Accountability:** When AI-derived decisions impact academic results be it grading, admissions, etc. issues of accountability loom large. Institutions need to develop frameworks to ensure that the outcomes of AI are transparent, correctable, and free from biases that would disadvantage students (Binns, 2018).

Future Directions

Higher education will continue to be influenced by AI as technology and education become further intertwined, but developing and implementing ethical frameworks will be necessary for a responsible future of higher education.

- **Set Up Ethical Guidelines:** Institutions must focus on formulating ethical guidelines that will regulate AI usage in education. These guidelines will need to respond to issues of fairness, transparency, privacy, and algorithmic accountability in each case to support responsible practices of AI (Binns, 2018).
- **Capacity Building and Training:** Educational institutions must pay attention to continuous learning and training of faculty and staff. This training should cover not just technical knowledge about how to use AI tools but also pedagogy about how to apply those tools to teaching (Almalki and Karim, 2020).
- **Longitudinal researches:** There is need for larger longitudinal studies that examine the influence of a variety of AI configurations on student learning outcomes. Research on AI in education will identify best practices, highlight successful integration methods, and help determine the long-term effects of AI in educational contexts (Frey & Osborne, 2017).
- **Drive Inclusivity within AI Development:** AI tools should always be designed inclusively. That means creating applications that all students can access, including students with disabilities and students who are not native speakers, which provide equitable benefits to the variety of student populations (Gonzalez, Phillips and Wang, 2021).
- **Involve Stakeholders in Developing AI solutions:** Stakeholders from education systems, technology developers and policymakers must work together to create AI that meets actual educational needs. Involving various stakeholders in design and

implementation stages of AI products can enhance effectiveness and usability of AI applications (Zawacki-Richter, Marin, Bond and Gouverneur, 2019).

Conclusion

Though AI may prove to be a game-changer in higher education space, with implementation, many challenges and ethical issues will need to be addressed. When emphasis is placed on the ethical, professional development, integration, and partnerships between stakeholders in the adoption of AI in education, educational institutions can firmly ground the trajectory of AI in education to a process of transformation that matters and one that positively impacts the student experience when adopted in a responsible manner.

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ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: SHAPING THE FUTURE

Gagandeep Kaura*

Abstract

This paper examines the implications and transformative role that generative artificial intelligence (AI) plays in higher education, from its roots to current applications in teaching, research, and administration, discussing trends that are redefining higher education and its outcomes. AI is not simply a technological advancement; it represents a paradigm shift that is revolutionizing how knowledge is imparted, received, and managed. A forward looking perspective allows exploration of emerging trends and technologies that will define the next era of AI integration. Roles and interactions in the educational ecosystem will be reshaped, and by anticipating and planning for future advancements, we can harness AI's capabilities to drive innovation, enhance learning, and address societal challenges. As generative AI is increasingly integrated into education, complex ethical considerations arise, including data privacy, security, algorithmic bias, and responsible use of AI, all of which must be addressed. Universities foster informed dialogues and development of robust policies that govern use of generative AI in higher education. Future research must, therefore, ensure that we understand what practices are effective and how to use them effectively.

Keywords: AI, Higher Education, Teaching, Learning, Technology.

Introduction

Generative artificial intelligence (AI) has emerged as a transformative force in higher education, reshaping teaching, learning, and administration on a global scale. Evolution of AI in education represents more than technological advancement; it is a paradigm shift that is revolutionizing how knowledge is imparted, received, and managed. The global market for AI in education is projected to grow significantly, driven by advancements in machine learning and natural language processing (NLP; Ahmad, Iqbal, El-Hassan, Qadir, Benhaddou, Ayyash and Al-Fuqaha, 2023). We explore the implications of generative AI in higher education, from its historical roots to current applications across teaching, research,

* Assistant Professor, Department of Commerce, G.T.B. National College Dakha, Ludhiana

and administration (Dempere, Modugu, Hesham and Ramasamy, 2023), identifying which trends are redefining education and its outcomes (Floridi, Cowls, Beltrametti, Chatila, Chazerand, Dignum, Luetge, Madelin, Pagallo, Rossi, Schafer, Valcke, and Vayena, 2018; Zhang and Aslan, 2023). We examine the transformative impact of generative AI on higher education, highlighting the ethical considerations, skill development, and strategic planning that harness AI's potential to shape the future of education and the transitioning of students to a professional world that uses AI.

Over half a century ago, calculators revolutionized mathematical computation by augmenting human capabilities, and generative AI is similarly reshaping higher education. Beyond its direct impact, generative AI parallels other transformative technological advancements. The internet's revolution in information access mirrors AI's transformation of educational content creation and delivery (Robert, 2024a). Like smartphones' integration into daily life, generative AI enhances educational tools and administrative efficiency (Yanes et al., 2020). The digital publishing revolution democratized knowledge access, and AI is similarly democratizing personalized learning and collaborative research tools (Floridi, Cowls, Beltrametti, Chatila, Chazerand, Dignum, Luetge, Madelin, Pagallo, Rossi, Schafer, Valcke, and Vayena, 2018). Virtual and augmented reality revolutionized immersive learning, with AI enhancing these technologies with dynamic and adaptive learning environments (Dempere, Modugu, Hesham and Ramasamy, 2023). Massive open online courses (MOOCs) democratized global access to education, and AI personalizes and optimizes these experiences based on individual learning preferences (Yanes, Mostafa, Ezz and Almuayqil, 2020). Each of these parallels highlights a different aspect of technological transformation and its impact on education, underscoring how generative AI has, is, and will continue to reshape education across multiple dimensions, especially driving innovation and accessibility across diverse educational contexts. At its core, generative AI represents a convergence of computational power and educational innovation, offering capabilities that extend far beyond traditional pedagogical methods. By analyzing vast datasets and simulating human-like reasoning, AI systems personalize learning experiences, automate administrative tasks, and augment research capabilities, advancements that enhance the efficiency, effectiveness, and inclusivity of education at all levels. The integration of generative AI into higher education began with experiments conducted during the early 2000s. Today, AI can understand and generate human-like text, making it valuable in personalized learning environments and during collaborative research (Johnson, 2023), an evolution that transformed AI from a supportive tool into a strategic asset that drives innovation in higher education. During early AI integration, institutions developed AI systems that were capable of tutoring and grading tasks. For example, an AI-based tutoring system developed at Stanford University provided personalized feedback and adaptive learning experiences in mathematics and other disciplines (Stanford University, 2016). Such early applications demonstrated AI's potential

to enhance educational interactions and support students in personalized learning paths that were tailored to individual needs.

Advancements in deep learning algorithms and NLP expanded the capabilities of generative AI in higher education. Deep learning techniques allow AI systems to process and analyze complex datasets, identify patterns, and make informed predictions. In the context of education, these capabilities facilitate adaptive learning that adjusts content and pace based on student performance and engagement (Johnson, 2023). NLP allows AI to understand and generate human-like text, enabling applications such as automated essay grading, language translation, and interactive tutoring. Such advancements not only streamline educational workflows, they foster deeper engagement and comprehension among students through interactive and personalized learning. As generative AI advanced, its application in personalized learning and collaborative research became more pronounced. AI-powered platforms such as Carnegie Learning's MATHia (Carnegie Learning, n.d.) and Khan Academy's Khanmigo (Castro, Sinha and Moran, 2023) provide personalized tutoring by analyzing student interactions and adjusting learning paths in real-time. AI algorithms similarly support research by analyzing large datasets, generating hypotheses, and even co-authoring scientific papers, accelerating the pace of discovery across disciplines (University of Buffalo, 2024).

Current Applications and Uses of AI

Generative AI ushered transformative changes across multiple domains in higher education, enhancing teaching methodologies, research, and administration. We explore how AI-powered technologies are revolutionizing education, research, and administrative efficiency, highlighting examples and their impacts. Such personalized approaches do more than enhance student engagement; they improve learning outcomes by adjusting content delivery based on real-time performance data. AI tutoring extends beyond traditional subject areas to encompass language learning, coding skills development, and soft skills training. These systems leverage AI's ability to simulate human-like interactions, offering students immersive learning experiences that cater to diverse learning styles and preferences (Yanes, Mostafa, Ezz, and Almuayqil, 2020)

In research, generative AI has begun to augment scientific discovery and innovation. AI allows researchers to assess large datasets quickly, uncovering patterns and correlations, and generating insights that might otherwise have remained undiscovered. For example, institutions use AI during complex data analysis, hypothesis generation, and predictive modeling across disciplines, including medicine and environmental science (University of Buffalo, 2024). AI facilitates collaborative research by automating repetitive tasks and enhancing communication among researchers. Automated literature review systems and AI-powered citation analysis streamline research, allowing researchers to focus more on

critical thinking and experimentation (Roberts, 2024), a collaborative approach that not only accelerates the pace of research, but fosters interdisciplinary partnerships that drive impactful discoveries and advancements.

Beyond academic and research applications, generative AI has impacted administration in higher education. AI streamlines routine administrative tasks, such as admissions processing, student counseling, and resource allocation. AI-powered chatbots handle inquiries from prospective students, providing instant responses and personalized guidance throughout admission. Chatbots also provide students with routine, even prescriptive, academic advising (Lucien and Park, 2024). AI analytics empower administrators with data-driven insights for strategic decision-making and operational efficiency. Predictive analytics models forecast enrollment trends, student retention rates, and resource use, enabling proactive interventions that enhance student success and institutional performance (McKinsey and Company, 2022). By automating administrative workflows and optimizing resource allocation, AI allows universities to allocate resources more effectively and enhance overall student experiences. From a student's perspective, AI enhances productivity and learning outcomes by automating tasks such as content generation, data analysis, and essay writing. Students using AI-powered tools experience increased efficiency when completing assignments, since such technologies assist with generating structured content, suggesting relevant resources, and providing real-time feedback on writing quality (Crompton and Burke, 2023; Castro, Sinha and Moran, 2023). Enhanced efficiency translates into improved efficiency, where students using generative AI feel more confident in their ability to manage complex tasks and meet academic expectations within deadlines.

Faculty's Role In Encouraging and Teaching Students To Use Generative AI

Faculty members prepare students to leverage generative AI responsibly for enhanced learning outcomes, though some faculty are reluctant to adopt AI for their own purposes or permit students to use AI, impacting integration of AI in higher education (Miller and Soares, 2023). Such reluctance is attributable to several factors, including lack of understanding of the technology, fear of losing control, and cognitive biases. Some faculty find the rapid advancement and technical complexities of AI intimidating, leading to hesitation in incorporating AI in their curricula (D'Agostino, 2023), a knowledge gap that hinders their ability to leverage AI effectively and confidently in the classroom. Venkatesh and Davis's (2000) model of technology acceptance suggests that intentions to use a technology are based on subjective norms (e.g., whether peers are using the technology), perceived usefulness of the technology, and perceived ease of use. Status quo bias (Garger, 2024) leads educators to prefer familiar methods over new technologies, while techno skepticism causes apprehension toward the efficacy and ethical implications of AI (Venkatesh and Davis, 2000). Such biases result in reluctance to explore AI's benefits and encourage use among students.

Integration into Curriculum- Integrating generative AI into curricula expose students to practical applications that align with academic goals. Faculty can design assignments that require students to use AI for tasks such as data analysis, content generation, and problem-solving. By contextualizing AI use in course content, educators demonstrate the relevance and value of such technologies in achieving learning objectives

Training Guidance- AI training equips students with the skills needed to navigate and use generative AI. Sessions should cover AI basics, ethics, tool-specific functionalities, and best practices when integrating AI into academic work. Hands-on exercises and case studies allow students to apply AI in controlled environments, fostering confidence and proficiency in their use (Dempere, Modugu, Hesham and Ramasamy, 2023).

Encouraging Collaboration and Peer Learning- Promoting collaborative projects that involve AI encourages peer learning and knowledge-sharing among students. Collaborations allow students to learn from others' experiences with AI tools, exchange insights, and explore diverse perspectives on the benefits and challenges of AI integration in education. Faculty should facilitate discussions on collaborative problem-solving using AI, highlighting the potential for teamwork to enhance innovation and creativity in AI-driven projects (Robert, 2024b).

Feedback and Reflection- Offering constructive feedback on students' use of generative AI encourages iterative learning and improvement. Faculty should provide guidance on refining AI-generated output, interpreting results, and evaluating the impact of AI on academic outcomes critically. Encouraging Students to reflect on their AI use fosters metacognitive awareness and helps them develop strategies for using AI in future assignments and professional contexts (Crompton and Burke, 2023).

Future Employers' Expectations- Integrating generative AI into curricula equips students with valuable skills and enhances learning, but it is crucial to consider the broader implications of future careers. AI continues to evolve and become integral to industry, employers are increasingly seeking candidates who can navigate and leverage these technologies. In addition to empowering students with AI and fostering its ethical use, faculty must prepare students to meet future employers' evolving expectations, which involves not only developing practical AI skills, but aligning educational practices with industry demands. Addressing these needs, faculty ensure that students are prepared to thrive in an AI-driven job market, bridging the gap between academic training and professional expectations. To meet future employers' expectations regarding use of generative AI, faculty can implement several proactive strategies, discussed below.

Curriculum Alignment with Industry Trends- Faculty play a role in ensuring that curricula remain relevant to evolving job markets, and to achieve this, it is essential to update curricula to reflect industry demands and emerging technologies, including generative AI. This involves integrating AI course work that covers foundational concepts, advanced applications,

and practical tools used in industry. Incorporating case studies, real world problems, and project-based assignments helps students apply theoretical knowledge in practical scenarios. By embedding AI technologies in curricula, such as through programming assignments, data analysis projects, and AI-driven simulations, students gain hands-on experience with methodologies relevant to their future careers (Dempere, Modugu, Hesham and Ramasamy, 2023). Collaborations with industry experts and incorporating employer feedback ensures that curricula evolve in line with technological advancements and job market requirements. This approach not only teaches technical skills that employers are seeking, it enhances understanding of how AI applies across sectors and industries, improving job readiness and competitiveness, especially students' perceptions of their own employability (Tymon, 2011).

Opportunities Associated with Generative AI in Higher Education: Using AI in education requires comprehensive adaptation and upskilling among educators and students to leverage their potential while addressing associated challenges. High School Prepares Students for use of AI in higher education and future careers, and thus integrating AI curricula and digital literacy (Zhang and Zhang, 2024) provide students with foundational knowledge about AI principles, applications, and the ethics that associate with both (Bender, 2024; Dempere, Modugu, Hesham and Ramasamy, 2023). By incorporating practical experiences with AI and fostering critical thinking skills, high schools prepare students for the demands of higher education and the workforce. Schools also partner with industry professionals and educational technology companies to offer workshops and hands-on training that demystify AI and its application in various fields (Yanes, Mostafa, Ezz, and Almuayqil, 2020).

For College Administrators, AI training is crucial to strategic planning, resource allocation, and policy development. Administrators need to understand AI's potential to enhance institutional efficiency, especially regarding automating administrative tasks and optimizing resource management. Professional development should cover data privacy, ethical AI use, and integration of AI into institutional systems. Training programs help administrators navigate the complexities of AI adoption, ensuring that institutional policies align with best practices and regulatory standards (Floridi, Cowls, Beltrametti, Chatila, Chazerand, Dignum, Luetge, Madelin, Pagallo, Rossi, Schafer, Valcke and Vayena, 2018), allowing administrators to make informed decisions about AI investment and implementations that align with institutional goals and ethical standards.

Faculty require targeted training to integrate AI into teaching while maintaining pedagogical autonomy and ethical standards, and thus professional development should focus on practical applications of AI in the classroom, including how to use AI for personalized learning, assessment, and student engagement (Dempere, Modugu, Hesham and Ramasamy, 2023). Training should especially address ethics such as avoiding over-reliance on AI and ensuring that AI complements, rather than replaces, human interactions (Robert, 2024c). Workshops, seminars, and collaborative projects provide faculty with

hands-on experience and foster a community of practice in which educators share insights and strategies for successful AI integration. Integration of generative AI into higher education requires thoughtful adjustments to course design and instructional practices to maximize potential benefits. Faculty are uniquely positioned to leverage AI to enhance education, but it requires careful planning and implementation.

One way faculty can adapt teaching strategies is by incorporating enhanced learning courses. AI such as data analysis platforms and AI-driven simulations offer opportunities to create assignments and projects that deepen students' understanding of course content through practical application. For example, assignments that use AI during data analysis provide students with hands-on experience with handling real-world datasets, bridging the gap between theoretical knowledge and practical skills (Crompton & Burke, 2023). Designing projects that include AI simulations, faculty help students explore complex scenarios and gain insights that are difficult to access using traditional methods.

Maximizing Positive Impacts of Generative AI

Integration of generative AI into higher education suggests transformative implications for multiple stakeholders, faculty, administrators, students, and employees each of which benefits uniquely from AI, reshaping their roles and interactions in education.

Implications for Faculty

Generative AI fosters pedagogical transformations, skill development, and research opportunities among faculty, providing innovative tools that enhance instructional effectiveness. Using AI, educators can customize educational content to meet diverse students' needs, provide personalized feedback, and adapt teaching strategies in real time, allowing tailored learning experiences during which instructional materials and methods adjust dynamically based on student performance and learning styles. Integration of AI into teaching requires faculty to acquire new skills and knowledge. Professional development that focuses on AI and its methodologies is essential to equip educators with the expertise needed to incorporate AI into curricula (Yanes, Mostafa, Ezz, and Almuayqil, 2020). Such training helps faculty use AI during instruction, ensuring they can guide students in responsible AI use and stay current with technological advancements in education. AI increases research capabilities and interdisciplinary collaborations. Leveraging AI during analysis and pattern recognition, faculty can uncover new insights and advance knowledge in their fields (Yanes, Mostafa, Ezz, and Almuayqil, 2020). AI research tools enable more efficient processing of large datasets, fostering collaboration across disciplines and contributing to development of innovative solutions to complex problems.

Implications for Higher Education Administrators

Generative AI improves operational efficiency, resource allocation, and strategic

planning. AI administrative systems streamline institutional operations, including admissions processing, student services, and resource management. Automating routine tasks and optimizing workflows, administrators enhance institutional efficiency and reduce operating costs, allowing more effective use of resources and improved service delivery. AI requires significant investment in infrastructure, data analytics, and cybersecurity. Tractors must ensure that AI systems are supported by robust technological frameworks and data protection to safeguard institutional data and maintain privacy (Floridi, Cowls, Beltrametti, Chatila, Chazerand, Dignum, Luetge, Madelin, Pagallo, Rossi, Schafer, Valcke and Vayena, 2018; IEEE, n.d.). Investment in these areas is crucial to integration and ongoing management of AI tools. AI provides insights through predictive analytics and data-driven decision-making, and administrators can leverage these insights to inform strategic decisions related to curriculum development and design, student support services, and institutional planning (Robert, 2024c). AI applied to student enrollment and course popularity optimizes classroom space and faculty workload, and AI enabled analytics offers a data-centric approach addressing institutional challenges and exploiting opportunities for growth.

Implications for Students

AI enhances learning by offering personalized learning paths, real-time feedback, and adaptive educational resources (Zhang and Aslan, 2023). Such tools support individualized instruction and improve student engagement, leading to better academic outcomes and more engaging educational experiences. As AI becomes increasingly integrated into academic and professional contexts, students must develop AI literacy, critical thinking, and data analysis. Such skills are essential to navigating AI-enhanced environments and preparing for careers in an AI driven world (Dempere, Modugu, Hesham and Ramasamy, 2023). Education programs should emphasize these competencies to prepare students for future challenges. Understanding the ethics of AI is crucial to responsible use of the technology. Education on AI ethics helps students evaluate AI-generated content critically, recognize biases, and consider societal impacts of AI (Floridi, Cowls, Beltrametti, Chatila, Chazerand, Dignum, Luetge, Madelin, Pagallo, Rossi, Schafer, Valcke and Vayena, 2018). Promoting ethical awareness ensures that students use AI responsibly in their education and professional lives.

The Future of AI in Education

Generative AI in higher education has moved beyond early experimental stages to become a transformative force. Initially providing basic tutoring and grading systems, AI is now reshaping teaching, learning, and administrative processes. As generative AI continues to evolve, it holds the potential to enhance educational outcomes, expand opportunities for learners, and reshape education, and as AI is integrated into higher education, faculty can harness its capabilities to personalize learning experiences, automate administrative

tasks, and augment research capabilities, ultimately promoting efficiency, effectiveness, and inclusivity in education.

Most extant literature that addresses AI in higher education is conceptual and theoretical, due to AI being a new topic. The computing power needed to process the information that makes AI possible has only recently become available and affordable, processing the vast amounts of data that underlie AI's utility. Exponential growth of its capabilities makes studying AI difficult. Empirical studies commonly assess customized learning experiences and enhancements for individual students and their learning outcomes, and although these are topics worth assessing, there is much more to understand through empirical investigation. Some such topics include

- what AI strategies make the most of instructors' time, and which increase and change instructor student engagement,
- how critical thinking is affected by increased use of AI,
- what employers expect new hires to know about AI, and
- how instructors can teach students to recognize when AI returns false information.

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THE INTEGRATION OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN MODERN HIGHER EDUCATION SYSTEMS

Jasvir Kaur & Jaspreet Kaur***

Abstract

Artificial Intelligence (AI) and automation have become significant drivers of transformation in various sectors, with higher education being a key area of development. This paper explores how AI and automation are reshaping the landscape of higher education by enhancing the learning process, streamlining administrative tasks, and improving overall educational outcomes. AI technologies, such as personalized learning systems, AI-driven tutoring, and learning analytics, are revolutionizing the way education is delivered, making it more tailored to individual student needs. Automation, on the other hand, is simplifying administrative functions like student enrollment, scheduling, grading, and communications, leading to increased efficiency and reduced costs. Despite the numerous advantages, the integration of AI and automation raises concerns about data privacy, equity, and the potential displacement of human jobs within educational institutions. This paper critically examines both the opportunities and challenges posed by AI and automation, offering recommendations for integrating these technologies responsibly to maximize their benefits in higher education.

Keywords: *Artificial Intelligence, Automation, Administrative Efficiency, Educational Technology, AI-driven Tutoring, Higher Education, Learning Analytics, Personalized Learning*

Introduction

The integration of Artificial Intelligence (AI) and automation into higher education is a growing trend, reshaping how universities and colleges deliver education and manage administrative processes. Technology's role in education is not new, but recent advancements have made AI and automation more accessible and impactful. AI, with its ability to process vast amounts of data and provide personalized solutions, is enabling new models of learning. Automation, through tools that handle administrative tasks, has led

* Department of Economics, Swami Ganga Giri Janta Girls College, Raikot

** Department of Computer Science, Swami Ganga Giri Janta Girls College, Raikot

to significant improvements in efficiency, reducing the burden on faculty and staff. In the context of global challenges such as increasing enrollment numbers, resource limitations, and the demand for higher-quality education, the role of AI and automation has become even more crucial. AI-driven tools can assist in adapting educational content to suit individual student needs, fostering more effective learning environments. Simultaneously, automation reduces administrative workload, allowing educators to focus more on teaching and less on bureaucratic processes.

This paper aims to explore the transformative role that AI and automation are playing in higher education, highlighting their applications in teaching, learning, and administration. Additionally, it will discuss the potential risks and challenges associated with these technologies, including issues of data privacy, equity, and job displacement.

Literature Review

Over the past few decades, the influence of technology on education has been growing exponentially. However, the application of AI and automation has only become prominent in the last few years. Previous studies have examined the role of AI in personalized learning, with many highlighting its potential to transform how students engage with content. AI tools, such as intelligent tutoring systems, provide immediate feedback and tailor learning experiences to individual students, which has been shown to enhance learning outcomes.

In addition to personalized learning, AI is playing an increasing role in learning analytics. Systems powered by AI can track student performance in real-time, identifying those who may need additional support and adjusting content accordingly. Studies have found that institutions using learning analytics see improved student retention and engagement.

Automation, in the context of administrative tasks, has also garnered attention. Various studies have reported that the automation of processes like grading, scheduling, and enrollment has resulted in increased operational efficiency. Administrative staff can focus on higher-value tasks, while the automation of routine tasks frees up resources for more strategic objectives.

While the advantages of AI and automation are well-documented, there is a growing concern about potential drawbacks. Ethical concerns, such as data privacy, the fairness of AI systems, and the risk of reinforcing biases, have been raised. Moreover, automation's impact on employment in educational institutions, particularly on administrative roles, is an area requiring careful consideration.

Role of AI in Reshaping Higher Education

Personalized Learning

AI technologies, particularly adaptive learning platforms, have the ability to deliver customized learning experiences. These systems analyze students' learning patterns and adjust course content to fit their specific needs. For example, AI-driven systems can assess a

student's progress, identify areas where they need improvement, and provide personalized learning materials. This level of personalization is not feasible in traditional classrooms, where one-size-fits-all teaching methods often fail to address the unique needs of each student.

AI-driven Tutoring

One of the most promising applications of AI in higher education is AI-driven tutoring. Virtual tutors can assist students outside of regular class hours, offering immediate support for complex concepts. These tutors can answer questions, provide explanations, and help students review material, offering personalized feedback. Unlike human tutors, AI tutors are available 24/7, making them an invaluable resource for students who need additional help during off-hours.

Learning Analytics

AI-powered learning analytics tools are helping educators make data-driven decisions about teaching and learning. By analyzing large sets of student data, AI can provide insights into student behavior, such as engagement, performance trends, and areas of struggle. With this information, instructors can intervene early and tailor their teaching methods to better support students. For instance, AI analytics can identify students who are at risk of falling behind, allowing educators to provide timely interventions.

Facilitating Research

AI is also playing a role in research within higher education. AI systems can process and analyze large volumes of academic data, making literature reviews more efficient and aiding in data analysis for research projects. Moreover, AI's ability to predict trends and patterns can help researchers in fields such as healthcare, engineering, and environmental studies make more accurate predictions and discoveries.

Automation in Higher Education

- **Administrative Efficiency-** Automation has significantly improved administrative functions in higher education institutions. Routine tasks such as course scheduling, admissions processing, student registration, and grading can now be handled by automated systems. This not only reduces the time and effort required by administrative staff but also increases accuracy and consistency. AI-driven chatbots are being used for answering frequently asked questions, guiding students through registration processes, and even assisting with course selection.
- **Automating Grading and Assessments-** One of the most time-consuming aspects of teaching is grading. AI and automation are making this process more efficient. Automated grading systems can quickly assess multiple-choice tests, short-answer questions, and even essay-style responses. This allows educators to focus more on interactive teaching and less on administrative tasks.

- **Student Support Systems-**Automation is also being used to create virtual student support systems. These systems help students with everything from academic advising to mental health resources. For example, AI-powered virtual assistants can help students book appointments with advisors, direct them to relevant academic resources, or even connect them with mental health services. Such systems can help institutions provide timely support to a larger number of students.

Challenges and Ethical Considerations

Despite the numerous benefits of AI and automation in higher education, several challenges and ethical concerns need to be addressed.

- **Data Privacy and Security-** The use of AI in higher education involves the collection and analysis of vast amounts of student data, including academic performance, personal information, and behavioral patterns. This raises significant concerns about data privacy and security. Educational institutions must implement robust data protection measures to ensure that student data is kept safe from cyberattacks and misuse.
- **Equity and Access-** While AI and automation have the potential to democratize education, there is a risk that they could exacerbate existing inequalities. Students from low-income backgrounds may not have access to the necessary technology or internet connectivity to fully benefit from these tools. Institutions must ensure equitable access to AI-driven learning systems to avoid widening the digital divide.
- **Bias in AI Systems-** AI systems are only as unbiased as the data they are trained on. If AI systems are trained on biased data, they may perpetuate existing inequalities in education. For example, an AI-based admissions system may unintentionally favor students from certain demographics if the data used to train it reflects historical biases. Ensuring that AI systems are trained on diverse and representative data is essential to mitigate these risks.
- **Job Displacement-** Automation in administrative tasks may lead to job displacement for employees who handle routine functions. However, automation should be seen as a tool to enhance productivity rather than replace human workers. Educational institutions must ensure that staff are retrained for higher- value roles that require creativity, problem- solving, and interpersonal skills.

Future of AI and Automation in Higher Education

The future of AI and automation in higher education is both promising and challenging. As these technologies continue to evolve, we can expect even more sophisticated systems for personalized learning, real-time student assessments, and improved administrative functions. AI-driven platforms will likely become even more integrated into everyday learning, allowing students to have truly individualized educational experiences.

Moreover, automation will continue to streamline administrative operations, making

education more efficient and accessible. However, these advancements must be approached with caution. Ethical considerations, such as privacy, equity, and job displacement, must be carefully managed to ensure that the benefits of AI and automation are maximized without causing unintended harm.

To ensure a sustainable future, educational institutions will need to invest in teacher training, infrastructure, and equitable access to technology. Policymakers will also need to develop guidelines and regulations that promote the responsible use of AI and automation in education.

Conclusion

AI and automation are undoubtedly transforming the landscape of higher education. By offering personalized learning experiences, improving administrative efficiency, and enhancing research, these technologies present vast opportunities for innovation. However, the implementation of AI and automation must be done carefully, with consideration given to ethical concerns such as data privacy, equity, and the potential impact on jobs. Educational institutions must embrace these technologies responsibly, ensuring that their benefits are distributed equitably while minimizing potential risks. Moving forward, the successful integration of AI and automation will depend on collaboration between educators, policymakers, and technologists to create a system that is efficient, inclusive, and supportive of the diverse needs of students and faculty.

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DIGITAL ARREST USING AI GENERATIVE DEEPFAKE CONTENT AND PREVENTION THROUGH MEDIA LITERACY

Kawaljit Singh* & Dr. Harish Kumar**

Abstract

In today's digital era, we are witnessing the emergence of what is known as a post-truth society. In this society, facts are frequently overlooked, resulting in a widespread belief in false information. One of the most alarming developments is the prevalence of deepfake media content generated using artificial intelligence. Unscrupulous online schemers are employing deepfake videos, photographs, and animated content to entrap their victims in what can be described as "digital arrest." Cybercriminals construct fake identities and impersonate government officials to perpetrate financial fraud. These fraudsters exploit the victims' fears and uncertainties, leaving them both financially and emotionally devastated. Alarming, even those who are highly educated can become targets of these sophisticated tactics. This study provides critical guidance to recognize and mitigate the risk of cybercrimes. It offers strategies for verifying information, safeguarding personal data, and remaining informed about emerging fraudulent schemes.

Keywords: Digital Arrest, Post-Truth Society, Artificial Intelligence,

Introduction

A relatively new occurrence is "digital arrest," in which hackers utilize technology to instill fear and coerce people into paying their demands. Digital arrests, in which scammers pose as government or regulatory authorities and threaten victims using audio or video recordings of conversations, are another more common kind of cyber scam. These fraudsters typically impersonate law enforcement or other authorities to manipulate victims into sending money or disclosing personal information by instilling fear and worry. Such attacks have a significant and serious psychological impact, leaving victims traumatized,

* Research Scholar, Department of Journalism and Mass Communication, Maharshi Dayanand University, Rohtak. (Haryana)

** Professor and Head, Department of Journalism and Mass Communication, Maharshi Dayanand University, Rohtak. (Haryana)

alone, and financially devastated (Rajnish, 2024). With the advent of the digital economy and technological advancements, digital arrests have become more common. catching someone digitally online is known as a “digital arrest.” The goal of this digital arrest was to hack someone’s device to commit financial fraud and engage in online harassment. Additionally, it resulted in identity theft and, occasionally, counterterrorism by hostile nations. The victim of a digital arrest is prevented from using his digital currency, his online activity is monitored, and his electronic devices are seized.

According to the Digital Arrest scam, the government monitors online conversations and information to discourage illegal activity including hacking and cybercrime. To avoid bogus judicial charges, criminals demand money. This helps identify and stop illegal activity on the internet. A new kind of cybercrime known as a “digital arrest” occurs when scammers call a potential victim and tell them that they have shipped or are expected to receive a box that contains illegal goods, drugs, forged passports, or any other type of illegal thing. Victims who were injured or participated in a criminal activity and were incarcerated may receive advice. Criminals may use “Digital Arrest” to force victims to remain visible through video calls or Skype until their demands are accomplished. Fraudsters occasionally pose in uniform studios that mimic government agencies and police headquarters. Technological house arrest is similar to restricting people’s access to the internet. (Mallick and Ghosh 2024). Prime Minister Narendra Modi brought up the topic of “digital arrests” on his radio program “Mann Ki Baat” on October 27. He cautioned listeners about the dangers of digital arrest fraud. He warned Indians to “be wary of digital arrest scams” during his speech. To raise attention about technological advances, he also concluded that “No government agency will ever contact you by phone or video call for such an investigation.”

A new form of online fraud known as “digital arrest” occurs when cybercriminals trick victims into believing they are under virtual or digital arrest and persuade them to keep using video conferencing to connect with the impostor. The con artists then successfully persuade their victims to maintain an ongoing video conversation, enslaving them to the fraudulent demands.

Objectives of The Study

1. To conduct a phenomenological inquiry into “digital arrest” and its consequences in the contemporary age.
2. To conduct a phenomenological inquiry about a post-truth society where false information and deepfake content entice individuals to become digitally arrested.
3. To identify available media literacy techniques to identify deepfake media content.

Methodology

In this study, we utilize a phenomenological inquiry method to explore the emerging concept of “digital arrest.” This idea has significant economic and psychological implications

for society in the post-truth era. To advance our research, we review relevant literature through a phenomenological lens. We investigate how fraudulent individuals exploit artificial intelligence technology to create deepfake digital content and fake identities, ultimately putting vulnerable people at risk of digital arrest. Additionally, we examine existing techniques to counter deepfake media content.

Phenomena of Post-Truth Society

Society has entered a post-truth era, characterized by the overwhelming presence of fake news and misinformation in the media landscape. In this post-truth culture, the ability to discern truth from falsehood is increasingly diminished. As a result, it has become difficult for people to trust real facts, with false information becoming more prevalent while truthful information declines. Despite the prevalence and intensity of encountering false information, individuals often have difficulty assessing the media they consume when needed. Therefore, it is reasonable to conclude that the post-truth environment does not cause media consumers to reject objective facts in favor of “alternative facts” or outright falsehoods when shaping public opinion. The rise of a post-truth society poses a significant threat due to the proliferation of false information. In this era, people engage with the media while equipped with a “thinking cap,” which helps them differentiate between what is real and beneficial and what is fake and misleading. (Olympus and Ejue, 2024).

The term “post-truth” encompasses five interrelated themes that shed light on a significant shift in how we process information and engage in public discourse. Instead of prioritizing objective facts and empirical evidence, the concept of post-truth emphasizes the profound impact of emotions on individual beliefs and societal conversations. This shift suggests that various sources of information may deliberately twist or misrepresent scientific and political claims, leading to widespread confusion and misinformation. One notable aspect of post-truth is that politicians can make conflicting statements without damage to their credibility or public standing. This phenomenon fosters an environment where dishonesty is often overlooked, resulting in a diminished sense of accountability. As a result, individuals may experience a reduced sense of shame when caught in lies or confronted with factual inaccuracies.

Additionally, post-truth appears to be closely linked to the polarization of opinions in society. This division is often amplified by the emergence of conspiracy theories, which frequently stem from the manipulation and a stark division in thought processes. Overall, the post-truth era raises critical questions about the nature of truth, trust, and rational discourse in contemporary society. (Malcolm, 2021).

AI-Generated Deepfake Content As A Tool for Digital Arrest

Digital arrest refers to deceiving someone into disclosing private information, which

can lead to financial loss or the misuse of that information for illegal purposes. With the rise of AI-generated audio and video content, an individual can utilize advanced deepfake videoconferencing technology to present themselves as a different, often highly realistic person during a video call. Audio AI algorithms can replicate a person's voice by analyzing recordings, such as those from court proceedings or high-ranking law enforcement officials, which fraudsters can exploit. (Oxford, 2024). In the current digital era, digital arrest has become popular. the increase in cybercrime and the need for an advanced legal system to combat offenders. Using the internet has grown commonplace in recent years. Digital forms are also used for human financial transactions (Chauhan, 2024).

Even while deepfake technology has been around since 2015, as machine learning and other artificial intelligence techniques advance, its use in fraudulent schemes keeps growing in frequency and complexity. These cutting-edge deepfake innovations assist fraudulent scammers in creating audio clips or photos, mixing conversations with deepfake AI multimedia watch videos, and then disguising themselves as real people in a virtual conference call like Teams, Zoom, or Skype. It could be challenging to identify the deepfake if the computer hosting the communication lacks anti-deepfake software. Certain deepfake algorithms can mimic an individual's speech patterns, emotions, and accent using as little as 10 seconds to one minute of audio recordings of that person in conversation. These sophisticated artificial intelligence programs excel at capturing the nuances of speech, including realistic pauses, variations in word inflection, and subtleties in tone. As a result, they can generate a voice that closely resembles the authentic speaker, making it increasingly challenging to distinguish between real and artificially generated speech. (Faqir, 2023).

There has been a surge in fraudulent activity in 2024. Due to enhanced artificial intelligence (AI) capabilities, scams achieved a never-before-seen sprint this year, devastating customer financial losses and eroding public trust in businesses. The technique has been applied to deepfake videos, realistic visuals, voice impersonation in phone calls, and fake text production. Applications for artificial intelligence (AI)-assisted voice duplication have been used to create false identities of friends' and family members' accents, which criminals then use to defraud victims of their money (Sharma, 2024).

- **Economic Losses:** Victims of "Digital Arrest" scams often suffer significant financial losses due to extortion, coercion, and fraudulent transactions carried out by cybercriminals. These losses affect the individual victims and impact overall economic stability. investor confidence and consumer purchasing power are all undermined. Additionally, when funds are redirected to combat cybercrime and support victims, it places extra pressure on government budgets and financial institutions, exacerbating existing economic challenges.
- **Psychological Trauma:** Victims of Digital Arrest scams often suffer from significant psychological trauma due to the pressure, intimidation, and manipulative tactics

employed by hackers. These scams can lead to false accusations of criminal behavior, which carry a societal stigma that worsens the emotional impact on victims and their families. The resulting embarrassment, damage to reputation, and feelings of isolation can be overwhelming. Additionally, long-term psychological effects such as depression and post-traumatic stress disorder (PTSD) may hinder victims' ability to recover and return to their normal lives (Vijay, 2025).

Types of Digital Arrests

- 1. Crypto Fraud Scandal:** Cryptocurrency scams are designed to target digital assets rather than traditional money. These scams employ a variety of deceptive tactics commonly found in other financial crimes. One notable method is the pump-and-dump scheme, where fraudsters artificially inflate the price of a cryptocurrency through misleading information, enticing unsuspecting investors to buy in. Once the price has been driven up, the scammers sell off their assets at a profit, leaving the new investors with worthless tokens.
- 2. Loan App Scams:** Scams involving digital lending apps have become hazardous types of cybercrime. Fraudulent professionals develop credit applications and promote seductive loan payback terms. After a victim downloads and accepts a loan, they are instantly inundated with phone calls, texts, and WhatsApp messages threatening to demand prompt payback, frequently for a significantly larger sum than was first agreed upon. They even threaten to phone and harass their friends and relatives if the victim doesn't comply.
- 3. Sextortion Scams:** In these types of crimes, the perpetrator typically lures and coerces the victim into sending them their intimate, naked photos or films over the phone, which the criminal then saves and keeps for use in future extortion (sextortion). People frequently use dating apps or even matrimony websites/apps to connect with strangers. Most of the profiles they interact with are fraudulent.
- 4. Cyberstalking:** A cybercriminal often threatens someone via the internet. Email, social media, and other internet platforms are frequently used to commit this crime. Cyberstalking can even coexist with the other, more traditional kind of stalking, in which the perpetrator harasses the victim in person. The abundance of information provided by social media, blogs, image-sharing websites, and numerous other commonly utilized online sharing activities allows cyberstalkers to plan their harassment. False charges, fraud, information destruction, threats to life, and manipulation through exposure threats are all examples of this type of behavior (Deo, 2013).
- 5. Phishing:** Another type of hacking is phishing. Phishing's name comes from the word "phish," which means "fish." This is often done to provide a lure that will trap the aquatic species. It is unethical to trick the victim into visiting dangerous websites. Hackers

attempt to obtain private information from banks, including account information, passwords, and credit card numbers. Phishing can be carried out by sending phony emails or messages that seem to be from reliable sources, such as reputable companies or well-known websites.

- 6. Cyberterrorism:** using online tools and tactics to carry out violent acts is known as “digital terrorism.” It mostly refers to attacks against computer systems, networks, or information storage facilities that are driven by political or ideological beliefs. The objectives could be anything from causing physical harm or creating fear to interfering with services and acquiring personal information.

Media Literacy To Counter Digital Arrest And Deepfakes

Deepfakes present challenges as they have the potential to mislead and harm reputations. Media literacy encompasses skills that enable individuals to effectively create, analyze, evaluate, and access media content including television, social media, websites, and print. We must develop the ability to critically decipher the information presented to us, understand its various contexts and implications, translate messages into our perspectives, and utilize this knowledge to make informed decisions in our daily lives. Media literacy and deepfake detection tools to combat misinformation are required at present. By focusing on ethical use and fostering awareness, we can work towards minimizing the risks associated with deepfakes and digital arrest.

By enhancing our media literacy skills, we will be better equipped to navigate the complex landscape of misinformation, characterized by the rising prevalence of deepfakes and cheap fakes. This improved understanding will empower us to critically analyze various sources of information, enabling us to recognize subtle manipulations and discern the truth from a plethora of misleading content.

Media literacy heightens our awareness of cognitive biases such as confirmation bias, where individuals seek out information that supports their existing beliefs and phenomena like filter bubbles and echo chambers that can limit our exposure to diverse perspectives. By gaining insight into how various forms of communication media function and how people interact with, interpret, and disseminate information, we equip ourselves to be thoughtful, critical participants in our society. This understanding empowers us to navigate the complexities of the digital landscape and engage more meaningfully as informed citizens.

Major news media organizations, leading technology companies, and prominent social media platforms are making significant financial commitments to enhance media literacy initiatives. These initiatives are designed to confront rising challenges like disinformation and deepfakes, which can mislead the public and distort reality. By focusing on education and training, these efforts seek to empower individuals with the critical thinking skills necessary to assess the credibility of information sources. Ultimately, the goal is to cultivate a more

informed and discerning public that can engage in thoughtful discourse on important societal issues.

MediaWise is a collaborative initiative involving prominent organizations such as Google, the Poynter Institute, Stanford University, and the Local Media Association. This program is designed for young people with the critical skills to recognize factual information and misinformation. Through engaging lessons and resources, MediaWise helps children navigate the complex media landscape, fostering a well-equipped generation to identify credible sources and think critically about the information they encounter. Facebook and Reuters recently introduced a media literacy course about manipulated media. This course leverages Reuters' expertise by providing real examples, hypothetical scenarios, and insights into emerging technologies such as deepfakes and Generative Adversarial Networks (GANs), which are used to create and detect instances of media manipulation.

Conclusion

The rapid advancement of technology presents significant challenges for law enforcement in the fight against cybercrime. In today's digital landscape, addressing cyber threats requires balancing legal authority, technical capabilities, and individual rights. Digital fraud is a major concern in India, affecting financial stability and mental well-being. To tackle this issue effectively, we need a comprehensive approach that includes stronger legislation, technological advancements, and public awareness campaigns. Education about cyber threats is crucial, and lawmakers must enforce robust cybersecurity laws. Individuals should proactively enhance their online safety by implementing essential practices like two-factor authentication and regularly updating passwords. Additionally, promoting media literacy is vital in countering the growing threat of cybercrime.

Educational institutions, technology companies, and media organizations should join forces to design and implement comprehensive literacy programs. These programs can equip individuals with crucial skills to counter deepfake content in the digital landscape. public awareness campaigns and community workshops that engage and inform people about digital literacy should be conducted. Individuals should also take the initiative to explore a wide range of perspectives and rigorously fact-check the information they encounter. This proactive approach is vital in combating the pervasive issue of misinformation that plagues the online world and ensures that users can make informed decisions based on accurate data.

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ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Dr. Komal Sharma*

Abstract

Higher education is undergoing a significant transformation due to the swift development of automation and artificial intelligence (AI). Teaching methods, administrative effectiveness, and student involvement are all being revolutionized by AI-driven technology including personalized learning, automated grading, and intelligent tutoring systems. Through the simplification of procedures like admissions, student support, and curriculum creation, automation improves operational efficiency. This paper examines the advantages, difficulties, and ramifications for teachers and students in integrating automation and artificial intelligence in higher education. The study emphasizes how AI promotes data-driven decision-making, improves adaptive learning, and cultivates inclusion. However, there are still major issues with data privacy, ethics, and the digital divide. The study ends with suggestions for the responsible and successful application of AI in higher education as well as insights into the field's future.

Keywords: Artificial Intelligence, Automation, Higher Education, Personalized Learning, Adaptive Learning, Ethical Concerns

Introduction

Higher education is undergoing a paradigm shift due to rapid technological advancements, particularly in AI and automation. Institutions worldwide are leveraging AI-driven solutions to enhance learning experiences, streamline administrative processes, and improve academic outcomes. AI's ability to process vast amounts of data and generate predictive insights is reshaping how education is delivered and accessed. This paper examines the impact of AI and automation on higher education, highlighting key areas of transformation, challenges, and future implications.

AI in Teaching and Learning

AI is revolutionizing teaching and learning methodologies through personalized and adaptive learning experiences. Key applications include:

* Assistant Professor, MIER College of Education

Intelligent Tutoring Systems (ITS) AI-powered tutoring systems provide personalized learning experiences by analyzing student performance and adapting content accordingly. These systems leverage machine learning algorithms to detect learning gaps, recommend supplementary resources, and guide students through complex topics. Examples include platforms like Carnegie Learning and Squirrel AI, which customize educational materials to fit individual learning needs. ITS can simulate one-on-one tutoring by responding to student queries in real time and adjusting the pace of instruction based on comprehension levels.

Automated Grading and Assessment AI-driven tools such as Gradescope automate the grading process, reducing instructor workload and enhancing assessment accuracy. These systems can evaluate multiple-choice questions, essays, and programming assignments, providing instant feedback to students. AI-based grading tools use natural language processing (NLP) to assess written responses, ensuring consistency in evaluation. Additionally, automated grading facilitates formative assessment, allowing students to improve through continuous feedback.

Virtual Assistants and Chatbots AI-powered chatbots, such as IBM Watson and Google's Dialog Flow, assist students with academic inquiries, course recommendations, and administrative tasks. These virtual assistants improve accessibility and student engagement by providing instant support. Universities deploy AI chatbots for answering frequently asked questions, scheduling appointments, and providing reminders about deadlines. Some AI-powered assistants, like Georgia Tech's Jill Watson, function as teaching assistants, helping students navigate complex coursework.

Personalized Learning Pathways AI analyzes students' strengths, weaknesses, and learning patterns to create customized learning paths. Adaptive learning platforms like Knewton and Coursera use AI algorithms to recommend resources and optimize learning experiences. These platforms continuously assess student progress, adjusting content delivery based on performance. Personalized learning ensures that students receive targeted instruction, enhancing their understanding of concepts and improving retention rates. Additionally, AI can identify struggling students early, enabling educators to provide timely interventions and support. AI-driven platforms can tailor educational content to individual learning preferences and paces. These platforms provide real-time feedback by analyzing student performance, allowing customized support.

Language learning -India is a linguistically diverse nation with multiple languages and dialects spoken across the country. AI-powered language-learning platforms are making it easier for students to acquire proficiency in different languages. English learning app Mondly is one such example that provides personalised language learning experiences. This is particularly valuable in a globalised world where multilingual proficiency can open up career opportunities and enhance cultural understanding.

Research Advancements -In the field of research, AI has the potential to revolutionise

the way projects are conducted and findings are analysed. AI-driven tools can process massive datasets, identify patterns and help researchers make sense of complex information. In India, AI is particularly valuable for scientific research in areas like healthcare, agriculture, and environmental science.

AI in Administrative and Institutional Operations

Automation enhances the efficiency of higher education institutions by optimizing administrative processes.

Student Admissions and Enrollment AI streamlines admissions processes by automating document verification, applicant screening, and predictive analytics to identify potential candidates. Universities like Arizona State University employ AI-driven systems to enhance recruitment efforts.

Curriculum Development and Academic Planning AI assists in curriculum design by analyzing market trends, employment data, and student preferences. Predictive analytics help institutions align courses with industry demands, ensuring students acquire relevant skills. Predictive analytics powered by AI enables universities to analyse vast amounts of data, predict student performance and identify at-risk students. AI is also impacting curriculum development. Institutions can analyse industry trends and the job market to adjust their programmes and better-prepare students for real-world challenges. AI can predict future high-demand skills, enabling universities to tailor their curriculum accordingly and ensure that students are equipped to succeed in the job market.

Student Support Services AI-driven platforms provide 24/7 academic and mental health support. Virtual counseling services use AI to detect early signs of stress and recommend interventions, promoting student well-being.

Benefits of AI and Automation in Higher Education

Innovative pedagogical approaches integrating technology, experiential learning, and personalized education are most promising for enhancing student engagement and learning outcomes in the coming years. One of the most transformative methods is AI-powered adaptive learning, which customizes educational content based on students' progress, strengths, and areas for improvement.

The integration of AI and automation in higher education offers numerous advantages:

- **Enhanced Learning Outcomes:** AI-driven adaptive learning tailors education to individual student needs, improving comprehension and retention. Innovations in AI have introduced newer dimensions in education through the creation of virtual assistants and chatbots. These AI progenies cater to students' inquiries in mere seconds, offer academic support, and provide emotional backing, enhancing the learning experience and elevating educational outcomes. This immediate, responsive interaction is a cornerstone in building a more supportive, engaging, and enriching learning environment.

- **Increased Efficiency:** Automation reduces administrative burden, allowing educators to focus more on teaching and mentoring.
- **Data-Driven Decision-Making:** AI provides insights into student performance, helping institutions design effective educational strategies.
- **Accessibility :** AI-powered tools assist differently-abled students, offering speech-to-text, text-to-speech, and language translation services. The combination of mobile learning and AI can bridge educational gaps, particularly for students in remote or underserved areas...
- **Cost Reduction:** Automation minimizes operational costs by optimizing resource allocation and administrative processes.
- **Hands-on learning experiences:** AI-driven simulations and virtual labs provide real-world skill development in aviation, aerospace, engineering, and business fields. These tools offer hands-on learning experiences, allowing students to practice decision-making in realistic scenarios and better prepare for the workforce.
- **Inclusivity:** AI-driven language translation tools help break down linguistic barriers, while text-to-speech and speech-to-text features support students with disabilities, fostering a more inclusive learning environment
- **Content creation:** GenAI enhances content creation and engagement by generating interactive learning materials such as quizzes, summaries, and virtual simulations.
- **Immersive learning:** immersive learning through augmented and virtual reality (AR/VR) creates interactive, hands-on learning environments that allow students to engage with complex concepts more tangibly.
- **Gamification:** incorporating game design elements like challenges, rewards, and competition has boosted motivation and engagement. When combined with project-based and experiential learning, where students work on real-world problems and collaborate with industry professionals, these approaches help bridge the gap between theoretical knowledge and practical application, preparing students for the evolving workforce.
- **Global connector :** AI isn't merely a technological upgrade; it acts as a global connector, dismantling geographical and financial barriers to quality education. It creates a canvas where students and educators from diverse backgrounds can interact and learn in real-time, making education a global conversation. This globalization of learning resources makes high-quality education an accessible treasure, opening doors to unprecedented learning opportunities.
- **Addressing Educational Inequalities:** AI has the transformative potential to address and mitigate educational inequalities by providing tailored support and resources to underserved communities. It offers opportunities for quality education in regions with

limited access to educational resources, ensuring equal opportunities for learning and development, and reducing the education access gap.

Challenges and Ethical Considerations

Despite its benefits, AI in higher education presents several challenges:

- **Data Privacy and Security** AI relies on vast amounts of student data, raising concerns about data security, consent, and ethical use of information. Institutions must implement robust data protection policies to safeguard student privacy.
- **Digital Divide and Accessibility** The adoption of AI-driven technologies may exacerbate existing inequalities, as students from underprivileged backgrounds may lack access to necessary digital resources.
- **Bias in AI Algorithms** AI systems can inherit biases from training data, leading to unfair assessments and recommendations. Continuous monitoring and ethical AI frameworks are necessary to mitigate these biases.
- **Role of Educators and Job Displacement** While AI automates certain tasks, it cannot replace the human touch in education. Faculty members must adapt to AI-driven teaching models, emphasizing mentorship, creativity, and critical thinking.
- **Over-reliance on technology** :There is a risk of over-reliance on technology. While AI can significantly enhance learning experiences, it should complement rather than replace human interaction. Critical thinking, creativity, and emotional intelligence are best nurtured through meaningful engagement with peers and educators. A balanced approach that integrates AI while maintaining human elements in education is essential to maximize the benefits of these advancements.
- **Bias and misinformation** :GenAI and mobile learning have potential challenges and pitfalls. One primary concern is bias and misinformation, as AI models may inherit biases from their training data, reinforcing stereotypes or generating misleading content.
- **Financial Implications**: The implementation of AI and automation can be financially demanding. Institutions must be cognizant of the investment required and evaluate the feasibility and long-term benefits of integrating such technologies, ensuring alignment with their financial capability and strategic objectives

Future Prospects and Recommendations

The future of AI and automation in higher education is promising, with continuous advancements in:

- **AI-Augmented Teaching**: Integrating AI with human instruction to create hybrid teaching models.
- **Blockchain for Credential Verification**: Ensuring secure and transparent academic records.

- **AI-Driven Research Assistance:** Enhancing research efficiency through AI-powered literature reviews and data analysis.

Recommendations For Implementation

1. **Develop Ethical AI Policies:** Institutions should establish guidelines for ethical AI use to address bias, data privacy, and transparency.
2. **Invest in Digital Infrastructure:** Ensuring equitable access to AI-powered tools for all students.
3. **Faculty Training and Development:** Providing educators with AI literacy and skills to effectively integrate AI in teaching.
4. **Continuous Monitoring and Evaluation:** Assessing the impact of AI applications and refining strategies based on feedback. institutions must implement strong oversight mechanisms to ensure fairness and accuracy in AI-driven learning tools. Data privacy and security risks also pose significant challenges, as AI-powered platforms collect vast amounts of student data. Universities must establish robust data governance policies to safeguard sensitive information.
5. **Applying design thinking**—a human-centered, iterative problem-solving approach—can drive meaningful improvements in teaching, learning, and administrative processes.
6. **Academic leadership:** Academic leaders should start by profoundly understanding stakeholder needs through empathy-driven research, such as faculty interviews, student feedback, and data analytics. From there, they should foster a prototype-and-test mindset, where new initiatives (e.g., AI-driven learning tools, hybrid education models, or student support innovations) are iteratively developed, tested, and refined based on honest user feedback.
7. **Dynamic and inclusive learning environments:** Institutions can create more dynamic and inclusive learning environments by leveraging mobile learning and AI-driven discussion platforms like Yellowdig. As education evolves, these pedagogical innovations will be essential in fostering deeper student engagement, critical thinking, and lifelong learning.

Conclusion

Artificial Intelligence and automation are transforming higher education by enhancing personalized learning, streamlining administrative functions, and improving student engagement. While AI presents several opportunities, institutions must address ethical challenges, digital equity, and data privacy concerns. A balanced approach that integrates AI with human-centric education will ensure its effective and responsible use. Future research should explore AI's long-term impact on pedagogy, employment, and academic governance, ensuring that technology serves as an enabler rather than a disruptor.

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FUTURE TRENDS: AI AND THE EVOLUTION OF HIGHER EDUCATION

Lalita*

Abstract

The incorporation of artificial intelligence within the realm of higher education is revolutionizing pedagogical methodologies and institutional operations, thereby facilitating individualized learning experiences, augmenting administrative efficiency, and fostering innovative instructional approaches. This literature review investigates the transformative influence of artificial intelligence (AI) on higher education, emphasizing emergent trends and prospective trajectories. As educational institutions progressively assimilate AI technologies, the review scrutinizes how these advancements enhance pedagogical practices, tailor learning experiences, and optimize administrative functions. Central themes encompass the function of AI in promoting adaptive learning environments, augmenting student engagement, and bolstering data-informed decision-making. Furthermore, the review confronts challenges such as equity, ethical implications, and the imperative for faculty development concerning AI tools. Through the synthesis of prevailing research and the identification of existing gaps within the literature, this review aspires to elucidate the dynamic landscape of higher education and the critical role that AI is poised to assume in its future development.

Keywords: Artificial Intelligence, higher education, Future Trends

Introduction

The use of artificial intelligence in higher education is revolutionizing teaching methods, personalizing learning, and inspiring innovative research. AI enhances student engagement and academic support through adaptive learning and data-driven tools. Institutions must address ethical, accessibility, and curriculum challenges as they adopt these technologies (Hinojo-Lucena, Aznar-Diaz, Caceres-Reche and Romero-Rodriguez, 2019). Collaboration among educators, technologists, and policymakers is essential to effectively use AI while maintaining educational integrity. This teamwork is vital for creating policies that enable technology integration while ensuring student welfare and equal access to educational

* Research scholar, Panjab University, Chandigarh

resources (Crompton and Song, 2021). By encouraging inclusive discussions, institutions can develop a framework that balances technological progress with core educational values, equipping students for a changing job market.

To manage these complexities, universities should create clear guidelines for AI use, ensuring transparency and accountability to enhance the growth of educators and students. Ongoing discussions will be key in shaping the future of higher education as stakeholders join forces to build a fair and inclusive framework that harnesses AI's benefits while tackling its challenges. This united effort will improve educational experiences and enable students to navigate a rapidly changing technological environment, focusing on critical awareness and ethical issues in their learning. Additionally, exploring research gaps and future trends in AI applications will provide valuable insights for educators and policymakers.

Frameworks of Theoretical Understanding

Constructivist Approaches to Learning

The constructivist perspective on learning underscores the importance of learners' active participation in knowledge creation through experiential and collaborative practices. This methodology enhances critical thinking and fosters ownership in the educational journey, thus cultivating lifelong learners equipped to tackle contemporary issues with adaptability (Sethi, Chauhan and Jaiswal, 2021).

Technological Pedagogical Content Knowledge (TPACK)

The TPACK framework combines technology, pedagogy, and content knowledge to improve teaching efficacy. Understanding these connections enables educators to create engaging learning experiences with digital tools (Sethi, Chauhan and Jaiswal, 2021). Integrating constructivist principles in curricula fosters collaborative and innovative educational settings. Utilizing AI-based approaches personalized learning, effectively meeting individual student requirements. This comprehensive approach prepares students with essential skills for a changing job market while highlighting the importance of continuous inquiry and flexibility in education.

Theories of Disruptive Innovation

Disruptive innovation theory highlights the necessity for educational methods to evolve with contemporary learner needs (Tomar and Verma, 2021). The incorporation of technology and practical problem-solving enhances student engagement and relevance in educational experiences. This transition to a more dynamic educational framework promotes collaboration among students, educators, and the community, thus fostering an innovative ecosystem with varied perspectives (Luckin and Cukurova, 2019). Such settings equip students for current challenges while cultivating lifelong learning, adaptability, and resilience in a complex, technology-oriented environment.

Current Applications of AI in Higher Education

AI in Personalized Learning

AI personalized learning by tailoring content to individual capabilities, enhancing engagement and self-directed learning (Kaur, Tandon and Matharou, 2020). It enables early identification of at-risk students, facilitating timely support for academic improvement (Gunn and Hollingsworth, 2012). Additionally, AI adaptive environments promote inclusivity by accommodating various learning styles and accessibility needs, thereby advancing equitable education (Godat, 2012).

AI in Administrative Processes

AI optimizes administrative functions such as enrollment and scheduling, thereby enhancing institutional efficiency (Roy, 2020). This automation allows educators to dedicate more time to teaching and student engagement, enriching the academic experience. AI systems also improve communication among educators, students, and parents, fostering a cohesive academic community. Furthermore, data analytics personalize learning pathways to meet individual student needs and objectives.

AI in Assessment and Evaluation

AI assessment tools provide immediate feedback, facilitating instructional adjustments and personalized interventions for student learning. This innovation promotes inclusivity by accommodating varying learning styles to ensure equitable student success (Slimi, 2023). The integration of AI in assessment processes streamlines grading while enabling more effective monitoring of student progress, revealing insights that inform teaching strategies (Sayed, Noeman, Abdellatif, Abdelrazek, Badawy, Hamed and El-Tantawy, 2022). AI tools enhance the academic environment by delivering data-driven insights and tailored learning experiences, ultimately improving educational outcomes.

Traditional vs. AI-Enhanced Learning Environments

Case Studies of Institutions Leading AI Adoption

Numerous institutions have effectively adopted AI solutions to enhance educational quality and optimize administrative functions. Arizona State University employs AI chatbots for immediate student assistance, improving response times and engagement. The University of Michigan utilizes AI in personalized learning platforms for adaptive coursework tailored to student progress. Stanford University analyzes learning patterns with AI to refine curriculum design. Nonetheless, these innovations pose challenges, such as data privacy concerns, access equity, and the necessity for advanced technological frameworks. Overcoming these hurdles demands ongoing research, strategic funding, and policy development for responsible AI integration in higher education.

Table 1: Comparison of Traditional and AI-Enhanced Learning Environments

Feature	Traditional Learning	AI-Enhanced Learning
Instruction Method	Fixed curriculum	AI-driven, adaptive content
Student Engagement	Passive learning	AI-driven, interactive experiences
Assessment	Standardized exams	AI-enabled, real-time feedback
Accessibility	Limited support	AI-powered tools for inclusivity
Educator Role	Instructor-led teaching	Facilitator, augmented by AI insights

As AI becomes increasingly integrated into higher education, the contrast between conventional and AI-enhanced learning environments becomes clearer. This evolution requires a reassessment of pedagogical strategies to meet contemporary educational needs. AI-enhanced learning fosters greater student engagement and essential digital literacy, equipping learners for a technology-oriented workforce. AI tools enable personalized education through differentiated instruction, effectively catering to varied student requirements.

Challenges and Barriers To AI Implementation

- **Ethical Considerations in AI Use-** Ensuring AI is deployed ethically requires clear policies that safeguard student privacy, promote equity, and maintain transparency in data collection practices. Institutions must actively engage stakeholders in discussions about AI’s implications, building trust among students, educators, and the broader community. Ethical AI integration not only enhances learning experiences but also prepares students to navigate an increasingly digital world responsibly.
- **Technological Infrastructure and Accessibility Issues-** For AI to be effective, institutions must address disparities in digital access by investing in reliable internet connectivity, providing necessary devices, and developing inclusive digital content. Collaboration between governments, educational institutions, and private sectors is essential to ensuring that all students, regardless of socioeconomic background, have equitable access to AI-driven educational tools.

Future Directions and Predictions

- **AI and the Digital Society-**The integration of AI and machine learning into education promises enhanced personalized learning experiences tailored to individual needs. Ethical considerations, including data privacy and equitable access, must remain a focus as these technologies advance.
- **Emerging AI Technologies and Their Educational Impact-** AI is set to revolutionize traditional teaching, fostering interactive environments that cater to various learning styles. These developments necessitate that educators adapt their strategies and commit

to lifelong learning, alongside ongoing professional development to effectively leverage AI tools.

- **AI's Role in Curriculum Development-** AI will significantly influence curriculum design by personalizing learning experiences based on individual preferences. This evolution encourages student agency and collaborative practices among educators while demanding ongoing training and support for effective AI integration.
- **The Future of Educator Roles in AI-Driven Environments-** The educational paradigm is shifting towards mentorship roles for educators within AI-enhanced settings. This change requires collaboration to ensure AI complements teaching, alongside a commitment to ethical access and the promotion of adaptability and digital literacy among educators and students.

Outstanding Challenges in Academic Discourse

Lasting Influence of AI on Employment Trends in Higher Education

The evolution of AI will necessitate a reevaluation of the competencies required for educators in higher education. Educators will need to integrate technology into their teaching methods and improve students' analytical skills. Collaborative initiatives between educational institutions and industry are essential for creating training programs that provide educators with appropriate resources. Furthermore, continuous professional development is imperative for faculty and staff to remain proficient in AI-based tools and methodologies, enabling their adaptation to changing educational requirements.

The Role of Accreditation in AI-Enhanced Educational Practices

Accreditation bodies are vital for upholding academic excellence in AI education. New evaluation metrics are essential for assessing AI programs (Chan & Tsi, 2023). Collaboration between schools and accreditation agencies is key for creating innovative yet quality guidelines. Institutions must implement rigorous evaluations to foster ethical, student-focused AI learning, thus boosting integrity, access, engagement, and knowledge retention across diverse educational environments.

Conclusion

The incorporation of AI in higher education requires flexible accreditation frameworks that recognize both traditional standards and AI's advancements. As AI integrates into curricula, accreditation frameworks must evolve to meet industry demands and equip graduates with essential technological competencies. The inclusion of AI in accreditation facilitates the development of adaptive learning environments that improve student employability and promote lifelong learning. This shift enables educators to enhance their teaching strategies, fostering innovation and engagement within academic settings. Joint efforts among teachers,

business stakeholders, and tech leaders are necessary for forming a powerful ecosystem that pushes forward educational benchmarks and results. Also, promoting a collaborative and knowledge-sharing ethos permits organizations to keep pace with technological evolution while confirming that learners access relevant and quality education. Aligning educational programs with industry standards boosts student involvement and prepares graduates for the complexities of the job market. In summary, a commitment to ongoing enhancement and interdisciplinary collaboration within education will foster a more dynamic and inclusive learning environment. By strategically leveraging AI's capabilities, institutions can ensure the success of both students and educators amid technological advancements and challenges. This proactive stance will strengthen educational systems, equipping learners with the necessary skills for success in an increasingly AI-oriented landscape.

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THE ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Mamta*

Abstract

Artificial Intelligence (AI) has made profound advancements in various sectors, and higher education is no exception. The integration of AI technologies into academic institutions offers exciting possibilities for enhancing the quality of education, improving administrative efficiency, and personalizing learning experiences. This paper explores the role of AI in reshaping higher education by enhancing learning experiences, improving administrative efficiency, and enabling personalized education. AI-driven technologies, such as adaptive learning systems, automated grading tools, virtual assistants, and predictive analytics, are making it possible to cater to individual student needs, streamline academic processes, and optimize resource allocation. Despite its promising potential, the adoption of AI in higher education raises significant challenges, including data privacy concerns, algorithmic biases, and the risk of job displacement. As universities and institutions continue to integrate AI, balancing innovation with ethical considerations is essential to ensure that these technologies benefit all stakeholders in higher education. However, the rise of AI also brings with it numerous challenges related to ethics, data privacy, job displacement, and the digital divide. This paper explores the role of AI in higher education, the opportunities it presents, the challenges it poses, and the potential future developments.

Keywords: Artificial Intelligence, AI -driven technologies, Automated Grading Tools, Higher Education

Introduction

In recent years, the integration of Artificial Intelligence (AI) and automation technologies into various sectors has sparked a revolution. These technologies are not just enhancing traditional educational methods but are fundamentally reshaping the way institutions operate, deliver content, and interact with students. As universities and colleges adapt to the

* Assistant Professor, P.C.M S.D. college for Women, Jalandhar.

demands of the digital age, AI and automation are driving innovative changes in teaching methodologies, administrative processes, student engagement, and even the research landscape.

AI refers to the simulation of human intelligence in machines that are capable of performing tasks such as learning, reasoning, and problem-solving. Automation, on the other hand, involves using technology to perform tasks that traditionally required human effort. In higher education, AI and automation are transforming how students learn, how educators teach, and how institutions manage resources and interact with stakeholders.

Evolution of AI in Higher Education

The evolution of AI in higher education has transformed the way teaching, learning, and administration are approached. Initially, AI in education was focused on basic automation, such as learning management systems and early adaptive learning tools. As machine learning and natural language processing advanced, AI systems evolved into personalized tutors and virtual assistants, helping students with queries and providing tailored learning experiences. In the late 2010s, intelligent tutoring systems and automated grading tools became more widespread, enabling real-time feedback and streamlining administrative tasks. By the 2020s, AI has become deeply embedded in higher education, driving personalized learning paths, enhancing accessibility through tools like speech recognition and translation, and improving research capabilities through data analysis. As AI continues to evolve, it holds the potential to further revolutionize higher education by creating more dynamic, efficient, and inclusive learning environments.

AI and automation in education manifest in various forms, such as adaptive learning systems, virtual teaching assistants, data-driven insights, predictive analytics, and more. These technologies leverage vast amounts of data to personalize learning, streamline administrative tasks, and even predict student outcomes, thus offering both educators and students enhanced experiences.

Applications of AI and Automation in Higher Education

- **Personalized Learning-** Traditional educational systems often take a “one-size-fits-all” approach, where all students receive the same materials and instructions regardless of their individual needs, strengths, or weaknesses. AI-powered adaptive learning systems, however, are designed to tailor educational content to each student’s specific needs.

These systems analyze students’ performance in real-time and adjust lessons and assessments based on their pace and level of understanding. For example, if a student struggles with a particular concept, the system may provide additional exercises or explanations to help them master the topic before moving on. This personalized approach can enhance student engagement and improve learning outcomes by allowing students to learn at their own pace.

Moreover, AI can also assist instructors by providing them with detailed insights into student progress, highlighting areas where students are excelling or struggling. This enables instructors to offer targeted interventions and adjust their teaching strategies as necessary.

- **Automated Grading and Feedback-** Grading is one of the most time-consuming tasks for educators. AI-powered grading systems are increasingly being used to automate the evaluation of assignments, essays, and exams, significantly reducing the workload for teachers. These systems use machine learning algorithms to assess student responses, compare them to predefined criteria, and provide feedback to students.

In addition to improving efficiency, automated grading systems offer several advantages. They reduce the potential for human bias in grading and ensure consistency across assessments. Moreover, AI can provide immediate feedback, allowing students to learn from their mistakes and improve their performance faster than with traditional grading methods.

However, it's important to note that while AI can handle objective assessments (e.g., multiple-choice or short-answer questions), grading more subjective assignments (e.g., essays or projects) still requires human intervention. That said, AI's role in automating grading continues to evolve, and it is likely that more sophisticated systems will be developed to handle a broader range of assessment types.

- **AI-driven Virtual Assistants and Chatbots-** AI-powered virtual assistants and chatbots are increasingly being used in higher education to handle administrative tasks and support student engagement. These tools can answer common student queries regarding admissions, course schedules, deadlines, and even provide academic advice. Chatbots can be available 24/7, providing students with instant responses and reducing the workload of administrative staff. In addition to answering queries, AI-powered chatbots can also offer personalized support.

For example, a chatbot could monitor a student's academic performance and suggest resources or study tips to improve their results. It can also help students stay organized by sending reminders for upcoming assignments or exams.

These virtual assistants contribute to a more efficient educational environment, allowing human staff to focus on more complex issues while AI handles routine tasks. This shift can lead to better use of resources and more timely responses for students.

- **Predictive Analytics for Student Success-** Another application of AI in higher education is the use of predictive analytics to improve student retention and success. By analyzing historical data, such as grades, attendance, and participation in extracurricular activities, AI systems can predict which students are at risk of failing or dropping out.

This early-warning system enables universities to intervene proactively. For example, if a student's data suggests they may be struggling, advisors or instructors can offer support, whether through tutoring services, counseling, or other resources. Predictive analytics can also help institutions identify trends in student performance, which can inform curriculum

development and teaching strategy.

- **Enhancing Research and Collaboration-**AI and automation also have significant implications for academic research. Researchers can use AI to analyze large datasets, uncover patterns, and even generate new hypotheses. In fields such as medical research, for example, AI can analyze clinical data to identify potential treatment options or predict patient outcomes.

Moreover, AI tools can assist researchers in automating repetitive tasks, such as data collection or literature reviews, allowing them to focus on more creative aspects of their work. AI-driven collaboration platforms can also facilitate the exchange of ideas between scholars across the globe, creating opportunities for more dynamic and efficient academic collaborations.

Challenges and Concerns in The Adoption of AI and Automation

Despite the numerous benefits, the adoption of AI and automation in higher education also brings several challenges and concerns.

- **Data Privacy and Security-** AI systems require access to large amounts of student data to function effectively. This raises concerns about data privacy and security, as sensitive information such as academic records, personal details, and even behavioral data is being stored and analyzed. Educational institutions must ensure that they are compliant with data protection regulations such as the General Data Protection Regulation (GDPR) in Europe and other national laws. Moreover, institutions must invest in cybersecurity measures to prevent data breaches and unauthorized access to student information. As AI technologies evolve, the potential for cyberattacks targeting AI systems will also grow, making data protection a critical concern for universities.
- **Bias in AI Algorithms-** If AI systems are trained on data that reflects historical inequalities or prejudices, they may perpetuate these biases in their predictions and recommendations. This is particularly concerning in the context of education, where AI-driven admissions, grading, and hiring decisions could inadvertently disadvantage certain groups of students. It is crucial that AI systems used in higher education are regularly audited for fairness and accuracy, ensuring that they do not perpetuate discrimination. Universities must also be transparent about the data they collect and how AI systems are being used to make decisions.
- **Job Displacement and the Human Element-**The automation of certain tasks in higher education, such as grading, administrative work, and even aspects of teaching, has raised concerns about job displacement. While AI can undoubtedly improve efficiency, there is a risk that it could lead to job losses for educators and administrative staff. However, many experts argue that AI should not replace humans but rather augment their capabilities. AI technologies can help educators focus on more meaningful tasks,

such as fostering creativity, critical thinking, and personal development in students. Rather than replacing educators, AI can provide them with tools to enhance their teaching and make their jobs more efficient.

- **Digital Divide and Accessibility**-AI and automation require access to advanced technology, and not all students or institutions have equal access to these resources. The digital divide, which refers to the gap between those who have access to technology and those who do not, could exacerbate inequalities in education. To ensure that AI and automation benefit all students, universities must invest in ensuring equitable access to technology. This includes providing access to devices, high-speed internet, and AI-powered learning platforms, particularly for students in underserved communities.

The Future of AI and Automation in Higher Education

As AI and automation continue to evolve, their role in higher education will only expand. Future advancements may include even more sophisticated personalized learning systems, AI-driven virtual classrooms, and highly efficient research automation. Universities will need to carefully navigate the challenges associated with these technologies, particularly those related to ethics, data privacy, and the digital divide.

In the future, AI and automation are likely to become even more integrated into the fabric of higher education, reshaping not just how institutions operate but also how they serve students, faculty, and researchers. By embracing these technologies while remaining mindful of their potential risks, higher education can harness the power of AI and automation to create more accessible, efficient, and personalized learning experiences for all.

Conclusion

The role of AI and automation in reshaping higher education is multifaceted, with significant potential to enhance learning experiences, improve efficiency, and support research. However, challenges related to data privacy, bias, job displacement, and accessibility must be addressed to ensure these technologies are used responsibly and equitably. As AI and automation continue to evolve, higher education institutions must strike a balance between technological innovation and maintaining the human-centered values that are at the core of education. By doing so, AI and automation can help create a more personalized, efficient, and inclusive higher education system for the future.

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THE ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Meenakshi*

Abstract

Artificial Intelligence (AI) and automation are transforming higher education, reshaping teaching methodologies, learning experiences, and administrative processes. AI-driven tools, such as intelligent tutoring systems, automated grading, and personalized learning platforms, enhance student engagement and optimize faculty workload. Automation streamlines administrative tasks, improving efficiency and reducing costs. This paper explores the role of AI and automation in higher education, analyzing their impact on teaching, assessment, and institutional operations. A literature review highlights recent advancements, opportunities, and challenges, including ethical considerations and concerns regarding academic integrity. The conclusion emphasizes the need for strategic AI integration to balance technological efficiency with human-centered education.

Keywords: Artificial Intelligence, Automation, Higher Education, AI-driven tools

Introduction

Higher education is undergoing a rapid transformation driven by technological advancements. Artificial Intelligence (AI) and automation are redefining traditional learning models, administrative functions, and student engagement. These technologies offer innovative solutions to enhance learning experiences, increase efficiency, and address challenges such as accessibility and personalized learning.

AI-powered tools like intelligent tutoring systems, machine learning algorithms, and automated assessment systems provide personalized feedback and support tailored to individual student needs. Automation reduces the administrative burden on faculty and staff, enabling institutions to focus more on academic quality and student success. However, integrating AI and automation in education raises concerns about data privacy, ethical implications, and the role of human educators.

This paper examines the role of AI and automation in reshaping higher education,

* Assistant Professor, DIPS College of Education, Tanda, Hoshiarpur

exploring their benefits, challenges, and future potential. Through a review of existing literature, the study highlights current trends and proposes recommendations for effective AI integration in higher education institutions.

Literature Review

- **AI in Teaching and Learning-** AI-driven educational tools have significantly enhanced the learning experience by providing personalized instruction, adaptive learning pathways, and real-time feedback. Intelligent Tutoring Systems (ITS) such as Carnegie Learning and Squirrel AI use machine learning to tailor educational content based on students' learning patterns. Research suggests that AI-based adaptive learning improves student retention and comprehension compared to traditional one-size-fits-all approaches (Kumar, Singh and Sharma, 2021). AI also facilitates language processing applications, such as Grammarly and Turnitin, which aid students in writing assignments by providing automated feedback. Virtual assistants like chatbots enhance student engagement by answering queries, scheduling assignments, and offering academic guidance (Zawacki-Richter, Marin, Bond and Gouverneur, 2019).
- **Automation in Higher Education Administration-** Automation is streamlining administrative processes, reducing operational costs, and enhancing institutional efficiency. AI-powered chatbots handle routine student inquiries, reducing the workload on faculty and administrative staff. Automated grading systems, such as Gradescope, facilitate objective assessment and provide instant feedback, saving educators valuable time. Additionally, AI-driven enrollment and retention prediction systems help universities identify at-risk students and implement targeted interventions (Baker & Inventado, 2021). Automated scheduling tools optimize resource allocation, ensuring efficient management of classrooms, faculty schedules, and institutional planning.
- **AI in Assessment and Evaluation-** AI and automation have revolutionized assessment and evaluation methods, ensuring accuracy, efficiency, and fairness. AI-powered assessment tools use natural language processing (NLP) and machine learning algorithms to evaluate essays, detect plagiarism, and provide constructive feedback. Automated proctoring solutions, such as Proctorio and Respondus, use facial recognition and eye-tracking technologies to maintain academic integrity in remote assessments. However, concerns regarding AI-based assessment include biases in grading algorithms, ethical issues related to student surveillance, and potential limitations in evaluating creativity and critical thinking (Selwyn, 2022). Addressing these challenges requires a balance between AI-driven automation and human oversight.
- **Ethical and Social Implications of AI in Education-** The increasing use of AI and automation in higher education raises ethical concerns, including data privacy, algorithmic

biases, and the digital divide. AI relies on vast amounts of student data, raising questions about data security and consent (Williamson and Eynon, 2020). Algorithmic biases in AI systems may lead to unfair grading and learning recommendations, disproportionately affecting marginalized groups. Furthermore, the digital divide remains a challenge, as students from lower-income backgrounds may lack access to AI-powered educational resources. Institutions must implement ethical guidelines and policies to ensure equitable access and responsible AI deployment in education.

- **The Future of AI and Automation in Higher Education-** The future of AI and automation in higher education is promising, with emerging technologies such as blockchain for academic credential verification, AI-driven research assistance, and virtual reality (VR) for immersive learning. AI-powered career counseling tools can analyze job market trends and provide personalized career guidance to students (Luckin, Holmes, Griffiths and Forcier, 2021). Institutions must adopt a strategic approach to AI integration, ensuring that technology complements human educators rather than replacing them. Faculty development programs should focus on equipping educators with AI literacy to effectively use these technologies in their teaching practices.

Conclusion

AI and automation are revolutionizing higher education by enhancing teaching, learning, and administrative efficiency. While these technologies offer numerous benefits, challenges related to ethical concerns, algorithmic biases, and equitable access must be addressed. A balanced approach, integrating AI with human oversight, is essential to maximize its potential while maintaining the integrity of education. Future research should focus on developing ethical AI frameworks, improving accessibility, and ensuring AI-driven education remains inclusive and student-centered. By embracing AI and automation strategically, higher education institutions can create a more efficient, personalized, and inclusive learning environment that prepares students for the challenges of the digital age. This research paper provides a comprehensive analysis of AI and automation in higher education, highlighting both opportunities and challenges while emphasizing the need for ethical and strategic implementation.

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ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Mehak Goyal*

Abstract

The accelerated advancements in artificial intelligence (AI) and their profound impact on the higher education sector, the integration of AI-driven technologies necessitates a comprehensive analysis of their implications for pedagogical frameworks, institutional operations, and adaptive learning environments. This research paper explores the transformative impact of artificial intelligence (AI) and automation in higher education, focusing on their role in enhancing teaching methodologies, personalized learning, and student engagement. The paper also examines the challenges of AI integration, including ethical concerns, data privacy, and potential biases in AI-driven systems. For this research, The researcher has taken data from secondary sources like research papers, journals, magazines, and articles to satisfy the objectives of this research. By analysing real-world applications and case studies, this study provides insights into the future of AI-driven education and its implications for students, educators, and institutions.

Keywords: Artificial intelligence, automation, teaching methodologies, higher education, personalized learning

Introduction

The integration of Artificial Intelligence (AI) and automation in higher education is fundamentally transforming pedagogical strategies, administrative processes, and student engagement frameworks. As academic institutions navigate the complexities of digital transformation, AI-driven technologies are playing a pivotal role in enhancing instructional methodologies, optimizing resource allocation, and personalizing learning pathways through data-driven decision-making.

AI-powered adaptive learning systems leverage machine learning (ML) algorithms to dynamically adjust instructional content based on students' cognitive abilities, learning patterns, and performance analytics. Intelligent tutoring systems (ITS), powered by deep

* Assistant Professor, Department of Commerce, A.S College, Khanna

learning and natural language processing (NLP), provide real-time, personalized feedback, enabling an interactive and self-regulated learning environment. Additionally, AI-enhanced virtual and augmented reality (VR/AR) simulations are revolutionizing experiential learning in disciplines such as medicine, engineering, and computational sciences.

Review of Literature

Jain and Jain (2019) examined in their study the role of artificial intelligence in higher education. The main aim of this study was to find out the impact of AI on learning students and relationship between demographic variables of respondents and AI impact on learning. The data for this study was collected from universities of Udaipur and Rajasthan with the help of a structured questionnaire. Both primary and secondary data was collected and analysed with the help of frequency tables/graphs and one-way ANOVA. The findings of this showed that while there are many opportunities for artificial intelligence in higher education and great prospects for its future, the current state of AI in these institutions necessitates significant time and financial investment.

Talan and Kalinkara (2023) conducted a study on the role of AI in higher education comparing ChatGPT assessment for anatomy course. Comparing ChatGPT's performance in an anatomy course to that of undergraduate students is the goal of this study. The respondents were the students from the faculty of health science at a state university in Turkey. There were forty items on the multiple-choice test that served as the examination format. Findings of this study concluded that ChatGPT fared better on the test than the students.

Karam (2023) examined in this study the transformation in higher education with AI. This study goes into the multiple issues that higher education faces around the world, particularly in the MENA area, such as the Two Sigma Problem, the uniformity of teaching and learning, and the increasing demands on educators. It investigates the revolutionary power of artificial intelligence (AI) as a tool for addressing these difficulties, with a focus on Generative AI's ability to democratize and personalize learning.

Aithal and Maiya (2023) discussed in their study the innovations in the higher education industry in shaping the future. This study seeks to introduce, identify, and outline the numerous types of innovation widespread in academia, encompassing policy-driven reforms, technological developments, pedagogical evolution, stakeholder-centric methods, and more. The data was collected from various search engines like Google Scholar and AI-based GPTs. This study highlighted the importance of collaboration and partnership in promoting innovation, while also revealing 'super innovations' that surpass traditional limits and establish new standards of excellence.

Jin, Goyal and Rajawat (2024) discussed in their study the informative role of artificial intelligence in higher education in the new era. This paper focuses on the relationship

between technology, education and teachers and has drawn various theories from the field of technological sociology. This paper outlines a three-tiered shift in the relationship between AI and university instructors through a historical analysis of educational technology innovation. A mixed method strategy was used by combining qualitative and quantitative approaches. This study clarifies how incorporating AI might improve learning outcomes and provide teachers more authority, guaranteeing that education will continue to progress in the digital era.

Need and Significance of the Study

- **Enhancing Academic Performance:** AI-driven insights can help educators track student progress and intervene when necessary, improving learning outcomes.
- **Supporting Educators:** AI tools can assist teachers in developing customized lesson plans, automating assessments, and providing real-time feedback.
- **Cost and Time Efficiency:** Automation reduces operational costs and administrative burdens, allowing institutions to allocate resources more effectively.
- **Expanding Access to Higher Education:** AI-powered virtual tutors, chatbots, and online courses make education more inclusive and flexible.
- **Improving Decision-Making:** Data analytics and AI can help institutions make informed decisions regarding curriculum development, enrolment strategies, and student engagement.
- **Addressing Challenges and Risks:** The study highlights potential risks of AI, such as job displacement in academia and ethical concerns, offering strategies for responsible AI implementation.

Objectives

- To examine the role of artificial intelligence and automation in enhancing higher education.
- To explore the challenges faced by integrating AI and automation in higher education systems.

Research Design

This study will use a descriptive and exploratory research design. In descriptive research study aims to describe the impact of AI and automation on higher education institutions, faculty, and students. Exploratory research will help in exploring various challenges, and future possibilities of AI in academia.

Scope of the Study

The scope of this study focuses on the role of Artificial Intelligence (AI) and automation in higher education. The research encompasses universities, colleges, and online higher

education platforms that are incorporating AI and automation into their pedagogical methodologies.

Collection of Data

Research Findings

For this research, the data is collected from secondary sources through various research papers, journals, magazines, and articles to satisfy research objectives.

Role of Artificial Intelligence and Automation in Enhancing Higher Education

- 1. AI-Powered Intelligent Tutoring Systems (ITS)-** Intelligent Tutoring Systems (ITS) leverage AI algorithms to offer personalized learning experiences by analyzing students' progress and providing tailored feedback. Examples include:
 - Carnegie Learning's MATHia: Uses AI to track students' problem-solving skills and adjust instructional content accordingly.
 - Squirrel AI: An AI-based adaptive learning system that personalizes course material based on students' strengths and weaknesses.
- 2. Automated Grading and Feedback-** AI-powered grading tools reduce educators' workload by automatically assessing assignments and exams. Some key applications include:
 - Gradescope: Uses machine learning to grade written assignments, coding exercises, and multiple-choice tests efficiently.
 - Turnitin: AI-based plagiarism detection software that ensures academic integrity.
- 3. AI in Content Creation-** AI assists in generating lecture materials, quizzes, and interactive simulations. Tools such as ChatGPT and GPT-powered platforms help educators design customized content that adapts to different learning levels.
- 4. Virtual and Augmented Reality in Education-** AI-driven Virtual Reality (VR) and Augmented Reality (AR) create immersive learning experiences in fields such as medicine, engineering, and history. Example: Medical VR Simulations allow students to practice surgical procedures in a risk-free virtual environment.
- 5. Adaptive Learning Platforms-** AI-driven platforms use real-time data to tailor course content to students' individual needs. Examples include:
 - Knewton: An adaptive learning platform that adjusts content difficulty based on student performance.
 - Coursera and edX: AI-powered MOOCs (Massive Open Online Courses) that recommend personalized learning paths.

- 6. AI-Powered Learning Assistants-** Virtual assistants help students by providing on-demand academic support. Examples include:
 - Jill Watson (Georgia Tech): An AI-powered teaching assistant that answers students' questions in online courses.
 - IBM Watson Tutor: Provides personalized tutoring and study recommendations.
- 7. Predictive Analytics for Student Success-** AI analyzes student performance and behavioral patterns to identify at-risk students and recommend interventions. For instance:
 - Purdue University's Course Signals: Uses predictive analytics to detect students who may struggle and provides early alerts.
 - Student Success Platforms: AI-driven tools such as Civitas Learning help institutions improve student retention rates.
- 8. AI-Enabled Chatbots and Virtual Assistants-** AI chatbots assist students with academic queries, course recommendations, and administrative tasks. Examples include:
 - ChatGPT-based university chatbots: Assist with course selection, deadlines, and FAQs.
 - Bots like AdmitHub: Guide students through the admissions and enrollment process.
- 9. Gamification in Learning-** AI integrates game-based learning strategies, increasing student motivation through:
 - Reward-based systems: Badges, leaderboards, and achievement tracking to encourage active participation.
 - AI-powered educational games: Tools such as Kahoot! and Duolingo engage students through interactive challenges.
- 10. Automated Peer Collaboration and Discussion Forums-** AI facilitates group learning by matching students with similar learning preferences and enhancing discussion forums with AI-generated topic summaries and relevant study resources.

Key Challenges Faced By Integrating AI and Automation in Higher Education Systems

- 1. Bias in AI Algorithms-** AI models are trained on large datasets, which may contain biases based on gender, race, socioeconomic background, or academic performance. If AI systems are not properly monitored, they can reinforce existing inequalities in education. Example: AI-driven grading systems may favour students from privileged backgrounds if trained on biased datasets.

- 2. Transparency and Explainability-** AI decision-making processes are often complex and opaque, making it difficult for students and faculty to understand why certain recommendations or grades are assigned. Example: An AI-based admissions system might reject a student without explaining the reasoning behind the decision.
- 3. Protection of Student Data-** AI-powered educational platforms collect vast amounts of student data, including academic performance, personal information, and learning behaviors. Improper handling of this data can lead to security breaches. Example: A university using AI-based analytics may suffer a cyberattack, exposing sensitive student records.
- 4. Risk of Data Misuse-** Educational institutions may use AI-collected data for purposes beyond its intended use, such as marketing or surveillance.
- 5. Integration with Existing Educational Systems-** Many universities already use Learning Management Systems (LMS) such as Moodle, Blackboard, and Canvas. AI-driven solutions must be compatible with these systems, which can be challenging. Example: An AI-powered chatbot for student assistance may struggle to integrate with an institution's outdated LMS.
- 6. Accuracy and Reliability of AI Tools-** AI tools are not always 100% accurate. Errors in AI-generated responses, grading, or student recommendations can negatively impact learning experiences. Example: An AI grading tool may misinterpret a student's essay due to natural language processing limitations.
- 7. Faculty and Staff AI Training-** Many educators lack the technical knowledge to effectively use AI tools in their teaching methodologies.
- 8. High Cost of AI Implementation-** Developing and maintaining AI-powered educational technologies requires significant financial investment. Institutions with limited budgets may struggle to afford AI-based solutions. Example: AI-driven virtual labs and intelligent tutoring systems can be costly for smaller universities.
- 9. Digital Divide and Accessibility Issues-** Not all students have equal access to AI-driven learning tools due to disparities in internet connectivity, devices, and digital literacy. Example: Students from rural areas may struggle to access AI-powered online courses due to poor internet infrastructure.
- 10. Faculty and Student Resistance-** Some educators and students may be hesitant to adopt AI-based learning due to concerns about job displacement, loss of human interaction, or a lack of trust in AI decisions.
- 11. Legal and Compliance Issues-** Different countries have varying regulations regarding AI and data privacy in education. Universities operating internationally must navigate complex legal landscapes. Example: AI-driven proctoring software has faced legal scrutiny in some countries due to privacy concerns.

Future Directions and Solutions

To overcome these challenges, universities should take a balanced approach to AI integration by:

- Establishing ethical AI guidelines for fair and transparent implementation.
- Investing in faculty training to enhance AI literacy.
- Strengthening data privacy policies to protect student information.
- Ensuring affordable AI solutions to bridge the digital divide.
- Encouraging human-AI collaboration to maintain academic integrity and personalized student support

Conclusion

This study emphasizes on how automation and artificial intelligence (AI) is playing an essential role in improving higher education through data-driven decision-making, automated evaluation, and intelligent tutoring systems. These tools improve individualized learning, institutional administration, and instructional effectiveness. However, issues like data security, algorithmic bias, and ethical governance call for a well-thought-out, strategic approach. For academic innovation and operational excellence to continue to progress, responsible AI integration will be essential.

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THE SYNERGY OF AI AND FACULTY: EMPOWERING EDUCATORS

Dr. Monica Mahajan*

Abstract

The rapid advancement of Artificial Intelligence (AI) is transforming education by reshaping traditional teaching methodologies and redefining the role of faculty members. This paper explores the evolving synergy between AI and educators, emphasizing that AI serves as a powerful tool to enhance, rather than replace, faculty capabilities. AI-driven technologies facilitate personalized learning, automate administrative tasks, provide data-driven insights, and support research, enabling educators to focus on critical aspects of student engagement, mentorship, and innovative pedagogical strategies. The study examines AI's applications in instructional design, assessment, and research, highlighting its role in fostering adaptive learning environments and improving academic efficiency. Additionally, it addresses the ethical and practical challenges associated with AI integration, such as algorithmic bias, data privacy concerns, and the necessity for digital literacy among educators. By analyzing the potential and limitations of AI in higher education, this research underscores the importance of AI-human collaboration to ensure that faculty members remain at the forefront of student learning while leveraging technological advancements to enhance educational outcomes.

Keywords: Artificial Intelligence, Faculty Empowerment, Personalized Learning, Adaptive Learning, AI in Education, Ethical AI, Digital Literacy

Introduction

Several industries, including education, are undergoing profound changes as a result of the rapid development of artificial intelligence (AI), which is redefining traditional teaching methodologies and the roles that faculty members play. The transmission of knowledge, the mentoring of students, and the development of critical thinking among students have traditionally been the primary responsibilities of educators. The incorporation of artificial intelligence into educational settings, on the other hand, signifies a transition away from

* Assistant Professor, Guru Nanak College of Education, Dalewal (Hoshiarpur)

traditional methods and toward AI-assisted teaching and learning procedures. This opens the door to pedagogical approaches that are more data-driven, efficient, and personalized (Luckin, 2018). The purpose of this paper is to investigate the evolving synergy between artificial intelligence (AI) and faculty, with the emphasis being placed on the fact that AI is not a replacement for educators but rather a tool that enhances their capabilities in research, instructional design, assessment, and student engagement. Through the utilization of tools powered by artificial intelligence, educators are able to create learning environments that are adaptable, automate administrative tasks, and gain deeper insights into the progress of students and their learning patterns. This study intends to answer key research questions, such as how artificial intelligence (AI) contributes to the empowerment of faculty members. How can artificial intelligence improve the effectiveness of teaching? What are the challenges, both ethical and practical, that come with incorporating AI into academic institutions? The implementation of artificial intelligence raises concerns regarding ethical use, data privacy, and the need for educators to have digital literacy. While AI presents numerous opportunities for faculty support and institutional development, it also raises concerns regarding the implementation of AI. This research offers a comprehensive understanding of how artificial intelligence (AI) can serve as a collaborative partner in higher education by conducting an in-depth analysis of these aspects. This understanding ensures that faculty members continue to be at the center of student learning while simultaneously embracing innovative technological advancements.

Understanding AI in Education

AI in education refers to the application of machine learning, natural language processing, and automation to facilitate teaching, learning, and administrative tasks (Holmes et al., 2019). AI tools in education can be categorized as:

- **Intelligent Tutoring Systems:** Personalized learning platforms such as Carnegie Learning and Knewton.
- **Automated Assessment Tools:** AI-based grading systems like Gradescope.
- **Virtual Teaching Assistants:** Chatbots and AI-driven feedback systems
- **Data Analytics for Institutional Decision-Making:** AI-based predictive analytics to track student performance and retention rates.

Evolution and Trends in AI in Education

The early applications of artificial intelligence in education focused primarily on computer-based adaptive testing. These systems were made so that the difficulty of test questions could be changed in real time based on how students answered. This would make the testing experience more personalized. This method set the stage for further improvements in intelligent tutoring systems and data-driven educational interventions. It also made it possible to use AI in personalized learning.

AI in education has changed a lot over the years. It used to just be adaptive testing, but now it includes more complex models for predictive learning analytics (Siemens and Long, 2019). Predictive analytics use huge amounts of data about students to find patterns in how they learn, predict how well they will do in school, and suggest specific interventions. These systems help teachers find students who are at risk early on, so they can help them and use individualized lessons that help them learn more.

The creation of personalized learning pathways is another big step forward in AI-driven education (Luckin, 2018). AI-powered platforms now use machine learning algorithms to tailor curriculum delivery to each student's learning style, pace, and strengths, instead of the old "one size fits all" method. These systems make learning more interesting and useful by giving students personalized content, interactive simulations, and feedback in real time. Personalized learning is especially helpful for students who have a variety of educational needs, such as those who need special accommodations or ways to learn faster.

The newest trend in AI applications for education is to focus on AI working together with humans instead of AI being fully autonomous. Instead of replacing teachers, AI is being used to improve the quality of instruction and build on what teachers already know. AI-powered tools help teachers by doing administrative tasks like grading, keeping track of attendance, and suggesting content. This frees up teachers to focus on more important things, like helping students think critically and creatively solve problems. AI-driven insights also help teachers make decisions about how to teach based on data, which creates a more responsive and student-centered learning environment.

This move toward AI and humans working together also makes sure that ethics are taken into account in schools. By keeping an eye on things with humans, teachers can make sure that AI algorithms don't have any biases, maintain the integrity of their teaching, and make sure that all students can learn in a way that puts their health first. AI is likely to play a bigger role in education in the future, incorporating new technologies like natural language processing, virtual and augmented reality, and conversational AI tutors. This will completely change the way we learn today.

The Role of AI in Faculty Empowerment

As artificial intelligence (AI) continues to advance, its impact on higher education has become increasingly significant. Faculty members across disciplines are leveraging AI-driven tools to enhance instructional design, streamline administrative tasks, improve research efficiency, and revolutionize pedagogical strategies. By integrating AI into their workflow, educators can focus more on fostering student engagement, mentorship, and innovative teaching methods.

AI as an Assistant in Instructional Design: AI-powered tools have transformed content development, language refinement, and curriculum enhancement. Platforms such

as ChatGPT, Grammarly, and DeepL assist faculty members by improving the clarity, coherence, and readability of instructional materials. These tools help educators create engaging and accessible course content, ensuring that students receive high-quality learning resources. Additionally, AI-based educational platforms like Coursera and EdX employ adaptive algorithms that adjust course content based on learners' progress and engagement levels (Zawacki-Richter, Marín, Bond and Gouverneur, 2019). This personalized approach ensures that students receive tailored learning experiences, reinforcing knowledge retention and comprehension. AI-powered Learning Management Systems (LMS) further enhance instructional design by offering predictive analytics that guide faculty in modifying lesson plans and assignments to better suit diverse learning needs.

AI in Administrative and Logistical Support: Faculty members often find themselves burdened with time-consuming administrative tasks, including attendance tracking, grading, scheduling, and student progress monitoring. AI-based automation tools significantly reduce this workload, enabling educators to focus on teaching and student mentorship.

- **Gradescope:** Automates grading, especially for multiple-choice and short-answer assessments, providing detailed analytics on student performance.
- **Turnitin:** Ensures academic integrity by detecting plagiarism and AI-generated content in student submissions.
- **Chatbots for Student Support:** AI-driven chatbots provide instant responses to common student inquiries, reducing the need for manual intervention by faculty members.
- **AI-Powered Scheduling Systems:** Platforms like X.ai and Clara help coordinate meetings, class schedules, and office hours, ensuring efficient time management.

These innovations alleviate administrative burdens and allow faculty to devote more time to research, professional development, and student engagement.

AI for Research and Scholarly Work: AI is revolutionizing academic research by assisting scholars in literature reviews, data analysis, and publication processes. AI-driven tools expedite the research workflow, making scholarly activities more efficient and insightful.

- **Literature Review Assistance:** Tools such as Elicit and Research Rabbit scan vast academic databases to identify relevant research papers, summarizing key findings and highlighting gaps in the literature.
- **Plagiarism Detection and Citation Management:** iThenticate and Grammarly's plagiarism checker ensure originality and proper citation of academic work.
- **Data Analysis and Statistical Computation:** AI-powered platforms like IBM Watson Analytics, SPSS Modeler, and Google AutoML enable faculty members to analyze complex datasets, identify patterns, and generate predictive models.
- **AI-Powered Writing Assistants:** Scholarcy summarizes research papers, helping

faculty and students extract key insights quickly, while tools like Scite.ai provide smart citation recommendations based on article context.

By integrating AI into research methodologies, faculty members can enhance the accuracy, efficiency, and impact of their scholarly contributions.

Enhancing Pedagogical Strategies Through AI

AI is reshaping the way educators design, deliver, and assess learning experiences. With advancements in adaptive learning, personalized instruction, and immersive learning environments, AI enhances student engagement and knowledge retention.

Adaptive Learning and Personalized Instruction: AI enables real-time student performance tracking and customizes learning experiences accordingly. Platforms such as Smart Sparrow and Century Tech adapt instructional materials to match students' learning paces, strengths, and areas for improvement. These AI-driven systems ensure that students receive individualized guidance, making education more inclusive and effective.

AI-Driven Assessment and Feedback: Traditional assessment methods often fall short in providing immediate and personalized feedback. AI-powered assessment tools use natural language processing (NLP) to analyze student responses and provide adaptive assessments with personalized recommendations that revolutionize the evaluation process by offering real-time insights and customized feedback. These AI-enhanced assessment methods not only streamline grading but also help students identify their strengths and areas for improvement.

AI in Virtual and Immersive Learning Environments: Experiential learning is undergoing a transformation with AI-driven virtual reality and simulation-based tools. These technologies enable students to engage in hands-on learning experiences, particularly in STEM, healthcare, and humanities. AI-Powered Simulations used in medical, engineering, and legal education replicate real-world scenarios, enhancing decision-making and problem-solving skills. Platforms such as Duolingo and Rosetta Stone use AI to provide adaptive language learning experiences, offering customized exercises and speech recognition feedback.

By integrating AI into immersive learning environments, educators can bridge the gap between theoretical knowledge and practical application, fostering deeper student engagement and understanding.

Challenges and Ethical Considerations

Artificial Intelligence (AI) has revolutionized various domains, including education, by offering personalized learning experiences and efficient administrative processes. However, AI algorithms are susceptible to inherent biases due to the limitations and historical imbalances within training data (Baker and Hawn, 2021). When AI models are trained on datasets that

do not adequately represent diverse demographics, they may reinforce existing prejudices, leading to disparities in educational outcomes. For instance, automated grading systems might inadvertently favor students from certain socioeconomic backgrounds due to inherent biases in language models or assessment patterns.

Beyond bias, AI-driven student monitoring systems have raised significant concerns regarding data privacy and ethical surveillance (Williamson and Eynon, 2020). The collection and analysis of student data ranging from attendance records to behavioral analytics pose risks related to data breaches and unauthorized access. Institutions must ensure robust encryption methods, transparent data collection policies, and explicit consent mechanisms to protect student privacy and maintain trust in AI applications within education.

Faculty Resistance and AI Literacy: Despite AI's potential to transform education, faculty members often exhibit resistance due to a lack of technical training and familiarity with AI applications (Aoun, 2017). Many educators perceive AI as a disruptive force that may replace traditional teaching methods rather than enhance them. This reluctance stems from concerns about job displacement, the complexity of AI integration, and skepticism about AI-driven decision-making in pedagogy. To address these challenges, institutions must implement structured AI literacy programs for educators. Such initiatives should focus on equipping faculty with the necessary skills to leverage AI tools for curriculum design, student engagement, and research advancement. By fostering AI competency, educators can transition from passive adopters to active contributors in shaping AI-driven education, ensuring ethical and effective implementation.

The Human Element: While AI enhances personalized learning by offering data-driven insights and adaptive learning models, it should not replace the fundamental human interaction between educators and students. Research indicates that students benefit significantly from human mentorship, which fosters emotional intelligence, critical thinking, and interpersonal skills (Selwyn, 2019). AI can provide tailored content recommendations and automated assessments, but it lacks the empathetic and contextual understanding that human educators bring to the learning process. To maintain a balanced educational environment, AI should be integrated as a supplementary tool that enhances, rather than diminishes, human connections. Hybrid learning models that blend AI-driven analytics with personalized educator feedback ensure a holistic learning experience where students receive both data-informed guidance and emotional support.

Future Prospects and Recommendations

The Evolving Role of Educators: As AI reshapes educational methodologies, educators must transition from traditional content delivery roles to becoming facilitators of knowledge. This paradigm shift involves leveraging AI for personalized learning experiences while fostering students' critical thinking, creativity, and problem-solving skills (Aoun, 2017).

Rather than solely imparting information, educators should focus on guiding students in analyzing, interpreting, and applying AI-generated insights to real-world challenges.

Training and Professional Development for Faculty: To facilitate this transition, institutions should invest in comprehensive AI training and professional development programs for faculty members. These programs should cover:

- Fundamental AI concepts and applications in education.
- Ethical considerations, including bias mitigation and data privacy.
- Hands-on experience with AI-driven teaching tools and learning management systems.
- Strategies to integrate AI without compromising the educator-student relationship.

By equipping educators with these skills, institutions can foster an AI-ready workforce capable of leveraging technology while upholding pedagogical integrity.

Policy Recommendations for Ethical AI Implementation: The ethical deployment of AI in education requires well-defined policies and regulatory frameworks. Governments and educational institutions must establish guidelines addressing:

- **Data Security:** Implementing stringent cyber security measures to safeguard student data.
- **Academic Integrity:** Establishing clear boundaries for AI usage in assessments to prevent unethical practices, such as plagiarism or unauthorized automation.

Institutions should also engage in interdisciplinary collaborations with ethicists, AI experts, and policymakers to develop dynamic policies that evolve alongside technological advancements. By prioritizing ethical AI deployment, the education sector can harness AI's potential while maintaining fairness, transparency, and student welfare.

Conclusion

The integration of artificial intelligence (AI) in education is reshaping the role of faculty members, enhancing their capabilities rather than replacing them. AI-driven tools assist educators in instructional design, administrative efficiency, research facilitation, and pedagogical innovation. From personalized learning pathways to automated grading and immersive virtual learning environments, AI is enabling more adaptive and student-centered educational experiences.

However, as AI becomes more prevalent in academia, ethical considerations such as data privacy, and the need for digital literacy among educators must be addressed. Faculty members must not only embrace AI as a collaborative partner but also remain vigilant in ensuring that AI applications uphold fairness, inclusivity, and ethical integrity. The successful integration of AI in higher education requires a balanced approach that leverages its potential while safeguarding the fundamental principles of teaching and learning.

Ultimately, AI serves as a transformative force that empowers educators, allowing

them to focus on fostering critical thinking, creativity, and mentorship among students. By strategically incorporating AI, academic institutions can create a more efficient, personalized, and inclusive learning environment, ensuring that faculty members continue to be at the heart of student success in the digital age.

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AI AND HUMAN EDUCATORS: A COMPARATIVE STUDY ON EMOTIONAL INTELLIGENCE AND STUDENT MOTIVATION

Priyanshi Gaba*

Abstract

This research compares the role of AI in education with that of human instructors in terms of motivation and emotional intelligence. While AI improves accessibility, efficiency, and individualized learning, it cannot match the profound emotional intelligence and mentorship abilities of teachers. Secondary data analysis by the research identifies that AI can assist, not substitute, teachers by taking care of administrative work. An optimal AI-human balance can maximize learning outcomes without sacrificing student motivation and emotional involvement.

Keywords: Human educators, Artificial Intelligence in Education, Emotional Intelligence, Student Motivation, AI-assisted Learning, Teacher-Student Interaction.

Introduction

This study delves into the use of AI in education, where it comes in handy for adaptive learning and administrative functions but falls short on emotional intelligence and inspiring students. Human instructors offer unmatched emotional care, individualized attention, and guidance, which cannot be mimicked by AI. Although AI-powered tools such as ChatGPT and intelligent tutoring systems are improving learning customization, their capability to fully grasp and respond to students' emotions is doubtful.

Research Goals

1. Analyze how emotional intelligence impacts student learning and instructional effectiveness.
2. Assess AI's ability to recognize and respond to student emotions compared to human teachers.
3. Examine the influence of AI and human educators on student engagement, motivation, and academic performance.

* M.Ed scholar, University School of Education, Guru Gobind Singh Indraprastha University, Dwarka, Delhi

4. Explore strategies for integrating AI and human instruction to enhance learning experiences.

The research questions are as follows

1. In normal classroom situations, how well does AI understand and react to students' emotions in comparison to human teachers? In terms of inspiring and involving students, what are the advantages and disadvantages of AI versus human teachers?
2. How can AI and human educators work together to build a more successful and individualised learning environment?
3. How do emotional intelligence demonstrations by human teachers impact students' motivation and engagement in comparison to artificial intelligence?

Employing secondary data analysis, this study examines whether to replace or supplement human teachers with AI and resolves in favor of a hybrid approach. Through the application of AI to assume administrative and adaptive learning functions, educators are free to focus on emotional relationships and motivation.

The research aims to guide policymakers and educators how to apply AI while protecting the essentiality of teachers in emotional and motivational assistance. An equilibrated human-AI model can optimize learning achievements while giving students the necessary interpersonal contact and support for holistic development.

Review of Related Literatures

Kovalchuk, Prylepa, Chubrei, Marynchenko, Opanasenko and Marynchenko, (2022) explored emotional intelligence (EI) in teacher development, with EI being critical in teaching performance. Building on Goleman (1995), EI is critical in recognizing and managing emotions. Whilst AI measures involvement and adjusts studying (OECD, 2018), it does not have real emotional acumen (Mayer and Salovey, 1997). Human educators promote intrinsic drive (Brackett, 2019) and meet emotional demands (Bialik and Fadel, 2018) and are essential even with the development of AI in education.

Machera and Machera (2017) highlighted emotional intelligence (EI) in learning for stress coping, academic performance, and communication. Goleman (1995) introduced EI as acknowledging and regulating emotions, which aid in motivating students. Carmeli (2003) pointed out that emotionally intelligent teachers foster compassionate classrooms, yet AI, however customized, lacks feelings (OECD, 2018). Singh (2015) identified EI with teaching effectiveness, while research on AI mimicking EI is limited. This study compares human and AI teachers in EI and motivation.

Drigas and Papoutsis (2020) prioritized emotional intelligence (EI) in education, especially in times of crisis such as COVID-19, because it builds resilience. Mérida-López and Extremera (2017) associated greater EI among teachers with lower burnout. Xu et al. (2019) equated student anxiety with crowd panic, wondering if AI could alleviate stress. Although studies

have grown, more research is necessary on AI versus human teachers in building motivation and emotional support.

Edannur (2010) identifies the central role of Emotional Intelligence (EI) in classrooms, affirming successful teachers have high EI. Goleman (1995) describes EI as emotional regulation, empathy, and relationship management. Boyatzis (2008) distinguishes this from AI-reliant teachers without emotional awareness. Whereas AI aids adaptive learning (McCluskey, 2000), it falters with motivation (Kusche and Greenberg, 2006). This study analyzes AI and human teachers' capacity for EI development and student motivation.

Edannur (2010) asserts that emotionally intelligent teachers improve learning, underscoring the significance of emotional intelligence (EI) in education. According to Boyatzis (2008), AI is not emotionally aware, whereas Goleman (1995) defines emotional intelligence (EI) as the ability to control emotions and interactions. It is emphasised by Parker et al. (2005) and Elias and Arnold (2006) that EI-driven instruction promotes engagement and success. While Pan & Yang (2021) and Heidrich (2024) examine AI's capacity for emotional recognition, they also point out that it lacks genuine empathy.

Hellín et al. (2023) investigated gamification, i.e., leveraging leaderboards, rewards, and feedback, as a means of boosting learning motivation and engagement. In contrast to AI, depending on sentiment analysis, human educators have the EI that is fundamental to them (Mayer, Salovey, and Caruso, 2004). Although AI boosts efficiency and personalization AI does not provide emotional depth. To achieve real education, subsequent research must pursue hybrid models which blend artificial intelligence with human emotional intelligence.

Zhai et al. (2021) discussed AI applications in education, dividing research into integration, application, and development. Although AI improves learning personalization, it poses ethical issues. Goleman (1995) highlighted emotional intelligence (EI) in education, which AI does not possess. Deci and Ryan's (1985) theory indicates human teachers promote intrinsic motivation, while AI promotes extrinsic motivation. AI increases productivity but does not possess EI. Future studies must investigate hybrid teaching models that combine AI and human teachers.

Josiah Koh et al. (2023) looked at how AI affected the relationship between students and teachers, highlighting how it can be a helpful tool rather than a danger. Through personalised learning, AI increases motivation and productivity, but it lacks human emotional intelligence (Goleman, 1995). AI-driven feedback supports extrinsic motivation, according to Deci and Ryan (1985), while human instructors promote intrinsic motivation. AI cannot take the place of teachers, despite its advantages, so more research on hybrid models that combine AI and human empathy is required.

Shi and Zhang (2023) averred that AI facilitates personal learning and simplifies work but has no emotional intelligence for developing rich teacher-student relationships. Teachers are stronger at intrinsic motivation (Wentzel, 1998), but AI facilitates extrinsic motivation

There should be future research focusing on AI-human hybrid pedagogy.

Research Methodology

The research used secondary data collection, reviewing books, peer-reviewed journals, conference proceedings, reports, and credible databases. Secondary data facilitated a wide comparative analysis due to the vast body of existing research. Ethical and practical constraints precluded classroom experimentation. The research compared AI and human teachers in motivation and emotional intelligence (EI), using credible literature over the last ten years. Peer-reviewed sources pinpointed gaps in research and contextualized findings against current trends, ensuring validity based on known authors and institutions.

Data Collection Sources

This study employs secondary data from reputable sources such as books on motivation, emotional intelligence, and AI in education, peer-reviewed journals, conference proceedings, and databases such as JSTOR, Google Scholar, IEEE Xplore, and ERIC. Through thematic analysis for qualitative data and statistical analysis for quantitative data, it contrasts AI and human instructors based on emotional intelligence and motivation, combining major theoretical models to evaluate strengths, weaknesses, and AI-human collaboration in education.

Comparative Analysis

Feature	Human educators	AI-based Systems
Emotional Intelligence	High; capable of empathy, understanding students' needs.	Limited; can recognize emotions via sentiment analysis but lacks true emotional awareness.
Motivation	Enhances intrinsic motivation through encouragement & mentorship	Enhances extrinsic motivation via gamification & personalized feedback.
Personalization	Personalized through experience and rapport-building.	Highly data-driven and adaptive but lacks deep personal connection.
Efficiency	Can be time-consuming in administration & content delivery.	Automates grading, adapts content delivery, and enhances efficiency.
Ethical Concerns	Subjective biases in teaching.	Algorithmic biases, data privacy risks.

The difference between AI-powered systems and human instructors identifies their relative strengths and weaknesses. Human teachers develop personal connections, showing emotional intelligence, empathy, and responsiveness, which are lacking in AI.

Although AI optimizes efficiency, personalization, and interest using data-based insights and automation, it is not able to duplicate mentorship or critical thinking enablement. The absence of emotional sensitivity in AI restricts its application to overall learning. There needs to be a blended AI-human model that harmonizes technological effectiveness with emotional

and motivational support for student-centered education.

Challenges and Ethical Considerations

Reliance on secondary data restrictions hinders close analysis of motivation and emotional intelligence. AI dependence on student analytics poses data privacy issues, where poor security may reveal information. Biases in training data used by AI produce educational inequalities, benefiting wealthy institutions. Overdependence on AI will stifle critical thinking and imagination, with limitations in teachers' adaptability and intuition. Lack of empathy from AI impacts motivation and well-being among students. An equilibrium between AI and humans is necessary to ensure effective learning and emotional well-being.

Future Recommendations and Implications

The study recommends maintaining the role of human teachers while maximising AI's educational potential. A hybrid approach boosts productivity while guaranteeing emotional and motivational support. Enhancing emotional intelligence ought to be the main goal of AI research. To provide individualised instruction without sacrificing the human element, educators must receive AI training. Legislators must guarantee the ethical application of AI, minimising prejudice and protecting student information. Human mentoring should be incorporated into AI-powered personalised learning. The role of AI in social and emotional learning requires more investigation.

Conclusion

The research brings to light the contribution of AI in augmenting education through accessibility, efficiency, and customization but points to its absence of emotional intelligence and motivation. Human teachers are critical to relationships, emotional nurturing, and intrinsic motivation, whereas AI is capable of streamlining administrative processes. Balanced integration of AI and humans ensures wholesome learning by using the efficiency of AI while retaining the emotional and motivational support essential for whole-some education.

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THE TRANSFORMATIVE IMPACT OF ARTIFICIAL INTELLIGENCE AND AUTOMATION ON HIGHER EDUCATION

Dr. Rachhpal Singh*

Abstract

The integration of Artificial Intelligence (AI) and automation in higher education is revolutionizing the way we teach, learn, and interact. This paper explores the transformative impact of AI and automation on higher education, highlighting their potential to enhance student learning outcomes, improve instructional efficiency, AI in NEP-2020 and address pressing challenges in the sector. Challenges and limitations associated with the adoption of AI and automation in higher education and propose strategies for mitigating these risks.

Keywords: Artificial Intelligence (AI), Automation, Higher Education, Robotics, Machine learning, Natural Language Processing and Knowledge Base System.

Introduction

The higher education sector is undergoing a significant transformation, driven by advances in artificial intelligence (AI) and automation. These technologies are being increasingly adopted in higher education institutions worldwide, with the potential to enhance student learning outcomes, improve instructional efficiency, and address pressing challenges in the sector.

Literature Review

Research has shown that AI and automation can enhance student learning outcomes by providing personalized learning experiences, real-time feedback, and adaptive assessments. Additionally, AI-powered tools can help instructors with tasks such as grading, data analysis, and student support, freeing up time for more strategic and high-touch activities.

The Role of AI and Automation in Higher Education

AI and automation are being used in various ways in higher education, including:

* Assistant Professor, GHG Khalsa College of Education, Guruser Sadhar

Personalized Learning: Artificial Intelligence powered adaptive learning systems tailor education to individual students' wants, aptitudes, skills, abilities and learning styles.

Intelligent Tutoring Systems: AI-based tutoring systems provide one-on-one support, offering real-time feedback and guidance.

Automated Grading: AI-driven grading systems reduce instructors' workload, enabling them to focus on teaching and mentoring.

Enhanced Accessibility: AI-powered tools, such as speech-to-text systems and virtual learning environments, improve accessibility for students with disabilities.

Learning Analytics: AI-powered learning analytics tools are helping educators make data-driven decisions about teaching and learning. By analyzing large sets of student data, AI can provide insights into student behavior, such as engagement, performance trends, and areas of struggle. With this information, instructors can intervene early and tailor their teaching methods to better support students. For instance, AI analytics can identify students who are at risk of falling behind, allowing educators to provide timely interventions.

Facilitating Research: AI is also playing a role in research within higher education. AI systems can process and analyze large volumes of academic data, making literature reviews more efficient and aiding in data analysis for research projects. Moreover, AI's ability to predict trends and patterns can help researchers in fields such as healthcare, engineering, and environmental studies make more accurate predictions and discoveries.

Customized Learning: AI technologies, particularly adaptive learning platforms, have the ability to deliver customized learning experiences. These systems analyze students' learning patterns and adjust course content to fit their specific needs. For example, AI-driven systems can assess a student's progress, identify areas where they need improvement, and provide personalized learning materials. This level of personalization is not feasible in traditional classrooms, where one-size-fits-all teaching methods often fail to address the unique needs of each student.

AI-driven Tutoring: One of the most promising applications of AI in higher education is AI-driven tutoring. Virtual tutors can assist students outside of regular class hours, offering immediate support for complex concepts. These tutors can answer questions, provide explanations, and help students review material, offering personalized feedback. Unlike human tutors, AI tutors are available 24/7, making them an invaluable resource for students who need additional help during off-hours.

Artificial Intelligence in NEP – 2020

The National Education Policy (NEP) 2020 emphasizes the importance of Artificial Intelligence (AI) in transforming India's education system. The policy proposes to introduce AI and coding in the school curriculum from class 6 onwards, aiming to equip students with necessary skills to participate in the digital economy and prepare them for future jobs.

Key Provisions for AI in NEP 2020:

Integration of Technology: The policy highlights the need to integrate technology, including AI, to improve the quality of education, enhance access, and provide personalized learning experiences.

AI-Powered Assessment: NEP 2020 suggests using AI-powered assessment systems to improve accuracy, reduce subjectivity and bias, and provide immediate feedback.

National Educational Technology Forum (NETF): The policy proposes establishing NETF as a platform for exchanging ideas, experiences, and best practices on using technology in education.

AI for All: The government has launched an online course, “AI for All,” to provide a basic understanding of AI to every citizen, available in 11 vernacular languages.

Compulsory Subject in Curriculum: Artificial Intelligence is the main compulsory subject with other subjects like Design Thinking, Holistic Health, Organic Living, Environmental Education, Global Citizenship Education (GCED), etc. at relevant stages will be undertaken to develop these various important skills in students at all levels.

Preparing Professionals of AI: Subjects which are critical to India’s overall development influence of technology on human endeavours is expected to erode the silos between technical education and other disciplines. India must prepare professionals in cutting-edge areas that are fast gaining prominence, such as Artificial Intelligence (AI), 3-D machining, big data analysis, and machine learning.

AI in teacher training: This is intended to help teachers to use technology effectively in their teaching practices and to keep up with the newest developments in technology.

Issues/Challenges of Using AI in Education

While AI and automation offer significant benefits for higher education, there are also challenges and limitations associated with their adoption. These include:

- **Job Displacement:** Automation may displace certain jobs, such as administrative and support staff, as AI takes over routine tasks.
- **Bias and Equity:** AI systems can perpetuate existing biases and inequalities if they are trained on biased data or designed with a narrow perspective.
- **Depersonalization:** Over-reliance on AI and automation may lead to a depersonalization of education, potentially diminishing the human touch and social interactions.

Future of AI and Automation in Higher Education

The future of AI and automation in higher education is both promising and challenging. As these technologies continue to evolve, we can expect even more sophisticated systems for personalized learning, real-time student assessments, and improved administrative functions. AI-driven platforms will likely become even more integrated into everyday learning, allowing students to have truly individualized educational experiences.

Moreover, automation will continue to streamline administrative operations, making education more efficient and accessible. However, these advancements must be approached with caution. Ethical considerations, such as privacy, equity, and job displacement, must be carefully managed to ensure that the benefits of AI and automation are maximized without causing unintended harm.

To ensure a sustainable future, educational institutions will need to invest in teacher training, infrastructure, and equitable access to technology. Policymakers will also need to develop guidelines and regulations that promote the responsible use of AI and automation in education.

Recommendations

Based on analysis, the following recommendations for higher education institutions are proposed:

- Develop AI Literacy: Educate students, faculty, and staff about AI, its applications, and its limitations to promote AI literacy.
- Address Bias and Equity: Develop AI systems that are inclusive, accessible, and culturally sensitive to promote equity and social justice.
- Foster Human-AI Collaboration: Develop AI systems that collaborate with humans, rather than replacing them, to enhance teaching and learning.

Conclusion

The integration of AI and automation in higher education has the potential to transform the sector, enhancing student learning outcomes, improving instructional efficiency, and addressing pressing challenges. However, it is essential to address the challenges and limitations associated with the adoption of these technologies, ensuring that they are used in ways that promote equity, accessibility, and social responsibility.

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THE OPPORTUNITIES AND CHALLENGES OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN TRANSFORMING HIGHER EDUCATION

Dr. Rakhi*

Abstract

Artificial Intelligence (AI) and automation are transforming a wide range of industries, including higher education. Higher education can benefit from AI because it is a computationally efficient paradigm. Learning adapted to the changing demands of students is one of the key educational advantages of AI. Students can modify the pace of a course to better competency. Poor faculty and teaching quality and a general lack of motivation and interest among students are among the difficulties facing higher education. Higher education's use of AI has resulted in a more efficient, adaptive, and effective educational model.

Keywords: Artificial Intelligence, Automation, Higher Education

Introduction

Artificial Intelligence (AI) and automation stand as pivotal forces push forwarding higher education into a new era. By refining teaching methods and streamlining administrative tasks, these can foster more engaging and effective learning environments. Artificial intelligence is transforming higher education by enhancing personalized learning, automating administrative tasks, and improving data-driven decision-making.

The use of AI in higher education is increasing at great surge. Not only can it automate processes and save a team significant time with daily tasks, but the true benefits of artificial intelligence in higher education go far beyond that. Schools are using AI to fulfill their core missions like improving student outcomes, building stronger communities, and generating new knowledge among masses.

Revolutionize Artificial Intelligence (AI) and Automation

AI and automation are expected to go sky high the AI education market to \$30 billion by

* Assistant Professor, Sant Darbara Singh College of Education for Women, Lopon (Moga)

2032. These are not just altering how we teach and learn but also optimizing administrative procedures, making education more personalized and efficient.

AI imitates human intelligence processes—learning, reasoning, problem-solving—using algorithms and data. In education, AI's transformative impact lies in its ability to analyze vast datasets, deriving insights to enhance learning experiences and educational outcomes.

Automation, on the other hand, uses technology to perform tasks without human intervention. In the educational realm, automation's value is in optimizing administrative processes, freeing up resources and enhancing overall efficiency.

Artificial Intelligence (AI) in Teaching and Learning

Alterable learning platforms powered by AI can personalize education to a level never before possible. By using real-time data from a student's interaction with the platform, these systems can adjust instructional content to each student's pace in real time to keep learners engaged.

AI is evolving new avenues in the education landscape, creating learning environments that respond to individual needs and preferences. Such adaptability empowers educators to modify their teaching methods, making learning more relevant and impactful for each student. This individualized approach increases engagement and fosters better knowledge retention, thereby boosting overall academic outcomes.

Raising Administrative Efficiency Through Automation

Automation is a transformative force in educational administration, assisting with crucial aspects like enrollment, record-keeping, and curriculum development. This shift enables institutions to focus more on enriching the educational journey for students and ensuring highest utilization of resources in environments where they are often limited.

Revolutionizing Student Learning and Educational Outcomes Through Artificial Intelligence (AI)

Innovations in AI have introduced newer dimensions in education through the creation of virtual assistants and chatbots. These AI products cater to students' inquiries in mere seconds, offer academic support, and provide emotional backing, enhancing the learning experience and elevating educational outcomes. This immediate, responsive interaction is a cornerstone in building a more supportive, engaging, and enriching learning environment.

The Artificial Intelligence (AI) Driven Classroom Experience- AI isn't merely a technological upgrade; it acts as a global connector, dismantling geographical and financial barriers to quality education. It creates a canvas where students and educators from diverse backgrounds can interact and learn in real-time, making education a global conversation. This globalization of learning resources makes high-quality education an accessible treasure, opening doors to unprecedented learning opportunities.

Educational Accessibility- AI has the transformative potential to address and alleviate educational inequalities by providing tailored support and resources to deprived communities. It offers opportunities for quality education in regions with limited access to educational resources, ensuring equal opportunities for learning and development, and reducing the education access gap.

Artificial Intelligence (AI) in Research- The use of AI is also transforming the field of academic research in higher education. Amid the pressure to publish, academic researchers are incorporating AI tools to help them handle large datasets, identify patterns, and extract key insights faster and more accurately. AI can streamline tasks like data cleaning and advanced statistical modeling.

AI also aids in the peer-review process by helping editors prioritize manuscripts, identify plagiarism, uncover biases in reviewers, and evaluate the quality of research. These advances are saving researchers' time—and they also may be speeding up the next big breakthroughs and the creation of new knowledge.

Potential Challenges of Artificial Intelligence (AI) and Automation- While AI and automation are significant assets to the educational sector, it's essential to navigate through their associated challenges with diligence and awareness. Here's a breakdown of the primary concerns and considerations.

Security and Data Privacy- Security is paramount when dealing with extensive data inherent in AI and automation. It's vitally important for educational institutions to implement robust security measures to ensure the confidentiality and integrity of student and staff information.

Preserving Personal Connection- A teacher's role is irreplaceable due to their unique ability to understand and motivate students on a personal level. While AI can optimize learning experiences, the human connection, empathy, and understanding provided by educators must remain central to the learning process.

Financial Implications- The implementation of AI and automation can be financially demanding. Institutions must be abreast with the investment required and evaluate the feasibility and long-term benefits of integrating such technologies, ensuring alignment with their financial capability and strategic objectives.

While AI and automation have the potential to revolutionize education, a thoughtful and balanced approach is crucial. By addressing these challenges proactively, institutions can harness the benefits of these technologies while maintaining a secure, human-centric, and financially sustainable educational environment.

Harnessing Artificial Intelligence (AI) and Automation for a Progressive Future in Higher Education

AI and automation are at the forefront of educational transformation. The integration

of these technologies promises a future of education that is more inclusive, accessible, and of higher QUALITY.

Conclusion

AI and automation has an amazing potential to transform higher education. Some of the benefits of AI in higher education include offering personalized learning experiences. By embracing AI and automation, institutions can create a better learning environment that prepares students for success in the workforce.

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THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN HIGHER EDUCATION: EXPLORING OPPORTUNITIES AND CHALLENGES

Ramandeep Kaur*

Abstract

Artificial Intelligence (AI) is rapidly transforming various sectors, and higher education is no exception. This paper explores the integration of AI in higher education, examining both the opportunities and challenges it presents. AI technologies have the potential to revolutionize teaching, learning, and administration by enabling personalized learning experiences, enhancing student engagement, and improving administrative efficiency. However, the adoption of AI also raises concerns about data privacy, ethical implications, and the potential for deepening educational inequalities. This study critically analyzes the benefits of AI, such as intelligent tutoring systems, automated grading, and adaptive learning platforms, alongside the challenges related to implementation, resistance to change, and the need for adequate infrastructure and training. Ultimately, this paper highlights the need for thoughtful integration of AI in higher education to ensure that its potential is maximized while addressing the ethical and practical challenges associated with its use.

Keywords: Artificial Intelligence (AI), Higher Education, Challenges, opportunities

Introduction

Over the past five years, the role of Artificial Intelligence (AI) in higher education (HE) has rapidly grown, accompanied by a surge in the availability of new AI tools (Chu, Lin and Yao, 2022). Several scholars (Chen, Chou and Yao, 2020; Crompton and Burke, 2020) have highlighted the potential benefits AI brings to both instructors and students in higher education. These advantages include the ability of AI to tailor instruction to meet the diverse needs of learners (Verdu, Garcia-Sanchez and Sosa, 2017), provide personalized feedback (Dever, Smith and Wallace, 2020), assist in assessment development (Baykasoglu, Yılmaz and Şen, 2018), and predict academic success (Çagataylı and Celebi, 2022). These studies

* Assistant Professor, GHG Khalsa College of Education, Gurugar Sadhar

offer valuable insights into how Artificial Intelligence in Education (AIED) can be leveraged in higher education.

However, scholars (Hrastinski, Hakansson and Nouri, 2019; Zawacki-Richter and Anderson, 2019) have pointed out a gap in understanding the collective benefits of AI in HE. To address this, the aim of this study is to review and synthesize research conducted between 2016 and 2022, providing a comprehensive and up-to-date overview of AI's application in the higher education context. In higher education, AI plays a pivotal role in administrative tasks by analyzing students' individual strengths and weaknesses, offering personalized learning paths, and delivering rapid feedback on assessments. The field of higher education has experienced a significant transformation due to the emergence of AI, which has proven to be a powerful agent of change. AI is poised to shape the future, offering substantial potential to simplify and enhance various aspects of human life and social interactions (Bostrom, 2017).

Concept of Artificial Intelligence

Artificial Intelligence (AI) was coined by Stanford Professor John McCarthy in 1955, who defined it as “the science and engineering of making intelligent machines.” Early AI research focused on programming machines to perform tasks traditionally associated with human intelligence, such as playing chess. However, today, the focus is on creating machines that can learn and adapt in ways similar to human beings.

AI refers to the theory and development of computer systems capable of performing tasks that typically require human intelligence, including speech recognition, decision-making, and pattern identification. It is an umbrella term encompassing various technologies such as machine learning, deep learning, and natural language processing.

Examples of Artificial Intelligence (AI) in use Today:

- **Google Translate:** Utilizes algorithms to translate text from one language to another.
- **ChatGPT:** Leverages large language models to generate text in response to questions or prompts.

Challenges of Artificial Intelligence (AI) in Higher Education

While AI holds significant promise in transforming higher education, its integration presents several challenges that institutions must navigate to ensure its effective and ethical use. These challenges span technological, ethical, organizational, and pedagogical domains.

- **Data Privacy and Security-** Higher education institutions handle vast amounts of personal data, including student records, assessments, and research data. AI systems that rely on this data must ensure strong privacy and security measures to prevent data breaches and misuse, which can jeopardize the trust of students and staff.
- **Bias and Inequity-** AI algorithms can unintentionally perpetuate biases present in the

data they are trained on, leading to biased decision-making in areas such as admissions, grading, and recruitment. If not properly addressed, this could exacerbate inequities and create unfair outcomes for marginalized groups in higher education.

- **Integration with Existing Systems**-Integrating AI into the existing infrastructure of higher education institutions can be challenging. Many universities still rely on outdated systems, and implementing AI tools across different departments (e.g., for grading, student support, or administration) requires considerable resources, technical expertise, and time.
- **Lack of Faculty Training**-For AI to be effectively integrated into teaching and learning, faculty need to be adequately trained in how to use AI tools and understand their potential benefits and limitations. However, many educators lack the skills or resources to learn and adopt new technologies, leading to resistance or improper use of AI systems.
- **Ethical and Accountability Issues**-The use of AI in higher education raises important ethical concerns, especially when it comes to decisions about student assessments, admissions, or faculty performance evaluations. There is a need for clear guidelines on accountability and ethical AI use to prevent misuse and ensure fairness in AI-driven processes.
- **Cost and Resource Allocation**- Developing, deploying, and maintaining AI tools in higher education can be costly. For many institutions, especially those with limited budgets, the financial investment required for AI infrastructure, research, and training may be prohibitive. Additionally, institutions must weigh the costs against the perceived benefits of AI integration.
- **Resistance to Change**-AI adoption in higher education may face resistance from faculty, administrators, and students who fear that technology could undermine traditional methods of teaching and learning. Overcoming skepticism and fostering a culture that embraces AI requires clear communication about its advantages and alignment with the educational mission.
- **Lack of Standardization**-There is a lack of standardized frameworks for AI in education, which complicates the adoption of AI tools across different institutions. Without standardized practices, the quality, effectiveness, and interoperability of AI systems may vary, leading to inconsistent outcomes and experiences for students and educators.
- **Human-AI Interaction**-AI's role in education is not just about automating tasks but also about enhancing human interaction. Striking the right balance between human educators and AI tools is crucial. Too much reliance on AI could diminish personal connections in teaching and learning, while too little integration may limit the potential benefits AI offers.
- **Accessibility and Inclusivity**-AI tools must be designed to be accessible to all

students, including those with disabilities. Ensuring that AI-driven platforms are inclusive and cater to diverse learning needs remains a significant challenge, as does bridging the digital divide between institutions with different levels of technological infrastructure.

Addressing these challenges requires a strategic, thoughtful approach that balances innovation with ethical considerations, ensuring that AI can be leveraged to enhance the quality and equity of higher education.

Opportunities of Artificial Intelligence (AI) in Higher Education

Artificial Intelligence (AI) presents numerous opportunities for transforming higher education by enhancing learning experiences, improving administrative efficiency, and supporting research and innovation. The integration of AI in academia has the potential to revolutionize both teaching and the student experience. Below are some key opportunities:

- **Personalized Learning**-AI can help create personalized learning pathways for students by analyzing their performance, strengths, and weaknesses. Adaptive learning systems powered by AI can provide tailored content and resources, allowing students to learn at their own pace, enhancing engagement and improving academic outcomes.
- **Enhanced Student Support**-AI-powered chatbots and virtual assistants can offer 24/7 student support, answering questions, providing guidance on coursework, and directing students to relevant resources. These tools help in managing large student populations and offering instant help, improving overall student satisfaction.
- **Intelligent Content Creation and Curation**-AI can help instructors by automatically generating learning materials, including quizzes, lesson plans, and even customized textbooks based on the students' progress and learning needs. Additionally, AI tools can assist in curating relevant and up-to-date content from a vast pool of resources, ensuring that students have access to high-quality learning materials.
- **Enhanced Research Capabilities**-AI can accelerate the research process by analyzing vast amounts of data quickly and identifying trends and patterns that might otherwise go unnoticed. AI-driven tools can assist researchers in literature review, data analysis, and hypothesis testing, leading to more efficient and impactful academic research.
- **AI for Lifelong Learning and Skill Development**-AI can support lifelong learning by providing personalized learning paths for individuals seeking to acquire new skills or credentials. Through AI-driven platforms, learners can access adaptive courses that cater to their unique learning styles and pace, helping them remain competitive in the ever-evolving job market.
- **Bridging Educational Gaps**-AI can make education more accessible by providing tools that support students with disabilities, such as speech recognition, language translation, and text-to-speech. This can help create a more inclusive learning environment, enabling students from diverse backgrounds to participate fully in academic life.

- **Global Collaboration and Networking**-AI can facilitate global learning experiences by connecting students and educators from different regions, enabling virtual classrooms, collaborative research, and cross-cultural exchanges. AI-powered platforms can support real-time translation and communication, breaking down barriers and promoting global knowledge sharing.
- **Virtual and Augmented Reality in Education**-AI can enhance immersive learning experiences by integrating with virtual and augmented reality (VR/AR) systems. These technologies, powered by AI, can simulate real-world scenarios, providing students with hands-on experiences and practical skills without the need for physical presence or resources.
- **Enhancing Learning Accessibility for Remote Students**-AI can play a key role in delivering quality education to remote or underserved areas by offering AI-driven e-learning platforms. This opens up opportunities for students who may not have access to traditional classroom settings, creating more equitable access to education worldwide.

By addressing these opportunities, AI has the potential to transform the landscape of higher education, making learning more personalized, efficient, and inclusive, while also enhancing institutional operations and research capabilities. However, to fully realize these benefits, careful planning, ethical considerations, and continuous adaptation to new AI developments are necessary.

Conclusion

Artificial Intelligence (AI) offers transformative potential for higher education, presenting both significant opportunities and challenges. From personalized learning experiences and enhanced student support to improved administrative efficiency and accelerated research capabilities, AI is poised to revolutionize how institutions operate and how students engage with their education. The ability to automate routine tasks, provide real-time feedback, and predict student success can lead to more tailored educational experiences, increased retention rates, and better academic outcomes. However, the integration of AI in higher education is not without its challenges. Issues related to data privacy, algorithmic bias, ethical concerns, and resistance to change must be addressed to ensure that AI is used responsibly and equitably. Furthermore, ensuring accessibility, faculty training, and standardized practices will be crucial for the successful adoption of AI across institutions. In conclusion, while AI has the potential to significantly enhance the quality and accessibility of higher education, its effective implementation requires careful planning, ethical considerations, and a balanced approach to human-AI interaction. As AI continues to evolve, its role in education will need to be continually reassessed to maximize its benefits while minimizing potential risks, ensuring that the future of higher education is both innovative and inclusive.

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ROLE OF ARTIFICIAL INTELLIGENCE IN RESHAPING HIGHER EDUCATION

Dr. Ritika Sharma*

Abstract

Artificial intelligence (AI) is transforming higher education by enhancing learning experiences, improving administrative efficiency, and fostering personalized education. AI-driven tools, such as adaptive learning platforms, can tailor course content to individual students' needs, promoting better engagement and retention. Instructors can use AI for grading, feedback, and even identifying at-risk students early on, allowing for targeted intervention. Moreover, AI facilitates administrative tasks like scheduling, resource management, and student support services, streamlining operations and reducing workload. As AI technologies continue to evolve, they hold the potential to reshape not only how education is delivered but also how institutions interact with and support students, creating a more efficient and responsive academic environment. This study aims to study the awareness level of students about artificial intelligence used in promoting higher education. The purpose of the research was to identify the factors affecting students' behaviour in relation to artificial intelligence. In order to collect information from 450 respondents of AS College, Khanna, proportionate random sampling was used. The research was conducted using an exploratory and descriptive research approach. The information was examined using a factor analysis. The data was scrutinized via SPSS Software. It was found in the study that institutional, technological and social factors were the three factors that affect the student's behaviour towards use of AI in higher education. Due to its coverage of 5.429 Eigen values, institutional factors received the highest rating score.

Keywords: *Artificial intelligence, higher education, students' learning behaviour, teaching methods.*

Introduction

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines designed to think, learn, and solve problems. It can involve tasks like understanding language, recognizing patterns, making decisions, and adapting to new situations, all of which are traditionally done by humans.

* Assistant Professor, PG Department of Commerce, A.S. College, Khanna, Punjab

There are different types of AI:

- **Narrow AI (Weak AI):** AI designed for a specific task, like Siri or Google Search.
- **General AI (Strong AI):** A theoretical form of AI that could perform any intellectual task a human can do.
- **Superintelligent AI:** AI that surpasses human intelligence in all areas.

AI systems are powered by machine learning (ML), where machines improve their performance over time based on data, and deep learning (a subset of ML), which uses neural networks to mimic the brain's structure.

Higher Education

Higher education refers to the level of education provided by universities, colleges, and other institutions that offer degrees or certifications beyond the secondary (high school) level. It plays a critical role in shaping individuals' intellectual, professional, and personal development.

Types of Higher Education Institutions

- **Universities:** Offer a wide range of undergraduate and graduate programs, including bachelor's, master's, and doctoral degrees. Universities often focus on research in addition to teaching.
- **Colleges:** In some countries, colleges are institutions offering undergraduate programs (bachelor's degree), while in others, "college" can be used interchangeably with "university." Some colleges also provide specialized degrees.
- **Community Colleges:** Offer two-year associate degree programs and certifications, providing a more affordable and accessible pathway to higher education.
- **Technical and Vocational Schools:** These institutions provide specialized training in specific trades or technical fields, often leading to certificates or diplomas.

Levels of Higher Education

- **Undergraduate:** This level includes programs like bachelor's degrees, typically lasting 3-4 years, where students learn foundational and specialized knowledge in a specific field.
- **Graduate:** After earning a bachelor's degree, students can pursue master's degrees, professional degrees, or doctoral programs. These programs focus more on advanced knowledge and research.
- **Doctoral (PhD):** The highest level of academic achievement. Doctoral programs involve in-depth research and original contributions to knowledge in a specific academic field.

Artificial Intelligence in Higher Education

Artificial Intelligence (AI) is increasingly being integrated into higher education, transforming both the learning experience and administrative operations. AI can help tailor learning experiences to individual students. By analyzing data from students' interactions with content, AI systems can recommend customized learning resources, suggest topics for review, and even adjust the difficulty of assignments to match a student's skill level. This is often referred to as adaptive learning. Platforms like Coursera and Duolingo use AI to personalize the learning paths for students based on their progress. AI-powered tutors and chatbots can provide real-time assistance to students. They can answer common questions about course content, help with administrative tasks, and even offer study tips. These AI systems can be available 24/7, allowing students to access support whenever they need it. AI chatbots like "Jill Watson" at Georgia Tech can assist students with course-related questions, reducing the workload for instructors.

Review of Related Literature

Aithal and Maiya (2023) have done research on the use of AI in higher education. The research was based on collection of data from various search engines such as google, google scholar and AI. based GPT's. The results of the study found that National Education Policy 2020 promoted innovation in the higher education system. The research also found that continuous assessment of quality encouraged universities to adopt AI in teaching. The study further suggested that the institutions should maintain proper policies for implementing AI in higher education. Jin, Goyal, and Rajawat (2023) examined the informational role of AI in higher education. The research explored the relationship between technology, education and teachers. The research was based on reviews of related literature. The findings of the study highlighted that the educators were worried about their jobs with the entry of AI in education. Further, the results showed that ethical and transparent AI implementation is necessary to create more fair classrooms. The outcomes of the research also highlighted the importance of addressing the ethical concerns related to data security and privacy.

Research Methodology

Objectives

- To examine the role of various sources of information on the awareness level of students about artificial intelligence.
- To identify the factors affecting behaviour of students in relation to artificial intelligence in higher education.

Research Design

The research design of this study was exploratory and descriptive. Exploratory study

helps to gain insights and understanding into a problem, issue or phenomenon that has not been clearly defined or is not well understood. Moreover, exploratory research helps to explore the topic as well as the area of study. Descriptive study is significant because it provides a foundational understanding of a topic that helps to identify existing conditions, behaviors or relationships and serves as the basis for future studies.

Scope of The Study

The scope of studying the student's behaviour towards artificial intelligence is broad and multifaceted. By conducting research on student's behaviour towards artificial intelligence, the researchers can better predict future trends and influence policies. For the purpose of research, Punjab state was chosen.

Selection of Research Area

For the selection of research areas, the students of AS College, Khanna were chosen from Arts, Commerce and Science stream.

Sampling Design

In order to have better access over the research problem, proportionate stratified sampling technique was selected. It is a sampling technique where the population is divided into streams and then a sample is drawn from each subgroup in proportion to the size of that subgroup within the entire population. This technique ensures that each subgroup is represented in the sample according to its actual proportion in the population which helps achieve more accurate and generalizable results.

Selection of sample size: 450 respondents were to be selected from the Arts, Commerce and Science streams of the college.

Collection of Data

For the purpose of research, the data will be collected from both primary as well as secondary sources. Primary data will be collected through questionnaires. A well-structured questionnaire will be used to gain fresh insights into the student's behaviour towards artificial intelligence in higher education. Secondary data was collected through various research papers, journals, magazines and articles in order to satisfy the objectives of research.

Tools and Techniques Used

The collected data was analyzed both by simple as well as advanced tools of statistics. Simple tools like percentages, weighted average score (WAS), frequencies etc. were used and advanced tools like Exploratory factor analysis (EFA) etc. were applied to make analysis of primary data.

Role of various information sources on level of awareness among students about use of artificial intelligence in higher education

Application of weighted average score (WAS)

This section examined how different informational sources affect students' knowledge about artificial intelligence that influence their learning strategies. Without these platforms students would not be aware about the use of artificial intelligence in their studies. These informational sources were found in the relevant literature. The students were asked to rate the various sources they believed will be used to notify them.

Table 1
Showing Awareness level of students

Rank	1	2	3	4	5	6	7	8	9	10	11	Total	WAS	WAS	R _k
Relevant weights	11	10	9	8	7	6	5	4	3	2	1				
Academic course enrollment	24	55	38	35	41	24	26	54	38	58	57	450	2500	5.5556	9
Blogs	47	63	43	41	45	30	43	26	26	34	52	450	2874	6.3867	3
Research papers/ Academic journals	34	44	32	45	40	49	54	47	53	43	09	450	2748	6.1067	6
School, colleges/ universities	57	29	43	43	43	56	45	19	34	49	32	450	2818	6.2622	5
Seminar/ Conferences	30	52	34	55	42	41	30	57	41	39	29	450	2744	6.0978	7
Industry Initiatives	44	22	26	56	15	45	41	24	36	56	85	450	2367	5.26	11
Social media	40	44	46	53	44	43	63	39	23	22	33	450	2901	6.4467	1
AI related competitions	41	26	36	47	44	42	39	47	43	46	39	450	2614	5.8089	8
News media	49	34	50	31	55	39	46	35	59	24	28	450	2819	6.2644	4
Government initiatives	44	31	21	23	41	39	32	71	44	57	47	450	2425	5.3889	10
News media	40	50	81	21	40	42	31	31	53	22	39	450	2890	6.4222	2
Total	450	450	450	450	450	450	450	450	450	450	450				

(Source: Researcher's own compilation)

The respondents' rankings ranged from 1 to 11, with 1 representing the most favoured

informational source and 11 representing the least liked information source. For each of these rankings, the associated weights were assigned in reverse order (11 to 1), and the WAS was computed.

Table 1 revealed the WAS for each informational source, which was derived using the rankings provided by the respondents. According to the respondents' rankings of the various informational sources, the category "Social media" had the highest weighted average score (WAS 6.96533); demonstrating social media platforms like Instagram, Facebook, Youtube may potentially inform students about the use of artificial intelligence. With a WAS of 6.46533, "Online learning platforms" was found to be the second most influential source, clearly indicating that the platform's extensive reach, targeting options and engagement tools make it an ideal space for influencing students' behaviour. As comparison to social media and digital marketing, "Blogs" was found to be the third-most significant informational source with a WAS of 6.16533, thus, it shows that Blogs can play a significant role in raising awareness about Artificial Intelligence (AI) among students by providing them with accessible, engaging, and informative content. Blogs can be an excellent resource for students to learn about artificial intelligence by breaking down complex concepts, showcasing real-world applications, providing resources, and discussing relevant ethical and social issues. "News media" was found to be the next highly influenced informational source having WAS 6.14667. News media play a crucial role in raising awareness about artificial intelligence (AI) among students by providing timely, accessible, and diverse content. Through articles, reports, interviews, and features, news outlets highlight AI advancements, breakthroughs, and how they impact various sectors like healthcare, education, finance, and entertainment.

After that "School, colleges and universities" ranked fifth in terms of informational source dominance with a WAS of 6.11467. The students are also influenced by research papers, academic journals, seminars, conferences, AI related competitions, academic course enrollment respectively. Besides these, with a WAS of 5.488, "Government initiatives" was the tenth informational source, which clearly signified that Government initiatives play a vital role in raising awareness about artificial intelligence (AI) among students by implementing programs, policies, and partnerships that foster education and skill development in the field. Many governments support AI-focused curriculum development in schools and universities, ensuring students gain foundational knowledge in AI and related technologies. With a WAS of 5.38533, "Crowdfunding" was the informational source that had the least impact. Surprisingly, this suggested that the influence of this source on students' awareness level is not very important. Industrial initiatives typically play a smaller role in directly raising awareness about artificial intelligence (AI) among students compared to other sectors like education and government. While industries are key drivers of AI innovation and development, their efforts often focus on applying AI in products and services rather than on student education.

Application of Exploratory Factor Analysis

Using the factor analysis technique, the respondents' knowledge about artificial intelligence was evaluated. Three factors were selected from the 10 statements based on the results. These components make clear how various tools that the respondents thought significant.

A scale was developed in order to ascertain the variables indicating the level of students' awareness about artificial intelligence. As stated in the literature survey, variables were selected after a review of pertinent literature was conducted. During the conversation with the experts in the field of artificial intelligence, a lot of information was updated and changed. After selecting the final ten statements, the participants were required to rate each one using a five-point Likert scale.

Extraction of Factors

The fundamental features of various information sources were ascertained through the application of Exploratory Factor Analysis. Using a Likert scale with a maximum score of five and a range from strongly disagree to strongly agree, the respondents were asked to rank ten different factors. As it can be seen from Table 2, all components with loadings more than 0.5 were considered good. In the particular situation, loadings ranged from .741 to .878. Items that had loading factors below 0.5 were excluded. The Eigenvalues of the three resultant factors range from 1.117 to 5.429, as shown in Table 2.

Table 2 -Factor Analysis Results for artificial intelligence

Statements	Factors		
	FI	F2	F3
My institution provides access to AI- powered learning tools and resources.	.890		
My professors effectively use AI tools to enhance learning.	.888		
The curriculum includes practical AI applications along with theoretical concepts.	.874		
AI assisted teaching methods improve my understanding of complex topics.	.856		
AI powered educational tools are easy to use and navigate.		.847	
High speed internet access is essential for effectively using AI based learning tools.		.844	
I feel safe using AI tools knowing that my personal data is protected.		.821	
My peers interest in AI encourages me to explore AI related learning.			.842
Family encouragement plays a role in my decision to pursue AI-related studies.			.823

Public debates on AI's risks and benefits affect my learning choices.			.786
Eigen Values	5.429	1.570	1.117
% Variance	54.290	15.702	11.167
Cumulative % Variance	54.290	69.992	81.159
Scale Reliability Alpha (Cronbach's Alpha)	.941	.884	.826
Cronbach's Alpha=.895, Kaiser- Meyer- Olkin Measure of Sampling Adequacy=.880, Bartlett's Test of Sphericity (Approx Chi- Square) = 3345.707, DF= 45, Sig.=.000, Mean= 36.99			

(Source: Researcher's own compilation)

Institutional factors (F1): “Institutional factors” is the name given to the first factor, which in the factor analysis explained 54.290% of the entire variation as per Table 2. It has four different variable statements. The findings showed that Institutional factors play a significant role in shaping students' behavior and attitudes toward artificial intelligence (AI) in higher education. The availability of AI-related courses and programs directly impacts students' exposure and understanding of the technology. Institutions that offer comprehensive AI curricula, hands-on labs, and interdisciplinary courses encourage students to engage more deeply with the subject. This factor has a factor loading of .856 to .890 and scale reliability is .941. The variable with the greatest weighting in this factor is “My institution provides access to AI- powered learning tools and resources.” Table 2 depicted that 5.429 of the Eigenvalues are covered by this factor.

Technological factors (F2): “Technological factors” is the name given to the second factor. It has three different variable statements. 15.702% of the total variation in the factor analysis was explained by this component as shown in Table 2. The findings showed that Technological factors have a profound impact on students' behavior and engagement with artificial intelligence (AI) in higher education. Access to advanced technology, such as high-performance computing systems, AI development platforms, and specialized software, enables students to gain hands-on experience and explore AI concepts more effectively. 1.570 of the Eigenvalues is covered by it and the loading of the factors varies between .821 and .847. This factor's scale reliability is .884.

Social factors (F3): The third factor is called “Social factors” and it has three variables. The factor accounted for 11.167% of the total variance in the variable analysis as per Table 5. The findings showed that social factors play a significant role in shaping students' behavior and attitudes toward artificial intelligence (AI) in higher education. Peer influence and social networks are crucial, as students often look to their friends, classmates, or mentors when deciding to pursue AI-related studies or career paths. If students are part of social circles where AI is a popular or valued field, they may be more motivated to engage with the subject. 1.117 of the Eigenvalues is covered by it and this factor has a factor loading between .786 to .842 and scale reliability is .826.

Findings and Conclusion

The study's findings highlighted the social media platform was the most influential informational source that aware the students about artificial intelligence while industrial initiatives was the least preferred platform by the students. According to the findings, institutional, technological and social factors were the three factors that affect the student's behaviour in relation to artificial intelligence. Due to its coverage of 5.429 Eigenvalues, the institutional factors received the highest rating score.

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THE ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Sakshi*

Abstract

The integration of Artificial Intelligence (AI) and automation in higher education is transforming the landscape of learning, teaching, and administrative processes. AI technologies, such as machine learning, natural language processing, and adaptive learning systems, are enabling personalized education by tailoring content and assessments to individual student needs. Automation streamlines administrative tasks, allowing institutions to optimize operations, reduce costs, and enhance the overall educational experience. AI-powered tools are also facilitating more efficient data-driven decision-making, helping educators track student progress and identify at-risk learners. Moreover, AI-driven platforms enhance accessibility for diverse student populations by offering support for disabilities and language barriers. While challenges related to data privacy, ethical concerns, and the digital divide remain, the potential of AI and automation in reshaping higher education is immense. These technologies promise to improve learning outcomes, increase institutional efficiency, and foster innovation in teaching methodologies, ultimately paving the way for a more inclusive, dynamic, and sustainable educational system.

Keywords: Artificial Intelligence, Automation, Higher Education

Artificial Intelligence

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think, learn, and problem-solve like humans. It involves a combination of machine learning, natural language processing, robotics, and other technologies to create systems capable of performing tasks that typically require human intelligence.

Here are some key aspects of AI:

Machine Learning (ML): A subset of AI that enables machines to learn from data without being explicitly programmed. Machine learning algorithms improve over time by analyzing data, recognizing patterns, and making decisions based on past experiences. For

* Assistant Professor, DAV College of Education, Hoshiarpur

example, AI systems like recommendation engines (e.g., Netflix, Amazon) use ML to suggest products or content based on user preferences.

Natural Language Processing (NLP): NLP is the ability of AI systems to understand, interpret, and respond to human language. This is used in applications like voice assistants (e.g., Siri, Alexa), chatbots, translation services, and sentiment analysis. NLP enables machines to interact with humans in a more natural, conversational manner.

Robotics: AI is often integrated into robots, allowing them to perform tasks autonomously or with minimal human intervention. Robots equipped with AI are used in industries like manufacturing, healthcare (e.g., surgical robots), and logistics (e.g., warehouse robots).

Computer Vision: Computer vision allows AI systems to interpret and make decisions based on visual data (such as images or videos). It's used in applications like facial recognition, self-driving cars, medical imaging, and security surveillance.

Cognitive Computing: This refers to AI systems designed to mimic human thought processes. These systems aim to simulate human reasoning and problem-solving, allowing machines to solve complex problems by processing vast amounts of unstructured data.

Deep Learning: A subset of machine learning, deep learning uses neural networks to model complex patterns and representations of data. Deep learning is behind many of the most impressive AI applications, such as image recognition, voice recognition, and language translation.

Ethics in AI: As AI becomes more advanced, ethical considerations are becoming increasingly important. Concerns include data privacy, algorithmic bias, job displacement, and ensuring AI systems are used in ways that are fair and responsible.

Reshaping Higher Education

AI and automation are significantly reshaping higher education, revolutionizing both the learning environment and the operational aspects of academic institutions. Here are some key areas where AI and automation are making an impact:

- 1. Personalized Learning:** AI helps create more customized learning experiences for students. By analyzing individual learning styles, progress, and preferences, AI-powered systems can adapt content, suggest resources, and guide students at their own pace. This personalized approach improves engagement and ensures students are mastering concepts before moving on to new material.
- 2. Intelligent Tutoring Systems:** AI-driven tutoring systems can assist students by offering personalized instruction, explanations, and feedback. These systems can provide immediate support outside of class hours, making education more accessible and efficient. For example, AI can help students practice problems, answer questions, and even offer hints when they're struggling.

- 3. Automated Grading:** Automation is making grading more efficient, especially for assignments that require standardized responses, such as multiple-choice tests or coding tasks. AI can help with grading essays and open-ended questions by assessing writing style, structure, and content. This allows instructors to focus on more nuanced, human aspects of teaching.
- 4. Predictive Analytics for Student Success:** AI can analyze student data to predict outcomes such as grades, graduation rates, and potential struggles. By identifying at-risk students early, universities can intervene proactively, offering support to ensure students stay on track to complete their studies.
- 5. Chatbots and Virtual Assistants:** AI chatbots are increasingly used to handle routine queries, offer 24/7 assistance, and support administrative tasks. These chatbots can help students with information about course registration, deadlines, campus resources, and general inquiries, freeing up staff time for more complex matters.
- 6. Smart Campus Technologies:** Campuses are becoming more connected with AI and IoT integration. Smart classrooms with AI tools can automatically adjust lighting, temperature, and even student attendance tracking. AI-powered systems can also help optimize resource use, like energy and space, ensuring better sustainability and efficiency in campus operations.
- 7. Research and Innovation:** AI is facilitating academic research by automating data analysis, identifying research trends, and assisting with literature reviews. AI-powered tools can process large datasets much faster than human researchers, allowing scholars to focus on interpreting results and pushing forward innovative discoveries.
- 8. Online Learning and Global Access:** AI plays a vital role in online education by facilitating the development of adaptive learning platforms, virtual classrooms, and AI-driven content delivery. These technologies make education accessible to a broader global audience, enabling students from various parts of the world to engage in quality learning experiences without the constraints of location.
- 9. Course Design and Curriculum Development:** AI tools can help institutions design and refine curricula by analyzing industry trends, student feedback, and job market demands. This ensures that academic programs are aligned with real-world needs, providing graduates with relevant skills and improving employability.
- 10. Supporting Inclusivity:** AI and automation can help provide a more inclusive learning environment for students with disabilities. Text-to-speech tools, speech recognition, real-time translation, and automatic captioning can make learning materials more accessible to diverse student populations.

AI and automation are making higher education more adaptive, efficient, accessible, and student-centered. As these technologies continue to evolve, they will likely play an even

greater role in shaping the future of education by addressing challenges, enhancing learning outcomes, and improving overall institutional performance.

The Role of Artificial Intelligence and Automation in Reshaping Higher Education

Artificial Intelligence (AI) and automation are playing pivotal roles in reshaping the higher education landscape, creating new opportunities and transforming how institutions approach teaching, learning, and administration. Here are some of the key ways these technologies are influencing the sector:

Personalized Learning-AI-driven platforms are revolutionizing the way students learn by enabling highly personalized educational experiences. Adaptive learning systems can adjust content, pace, and difficulty based on each student's individual progress and learning style. This customization helps students grasp concepts at their own pace, ultimately leading to better engagement and improved academic performance. AI tools also provide personalized feedback, guiding students in areas where they need more focus.

Automation in Administration-Automation is significantly improving efficiency in university operations. Tasks like scheduling, student registration, grading, and managing admissions are becoming automated, allowing administrative staff to focus on higher-level responsibilities. This reduces human error, enhances consistency, and helps educational institutions save time and resources.

AI-Powered Learning Tools-AI is enhancing the classroom experience with tools like intelligent tutoring systems, virtual teaching assistants, and automated grading software. These tools support students by providing immediate assistance with assignments and answering questions outside of class hours, ensuring that learners have continuous access to resources. AI is also facilitating the creation of immersive learning environments through virtual reality (VR) and augmented reality (AR) technologies, which are transforming traditional methods of teaching complex subjects.

Data-Driven Insights-The use of big data and AI algorithms enables institutions to track student performance in real-time. This data can highlight trends, predict outcomes, and identify students who might be at risk of falling behind. Educators can use this information to intervene early, providing targeted support and resources. AI systems also facilitate more informed decision-making in areas like curriculum design, student retention strategies, and resource allocation.

Enhanced Accessibility-AI is making education more accessible to diverse student populations. Speech-to-text, translation tools, and assistive technologies powered by AI help students with disabilities engage more fully with course materials. AI's ability to break down language barriers through real-time translations is helping international students integrate more easily into academic environments.

Improving Educator Efficiency-While AI and automation are revolutionizing student

experiences, they also support faculty members by streamlining grading, course design, and communication with students. AI tools can help professors analyze large sets of student data, which can be used to improve teaching methods and provide more effective feedback. Additionally, automation of routine tasks frees up time for instructors to focus on more interactive, engaging aspects of teaching.

Scalable Learning Opportunities-The use of AI and automation can create scalable, flexible learning environments. Massive Open Online Courses (MOOCs) and other digital learning platforms are becoming more prevalent, offering high-quality education to large numbers of students worldwide. AI technologies make it possible to provide these educational opportunities to learners with diverse needs, without the limitations of traditional classroom settings.

Ethical Considerations and Challenges-Despite its benefits, the rise of AI and automation in higher education also presents challenges. Issues surrounding data privacy, algorithmic bias, and the ethical implications of AI decision-making need to be addressed. Educational institutions must ensure that AI tools are transparent, fair, and used responsibly to avoid exacerbating inequalities or compromising the integrity of the educational process.

Future Prospects-Looking ahead, AI and automation are expected to continue evolving, providing even more advanced tools for teaching, learning, and administration. The role of human educators will likely shift toward more mentoring and facilitation, while AI handles the more administrative or repetitive tasks. As AI becomes more sophisticated, it is likely to enable even more immersive, interactive, and globally accessible learning experiences.

Virtual Teaching Assistants-AI-powered virtual assistants can help students with course-related questions, offer tutoring support, and provide 24/7 assistance. This frees up instructors from responding to repetitive queries and enables them to focus on more complex interactions.

Research Enhancement-Automation and AI are enhancing the research process by analyzing vast amounts of data quickly. AI tools can identify trends, suggest research papers, and even generate hypotheses, allowing researchers to advance their work more efficiently.

Improved Accessibility-AI and automation can improve access to education for students with disabilities. Speech recognition, AI-powered subtitles, text-to-speech tools, and other assistive technologies ensure that all students can participate fully in courses, regardless of their needs.

Smart Campuses-The integration of AI with the Internet of Things (IoT) is leading to smart campuses that enhance the overall experience for students and staff. For example, AI can optimize energy use, improve campus security, manage classroom occupancy, and even provide personalized guidance on campus navigation.

Course and Program Development-AI can help universities analyze labor market trends and industry needs to design courses and programs that are better aligned with

the demands of the job market. This ensures that graduates are better prepared for the workforce.

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ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN RESHAPING HIGHER EDUCATION

Shilpa Kaura*

Abstract

Artificial intelligence (AI) and Automation have become inevitable in all walks of life. Even Higher Education has not remained untouched and unaffected by its impact. Significant advancements have been made in the era of “Artificial Intelligence in Education (AIED)” in the last few years. Future higher education will see a drastic surge due to the development of new technologies and the processing power of intelligent machines. Developments in artificial intelligence have the potential to fundamentally change internal architecture and management, as well as bring new opportunities and challenges for teaching and learning in higher education. This study sets out to determine the role and challenges of using Artificial Intelligence in Higher Education as well as how to overcome those challenges.

Keywords: Artificial intelligence, Automation, Higher Education

Introduction

Artificial Intelligence (AI) and Automation are drastically changing higher education by enabling personalized learning experiences, automating repetitive tasks like grading and record keeping, improving access to education through virtual learning platforms and offering data-driven insights into student performance. Ultimately, this allows educators to concentrate more on student engagement and customized instruction.

The pathway of AI in the education sector is on a high slope with estimates predicting a sharp increase from \$3.99 billion in 2023 to \$5.57 billion in 2024 and then an astounding hike to \$21.13 billion by 2028. The widespread adoption of AI-based assessment tools, the global move towards remote and hybrid learning models and significant expenditures in educational technology (EdTech) are the main drivers of this expansion. The ethical use of AI in educational settings, the incorporation of immersive technologies like augmented and virtual reality and the adoption of AI to improve learning analytics are noteworthy themes.

* Assistant Professor in Pedagogy of Commerce, B.C.M. College of Education, Ludhiana

AI-based technologies, such as personalized learning and predictive analytics for curriculum development are revolutionizing the Indian education sector. Artificial intelligence (AI) is transforming entire businesses and society by automating operations across the knowledge economy. From writing and editing to the advancement of medicine, artificial intelligence is upending and altering many established professions. Ed-tech is being significantly impacted by AI. According to a Business Today survey, 47% of learning management systems will be AI-enabled by 2024. This is a result of the widespread adoption of AI-powered technologies, which enable innovative and effective learning solutions. Artificial Intelligence is the technological future that happens to make the lives of human beings a lot easier. It is a booming technological domain capable of altering every aspect of our social interactions (Bostrum, 2017).

Objective of The Study

- To determine the role of Artificial Intelligence and Automation in reshaping Higher Education.
- To determine the challenges in application for Artificial Intelligence and Automation in Education.
- To know the ways of overcoming the challenges in the application of AI in education.

Role of Artificial Intelligence and Automation in Reshaping Higher Education

AI and Automation promotes more flexible and endless learning possibilities for students as well as educators. Numerous studies show the benefits of artificial intelligence in higher education for the whole teaching learning community. Due to artificial intelligence's enhanced speed and flexibility, many students use it to enroll in institutions across the world. All pupils have universal access to education due to AI due to global classrooms available to all, including even those who speak different languages or who might have visual or hearing impairments. Presentation Translator is a free plug-in for PowerPoint that creates subtitles in real time for what the teacher is saying. This also creates new possibilities for students who might not be able to attend school due to illness or who require learning at a different level or on a particular subject that is not available at their own institution. AI can help break down silos between schools and between traditional grade levels (Williamson, 2014). Artificial intelligence will only add value to the quality of training. There have been lots of arguments around the development of artificial intelligence as having more potential to change higher education than any other technological advancement. For instance, Bates (2018) have listed the following goals for AI in higher education:

- Increase outcomes
- Increase access
- Increase retention

- Lower cost
- Decrease time to completion

Development of Individualized Lesson Plans: The development of individualized lesson plans is among the most potent uses of AI in education. AI can create individualized curricula that meet the specific requirements of every learner by evaluating student data, including prior performance, abilities and feedback.

Manage Pedagogical, Ethical and Security Issues: AI-powered tools can improve students' engagement with the material. To guarantee that these technologies are used appropriately, institutions must also manage pedagogical, ethical and security issues.

Provide real-world Skill Development: Furthermore, AI-driven simulations and virtual labs provide real-world skill development in aviation, aerospace, engineering and business fields. These tools offer hands-on learning experiences, allowing students to practice decision-making in realistic scenarios and better prepare for the workforce.

Evaluation: Teaching and assessment strategies will be revised and rethought in light of the development of AI. Formative, normative, and impassive evaluations are just a few of the ways that faculty can diversify student assessments using AI platforms. They can even evaluate the new set of AI-related skills using AI. The development of analytical mindsets, knowledge of intelligent user interfaces and the capacity to use predictive analytics rather than just statistics and an awareness of artificial neural networks are some examples of these abilities.

Critical thinking: While testing students' critical thinking skills, using AI as a supplemental tool may enhance their learning experience. Promoting human-machine cooperation strengthens students' capacity to adjust technology to any setting or position.

Adaptability: Future users, designers and shapers of these technologies must be urgently prepared to keep up with the rapid pace of change. Introducing students to new platforms and features as they emerge is a crucial component of teaching them how to use AI.

Personalized Learning: AI is transforming Indian higher education, especially through personalized learning—adaptive learning systems tailored to each student's unique needs. While AI capabilities are new to consumers, it has been a well-established element of Ed-tech companies. Learning companies such as Pearson have been using AI for tasks ranging from English assessment to formulating specific course directives for students. Notably, Pearson has launched new generative AI beta features in select products with the intention to learn and evolve. Digital education platforms, e-learning and e-learning resources are increasingly popular in India, with AI algorithms analyzing students' interactions with content to identify areas where they may need help and offer relevant resources.

Curriculum enhancement through predictive analytics: Universities can analyze enormous volumes of data, forecast student performance and identify at-risk students thanks

to AI-powered predictive analytics. AI has an effect on curriculum development as well. Institutions can modify their programs and better prepare students for challenges in the real world by analyzing job market trends and industry trends. By using AI to forecast future high-demand skills, academic institutions can adjust their curricula to better prepare students for success in the workforce.

Research Advancements: AI has the potential to completely change how research projects are carried out and results are analyzed. Massive datasets can be processed by AI-driven tools, which can also spot patterns and assist researchers in deciphering complex data. AI is especially useful for scientific research in India in fields like environmental science, agriculture and healthcare.

Language Learning: There are several languages and dialects spoken throughout India, making it a linguistically diverse country. Students are finding it easier to become proficient in a variety of languages thanks to AI-powered language learning platforms. One example of a personalized language learning experience is the English learning app Mondly. This is especially beneficial in today's globalized world, where being multilingual can improve cross-cultural understanding and lead to new job opportunities.

Accessibility and Inclusivity: AI is lowering barriers to education by increasing its inclusivity and accessibility. AI can offer tailored support for students with disabilities, including adaptive content, speech-to-text, and text-to-speech. This guarantees that a greater variety of students, irrespective of their cognitive or physical capabilities, can access higher education.

Challenges for Artificial Intelligence in Education

Major Challenges of Artificial Intelligence in Education as suggested by Woolf, Lane, Chaudhri and Kolodner, (2013) includes virtual trainers for each student, where the inevitable help in coordinating user demonstration, social playback and information presentation helps students learn., self-assessment, collaboration and some combine vast amounts of data about individual learning, social contexts, learning and individual interests, increasing the interconnectedness and openness of classrooms worldwide and bringing learning beyond the classroom into students' lives.

Another data aspect concerns comprehensiveness. In other words, does the data include information about a variety of students? There has been much discussion about this recently in terms of facial recognition. The tools are much more accurate for light-skinned men than light-skinned women or darker-skinned men. For example, in one study, facial recognition tools had nearly 100 per cent accuracy for light-skinned men but only 65 percent accuracy for dark skinned women (Perera and Aboal, 2020). Even though AI is clearly changing Indian higher education, there are still issues and concerns that must be taken into account. First and foremost, there is the matter of data security and

privacy. It is essential to make sure that student data is secure and handled appropriately as AI systems gather and analyze enormous volumes of data.

The issue of AI bias is another. Discrimination may be sustained by algorithms that inherit biases from the data they are trained on. To maintain justice and equity, the higher education ecosystem needs to be on the lookout for and take action against bias in its AI systems.

An additional, often overlooked, factor in adverse outcomes is output. Developers' decisions shape how the insights that AI systems offer are instructed and interpreted. Some provide detailed information on various elements of student learning or behaviour that instructors and administrators can act upon. Other observations are not as useful in informing interventions. For example, one predictive analytics tool estimated that 80 percent of the students in an organic chemistry class would not complete the semester. This was not news to the professors, who still wondered what to do. It is important to understand in advance what you want to do with the information these tools provide (Sharma, 2021). Finally, although AI can help close the digital divide, it can also make education more accessible. Not every student has access to the internet and required technology. To overcome challenges of artificial intelligence (AI) and automation in reshaping higher education, institutions must prioritize addressing concerns around data privacy, faculty training, ethical implementation, ensuring accessibility for all learners, managing potential job displacement anxieties, and integrating AI tools seamlessly into existing educational frameworks, while focusing on utilizing AI to enhance teaching and learning rather than replace human interaction.

Strategies for Effective AI Integration in Educational Environments

- **Championing Data Privacy:** Establishing robust data privacy and security protocols is non-negotiable. Strategies include deploying end-to-end encryption, ensuring transparent data usage policies, and adhering to global privacy standards. These measures build a secure foundation for leveraging AI in education, ensuring stakeholders' confidence.
- **Facilitating Technological Harmony:** Selecting AI solutions designed with interoperability in mind to address integration challenges is crucial. Partnerships with tech providers who understand the educational sector's unique needs can streamline the adoption of AI tools, ensuring they complement rather than complicate existing systems.
- **Advocating for Professional Development:** Counteracting resistance with comprehensive support and education for teachers and staff is critical. Initiatives should highlight the benefits of AI in education, providing hands-on training, and fostering a community of practice. This approach aims to shift perceptions of AI from a disruptive force to an empowering ally in education.
- **Cultivating Innovation and Partnership:** Promoting a culture that values innovation

and collaboration within educational institutions is critical for embracing AI. Encouraging cross-disciplinary teams, open discussions, and incentivizing innovation can pave the way for creative solutions and successful AI integration in education.

Addressing these challenges with strategic planning and focused efforts can help the educational sector harness AI's full potential, leading to an enriched and more personalized learning experience for students. Integrating AI in education is a collaborative endeavor that requires the commitment of educators, technologists, and policymakers to realize its transformative promise.

Conclusion

AI in education is transforming how teaching and learning happen across the globe, with tools like ChatGPT and Google's various AI platforms at the forefront of this innovation. By leveraging AI, educators can generate personalized learning experiences, automate administrative tasks, and provide instant feedback to students. AI's capability to analyze vast amounts of data enables it to tailor learning paths for students individually, enhancing their understanding and retention of knowledge. Universities and educational institutions are increasingly incorporating AI into their curricula, using it to create dynamic learning environments that can adapt to the needs of each student. This personalized approach makes learning more engaging and compelling, preparing students better for their future careers.

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PERCEPTIONS OF B.ED.TRAINEES ON THE IMPACT OF AI INTEGRATION ON TEACHING METHODOLOGIES, CURRICULUM DESIGN AND FACULTY ROLES IN B.ED. PROGRAMS

Suman Gupta*, Jyoti Sharma** & Dr. Reeta Dwivedi***

Abstract

Artificial intelligence (AI) is transforming educational paradigms by reshaping teaching methodologies, curriculum design, and faculty roles in Bachelor of Education (B.Ed.) programs. This study investigates AI integration using a mixed-methods approach, gathering data from 150 B.Ed. students via surveys and interviews. Results indicate that AI enhances personalized learning (78%), student engagement (85%), and critical thinking and problem-solving skills (72%). Additionally, faculty roles are shifting from traditional lecturing to facilitative, mentorship-driven practices (68%), while an updated curriculum enriched with digital resources better prepares students for modern classroom challenges (75%). However, only 40% of participants recognized AI's effectiveness in assessment and feedback, revealing a need for improved evaluation techniques. These findings underscore AI's transformative potential in teacher education and highlight the necessity of ongoing curriculum innovation, professional development, and enhanced training in AI-based assessment to fully realize digital transformation in education. These promising results advocate for further research and targeted policy reforms.

Keywords: AI in Education, Teaching Methods, Student Learning, Curriculum Innovation

Introduction

Artificial intelligence (AI) is rapidly transforming education, influencing teaching methodologies, curriculum design, and faculty roles in Bachelor of Education (B.Ed.) programs (Zawacki-Richter, Marín, Bond and Gouverneur (2019). By integrating AI, these programs offer personalized learning experiences, adaptive curriculum models, and dynamic teaching

* Assistant Professor, MIER College of Education (Autonomous), Jammu

** Assistant Professor, MIER College of Education (Autonomous), Jammu

*** Assistant Professor, MIER College of Education (Autonomous), Jammu

approaches that enhance student engagement (Holmes, Bialik and Fadel, 2021). However, the evolving educational landscape demands faculty members to shift from traditional lecturing to mentoring, guiding students in using AI tools effectively (Luckin, 2018). This paper explores B.Ed. trainees' perceptions of AI's impact on teaching, curriculum design, and faculty roles, utilizing data from 150 students to offer insights into the transformative potential of AI in teacher education.

Significance of The Study

This study highlights AI's transformative role in B.Ed. programs, enhancing personalized learning, engagement, and faculty roles. It highlights the need for AI-driven curriculum innovation and professional development while identifying gaps in assessment and feedback mechanisms, advocating for greater awareness and training in AI-based evaluation techniques.

Review of Related Literature

AI has revolutionized teaching by automating tasks and providing intelligent tutoring systems that enhance engagement and comprehension (Zhou, Zhang and Li, 2020). Studies show that AI tools promote active learning and self-regulated study habits among pre-service teachers (Wang and Chen, 2021).

AI-enriched curricula foster problem-solving skills and adaptability to technological advancements (Gulson and Webb, 2018). Researchers emphasize the need to integrate digital literacy and AI ethics in teacher education (Sun, Jiang and Zhang, 2022).

Faculty roles are shifting from lecturing to mentorship as educators guide students in leveraging AI (Ng, Bartlett and Elliott, 2021). This transition requires continuous professional development to adapt to AI-driven teaching models (Luckin, 2018).

Challenges include ethical concerns, data privacy issues, and the risk of reduced human interaction (Selwyn, 2020). Balancing AI integration with human-centric teaching practices is essential (Williamson and Eynon, 2020).

The existing literature highlights AI's transformative impact on teaching methodologies, curriculum design, and faculty roles in B.Ed. programs. However, gaps remain in understanding trainees' perceptions of these changes and their preparedness for AI-driven educational environments.

Objectives of The Study

1. To analyze AI's impact on teaching methods in B.Ed. programs, focusing on personalized learning, engagement, and course adaptability.
2. To evaluate how AI-driven curriculum design prepares B.Ed. trainees for modern classroom challenges.
3. To examine the shift in faculty roles from traditional lecturing to mentorship in AI-integrated education.

4. To assess the effectiveness of AI tools in enhancing critical thinking and problem-solving skills among B.Ed. trainees.
5. To explore B.Ed. trainees’ perceptions of AI-based assessment and feedback and identify areas for improvement.

Research Methodology

Method: A mixed-methods design was used, combining quantitative surveys and qualitative interviews.

Sample: A purposive sample of 150 B.Ed. trainees from diverse backgrounds participated.

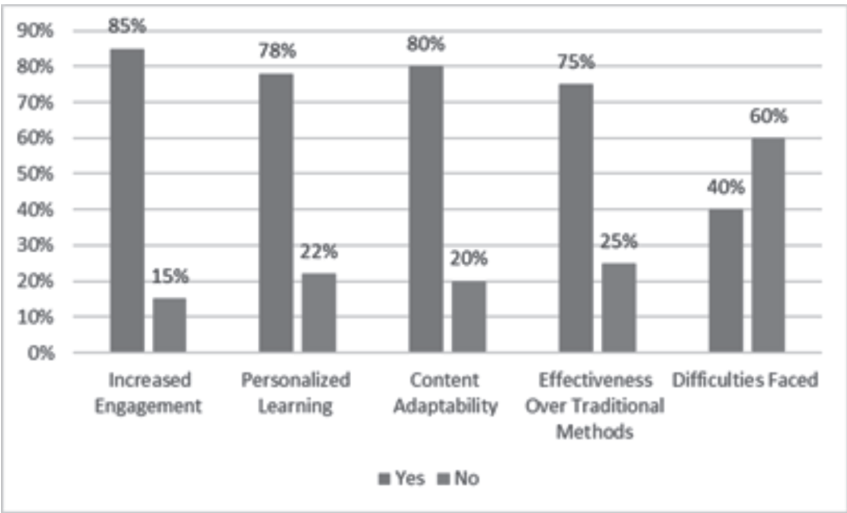
Tools: Data were collected using structured Likert-scale surveys and semi-structured interviews for statistical and qualitative insights.

Findings of The Study

Objective1. To analyze AI’s impact on teaching methods in B.Ed. programs, focusing on personalized learning, engagement, and course adaptability, the number and percentage of responses of students are given below

Table1. Perceptions of Teacher Trainees on AI Integration in Teaching Methodologies

S. No.	Statements	Response in Percentage			
		Number	%tage of Yes	Number	%tage of No
1	AI-enhanced methods increased engagement	128	85%	22	15%
2	AI provides a more personalized learning experience	117	78%	33	22%
3	AI makes course content more adaptable	120	80%	30	20%
4	AI teaching methods are more effective	112	75%	38	25%
5	Trainees faced difficulties using AI methods	60	40%	90	60%

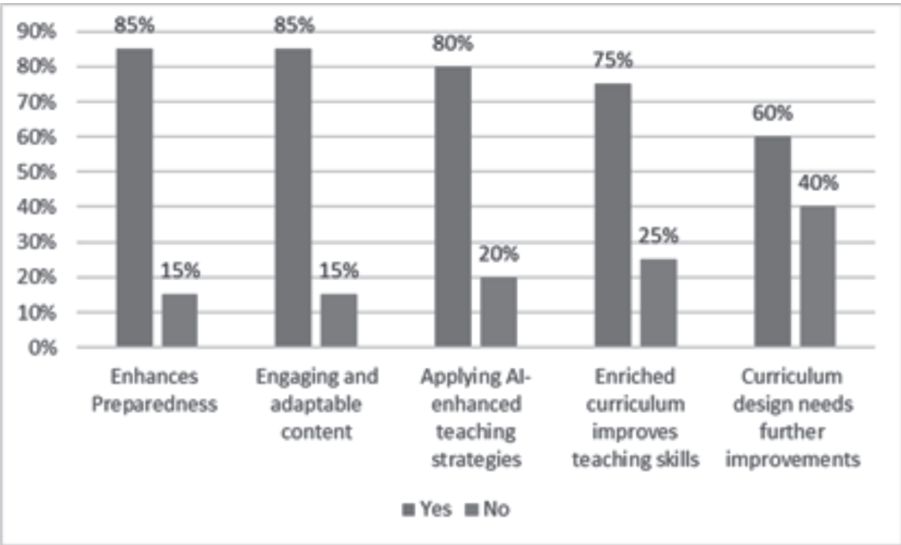


The findings indicate that 78% of B.Ed. trainees experienced enhanced personalized learning through AI integration. Additionally, 85% of students found AI tools increased their engagement, and 80% acknowledged improved adaptability in course content. However, 40% reported challenges in using AI-integrated methods, suggesting the need for better training and support.

Objective 2. To evaluate how AI-driven curriculum design prepares B.Ed. trainees for modern classroom challenges, the number and percentage of responses of students are given below

Table 2. Perceptions of Teacher Trainees on AI-Driven Curriculum Design and Classroom Preparedness

S. No.	Statements	Response in Percentage			
		Number	%tage of Yes	Number	%tage of No
1	AI-driven curriculum design enhances preparedness for modern classrooms.	128	85%	22	15%
2	AI integration made course content more engaging and adaptable	128	85%	22	15%
3	Trainees feel confident in applying AI-enhanced teaching strategies	120	80%	30	20%
4	Digital resource-enriched curriculum improves teaching skills.	112	75%	38	25%
5	AI-driven curriculum design needs further improvements	90	60%	60	40%



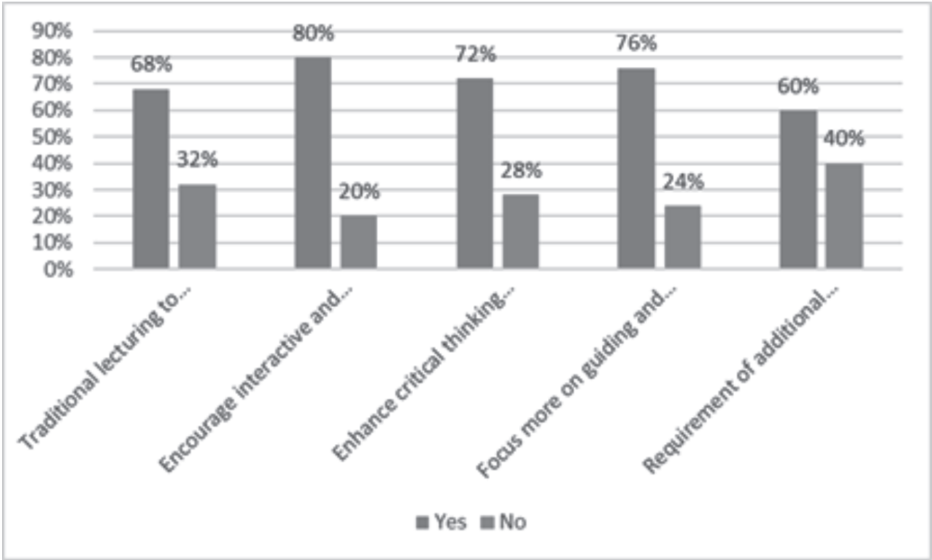
The results show that 85% of B.Ed. trainees reported increased engagement and

adaptability in course content due to AI-driven curriculum design. Additionally, 80% felt more confident in applying AI-enhanced teaching strategies, and 75% acknowledged improvements in their teaching skills. However, 60% believed further improvements are needed, indicating a scope for refining AI integration in curriculum design.

Objective 3: To examine the shift in faculty roles from traditional lecturing to mentorship in AI-integrated education, the number and percentage of responses of students are given below:

Table 3: Perceptions of Teacher Trainees on the Evolving Role of Faculty in AI-Integrated Teacher Education

S. No.	Statements	Response in Percentage			
		Number	%tage of Yes	Number	%tage of No
1	AI integration has shifted faculty roles from traditional lecturing to mentorship and facilitation.	102	68%	48	32%
2	AI-assisted teaching methods encourage interactive and student-centered learning.	120	80%	30	20%
3	AI-driven teaching strategies enhance critical thinking and problem-solving skills.	108	72%	42	28%
4	Faculty members now focus more on guiding and mentoring rather than just delivering lectures.	114	76%	36	24%
5	Faculty requires additional training for effective AI integration in teaching.	90	60%	60	40%



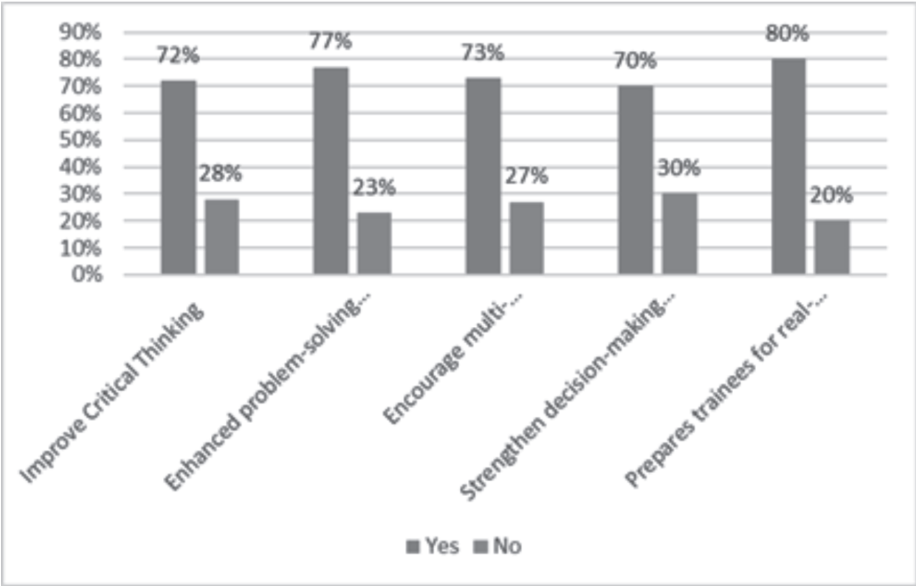
The findings indicate that 72% of B.Ed. trainees noted a significant boost in critical

thinking and problem-solving skills due to AI-integrated faculty roles. Additionally, 68% observed a shift in faculty roles from traditional lecturing to mentorship, and 80% agreed that AI promotes interactive, student-centered learning. However, 60% believed faculty need further training, highlighting the importance of continuous professional development in AI-integrated education.

Objective 4: To assess the effectiveness of AI tools in enhancing critical thinking and problem-solving skills among B.Ed. trainees. the number and percentage of responses of students are given below:

Table 4: Perceptions of Teacher Trainees on the Effectiveness of AI Tools in Enhancing Critical Thinking and Problem-Solving Skills

S. No.	Statements	Response in Percentage			
		Number	%tage of Yes	Number	%tage of No
1	AI tools have improved critical thinking skills.	108	72%	42	28%
2	The use of AI tools has enhanced problem-solving abilities.	115	77%	35	23%
3	AI tools encourage a multi-perspective approach to problem-solving.	110	73%	40	27%
4	AI-driven simulations and activities strengthen decision-making skills.	105	70%	45	30%
5	AI integration better prepares trainees for real-world teaching challenges.	120	80%	30	20%



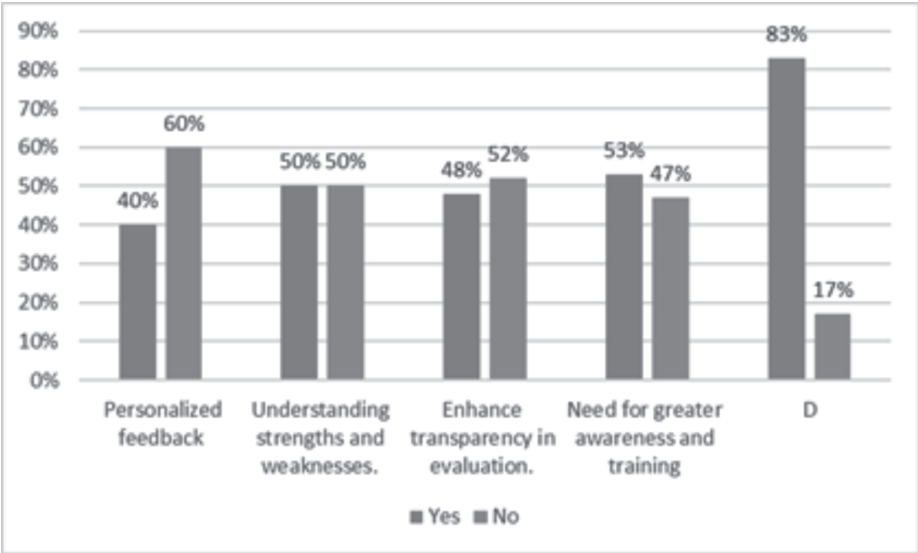
The data reveals that 72% of B.Ed. trainees found AI tools helpful in improving critical

thinking and 77% reported enhanced problem-solving abilities. Furthermore, 80% felt AI tools better prepared them for real-world teaching challenges. These findings suggest that AI has a positive impact on enhancing critical thinking and problem-solving skills among B.Ed. trainees.

Objective 5: To explore B.Ed. trainees’ perceptions of AI-based assessment and feedback and identify areas for improvement, the number and percentage of responses of students are given below.

Table 5. Perceptions of Teacher Trainees on AI-Driven Assessment and Feedback Mechanisms

S. No.	Statements	Response in Percentage			
		Number	%tage of Yes	Number	%tage of No
1	AI-driven assessments provide timely and personalized feedback.	60	40%	90	60%
2	AI assessment tools help in understanding strengths and weaknesses.	75	50%	75	50%
3	AI-based feedback is more objective and unbiased than traditional methods.	72	48%	78	52%
4	AI-driven assessments enhance transparency in evaluation.	80	53%	70	47%
5	There is a need for greater awareness and training on AI assessment tools.	125	83%	25	17%

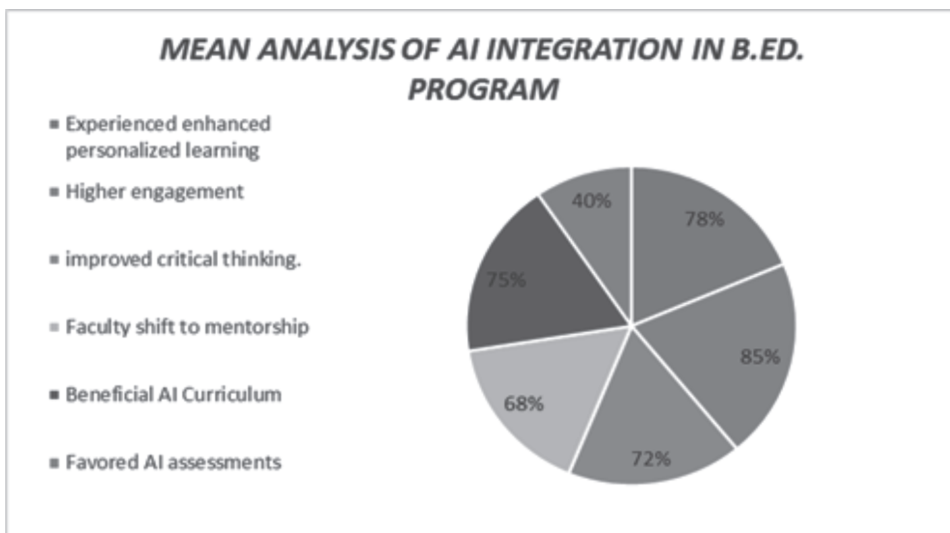


The data reveals that only **40%** found AI assessments timely and personalized, while

50% felt they identified strengths and weaknesses. **48%** considered AI feedback objective, and **53%** saw improved transparency. However, **83%** stressed the need for better awareness and training in AI assessment tools.

Mean Analysis of AI Integration in B.ed. Program

The mean analysis shows that AI integration in B.Ed. programs, The mean analysis shows 78% experienced enhanced personalized learning, 85% reported higher engagement, and 72% noted improved critical thinking. 68% observed a faculty shift to mentorship, while 75% found AI-driven curricula beneficial. However, only 40% favored AI assessments, highlighting the need for better evaluation methods and faculty training. Overall, AI enhances learning but requires better implementation in evaluation and faculty training.



Educational Implications

The research study has several significant educational implications:

- 1. Personalized Learning:** AI tailors instruction to individual needs, enabling teachers to progress at their own pace.
- 2. Increased Engagement:** AI creates interactive, engaging learning experiences that motivate active participation.
- 3. Enhanced Critical Thinking:** AI tools foster critical thinking and problem-solving skills essential for classroom success.
- 4. Evolving Teacher Roles:** As teachers shift from lecturing to mentoring, training must support their effective use of AI.
- 5. Curriculum Modernization:** Integrating AI resources in curricula equips teachers for modern classroom challenges.

- 6. Improved Assessments:** Developing AI-driven assessments will provide timely, personalized feedback.
- 7. Continuous Professional Development:** Regular training is vital for teachers to master AI tools and guide students effectively.

The above points help to show the impact of AI on teacher training and the changes needed to make the most out of AI in education.

Conclusion

The study reveals that AI integration in B.Ed. programs has improved teaching methodologies, curriculum design, and faculty roles. It enhances personalized learning, student engagement, and critical thinking skills. However, improvements in AI-driven assessments and feedback mechanisms are needed. The study emphasizes the need for ongoing curriculum innovation and faculty development to fully realize AI's transformative potential.

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CHATGPT AS AN AI ASSISTANT IN TEACHER EDUCATION: A TRANSFORMATIVE POTENTIAL

*Dr. Tapan Kumar Sahu**

Abstract

The rapid advancements in Artificial Intelligence (AI) present both exciting opportunities and potential challenges for the field of education. This paper explores the transformative potential of ChatGPT, a large language model, as an AI assistant in teacher education. It examines the various ways ChatGPT can be leveraged to enhance the learning experience for pre-service and in-service teachers, improve pedagogical practices, and streamline administrative tasks. The paper also discusses the ethical considerations and potential limitations associated with the use of AI in education, emphasizing the importance of human oversight and critical evaluation.

Keywords: *Teacher Education, ChatGPT, Critical Thinking, Academic Integrity, Artificial Intelligence (AI), Pedagogy*

Introduction

Teacher education plays a crucial role in shaping the future of education. Preparing effective and adaptable teachers requires innovative approaches that leverage the latest technologies. In the realm of teacher education, the integration of innovative technologies has emerged as a central focus to enhance pedagogical practices and prepare future educators for their roles in secondary schools. ChatGPT, as a sophisticated language model, has garnered significant attention for its advanced natural language processing capabilities and its promising applications in higher education. ChatGPT, a powerful language model, offers a range of potential applications in teacher education, from personalized learning experiences to automated feedback and administrative support. This paper explores these possibilities, analyzing how ChatGPT can contribute to enhancing the quality and effectiveness of teacher education programs.

* Principal, S.D.College of Education, Barnala (Punjab)

Chat GPT

Conceptual and Historical Background of “CHATGPT”?

A Chabot could be a program that employs client input to reenact human-like intuitiveness. The ChatGPT Chatbot was made by San Francisco-based OpenAI. On November 30, 2022; the Chatbot was made available for gratis open testing. Nowadays, we'll see at the GPT and endeavor to figure out what it all implies. The Diary of India characterizes ChatGPT as a 'conversational' AI that would reply questions like a human—or so the guarantee and presumption goes. ChatGPT is an advanced Chatbot based on OpenAI's GPT innovation. It is able to take care of a wide assortment of text based demands, extending from fundamental questions and answers to more complicated occupations. OpenAI's ChatGPT could be an enormous dialect demonstration planned as a conversational specialist. ChatGPT, as a huge dialect demonstrates, is prepared on tremendous volumes of data. For illustration, on the off chance that you would like help composing a message to a colleague, ChatGPT can rapidly create a significant and well written letter. So also, in case you wish to address an issue with a colleague's efficiency but do not know what to say, ChatGPT can offer assistance. ChatGPT, with its colossal information stockrooms and productive engineering can indeed create theses on topics such as the value of counterfeit insights. Usually ChatGPT's particular esteem for scholarly analysts.

ChatGPT and Access To Information

ChatGPT is an AI-powered tool that can facilitate information access for students, finding information on Google can be a difficult task for many people, because Students must decide on an exact link to search for specific information. Let's compare the difference between Google and ChatGPT. Let us compare the distinction between Google and ChatGPT. Google returns answers based on search results from specific websites. ChatGPT provides direct answers like chatting with a tutor. Google gives reactions based on look comes about from particular websites, ChatGPT gives a coordinated reaction, it is like Chatting with a mentor. Google look comes about are based on websites that the Google calculation has distinguished Search results are based on websites identified by the Google algorithm as significant to your look inquiry. In addition, Chatbots like ChatGPT can give coordinate reactions since they have been modified with a particular set of data and rules for creating reactions. ChatGPT may be an expansive dialect show prepared by OpenAI, so it can give reactions to a wide run of questions on an assortment of themes.

AI Challenges in Higher Education and Future Teacher Training

The challenges posed by Artificial Intelligence (AI) in higher education and in the training of pre-service teachers is multifaceted. AI applications in education, such as personalized

learning, automated grading, virtual tutoring, and learning analytics, offer significant benefits but also raise ethical concerns. Pre-service teachers need to be aware of the implications of AI in education, especially in subject like science and mathematics. The shift to online learning during the COVID-19 pandemic has highlighted the importance of preparing pre-service teachers for online teaching and learning. Additionally, the need for more training in special education for pre-service teachers is well-documented, emphasizing the importance of inclusive education.

In conclusion, addressing the challenges posed by AI in higher education and in teacher training requires a comprehensive approach that includes ethical considerations, awareness of AI implications, preparation for online learning, training in special education and inclusive practices, exposure to real-world challenges through service-learning, and the development of technological integration skills and competencies among pre-service teachers. By equipping pre-service teachers with the necessary knowledge and skills, teacher training programs can better prepare them to navigate the evolving landscape of education in the digital age.

Potential Applications of ChatGPT in Teacher Education

ChatGPT can be utilized in various aspects of teacher education, including:

- **Personalized Learning:** ChatGPT can adapt to individual learning styles and paces, providing customized learning materials, practice exercises, and feedback. It can identify areas where a teacher candidate needs more support and offer tailored resources to address those specific needs. This personalized approach can significantly enhance learning outcomes and improve teacher preparedness.
- **Content Creation and Curation:** ChatGPT can assist in generating diverse learning materials, such as lesson plans, worksheets, quizzes, and presentations. It can also curate relevant resources from the vast expanse of online information, saving teachers valuable time and effort. This can be particularly useful for creating differentiated instruction materials to cater to diverse student needs.
- **Simulation and Role-Playing:** ChatGPT can create realistic simulations of classroom scenarios, allowing teacher candidates to practice their teaching skills in a safe and controlled environment. It can simulate student interactions, challenging questions, and classroom management issues, providing valuable experience before entering a real classroom. It can also facilitate role-playing activities, helping teachers develop empathy and understand diverse perspectives.
- **Feedback and Assessment:** ChatGPT can provide automated feedback on assignments, lesson plans, and teaching performance. It can analyze written work, identify areas for improvement, and offer suggestions for refinement. While human feedback remains essential, ChatGPT can provide a first layer of automated feedback, freeing up instructors to focus on more complex aspects of assessment.

- **Mentoring and Coaching:** ChatGPT can act as a virtual mentor, providing guidance and support to teacher candidates. It can answer questions, offer advice, and connect teachers with relevant resources. While it cannot replace human mentors, it can supplement their support and provide readily accessible assistance.
- **Administrative Support:** ChatGPT can automate administrative tasks, such as scheduling, grading, and generating reports. This can free up instructors' time, allowing them to focus on teaching and mentoring. It can also assist with communication, sending reminders, and disseminating information to teacher candidates.
- **Research and Professional Development:** ChatGPT can assist teachers in conducting research by summarizing articles, generating literature reviews, and identifying relevant studies. It can also provide personalized recommendations for professional development resources, helping teachers stay up-to-date with the latest research and best practices.

Benefits of Using ChatGPT in Teacher Education

- **Enhanced Learning Outcomes:** Personalized learning and targeted feedback can lead to improved learning outcomes for teacher candidates.
- **Increased Efficiency:** Automation of administrative tasks and content creation can increase the efficiency of teacher education programs.
- **Improved Pedagogical Practices:** Simulations, role-playing, and access to diverse resources can help teachers develop more effective pedagogical practices.
- **Personalized Support:** ChatGPT can provide personalized support and guidance to teacher candidates, addressing their individual needs and challenges.
- **Greater Accessibility:** AI-powered tools can make teacher education more accessible to individuals who may face barriers to traditional programs.

Ethical Considerations and Potential Limitations

While the potential benefits of ChatGPT in teacher education are significant, it is crucial to address the ethical considerations and potential limitations:

- **Bias and Fairness:** AI models can reflect biases present in the data they are trained on, potentially leading to unfair or discriminatory outcomes. It is essential to ensure that AI systems used in education are free from bias and promote equity.
- **Data Privacy and Security:** The use of AI in education involves the collection and storage of student data, raising concerns about privacy and security. Robust data protection measures are essential to safeguard student information.
- **Over-Reliance on AI:** It is important to avoid over-reliance on AI, recognizing that human interaction and judgment remain essential in education. AI should be used as a tool to enhance, not replace, human teachers and instructors.
- **Critical Evaluation:** The information generated by AI models should be critically

evaluated, as it may not always be accurate or reliable. Teachers need to develop the skills to critically assess AI-generated content and identify potential errors or biases.

- **Digital Divide:** The use of AI in education may exacerbate the digital divide if access to technology is not equitable. Efforts are needed to ensure that all teacher candidates have access to the necessary technology and support.
- **Human-Centered Approach:** The use of AI in education should be guided by a human-centered approach, prioritizing the needs and well-being of students and teachers.

Conclusion

ChatGPT and other AI technologies have the potential to revolutionize teacher education, offering personalized learning experiences, improving pedagogical practices, and streamlining administrative tasks. However, it is crucial to address the ethical considerations and potential limitations associated with the use of AI in education. By adopting a thoughtful and responsible approach, we can harness the power of AI to enhance teacher education and prepare future generations of educators for success in the 21st century. The key lies in integrating AI as a tool to augment, not replace, the essential human element in teaching and learning. Continuous research, open dialogue, and careful implementation are necessary to ensure that AI serves the best interests of both teachers and students.

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ARTIFICIAL INTELLIGENCE: CHALLENGE OF THE DAY

Yashoda Chopra*

Abstract

The ability of machines to simulate human intelligence is known as artificial intelligence (AI). It can be applied to tasks like decision-making, learning, and problem-solving. Many facets of our lives are being revolutionized by artificial intelligence (AI), which has quickly become a transformative force. It has a significant impact on daily life and the modern workplace, bringing with it both opportunities and challenges. This paper attempts to throw light on the working of artificial intelligence, role of AI in higher education, challenges and ethical consideration in AI.

Keywords: *Artificial intelligence, Opportunities, Challenges*

Introduction

Artificial intelligence refers to the ability of machines, particularly computer systems, to simulate human intelligence processes. Expert systems, natural language processing, speech recognition, and machine vision are some specific uses of artificial intelligence. One of the pioneers of artificial intelligence is John McCarthy. John McCarthy was a computer scientist from the United States. He was the one who first used the term “artificial intelligence” McCarthy first used the term “Artificial Intelligence” in the middle of the 1950s, and he would go on to define it as “the science and engineering of making intelligent machines.” The term “artificial intelligence” was first used in a workshop led by John McCarthy at Dartmouth in 1955, and this is how it gained popularity.

Artificial intelligence (AI) is a vast technology used in the education sector. Several types of AI technology are used in education (Nemorin, Vlachidis, Ayerakwa and Andriotis, 2022). Majorly includes Plagiarism Detection, Exam Integrity (Ade-Ibijola, Young, SivaPrasad, Seforo, Ally, Olowolafe and Frahm-Arp, 2022), Chatbots for Enrollment and Retention (Nakitare and Otiike, 2022), Learning Management Systems, Transcription of Faculty Lectures, Enhanced Online Discussion Boards, Analyzing Student Success Metrics,

* Assistant Professor, Partap College of Education, Ludhiana

and Academic Research (Nakitare and Otiike, 2022). Nowadays, Education Technology (EdTech) companies are deploying emotional AI to quantify social and emotional learning (McStay, 2020). Artificial intelligence, affective computing methods, and machine learning are collectively called “emotional AI” (AI). Artificial intelligence (AI) shapes our future more powerfully than any other century’s invention. Anyone who does not understand it will soon feel left behind, waking up in a world full of technology that feels more and more like magic (Maini and Sabri, 2017).

Artificial intelligence (AI) is the intelligence of machines or software, as opposed to the intelligence of living beings, primarily of humans. It is a field of study in computer science that develops and studies intelligent machines. Such machines may be called AIs.

How does AI work?

Vendors are rushing to highlight how AI is used in their goods and services as the hype surrounding it has grown. What they call artificial intelligence is frequently just a part of the technology, like machine learning. In order to create and train machine learning algorithms, artificial intelligence needs a foundation of specialized hardware and software. Programming languages such as Python, R, Java, C++, and Julia have features that are popular with AI developers, but no single language is synonymous with AI.

Large volumes of labeled training data are typically ingested by AI systems, which then use the data to identify correlations and patterns and use those patterns to forecast future states. In this way, an image recognition tool can learn to recognize and describe objects in images by analyzing millions of examples, or a chatbot fed text examples can learn to create realistic conversations with people. Realistic text, images, music, and other media can be produced using new, quickly developing generative AI techniques.

AI Programming Focuses on Cognitive Skills that Include the Following

- **Learning.** This area of AI programming is concerned with gathering data and formulating guidelines for converting it into useful knowledge. The rules, also referred to as algorithms, give computing devices detailed instructions on how to carry out a particular task.
- **Reasoning.** Selecting the appropriate algorithm to achieve a desired result is the main focus of this area of AI programming.
- **Self-correction:** The goal of this component of AI programming is to continuously improve algorithms and make sure they yield the most accurate outcomes.
- **Creativity.** This area of AI creates new images, text, music, and concepts using neural networks, rules-based systems, statistical methods, and other AI techniques.

Role of AI in Higher Education

Every day, more and more educational institutions are using AI to make decisions. AI

is being used by universities for both administrative and scholarly purposes. Personalization, tutoring, prompt responses, round-the-clock access to learning, question answering, and task automation are the main functions AI plays in the education sector, helping students with everything from program admission requirements to degree issuance. (Karandish, 2021).

- 1. Personalize Education:** By determining a student's strengths and weaknesses, artificial intelligence creates a customized study plan for each student that takes their knowledge gaps into account. AI increases students' efficiency by customizing their studies to meet their unique needs.
- 2. AI Support for Teaching:** By improving learning outcomes, assisting educators, and providing students with more individualized learning opportunities, artificial intelligence (AI) holds the potential to completely transform the educational landscape. We must give educators the skills and information they need to use this new technology to enhance and expedite daily tasks and classroom instruction. Personalized learning, ideation, adaptive learning, special needs education, bilingual education, gamification, and immersive learning are a few ways AI can revolutionize the classroom.
- 3. Contribute To Task Automation:** Simplifying administrative tasks: Teachers could use AI to streamline time-consuming tasks like grading, assessing, and responding to students.
- 4. Virtual Tutors:** While personalized learning solutions can enable students with special needs to realize their full potential, AI-powered virtual tutors can offer students round-the-clock support. Immersion learning and gamification have the potential to increase student engagement, enjoyment, and retention.
- 5. Changing job market:** The need for professionals with expertise in AI and related fields is growing, which is changing the job market. Students who learn about artificial intelligence (AI) can acquire the knowledge and abilities necessary to work in data science, technology, and other fields that are in high demand. AI education can encourage students to come up with ideas and solutions, which will help them become more creative and innovative—two qualities that are crucial in the competitive and changing job market of today.

Providing students with access to AI education can help close opportunity gaps, ensure that they have the skills necessary to compete in the global workforce, and create a more diverse pool of talent in AI and related fields. This diversity can lead to improved problem-solving, creativity, and innovation in the development of AI technologies and solutions. Underrepresented communities can be empowered by AI education to use technology for social good and promote change both locally and globally. Last but not least, making sure underrepresented groups are knowledgeable about AI puts them in a position to influence the laws and policies governing AI applications by participating in policy and decision-making processes.

Challenges and Ethical Considerations of AI

As AI is becoming more prevalent in India, ethical considerations and several other challenges have come to the forefront, which are explained in brief below:

1. **Data Privacy:** Large volumes of data are necessary for AI systems to operate efficiently. By extracting private data from databases, user social media accounts, or online platforms without the required consent, AI-powered tools have the potential to violate data privacy. This can cause financial and personal harm in addition to violating people's right to privacy. One of India's top priorities is guaranteeing data privacy and adherence to data protection regulations, like the proposed Personal Data Protection Bill.
2. **Bias and Fairness:** AI systems gather historical data from a variety of sources in order to learn. Biases reflecting societal prejudices and inequalities may be present in the aforementioned collected data. AI models have the potential to reinforce and even magnify biases in people's perceptions and decisions when they are trained on biased data. Ensuring equity and avoiding discrimination are crucial in a multicultural nation like India.
3. **Accountability:** As with autonomous entities, the notion of holding AI systems accountable for their actions is still in its infancy. However, establishing legal responsibility for AI systems poses complex issues regarding both their legal standing and their ability to follow rules and laws. It's possible that the existing legal frameworks lack the resources needed to adequately handle concerns about AI accountability. As a result, legal changes might be required to clearly define obligations and liabilities in the context of artificial intelligence.
4. **Transparency:** Many AI algorithms are considered "black boxes" because of their complexity, particularly deep learning models. It is crucial to guarantee openness and improved comprehension in AI decision-making. It is expected that in the near future, transparency regarding the ease of understanding of AI tools and algorithms will be improved due to the rapid growth and adoption of AI.
5. **Employment concerns:** The issue of employment in India has been a significant concern, and every government in power has periodically examined methods to expand job prospects for Indian citizens. However, the automation of some tasks by AI (which may even increase in the future) may cause employment opportunities to decline and raise concerns about job displacement of those currently employed in other sectors. Making sure that technology augments human capabilities rather than replaces them is at the heart of ethical considerations
6. **Ethical AI:** Making ethical decisions is one of the main issues with AI. Concerns regarding privacy, bias, and accountability surface as AI systems grow more independent.

It is still crucial to make sure AI functions responsibly and fairly. It is essential to create and implement AI systems that respect human values and ethical standards. Fairness, accountability, transparency, and the avoidance of bias are all taken into account.

The Regulatory Framework in India

India is in the process of formulating a regulatory framework for AI. Several key aspects of this framework include:

- 1. Data Protection Laws:** In accordance with international data protection standards, India's Personal Data Protection Bill seeks to regulate the gathering, use, and preservation of personal data. It is anticipated that this legislation will be essential in controlling AI's data usage while addressing ethical and legal concerns..
- 2. Ethical AI Guidelines:** Guidelines for the responsible development and application of AI are being developed by industry organizations and government think tanks such as NITI Aayog. When utilizing AI tools and solutions in India, these guidelines will place a strong emphasis on equity, accountability, transparency, and user consent.
- 3. Liability Clarity:** Addressing questions of liability in AI-related incidents is a complex challenge. When AI systems make decisions that have legal ramifications, legislation should make it clear who is accountable.
- 4. Intellectual Property Rights:** Intellectual property laws must change to handle concerns about authorship, ownership, protection, and enforcement of such AI-generated content since AI is being used more and more to create inventions as well as literary and artistic works. The principal aim of such legislation or laws should be to resolve the question of whether the relevant AI or the individual who developed the AI or gave the AI the order to generate the relevant content will be the owner of the intellectual property.
- 5. Standardization and Certification:** To guarantee quality and interoperability, standards and certification procedures for AI technologies should be developed. Users will feel more confident using AI tools and solutions if these certifications and standards show that an AI system satisfies particular ethical and technical requirements.

India is following international trends in its approach to AI regulation. With an emphasis on ethical AI, data protection, and innovation, nations such as the US, EU, and China have been creating their own AI policies and strategies. India's regulatory initiatives align with global discourse on the governance of artificial intelligence.

Conclusion

With the ability to spur innovation, boost productivity, and raise the standard of living for its people, artificial intelligence has enormous potential for India. But great power also comes with great responsibility. A strong regulatory framework that addresses data privacy,

fairness, transparency, and accountability is necessary for the responsible development and application of AI. India must strike a balance between the need for innovation, ethical issues, and the impact on society as it navigates the complicated landscape of AI regulation. A dedication to promoting responsible AI innovation in India is shown by the continuous efforts of government agencies, business partners, and the academic community to develop AI guidelines and regulations.

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Theme VIII

*Promoting Sustainable Practices and
Environmental Consciousness through
Higher Education*

A GREENER TOMORROW: HIGHER EDUCATIONAL INSTITUTIONS AS LEADERS IN SUSTAINABLE INFRASTRUCTURE

Deeksha Sharma*

Abstract

As the global demand for sustainability increases, higher educational institutions (HEIs) have emerged as key players in driving environmental change. This paper explores the role of universities and colleges in leading the way toward sustainable infrastructure development. Focusing on campus buildings, energy systems, waste management, and green spaces, it investigates how HEIs can serve as models for environmentally responsible practices. The study examines the adoption of eco-friendly technologies, such as solar power, green roofs, and sustainable construction materials, and evaluates the effectiveness of these initiatives in reducing the carbon footprint of university campuses. The paper highlights best practices and the challenges these institutions face in balancing sustainability goals with financial and logistical constraints. The paper emphasizes the importance of HEIs not only educating future generations about sustainability but also exemplifying it through their own infrastructure choices, contributing to the global movement towards a greener, more sustainable future.

Keywords: Higher Educational Institutions, Sustainable Development, Sustainable Infrastructure, Environment Friendly Practices

Introduction

Higher educational institutions play a pivotal role in shaping future generations and driving societal progress. As the world grapples with increasingly complex environmental challenges, these institutions are uniquely positioned to lead by example in adopting sustainable infrastructure practices. Universities and colleges have the potential to serve as living laboratories for innovative solutions, demonstrating the feasibility and benefits of eco-friendly approaches to a wide audience of students, faculty, staff, and the broader community.

* Junior Research Fellow, Department of Education, Panjab University, Chandigarh

This paper explores the transformative potential of universities and colleges in spearheading eco-friendly initiatives, fostering innovation, and cultivating a culture of sustainability. This research paper delves into the multifaceted aspects of sustainable infrastructure within the context of higher education, examining how these institutions can leverage their resources, expertise, and influence to create positive environmental change. The study begins by examining the current landscape of sustainable infrastructure in higher education, highlighting best practices that have been successfully implemented across various campuses worldwide. It investigates innovative approaches to energy efficiency, waste reduction, water conservation, and green building design that have been pioneered by forward-thinking institutions. Additionally, the paper explores the integration of sustainability principles into curriculum development and research initiatives, emphasizing the importance of interdisciplinary collaboration in addressing complex environmental challenges.

Furthermore, this research paper critically analyzes the challenges faced by higher educational institutions in implementing sustainable infrastructure. It examines financial constraints, regulatory hurdles, and resistance to change that may impede progress towards more environmentally friendly practices. By identifying these obstacles, the study aims to provide insights into potential solutions and strategies for overcoming barriers to sustainability. The paper also explores opportunities for improvement and innovation within the realm of sustainable infrastructure in higher education. It investigates emerging technologies, such as smart building systems, renewable energy integration, and advanced waste management techniques, that hold promise for enhancing the environmental performance of campus facilities. Additionally, the study examines the potential for partnerships between universities, industry, and government agencies to accelerate the adoption of sustainable practices and drive broader societal change. By analyzing case studies from diverse institutions across different geographical and cultural contexts, the research aims to provide a comprehensive framework for universities and colleges seeking to enhance their environmental stewardship. It highlights successful initiatives, lessons learned, and replicable models that can be adapted to suit the unique needs and constraints of different institutions. Moreover, the study explores the ripple effects of sustainable infrastructure initiatives in higher education, examining how these efforts can inspire and influence the broader community. It investigates the potential for universities to serve as catalysts for sustainable development in their surrounding regions, fostering partnerships with local businesses, government agencies, and community organizations to promote environmentally responsible practices beyond campus boundaries.

Thus, the paper aims to provide a thorough examination of the role that universities and colleges can play in advancing sustainability goals. By showcasing innovative approaches, addressing challenges, and highlighting opportunities for improvement, this research paper seeks to inspire and guide higher educational institutions in their journey towards becoming

beacons of environmental stewardship and catalysts for positive change in the pursuit of a more sustainable future.

Methodology

The methodology for this research paper employs use of secondary data to explore the impact of sustainable infrastructure initiatives in higher education institutions (HEIs) and their role in fostering environmental consciousness. The study involves a comparative case study analysis of universities with notable sustainability programs, such as the University of California, Berkeley, and the University of British Columbia, examining their green building practices, energy consumption, carbon emissions, and waste reduction efforts.

Objectives

1. To analyze the impact of sustainable infrastructure initiatives in higher education institutions on reducing environmental footprints, including energy consumption, waste generation, and carbon emissions.
2. To explore the role of universities in fostering environmental consciousness among students, faculty, and surrounding communities through the adoption of sustainable building practices and campus sustainability programs.

Research Questions

1. How do sustainable infrastructure initiatives implemented by higher education institutions contribute to reducing their overall environmental impact and carbon footprint?
2. What role do higher education institutions play in influencing student behavior and community attitudes towards sustainability through the integration of eco-friendly infrastructure and campus-wide sustainability programs?

Findings

1. Impact of Sustainable Infrastructure Initiatives on Reducing Environmental Footprints in Higher Education Institutions:

- **Reduction in Energy Consumption:** Several higher education institutions have successfully reduced energy consumption through the adoption of energy-efficient technologies and renewable energy systems. For example, the University of California, Berkeley, implemented a comprehensive energy strategy, which included upgrading HVAC systems, retrofitting lighting, and installing solar panels, resulting in a 20% reduction in energy consumption over five years (Anderson & Simms, 2018). Similarly, many campuses have incorporated smart building technologies that optimize energy use in real-time, contributing to significant reductions in electricity demand and greenhouse gas emissions (Hill and Wright, 2021).

- **Lower Carbon Emissions:** Sustainable infrastructure, such as the construction of LEED-certified buildings, has had a direct impact on lowering the carbon footprint of universities. The University of British Columbia (UBC) has constructed multiple LEED Platinum-certified buildings, which use sustainable building materials, energy-efficient lighting, and advanced insulation systems, leading to a reduction in their overall carbon emissions by approximately 15% within the first five years of implementation (Kats, 2016). These buildings are designed to minimize energy waste, reduce reliance on fossil fuels, and use renewable energy sources, contributing to global efforts in mitigating climate change.
- **Waste Management and Resource Conservation:** Many universities have integrated comprehensive waste management and recycling programs as part of their sustainable infrastructure initiatives. For instance, the University of Vermont has implemented composting programs and increased recycling rates, leading to a 30% reduction in landfill waste (Spector, 2018). Additionally, rainwater harvesting and water-efficient fixtures have been incorporated into campus buildings to reduce water consumption, further contributing to sustainable resource management.
- **Cost Savings and Financial Benefits:** Sustainable infrastructure not only benefits the environment but also provides long-term financial savings. The integration of energy-efficient systems has led to significant cost reductions for universities. For example, the University of Colorado Boulder saved over \$1 million annually after retrofitting its buildings with energy-efficient lighting and HVAC systems (Perrot & Sorrell, 2017). These savings can be reinvested in further sustainability initiatives or educational programs, creating a positive feedback loop that supports long-term environmental goals.

2. The Role of Universities in Fostering Environmental Consciousness through Sustainable Infrastructure and Campus-Wide Programs:

- **Increased Awareness and Engagement Among Students:** Universities have proven effective in increasing environmental awareness and engagement among students through sustainable infrastructure and educational programs. The integration of green building practices, such as the installation of solar panels and rainwater harvesting systems, has made sustainability tangible for students, providing real-world examples of eco-friendly technologies. For instance, the University of Michigan's "Campus Sustainability Integration" program, which focuses on hands-on student involvement in sustainability projects, has led to a significant increase in student participation in sustainability initiatives, with more than 50% of students actively involved in sustainability projects (Garrison and Vaughn, 2020). This hands-on experience fosters a deeper understanding of environmental issues and solutions, influencing students' personal behaviors and future career choices.

- **Campus Sustainability as a Teaching Tool:** Sustainable campus infrastructure is increasingly being used as a “living laboratory” where students can learn about environmental sciences and sustainability practices in a real-world setting. At Stanford University, sustainability initiatives, such as the LEED-certified buildings and zero-waste policies, are incorporated into the curriculum across various disciplines. This integration allows students to study the practical applications of sustainability principles while contributing to the campus’s eco-friendly goals. Research by Williams and Choi (2020) highlights that 70% of students who participated in sustainability-focused courses felt more committed to applying sustainability practices in their personal and professional lives after graduation.
- **Influencing Student Behavior and Lifestyle Choices:** Sustainable infrastructure not only raises awareness but also influences student behavior and lifestyle choices. Green spaces, bike-sharing programs, and energy-efficient dormitories are examples of how campuses encourage environmentally conscious behaviors. The University of California, Santa Barbara (UCSB), for example, has incorporated sustainable transportation options, such as bike-sharing programs and electric vehicle charging stations, which have led to a noticeable shift in students’ transportation choices, with a 20% increase in students choosing to bike or use public transportation instead of driving (Kumi and Farrell, 2022). These infrastructure changes promote long-term shifts in attitudes toward sustainability, encouraging students to adopt eco-friendly practices beyond campus.
- **Community Impact and Outreach:** Universities often extend their sustainability efforts beyond campus borders, fostering environmental consciousness in surrounding communities. For example, the University of British Columbia (UBC) runs community-based sustainability initiatives, such as local environmental education workshops and collaboration with nearby businesses to promote green practices. According to research by Rissman & Thompson (2015), these initiatives have not only contributed to the local community’s environmental awareness but have also led to an increase in local green job creation and community-based sustainability projects. This outreach helps cultivate a culture of sustainability that reaches beyond the student body, creating a ripple effect throughout the broader community.
- **Long-term Environmental Leadership:** Many universities report that students who engage with sustainability initiatives on campus are more likely to carry these practices into their careers, thus becoming long-term environmental leaders. A study conducted by Perrot and Sorrell (2017) found that alumni of universities with strong sustainability programs were significantly more likely to take on leadership roles in environmental advocacy, green businesses, or policy-making after

graduation. These students not only become advocates for sustainable practices but also influence their future workplaces to adopt greener policies, creating a multiplier effect for environmental consciousness.

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PROMOTING SUSTAINABLE PRACTICES AND ENVIRONMENTAL CONSCIOUSNESS THROUGH HIGHER EDUCATION

*Dr. Jasbir Kaur**

Abstract

Sustainable development is the most important and challenging goal to be achieved for the holistic development of one's own as well as one's nation. As a responsible citizen of a nation, it's our duty to adopt healthy practices for the healthy survival of our mother earth, struggling with drastic environmental challenges such as climate change, resource depletion, and biodiversity loss. So, there is a pressing need for our collective commitment to sustainability. The best possible way towards generating continuous and healthy practice of environmental consciousness among people in general and students in particular is through making it an integral part of the curriculum at each level of education starting from primary and leading to higher education. Higher education is one of the key actors in environmental education and sustainable development. Higher education can play a pivotal role in turning society toward sustainability (Corcoran and Wals, 2004).

Keywords: *Sustainable Development, Higher Education, Environment*

Introduction

For the past one decade much effort has been made across the globe to achieve sustainable development. Various sources of environmental awareness including conferences, seminars, rallies, surveys and world summits towards the protection of environment have been conducted but of no use as the present world is environmentally less sustainable than in the previous days.

The common definition for sustainable development is as follows:

“Development that meets the needs of the present without compromising the ability of future generation to meet their own needs”

The operational definition of sustainable global development:

* Assistant Professor, GHG Khalsa College of Education, Gurusar Sadhar

“Sustainable global development requires that those who are more affluent adopt lifestyles within the planet’s ecological means – for example, in their use of energy.”

The eminent French anthropologist Levi – Strauss’s view is that “Man is not a privileged inhabitant of the universe, but merely a passing species that will leave only a few faint traces of its passage when it becomes extinct”.

The growing concern with environmental issues and their impact on general awareness is one of the most noticeable phenomena of the last two decades. India has more than 40% of young people in the world. The World Bank expert reveals that in the year 1995 to 2010, India has become one of the fastest progressing countries in the world, in addressing its environmental issues and improving its environmental quality. Still, India has a long way to go to reach environmental quality similar to those enjoyed in developed economies. India has adopted various international and national strategies to solve and mitigate many environmental issues such as Environmental Courts, Environment Friendly Products, Un-leading of Petrol, and Ban on Harmful Pesticides, National Waste Management Council, Public Liability Insurance, and Pollution by Motor Vehicles, Regulation of Sea Shore Hotels, National River Action Plan, Solar Energy Commission, and Prohibition of Smoking in Public Places. Even so, many environmental problems remain unresolved.

Environmental problems are due to a combination of several factors. These factors cause both environment and health problems. Some of the problems faced by humankind directly or indirectly are ozone depletion, greenhouse effect, acid rain, global warming, air-water pollution, and fossil fuel combustion.

Need for Environmental Consciousness

Environmental study and awareness as well as induced public participation in environmental protection become predominant to achieving environmental sustainability (Abbas and Singh, 2014). Oguz, Cakci and Kavas (2010) believed that the environmental study aims to equip the individuals with some set of knowledge, attitudes, and skills in order to raise concern for the environment and to work towards solutions to the prevention of new problems. According to Lin and Niu (2018) environmental awareness is not only pertinent to one’s perception and knowledge towards environmental issues but also towards the behavior that one consequently conducts, for instance, some activities related to waste, recycling and energy-saving (Eren and Yaqub, 2015). Environmental study is also perceived as a multitude of processes and activities that are concerned with knowledge, emotions, feelings, attitudes, and values. Its aim is to produce informed and responsible citizens capable of playing an active role in all matters concerned with the environment (Maigari, 2002).

Green Behavior is associated with pro-environmental behavior that minimizes harm to the environment through minimizing the use of energy, reducing waste, conserving water, refraining from buying goods perceived to be hazardous to the environment, etc. (Mishal, Dubey, Gupta, and Luo, 2017).

When focusing on becoming sustainable, educating human resources on sustainable development, environmental sustainability, and various environmental protection concepts should be carried out, especially in higher education (Daneshjoo, Haghighi and Talaei (2020)

The Role of Academic Organizations

The role of academic organizations is fundamental in addressing pressing global environmental challenges. This is possible through a curriculum that is enriched with the ethos of sustainability and one that offers a platform for research and community involvement, motivating lasting societal change. By showcasing best practices in their operations, research, and teaching, educational institutes have both a direct and a multiplier effect on society. For these to comprehensively address environmental consciousness, a “learning-for-sustainability” approach needs to be embedded synergistically across every aspect of institutional operations.

The earlier learners are exposed to the importance of embracing environmental consciousness, the bigger the impact and reach. Hence, it is imperative to introduce the concepts of environmental preservation and consciousness, as early as in the preschool stage, for young learners to carry the teachings all the way to higher education, just as we do with other basic social and cultural values.

In 2020, India passed the National Education Policy (NEP), finally addressing the pressing need for environmental education in schools. Through the policy, the government has successfully incorporated initiatives to ensure that students receive a comprehensive education that increases environmental awareness and encourages practical action.

By suggesting a shift from content-based learning to skill-based learning, the policy acknowledges the transformative force of an experiential approach in all subject areas, including environment education. It actively encourages educators to integrate hands-on pedagogy that enables students to actively engage with real-world environmental challenges.

Strategies To Attain Sustainable Development

Developing a Positive Connection with Nature

The onus to establish a positive relationship between students and the environment lies largely with educators, who have the power and reach to imbibe environmental consciousness through observation, experimentation, and example.

As the first step, teachers are encouraged to integrate environment education into their learning modules. The idea is for them to be well-versed in the curriculum themselves, to be able to carry the legacy ahead and ignite the minds of learners. The NEP also recognizes the pivotal role of educators and teachers in training and capacity building in environmental education. By equipping teachers with professional development opportunities to enhance

their understanding of environmental issues, teaching methodologies, and the integration of sustainability principles into the curriculum, the policy lays the foundation for an efficient delivery of environmental education to learners of all ages.

Curriculum Development

The younger generations, students are the effective media to bring enormous changes in the society and hence educating the environment to the young minds is the right step and also this is the right time for the same. The resource base is not inexhaustible and there must exist some limit beyond which the rate of exploitation of natural resources will comprise the ability of future generations to meet their own needs. Hence the focus must be on reducing consumption with a view to achieving sustainability. Wherever possible, strategies for reducing consumption of energy and materials, and greater use of renewable resources, should be incorporated in design and construction.

Science and Technology, even though advanced, cannot help in bringing about the change of attitude. Hence education in moral and ethical philosophy is needed and Environmental study should be made a mandatory part.

Reasons for including moral education in Curriculum Development

- As future planners, designers, builders and decision makers, engineers shoulder special responsibility in protecting the integrity of nature and the natural environment.
- Human beings are rational creatures who have an innate need to rationalize all their actions and thoughts. Moral philosophy provides this rationale, and by doing so gives us our humanity.

This moral education reinforces the environment – respecting moral values, especially in the young through formal education.

Criteria for Curriculum Development

Curriculum development must focus upon including the practices related with reducing consumption with a view to achieving sustainability. Strategies for effective use of natural and man made energy resources and greater use of renewable resources should be incorporated in design and construction of curriculum.

Emphasis should be on looking at the problem from local as well as regional perspective along with national and global in accordance with the Rio slogan of “Act locally and think globally”.

Enhancing Research Activities

Higher Education should focus more on research activities related to achieving sustainable development and environmental preservation. Students should be motivated to work upon various issues and challenges related to pertinent environmental issues like ozone

depletion, use of pesticides, unpredictable climatic conditions etc. Funding agencies like UGC, Ministry of Govt, ICSSR, NCERT, NUEPA should provide grants for the research work on environmental issues. The scientific and technological capacities needed for our country can be strengthened. This will be able to implement a sustainable model in the short and long term, integrating its social, economic and environmental dimensions, contributing to international efforts mitigating adverse trends in global change.

The research may be centered on pollution, health and environmental action. More funds can be allotted for environmental related projects and students may be motivated by giving awards and prizes for best social impact environmental projects. The interest among the students may also be enhanced by conducting essay writing competitions.

Developing Responsible Environmental Behaviour

Environmental education must focus upon developing a ‘responsible environmental behaviour’ among the student population. For this we need a sharing of facts and information among the students regarding their role and responsibilities towards safety, protection and promotion of a healthy environmental attitude. It will help them to think about their environment not only from the individual perspective but also from a social perspective.

The ‘responsible environmental behaviour’ is defined as “the whole of actions of an individual within the society, that takes into account, in a conscious way, the perennial and harmonious relationship between these actions and environment”.

Conclusion

So to conclude promoting sustainable practices and environmental consciousness is though not an easy task as we are a victim of our age old habits but it is nevertheless an impossible goal to be achieved. The only requirement is generating awareness and creating role models in front of our students population for adopting healthy environmental practices and positive attitude towards sustainability.

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ENVIRONMENTAL CONSCIOUSNESS FOR SUSTAINABLE DEVELOPMENT

*Dr. Jasvir Kaur**

Abstract

The world in the 21st century is facing many challenges related to the environment. The ever increasing population and changing lifestyles are making these challenges more critical. Educational institutions can be the best solution to solve this situation. Educational institutions will have to redefine their missions and goals, and establish the priorities as per the needs of the sustainable society. If the goals of Sustainable Development are to be realized, the attitudes of all the stakeholders of education with regard to our current lifestyles and the impact they have on the environment will need to change. Universities are the apex bodies in the higher education system and can provide environmental education and awareness through its curriculum, research and collaborative efforts with NGOs working in those areas. They can provide trained manpower and knowledgeable expertise to solve these critical environmental problems. Education is the fundamental pillar of democracy, human rights, peace and sustainable development. Development of sustainable individuals and sustainable communities should be one of the major goals of the Higher Education system both nationally and globally. This paper explores how education contributes to developing environmental awareness in the current global context.

Keywords: *Environmental Consciousness, Sustainable Development, Unsustainability, Environmental Education*

Sustainable Development

In 1987, the United Nations released the Brundtland Report, which presented one of the most widely recognized definitions of sustainable development: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs," as outlined in *Our Common Future* by the World Commission on Environment and Development.

A later interpretation by Kates, Parris, and Leiserowitz, (2005) elaborates on this,

* Assistant Professor, G.H.G. Khalsa College of Education, Gurusar Sadhar, Ludhiana

defining sustainable development as humanity's ability to make development sustainable, ensuring that the needs of the present are met without compromising the ability of future generations to meet their own.

The concept of sustainable development represents a significant milestone in environmental theory, as it focuses not just on the reasons for adopting environmental protections or the best methods of implementation, but on how society itself should be organized. This broad interpretation is widely embraced by business leaders, policymakers, and academics. However, the degree of social and economic change deemed necessary to achieve sustainability depends on one's view of how unsustainable the present situation is. Many advocates of sustainability believe the current state of affairs is highly unsustainable and therefore support substantial, even radical, change (Taylor, 2002).

Causes of Unsustainability

- The increasing global population places greater demands on resources.
- Overuse of resources to meet basic human needs such as fuel, fodder, and shelter.
- Practices like overfishing, agriculture, excessive freshwater usage, deforestation, and industrialization contribute significantly to environmental degradation.
- This leads to soil degradation, pollution, biodiversity loss, deforestation, desertification, and climate change.
- Factors like rising unemployment, health crises, armed conflicts, urbanization, poverty, and income inequality contribute to the decline of societal well-being.

Need for Sustainable Development

- Protecting biological diversity in terrestrial, freshwater, and marine ecosystems.
- Ensuring resources are used efficiently while minimizing depletion.
- Fostering a mindset that prioritizes the well-being of the environment.
- Safeguarding both renewable and non-renewable resources for future generations.
- Implementing boundaries on the utilization of natural resources and waste assimilation.
- Improving resource efficiency across all societies.
- Minimizing emissions that contribute to global warming and climate change.
- Reducing the use of chemicals that harm the ozone layer.
- Reducing pollutants in the atmosphere for cleaner air.
- Limiting the use of chemical fertilizers to preserve soil health and reduce pollution.
- Halting the destruction of forests to preserve ecosystems and biodiversity.

Environmental Education For Sustainable Development

Environmental education for sustainable development (EESD) is a concept encompassing a vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future. For many years environmental education has sought to develop

knowledge about the environment and to establish an ethic of caring towards the natural world. It has also grown over time to recognize the need to engage with many different interests in society in order to address environmental issues. Environmental education for sustainability acknowledges what has always been true, that how people perceive and interact with their environment cannot be separated from the society and the culture they live in'. Importantly, recognition of the many values natural and cultural which the environment may encompass including the protection of places of National Heritage Significance, based on their natural, cultural and indigenous values. It is timely that this statement, Educating for a Sustainable Future, is released during the first year of the United Nations Decade of Education for Sustainable Development (UNDESD 2005– 2014).

Characteristics of Environmental Education

Environmental Education (EE) plays a crucial role in enhancing public environmental awareness, equipping individuals with the skills needed to address environmental challenges, and promoting the well-being of both people and the planet.

- EE helps students build the knowledge and skills required to tackle current environmental issues effectively.
- Environmental learning broadens students' understanding of both local and global environmental concerns, fostering critical ecological thinking
- Environmental education promotes environmental literacy, encourages responsible citizenship, and teaches personal, civic, and global responsibilities, preparing students to live more sustainably.
- Environmental education motivates individual activism by emphasizing local ideas and activities through project-based learning, which is focused on taking meaningful action in support of the environment.
- Environmental education helps students develop valuable transferable skills, such as classification techniques, as well as collaborative problem-solving abilities.
- Environmental education is a process that increases knowledge and awareness about environmental issues, builds the necessary skills and expertise to address them, and nurtures attitudes and commitments to make informed decisions and take responsible actions.

Role of Education In Sustainable Development

Human society is currently grappling with numerous environmental challenges such as climate change, air, water, and soil pollution, the greenhouse effect, depletion of natural resources, biodiversity loss, and the energy crisis. These issues span from local to global levels, and are exacerbated by the growing population and changing lifestyles. It is urgent to take precise actions to protect the natural environment.

Educational institutions play a pivotal role in addressing these issues. By redefining their missions and aligning their goals with the needs of a sustainable society, educational institutions can become the solution. Education is fundamental for an individual's success, providing physical, mental, and social skills necessary for tackling societal problems. It is a key element in the development of modern societies and serves as the foundation of sustainable development, empowering individuals with the knowledge, skills, and values to contribute to a more equitable, environmentally aware, and economically resilient world.

Key Roles of Education in Sustainable Development

- **Raising Awareness:** Education is essential in raising awareness about environmental degradation and climate change, providing individuals with the knowledge to understand and address these urgent issues.
- **Empowering Communities-**Sustainable development requires active community participation. Education empowers people by giving them the knowledge and tools to make decisions that impact their environment and resource availability, helping marginalized communities take control and make sustainable choices.
- **Promoting Sustainable Practices-** Education disseminates knowledge about sustainable practices, such as renewable energy, sustainable agriculture, waste reduction, and eco-friendly construction. This helps professionals and students adopt and spread these practices across industries.
- **Eradicating Poverty-** Education helps break the cycle of poverty, which is both a cause and a consequence of unsustainable practices. By providing quality education to impoverished communities, individuals gain the skills to secure better jobs, improving their livelihoods and reducing dependence on resource-draining practices.
- **Technological Innovation and Research-** Educational institutions are hubs for innovation and research. Through academic programs and research initiatives, education drives the development of sustainable technologies and solutions in areas like renewable energy, sustainable agriculture, and waste management.
- **Global Citizenship-** Education fosters a sense of global citizenship, encouraging individuals to recognize their interconnectedness with people and ecosystems worldwide. This mindset is vital for tackling global challenges collaboratively and building a more sustainable and peaceful world.
- **Policy Advocacy and Implementation-** Informed citizens are better equipped to hold governments and corporations accountable and advocate for sustainable policies. Education provides the tools for engaging in political processes and supporting the creation and implementation of sustainable policies across sectors.
- **Adaptation and Resilience-** As climate change and environmental degradation increase the frequency of natural disasters, education prepares communities to adapt

and build resilience. This includes teaching disaster preparedness, sustainable land management, and the development of climate-resilient infrastructure.

- **Measuring Progress and Accountability-** Education equips individuals with the skills to analyze data, evaluate the impact of policies, and advocate for evidence-based decision-making. This ensures that sustainability remains a priority at all levels of society.

The Future of Education In Sustainable Development

Education is the cornerstone for building a sustainable future. From fostering awareness and promoting sustainability to empowering communities and supporting gender equality, education addresses some of the world's most pressing challenges. As we navigate the complexities of the 21st century, investing in education and recognizing its role in sustainable development is not just optional; it's essential.

- The UN's Sustainable Development Goal 4 (SDG 4) emphasizes providing "quality education" to ensure inclusive and equitable education for all by 2030.
- As of 2023, 72 countries have integrated climate change into their primary education curricula, and this number is expected to grow. Many schools are also developing their own climate curricula and resources in response to the climate crisis.
- By 2025, it is estimated that 50% of classroom tools will be e-driven, making education more accessible and focused on sustainable themes like resource efficiency. The COVID-19 pandemic has accelerated the adoption of digital learning, which presents an opportunity to tailor education to sustainability. However, it's crucial to ensure all students have access to the necessary technology.
- The International Labour Organization (ILO) predicts that 24 million green jobs could be created globally by 2030 with the right policies. Educational institutions are developing programs to meet the demand for skills in green jobs. Awareness of these jobs must be increased to ensure that students are adequately prepared for sustainable career paths.
- The UNESCO Learning for the Planet report suggests that by 2040, curricula will adopt a holistic approach, integrating emotional, social, and physical well-being with traditional academic learning to promote sustainable lifestyles.
- There is growing recognition of the value of indigenous knowledge in sustainability. By 2050, many educational institutions will have integrated these practices into curricula, providing diverse perspectives on conservation and environmental stewardship.

Conclusion

Education is the key to addressing the global challenges of environmental sustainability. It empowers individuals, fosters innovation, supports policy advocacy, and prepares communities for future challenges. As we move forward, education will remain at the heart of sustainable development, guiding the world toward a more just, resilient, and sustainable future.

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INTEGRATING SUSTAINABILITY INTO ACADEMIC CURRICULA-KEY STRATEGIES AND CHALLENGES

Dr. Manu Chadha*

Abstract

The urgent challenges posed by climate change, resource depletion, and environmental degradation necessitate sustainable solutions across all sectors, particularly higher education. Universities and colleges are uniquely positioned to cultivate environmentally conscious leaders by embedding sustainability into their curricula, campus operations, and student engagement initiatives. This study examined various strategies for integrating sustainability education, eco-friendly campus policies, and student-driven environmental programs. The findings indicate that institutions prioritizing sustainability contribute significantly to shaping students' attitudes and behaviors, fostering long-term commitment to environmental responsibility.

Keywords: Sustainability, Environmental consciousness, Higher education, Sustainable practices, eco-friendly initiatives

Introduction

Definition of Key Terms

- **Sustainable Practices:** Sustainable practices refer to actions and policies designed to meet present needs without compromising the ability of future generations to meet their own needs. These practices focus on environmental conservation, social responsibility, and economic viability.
- **Environmental Consciousness:** Environmental consciousness is an awareness and understanding of environmental issues, coupled with a commitment to taking responsible actions to protect natural resources and ecosystems.
- **Higher Education:** Higher education encompasses post-secondary education offered by universities, colleges, and other institutions that grant academic degrees and professional certifications.

* Associate Professor, GHG Khalsa College of Education, Gurur Sar Sadhar, Ludhiana

Promoting Sustainable Practices and Environmental Consciousness through Higher Education, emphasizes the role of academic institutions in fostering a culture of sustainability. It highlights the proactive efforts required by universities and colleges to instill sustainable values in students, faculty, and administration. The phrase “sustainable practices” refers to the implementation of eco-friendly policies, while “environmental consciousness” underscores the awareness and mindset shift necessary for long-term ecological responsibility. The inclusion of “higher education” signifies the pivotal role of educational institutions in driving systemic changes towards sustainability.

Scholars emphasize the increasing importance of sustainability in higher education, noting that it significantly impacts students’ perceptions and behaviors regarding environmental responsibility. Sterling (2016) advocates for a shift toward education for sustainable development (ESD), which involves moving beyond traditional lecture-based teaching to more immersive, problem-solving approaches. By incorporating interdisciplinary coursework, experiential learning, and external partnerships, students can gain practical insights into sustainability challenges and solutions.

Lozano, Barreiro-Gen, Lozano and Sammalisto (2017) argue that incorporating sustainability into university curricula improves students’ understanding of global environmental challenges and equips them with the skills needed for sustainable decision-making.

According to Barth, Michelsen, Rieckmann, and Thomas (2019), institutional leadership is crucial to advancing sustainability objectives. Their research revealed that universities with well-defined sustainability policies and active governance bodies tend to achieve higher success rates in implementing eco-friendly practices. The presence of dedicated sustainability committees ensures accountability and continuous progress toward sustainability goals.

Filho, Shiel, Paço and Brandli (2020) highlighted the impact of sustainability-focused policies on campuses, showing that universities implementing green initiatives have lower carbon footprints and increased student engagement in eco-friendly behaviors. Their research suggests that students in environmentally conscious institutions are more likely to adopt sustainable habits, both on campus and in their personal lives

Importance of The Study

As global environmental concerns intensify, higher education institutions (HEIs) have a critical role in promoting sustainability and fostering environmental consciousness among students. Universities and colleges are influential in shaping future professionals who will develop and implement sustainable solutions in various industries. By integrating sustainability into their core mission, HEIs can provide students with both theoretical knowledge and practical skills to address environmental challenges.

Sustainability efforts in HEIs extend beyond traditional academics; they include implementing environmentally responsible campus policies, fostering research on

sustainability issues, and promoting student-led initiatives. Creating a culture of environmental responsibility within HEIs equips graduates with the awareness and competencies needed to contribute to a more sustainable future. This paper explores how sustainability can be incorporated into higher education through curriculum development, campus-wide initiatives, and student participation, ultimately encouraging long-term ecological stewardship.

Methodology

This study employs a qualitative research approach utilizing case studies of universities that have effectively implemented sustainability programs. The data collection methods included the following:

Interviews: Conducted with university administrators, faculty members, and students to understand their perspectives on sustainability initiatives.

Document analysis: Review of institutional sustainability reports, academic literature, and policy documents to assess the implementation of sustainability measures.

Surveys: Students were involved to evaluate their awareness, participation, and attitudes toward campus sustainability efforts.

A thematic analysis was conducted to identify the key strategies, best practices, and challenges faced by HEIs in implementing sustainability programs. The study also compares sustainability efforts across universities in different regions to understand variations in approach and effectiveness.

Findings and Discussion

Integration of Sustainability into Curricula

- Many universities have introduced sustainability-related courses across various disciplines, including business, engineering, and social sciences.
- Interdisciplinary programs, such as sustainable business management and environmental engineering, equip students with a holistic understanding of sustainability challenges.
- Hands-on learning opportunities, such as internships, field research, and community engagement projects, help students apply theoretical knowledge to real-world sustainability issues.
- The expansion of online sustainability courses and Massive Open Online Courses (MOOCs) has increased accessibility to environmental education worldwide.

Sustainable Campus Initiatives

- Universities have increasingly adopted energy-efficient buildings, renewable energy sources, and improved waste management practices to reduce their environmental impact.

- Water conservation programs, such as rainwater harvesting and the installation of low-flow fixtures, have proven effective in reducing water consumption.
- Policies banning single-use plastics and encouraging sustainable dining options, such as plant-based meals, have contributed to reducing campus waste.
- Transportation initiatives, including bicycle-sharing programs and incentives for using public transport, have minimized the carbon footprint of students and faculty.

Student Engagement in Sustainability

- Student organizations play an active role in environmental advocacy, organizing sustainability awareness campaigns, clean-up drives, and conservation programs.
- Universities provide funding and resources for student-led sustainability projects, fostering innovation and environmental entrepreneurship.
- Volunteering programs, such as tree-planting events and energy conservation campaigns, have increased student participation in sustainability efforts.
- Social media has emerged as a key platform for students to promote sustainability awareness and encourage peer engagement in environmental activities.

Challenges and Recommendations

- **Financial Barriers:** Many universities struggle with the costs associated with sustainable infrastructure. Forming partnerships with private organizations and seeking government grants can help fund sustainability projects.
- **Resistance to Change:** Some faculty and administrative staff are hesitant to adopt new sustainability policies. Offering professional development programs and incentives can facilitate the transition.
- **Lack of Standardized Evaluation Metrics:** Establishing clear, measurable benchmarks for sustainability performance, such as the Sustainability Tracking, Assessment & Rating System (STARS), can help universities track progress and ensure accountability.
- **Need for Increased Research and Development:** HEIs should invest in sustainability research centers and encourage interdisciplinary collaborations to develop innovative solutions for environmental challenges.

Conclusion

Higher education institutions have a vital role in promoting sustainability and fostering environmental consciousness among students. By integrating sustainability into academic curricula, implementing green campus initiatives, and encouraging student-led efforts, universities can create an environmentally responsible generation of graduates. Future research should explore the long-term impacts of sustainability education on students' professional and personal choices. Additionally, policymakers should work toward establishing regulatory frameworks that support sustainability initiatives in higher education.

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EMBEDDING ENVIRONMENTAL SUSTAINABILITY IN INDIAN EDUCATION CURRICULA: ROLE OF NEP 2020

Dr. Mini Sharma*

Abstract

Environmental sustainability has become more than just a vogue and buzzword. NEP 2020 aims to incorporate environmental sustainability seamlessly into the Indian educational programs. It encourages holistic and multidisciplinary education through flexible and innovative curricula for all education institutions across India. Recognizing the urgency of sustainability, educational institutions across India are launching a wide range of courses and programs centered on sustainable development, environmental studies, and social responsibility. By aligning with student values and incorporating sustainability across the curriculum, universities transform into true sustainability hubs that not only provide knowledge but also foster a deep sense of environmental responsibility. The incorporation of sustainability and eco-literacy into higher education curricula has become a key strategy for tackling environmental issues and promoting responsible global citizenship.

Keywords: *Environmental Sustainability, Indian Education Curricula, NEP 2020*

Introduction

The urgency of sustainability has intensified amid the escalating climate crisis. In the current scenario we are facing problems like increasing global temperatures, loss of flora and fauna, depletion of natural resources, melting of polar ice and severe climatic changes which seem to be distant threats. They are affecting our ecosystems, economies including our daily life. For example, when we're stressed or disconnected, many of us naturally seek out walks, often heading to forests, parks, beaches, or country roads to find peace and reconnect with nature. This reflects the deep connection between human well-being and the health of our environment. To live long, healthy lives, we need clean air to breathe, safe water to drink, and environments free from harmful toxins. The most important concern nowadays is not how we should act in this scenario, but rather how we can achieve environmental

* Assistant Professor, G.H.G. Khalsa College of Education, Gurusar Sadhar, Ludhiana

sustainability effectively.

Environmental Sustainability

Environmental sustainability has become more than just a vogue and buzzword. It involves fulfilling our current needs while safeguarding the ability of future generations to flourish, by maintaining resilient ecosystems, managing resources responsibly, and aligning human activities with the health of the environment. The U.N. Environment Programme states that environmental sustainability requires making decisions that guarantee future generations can enjoy a quality of life that is at least as good as, if not better than, our own. Environmental sustainability involves a wide array of actions, including conserving natural resources, protecting biodiversity, and minimizing waste and emissions. At its core, it is based on the understanding that human health and well-being are deeply connected to the health of the environment. This is why it is crucial for us to live within the Earth's ecological limits.

Environment Sustainability and Educational Institutions

Education helps to equip the young minds with the knowledge, skills, values, and attitudes required to face global issues. Education for sustainable development in higher education institutions provides the academic community with the skills, capabilities and strategies needed to achieve sustainable development. It also plays a crucial role in achieving the SDGs and promoting sustainability in academic research, thereby contributing to the realization of sustainability goals (Huge, Block, Waas, Wright and Dahdouh-Guebas, 2016). Higher Education Institutions (HEIs) are tasked with advancing sustainability by addressing the “Agenda 2030,” primarily through their connections among people, the planet, and profit. HEIs foster organizational cultural changes to integrate sustainability values into strategic planning and both academic and managerial operations (Ruiz-Mallen and Heras, 2020). In this capacity, HEIs can serve as catalysts for change, actively practicing and promoting sustainability, thereby contributing to the sustainable development of society, the economy, politics, and their institutional life. Nowadays, all the education institutions are trying to discover the most effective sustainable strategies for sustainability because of rapid development of education technology. In response to growing environmental concerns and the focus on shaping a sustainable future, Indian educational institutions are moving towards integrating sustainability values into their core curricula and campus culture. This extends beyond the boundaries of campuses, seeking to equip students with the knowledge, skills, and values essential for addressing critical sustainability challenges.

NEP 2020 and Environment Sustainability in Curricula

NEP 2020 highlights the importance of addressing environmental concerns, clear recognition of addressing global needs for energy, water, food, and sanitation. It

emphasizes the integration of environmental education into curricula. It further aims to promote understanding and sensitivity towards environmental conservation and sustainable development principles. NEP 2020 aims to incorporate environmental sustainability seamlessly into the Indian educational programs. It encourages holistic and multidisciplinary education through flexible and innovative curricula for all education institutions across India. For higher education institutions Policy recommends to offer credit-based courses and projects related to community engagement, service, and environmental education. Many important societal issues including clean water, education, healthcare, transportation, air quality, energy, and infrastructure have been prioritized by the policy through school and higher education curricula. It has been recommended that there is a dire need to merge cutting-edge science and technology with social sciences, humanities, and the socio-cultural and environmental aspects.

NEP 2020 and Environment Sustainability Through School Curricula

NEP 2020 recommends integrating environmental education into school curricula by:

- Promoting awareness on conservation and sustainable development, raising awareness about the environment, importance of water, resource conservation, sanitation, and hygiene. Further, NCERT National Curriculum Frameworks is based on input from Ministries / Departments, States, and UTs. CBSE and NCERT to organise several outreach activities to promote environmental awareness.
- NCERT textbooks address environmental issues comprehensively as Class VI–XII science textbooks have chapters on environmental issues and the Social science and language textbooks address environmental issues.
- NCERT has created environment education-focused supplementary materials for students and instructors. All B.Ed. programmes are mandated to integrate environmental awareness and sensitivity towards its conservation and sustainable development.

NEP 2020 and Environment Sustainability Through Higher Education Curricula

NEP 2020 encourages holistic and multidisciplinary education through flexible and innovative curricula for all higher education institutions (HEI's). HEI's Policy recommends HEI's to offer credit-based courses and projects related to community engagement, service, and environmental education. The Supreme Court has already directed the University Grants Commission (UGC) to implement a course on Environmental Studies (EVS) at every educational level due to the lack of environmental focus in academic programs. In response to this, the UGC introduced a mandatory six-month core EVS course for all Indian universities and colleges in 2003, in accordance with the Court's order.

In 2020, the University Grants Commission (UGC) outlined guidelines for creating a sustainable campus environment in Higher Education Institutions (HEIs). These principles

include promoting renewable energy, reducing waste, implementing green building practices, and more. Following the NEP 2020 guidelines, the UGC made significant progress by launching a set of guidelines and a curriculum framework for Environmental Education on World Environment Day, 2023. These updated guidelines were built on the syllabus first introduced in 2017, which was a revised version of the 2003 curriculum. This eight-module course was part of the Choice-Based Credit System (CBCS) and was categorized as an Ability Enhancement Compulsory Course (AECC) which aims to enrich students' knowledge through their content, and all academic disciplines were required to follow these guidelines. To ensure the interdisciplinary spirit of the proposed curriculum, teaching is supposed to be carried out by faculty trained at post-graduate (M.Sc./M.A.) and Ph.D. levels in 'Environmental Studies or Environmental Sciences' Sciences'.

The UGC's Institutional Development Plan guidelines for 2024, which play a vital role in implementing NEP 2020, also emphasize environmental responsibility. These guidelines promote energy efficiency, waste reduction, and minimizing environmental impacts. The "green campus" strategy encourages preserving ecosystems by protecting natural landscapes, reducing carbon emissions, and conserving water resources. It also advocates for awareness campaigns to foster environmental consciousness and prioritizes the use of recycled materials, sustainable infrastructure designs, and eco-friendly technologies. As per the UGC's Institutional Development Plan guidelines for 2024, educational institutions are encouraged to adopt alternative energy sources and promote sustainable transportation.

Curriculum Framework for Environmental Education At The Undergraduate Level

Starting in the 2023-2024 academic session, the UGC has introduced a mandatory environment education course for all undergraduate programs as part of the NEP 2020 implementation. This course also aligns with India's commitment to achieving the United Nations Sustainable Development Goals (SDGs).

The new curriculum takes a multidisciplinary approach, addressing critical issues like climate change, sustainable development, biodiversity conservation, pollution, sanitation, waste management, and the protection of forests and wildlife. It is designed to promote interdisciplinary understanding of these concerns, covering eight key topics and incorporating practical fieldwork and exposure. Previously available as an elective, environmental education is now a core subject. The updated curriculum places greater emphasis on practical knowledge and real-world environmental challenges, rather than focusing solely on theoretical aspects. Institutions have the flexibility to determine how to teach the course, and students can earn credits within six to eight semesters, with the course carrying four credits. HEIs can also adjust the credit distribution across this period. The course encourages community engagement and service, while fostering a practical understanding of environmental challenges. It emphasizes 'value-based' education, which focuses on environmental protection and sustainable

development. This is crucial for shaping more responsible attitudes and behaviors toward the environment. Beyond imparting knowledge, environmental education aims to instill a sense of responsibility for addressing and adapting to environmental crises.

India's Educational Institutions Embrace Sustainability and Social Responsibility

Recognizing the urgency of sustainability, educational institutions across India are launching a wide range of courses and programs centered on sustainable development, environmental studies, and social responsibility. For example, a prominent social science institute in Mumbai offers programs such as a Master's in Sustainable Livelihoods and Natural Resources Governance. These programs go beyond traditional academic disciplines, providing students with a well-rounded understanding of sustainability challenges. The Indian Institute of Technology (IIT) Delhi's Center for Excellence offers numerous programs aimed at advancing sustainability research, reflecting a broader trend where universities are not only embedding sustainability within academic curricula but also developing specialized offerings aligned with the UN SDGs, while significantly increasing research funding. As a result, universities are offering courses such as Environmental Science, Wastewater Engineering, and Materials and Air Pollution, while also incorporating sustainability concepts into more traditional disciplines like Civil Engineering and Urban Planning.

Numerous universities in India offer certificate, diploma, and degree programs in Environmental Studies and related fields. The Ministry of Education's e-learning portal, SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), provides teaching materials, videos, and other online resources that are accessible to everyone. Universities are transforming into hubs of sustainability, encouraging faculty from diverse departments to create educational experiences that empower students and cultivate a new generation equipped to drive global change. This multidisciplinary approach not only offers a variety of courses but also emphasizes the integration of sustainable practices. With all these initiatives by the higher education institutions, it is imperative to take into consideration that interdisciplinary environmental programmes at UG level will be successful only when independent departments of environment are established at undergraduate levels.

Conclusion

Universities that embrace sustainability extend beyond their traditional roles, making significant contributions to research and development. In doing so, they engage a wider range of stakeholders in important sustainability discussions. By aligning with student values and incorporating sustainability across the curriculum, universities transform into true sustainability hubs that not only provide knowledge but also foster a deep sense of environmental responsibility. The incorporation of sustainability and eco-literacy into higher education curricula has become a key strategy for tackling environmental issues and

promoting responsible global citizenship. As higher education institutions increasingly adopt sustainability-driven initiatives, they play a vital role in nurturing ecological awareness and inspiring action among future leaders. The shift toward sustainability education focuses on interdisciplinary approaches that integrate ecological, social, and economic aspects, thus reshaping traditional learning models.

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THE ROLE OF HIGHER EDUCATION IN ADDRESSING MODERN ENVIRONMENTAL CHALLENGES

Ramandeep Kaur*

Abstract

Sustainability and environmental consciousness have become even more critical in today's context, as global challenges such as climate change, resource depletion, and pollution continue to escalate. Higher education institutions play a pivotal role in fostering sustainable practices by educating students, promoting research, and implementing green initiatives. This abstract examines the role of education in fostering environmental awareness within the current global landscape. Environmental education goes beyond merely sharing knowledge; it plays a crucial role in shaping attitudes and behaviours toward sustainability. Integrating environmental concepts into curricula across all educational levels ensures that learners understand the interconnectedness of human actions and natural ecosystems. This holistic approach enables students to grasp the urgency of environmental issues and the necessity of adopting sustainable practices. A key goal of environmental education is to instill a sense of responsibility and stewardship for the environment. By understanding the root causes and consequences of environmental degradation, students are empowered to take proactive steps in promoting and embracing sustainable lifestyles. This awareness is essential in shaping a generation of environmentally responsible citizens committed to driving positive change. Educated individuals are also more likely to support and advocate for environmental policies, influencing both corporate and public sector sustainability efforts. The impact of environmental education extends beyond individual learning, shaping societal values and norms. By fostering a culture of environmental responsibility, education serves as a powerful catalyst for sustainable transformation at both local and global levels. By implementing comprehensive and inclusive educational strategies, we can cultivate a culture of environmental stewardship that is essential for tackling today's pressing environmental challenges and ensuring a sustainable future."

Keywords: Sustainability, Higher Education, Environmental Awareness, Green Campus Initiatives, Sustainable Development, Eco-Friendly, Climate Change.

* Assistant Professor, A.S Group of Institutions, Khanna

Introduction

The urgency of sustainability has intensified due to the increasing frequency of climate-related disasters, rising global temperatures, and biodiversity loss. Higher education institutions (HEIs) have a crucial responsibility to equip future leaders with the knowledge and skills required to address these pressing issues. Through academic programs, campus operations, and outreach efforts, HEIs can instill a culture of environmental responsibility. Education serves as a fundamental tool in this context, playing a vital role in cultivating environmental awareness and equipping individuals with the knowledge and skills necessary to effectively address these challenges. Environmental education goes beyond simply imparting knowledge; it actively shapes attitudes and behaviours by integrating environmental principles into learning experiences. This comprehensive approach enables students to understand the complexity of environmental issues and recognize the necessity of adopting sustainable practices. A fundamental objective of environmental education is to nurture a sense of responsibility and stewardship for the environment. By exploring the causes and consequences of environmental degradation, students gain deeper insights into their role in both contributing to and addressing these challenges. This heightened awareness is crucial in fostering a generation of environmentally conscious individuals committed to sustainable living and advocacy. Education also serves as a catalyst for innovation and problem-solving. Through environmental education, students are encouraged to think critically and develop creative solutions to sustainability challenges. Engaging in research, projects, and community initiatives not only enriches their learning experiences but also leads to tangible contributions toward environmental conservation. Beyond the classroom, education influences public policies and corporate strategies. Individuals with strong environmental knowledge are more likely to advocate for policies that promote sustainability and conservation. Additionally, businesses and industries benefit from an educated workforce that prioritizes eco-friendly practices and innovations, fostering long-term sustainable economic growth. In today's global context, where environmental crises are escalating, the role of education in raising environmental awareness is more important than ever. By implementing inclusive and comprehensive educational strategies, we can cultivate a more environmentally literate society. This, in turn, will drive collective efforts to address environmental issues and promote a sustainable future for all. Education remains a cornerstone in building environmental consciousness, empowering individuals with the knowledge, skills, and mindset necessary to tackle modern environmental challenges. Embedding sustainability education across all levels and sectors will help foster a culture of stewardship essential for protecting our planet and securing the well-being of future generations.

Objectives of The Study

This study aims to:

- Analyse the role of higher education institutions in promoting sustainability and environmental consciousness.
- Examine the integration of sustainability principles into university curricula and campus operations.
- Identify challenges faced by universities in implementing sustainable initiatives.
- Provide recommendations to enhance sustainability education and practices within higher education.
- Assess the broader implications of sustainability in higher education for society, the economy, and policy development.

Review Literature

Research on sustainability in higher education has expanded in recent years, highlighting the growing importance of integrating sustainable practices into academic institutions. Several key themes emerge from the existing literature:

1. Integration of Sustainability in Curriculum

- Leal-Filho (2016) emphasizes the importance of embedding sustainability concepts across all academic disciplines to create a holistic learning experience.
- Lozano, Carpenter and Huisinigh, (2015) argue that interdisciplinary approaches help students develop a comprehensive understanding of sustainability challenges and solutions.

2. Campus Sustainability Initiatives

- Studies have shown that institutions implementing green infrastructure, waste management programs, and energy-efficient technologies significantly reduce their carbon footprint (Sterling, 2010).
- Universities such as Harvard and the University of California have pioneered carbon neutrality goals and renewable energy adoption, setting a benchmark for other institutions (Tilbury, 2011).

3. Community Engagement and Policy Advocacy

- Research suggests that universities serve as hubs for sustainability knowledge dissemination, influencing both students and the broader community (UNESCO, 2021).
- Active collaborations between HEIs and government bodies have proven effective in shaping environmental policies and promoting sustainable urban development.

4. Challenges in Implementing Sustainability in Higher Education

- Financial limitations, lack of institutional support, and resistance to change are

commonly cited barriers to sustainability adoption (Leal-Filho, 2016).

- A lack of awareness among faculty and students regarding sustainability initiatives remains a significant obstacle (Lozano, Carpenter and Huisinck, 2015).

The literature underscores the essential role of higher education institutions in fostering sustainability but also highlights the need for strategic frameworks, funding support, and innovative educational models to overcome barriers to implementation.

Research Methodology

This study employs a qualitative research approach to explore how higher education institutions (HEIs) promote sustainability and environmental consciousness. A descriptive research design is used to analyse how sustainability is integrated into higher education curricula, campus initiatives, and community engagement. The study focuses on identifying best practices, challenges, and the impact of sustainable education on students and institutions.

Integrating Sustainability into the Curriculum

One of the most effective ways to promote sustainability in higher education is through curriculum development. Universities must adapt to the latest environmental challenges and ensure that students across disciplines grasp sustainability principles. Key strategies include:

- Offering specialized programs such as Environmental Science, Climate Change Studies, and Sustainable Development.
- Embedding sustainability topics into courses across all disciplines, including technology, business, and social sciences.
- Providing experiential learning opportunities through internships, fieldwork, and service-learning projects that address real-world sustainability issues.

Campus Sustainability Initiatives

HEIs can lead by example by implementing environmentally friendly policies and practices on campus. Key modern initiatives include:

- Transitioning to renewable energy sources and carbon-neutral goals.
- Enhancing waste reduction strategies, including zero-waste policies and sustainable supply chains.
- Promoting sustainable transportation options such as electric vehicle charging stations, public transport partnerships, and bike-sharing programs.
- Constructing and retrofitting buildings to meet the latest environmental standards, incorporating smart energy management systems.

Community Engagement and Outreach

Today's sustainability challenges require collective action beyond campus boundaries. Universities can promote sustainability by engaging with local and global communities. Current approaches include:

- Hosting online and offline sustainability workshops, webinars, and awareness campaigns.
- Collaborating with industries and governmental organizations to drive environmental policies and initiatives.
- Encouraging student participation in sustainability projects, including urban gardening, waste management programs, and climate advocacy groups.

Implications for Policy and Practice

Higher education institutions (HEIs) play a vital role in shaping sustainability policies at both national and international levels. By integrating sustainability education into curricula, universities contribute to a knowledgeable and environmentally responsible workforce that influences public policy and corporate decision-making. Universities can impact sustainability policies in the following ways:

1. Influencing National and International Sustainability Policies

- HEIs serve as research hubs that provide scientific data and policy recommendations for environmental legislation.
- Collaboration with governments to develop sustainability education standards and frameworks ensures policy alignment with academic advancements.
- Universities can advocate for climate action by producing research that informs global sustainability efforts, such as the United Nations Sustainable Development Goals (SDGs).

2. Government and Private Sector Collaboration

- Public-private partnerships can enhance funding opportunities for sustainability initiatives within universities.
- Businesses can work with HEIs to develop sustainable technologies and practices, creating a knowledge exchange between academia and industry.
- Joint sustainability projects, such as renewable energy programs, waste management strategies, and biodiversity conservation, can foster practical solutions to global challenges.

3. Recommendations for Policymakers

- **Funding Support:** Governments should provide grants and incentives to HEIs for sustainability-related research and infrastructure.

- **Curriculum Integration:** National education boards should mandate sustainability education across all disciplines.
- **Regulatory Frameworks:** Policies should promote university compliance with environmental standards, such as carbon neutrality and resource efficiency.
- **Recognition and Accreditation:** Institutions that excel in sustainability efforts should receive certifications or rankings that encourage continuous improvement.

Challenges and Recommendations

Challenges

Despite their efforts, HEIs face several challenges in promoting sustainability:

- **Financial Constraints:** Many institutions struggle to secure funding for sustainability initiatives and green infrastructure.
- **Lack of Awareness:** Some students and faculty members may not fully understand the importance of sustainability or how to incorporate it into their studies and work.
- **Institutional Resistance:** Universities with traditional structures may be resistant to integrating sustainability into their core activities.
- **Policy and Regulatory Hurdles:** Government policies and regulations may not always support sustainability transitions within higher education.

Recommendations

To address these challenges, HEIs can adopt the following strategies:

- **Increase Funding and Partnerships:** Universities should seek partnerships with government agencies, corporations, and nonprofits to secure funding for sustainability projects.
- **Enhance Sustainability Education:** Implementing workshops, training sessions, and awareness campaigns can help foster a culture of environmental responsibility.
- **Develop Strong Institutional Policies:** Universities should create clear policies that integrate sustainability into teaching, research, and campus operations.
- **Leverage Technology:** Digital tools, smart energy systems, and innovative solutions should be utilized to improve sustainability outcomes.

Future Research Directions

Despite the growing body of research on sustainability in higher education, several gaps remain that warrant further investigation. Future research should focus on:

1. Assessing the Long-Term Impact of Sustainability Education

- There is limited research on how sustainability education influences graduates' behaviours and career choices in the long run.

- Longitudinal studies can track the impact of sustainability courses on students' environmental actions post-graduation.
- Research can evaluate whether sustainability education leads to policy changes in corporate and government sectors.

2. Exploring Emerging Trends: AI and Technology in Sustainability Education

- The use of artificial intelligence (AI) and digital tools in sustainability education is an evolving area that requires further exploration.
- AI-powered data analytics can help universities measure their carbon footprint and optimize resource management.
- Virtual reality (VR) and simulation-based learning can offer immersive experiences that enhance students' understanding of environmental challenges.

3. Bridging the Gap Between Theory and Practice

- Research should focus on how universities can better integrate hands-on sustainability experiences into their curricula.
- Case studies on universities that successfully implement sustainability programs can provide actionable insights for other institutions.
- The role of interdisciplinary collaboration in sustainability education should be further explored to create comprehensive learning models.

By addressing these areas, future research can strengthen the role of higher education in fostering sustainable societies.

Conclusion

Higher education institutions play a critical role in promoting sustainable practices and fostering environmental consciousness, especially in today's context of escalating global environmental challenges. By integrating sustainability into curricula, implementing campus-wide green initiatives, and engaging with local and global communities, universities can equip students with the knowledge, skills, and motivation to drive sustainable change. This study highlights the importance of embedding environmental education at all levels, ensuring that graduates from diverse disciplines contribute to sustainable development. Despite the promising progress, several challenges hinder the full realization of sustainability in higher education, including financial constraints, institutional resistance, and policy limitations. Addressing these barriers requires proactive institutional policies, increased funding, strategic partnerships, and innovative teaching methods that emphasize experiential learning. By overcoming these challenges, HEIs can foster a culture of sustainability that extends beyond academic institutions, influencing industries, governments, and communities. The findings of this study underscore the urgency of reinforcing environmental education to cultivate responsible global citizens who are equipped to address climate change, resource

depletion, and other pressing environmental issues. Moving forward, sustained efforts from universities, policymakers, and stakeholders will be essential in shaping a more sustainable and environmentally conscious future.

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Theme IX

*Addressing the Employability Gap through
Curriculum Redesign*

INTEGRATING CAREER GUIDANCE IN CURRICULUM FOR ENHANCED EMPLOYABILITY

G S Smitha Nair*

Abstract

The growing mismatch between graduate skills and employer needs, commonly known as the employability gap, poses a significant challenge to higher education institutions. This paper argues that integrating career guidance within the curriculum is crucial for enhancing graduate employability. Traditional career services, often relegated to the periphery of academic life, are insufficient in equipping students with the necessary skills and knowledge for a successful transition into the workforce. This paper explores the theoretical underpinnings of career development, analyzes the current state of career guidance in higher education, and proposes a framework for integrating career guidance seamlessly into the curriculum. It emphasizes the importance of a collaborative approach involving faculty, career counsellors, and industry professionals. The paper also highlights the need for continuous evaluation and adaptation of the integrated curriculum to ensure its effectiveness in meeting the evolving demands of the labour market. By fostering self-awareness, career exploration, skill development, and experiential learning, a career guidance-integrated curriculum can empower graduates to navigate the complexities of the modern workplace and achieve career success. This paper concludes with recommendations for implementing and sustaining such a model, emphasizing its potential to bridge the employability gap and produce future-ready professionals.

Keywords: Career Guidance, Curriculum Integration, Employability, Higher Education.

Introduction

The widening chasm between the skills and competencies graduates possess and those demanded by employers, commonly known as the employability gap, has become a persistent and pervasive challenge for higher education institutions worldwide. While a strong foundation in academic knowledge remains fundamental, employers increasingly prioritize a broader spectrum of attributes, including not only technical proficiency but also

* Research Scholar, Govt College of Teacher Education, Trivandrum, Kerala

crucial soft skills, demonstrable practical experience, adaptability in the face of change, and a clear sense of career direction – in essence, career readiness. Traditional career services, often relegated to the periphery of academic life and offered as standalone workshops, sporadic events, or individual counseling sessions, frequently prove insufficient in adequately preparing students for the multifaceted realities and complexities of the contemporary job market. This paper argues that a more proactive, integrated, and holistic approach is not only desirable but absolutely imperative one that seamlessly embeds career guidance within the curriculum itself. By weaving the core principles and practical applications of career development into the very fabric of academic learning, institutions can effectively empower students to make informed and strategic career choices, cultivate essential employability skills, navigate the job market with confidence, and effect a smooth and successful transition from the often-insular world of academia to the dynamic and demanding professional world. This integrated approach goes beyond simply adding a few career-related modules; it necessitates a fundamental reshaping of the entire educational experience to prioritize and cultivate career readiness from the very outset of a student's academic journey.

Theoretical Framework

Several established and widely recognized career development theories provide a robust theoretical foundation for the rationale underlying curriculum-integrated career guidance. Holland's theory of vocational personalities and work environments emphasizes the crucial importance of achieving congruence between individual interests, aptitudes, and values, on the one hand, and the characteristics and demands of compatible career choices and work environments, on the other. Super's life-span, life-space theory underscores the dynamic and evolving nature of career development, highlighting the on-going and iterative need for exploration, self-assessment, and adaptation throughout an individual's career trajectory. Social Cognitive Career Theory (SCCT) emphasizes the pivotal role of self-efficacy beliefs (an individual's belief in their ability to succeed), outcome expectations (beliefs about the likely consequences of actions), and effective goal setting in the complex and often challenging process of career decision-making. These and other relevant theories collectively underscore the necessity for a comprehensive, developmental, and personalized approach to career guidance one that ideally commences early in a student's academic journey, perhaps even during pre-university orientation, and continues as a consistent and supportive thread throughout their educational experience. Furthermore, these theories highlight the intricate interconnectedness of personal factors, environmental influences, and behavioural choices in shaping individual career paths, thereby reinforcing the need for integrated and multifaceted support systems.

Current State of Career Guidance in Higher Education

While the majority of higher education institutions offer some form of career services,

these provisions are often underutilized, fragmented, and perceived by students as being separate and distinct from their core academic experience. Students may lack awareness of the available resources, struggle to effectively connect their academic learning to viable career options, or find it challenging to balance the demands of career exploration and development with the pressures of academic coursework and other commitments. Moreover, faculty members, who are often the most influential figures in shaping students' academic and, consequently, career trajectories, may not be adequately equipped with the requisite knowledge, skills, or resources to provide effective and relevant career guidance. This often results in a fragmented, reactive, and ultimately inadequate approach to career development, leaving students feeling unprepared, uncertain, and even anxious about their future professional paths. The current model frequently treats career guidance as an afterthought, a supplementary service, rather than an integral and essential part of the overall educational process.

A Framework for Integrating Career Guidance in Curriculum

Integrating career guidance into the curriculum requires a systemic, collaborative, and sustained effort, involving all stakeholders within the higher education ecosystem. The following framework outlines the key components of such an integrated approach:

- 1. Early Career Awareness and Exploration:** Introduce career concepts, career pathways, and exploration activities early in the academic program, ideally in the first year or even during pre-university orientation programs. This can involve interactive workshops, engaging guest lectures from industry professionals representing diverse career fields, and the administration of validated self-assessment tools to help students identify their individual interests, values, skills, and personality traits. These initial experiences should lay the foundation for on-going career exploration and development throughout their academic journey.
- 2. Curriculum Mapping and Alignment:** Conduct a thorough and systematic mapping of the existing curriculum to identify both explicit and implicit opportunities for integrating career-related content, activities, and discussions. This can involve incorporating relevant case studies, real-world projects, simulations, and assignments that directly and meaningfully connect academic learning to practical applications and potential career paths. The overarching goal is to clearly demonstrate the relevance and applicability of academic knowledge to the realities of the world of work.
- 3. Dedicated Skill Development Modules:** Integrate dedicated and focused modules focusing on the development of essential employability skills, often referred to as "soft skills," such as effective communication (both written and oral), collaborative teamwork, creative problem-solving, critical thinking, adaptability,

leadership, and digital literacy. These modules should be highly interactive, experiential, and practical, providing students with ample opportunities to practice, receive constructive feedback, and refine their skills in realistic and simulated professional contexts.

- 4. Experiential Learning and Industry Engagement:** Facilitate a wide range of experiential learning opportunities, including internships, co-op programs, industry-based projects, shadowing experiences, research opportunities, and even volunteer work, to provide students with valuable hands-on experience and meaningful exposure to different career fields and diverse workplace environments. These experiences are absolutely crucial for developing practical skills, building professional networks, and gaining a deeper and more nuanced understanding of workplace culture, expectations, and professional norms.
- 5. Mentorship and Professional Guidance:** Establish a robust and well-structured mentorship program connecting students with experienced industry professionals who can serve as mentors, providing guidance, support, and valuable insights into their respective fields. Mentors can act as role models, sharing their own career journeys, offering personalized career advice, and helping students navigate the often-complex transition from the academic realm to the professional landscape.
- 6. Personalized Career Counselling and Advising:** Ensure easy and consistent access to qualified and experienced career counsellors who can offer individualized guidance and support to students throughout their career exploration and planning process. Counsellors can assist students in interpreting assessment results, developing realistic and achievable career goals, creating personalized career plans, and effectively navigating the job search process, including resume and cover letter writing, interview preparation, and networking strategies.
- 7. Faculty Engagement and Development:** Actively engage faculty members in the career guidance process by providing them with relevant training, resources, and on-going support to effectively integrate career-related discussions, activities, and perspectives into their courses. Faculty members, by virtue of their expertise and close interaction with students, can play a vital role in connecting academic content to career applications and providing students with valuable insights into their specific fields of expertise.
- 8. Strategic Industry Collaboration and Partnerships:** Establish strong and mutually beneficial partnerships with industry to ensure that the curriculum remains aligned with current and future industry needs, emerging trends, and evolving skill demands. This can involve inviting industry professionals to serve on advisory boards, participate in guest lectures, co-develop curriculum content, and provide regular feedback on program effectiveness and relevance.

- 9. Continuous Assessment, Evaluation, and Improvement:** Implement a robust and systematic system for continuously assessing and evaluating the effectiveness of the integrated career guidance program. This can involve collecting data on a range of student outcomes, such as employment rates, job satisfaction, career progression, further education pursuits, and employer feedback on graduate preparedness. The evaluation findings should be used to inform ongoing improvements and adjustments to the program, ensuring its continued relevance, effectiveness, and impact.

Challenges and Recommendations

Implementing a comprehensive and truly integrated curriculum-integrated career guidance program is not without its inherent challenges. Common obstacles encountered include limited resources (financial, human, and infrastructural), faculty resistance to incorporating career-related content into their already demanding workloads, and the inherent difficulty in accurately and longitudinally measuring the long-term impact of such programs on student career trajectories. To effectively address these and other potential challenges, institutions should:

- Secure dedicated and sustainable funding and resources to support the development, implementation, and on-going maintenance of the program.
- Provide faculty with on-going professional development opportunities to enhance their career guidance skills, knowledge, and confidence in integrating career-related content into their teaching.
- Develop clear, measurable, and relevant metrics and robust evaluation frameworks to track the effectiveness and impact of the program on a range of student outcomes.
- Foster a strong culture of collaboration, OPEN communication, and shared responsibility among faculty, career counsellors, administrators, and industry professionals.

Conclusion

Integrating career guidance into the curriculum is not merely a supplementary add-on or a cosmetic improvement but a fundamental and transformative shift in the way higher education institutions prepare students for success in the increasingly complex and competitive 21st-century workforce. By adopting a holistic, proactive, and collaborative approach, institutions can effectively empower graduates to confidently navigate the complexities and uncertainties of the modern workplace, achieve fulfilling and meaningful career paths, and contribute significantly to society. This requires a concerted and sustained effort involving all stakeholders, from faculty and career counsellors to administrators,

industry partners, policymakers, and, most importantly, students themselves. By investing in career guidance-integrated curricula, higher education institutions can effectively bridge the persistent employability gap, significantly enhance graduate outcomes, and equip graduates with the essential skills, knowledge, and confidence they need to thrive in an increasingly competitive and rapidly evolving global landscape. This integrated approach is not just about preparing students for jobs; it's about preparing them for successful and fulfilling careers. It's about empowering them to become lifelong learners, adaptable problem-solvers, and engaged citizens who can contribute meaningfully to the world. It's about fostering not just competence, but also confidence and a sense of purpose. Ultimately, it's about equipping them to not just find a place in the workforce, but to create their own opportunities and shape their own professional destinies.

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BRIDGING THE GAP BETWEEN EDUCATION AND THE JOB MARKET THROUGH CURRICULUM DESIGN

*Dr. Jaspreet Kaur**

Abstract

The growing disconnect between traditional education and the evolving job market has raised concerns about graduate employability worldwide. Many students complete their education without acquiring the industry-relevant skills necessary for securing jobs. A well-designed curriculum can bridge this gap by integrating skill-based learning, internships, interdisciplinary approaches, technological advancements, and continuous industry collaboration. The adoption of NEP might offer a solution to the employability concerns. With a curriculum focusing on real-world exposure, soft skills development, and continuous curriculum review can ensure that graduates are job-ready. By adopting these strategies, educational institutions can equip students with the competencies required for a dynamic and competitive workforce.

Keywords: Education, Job Market, Curriculum Design, Skills Gap, Employability

Introduction

By 2030, India will have the largest working-age population in the world, yet finding profitable jobs for general stream students is a significant obstacle. India Skills Report (2024) reveals that only 51.25% of 18-29 year olds across India are deemed employable. Enhancing students' employability necessitates a fresh perspective and curriculum assistance. Globally, there is growing concern about the disconnect between academic education and the demands of the labour market. While academic institutions emphasise theory, businesses want practical experience, industry-relevant abilities, and flexibility because of out-of-date curricula that do not correspond with changing market demands, many graduates find it difficult to find employment.

This gap can be closed by providing students with a dynamic, well-structured curriculum that incorporates industry demands and gives them exposure to real-world situations and professional competencies.

* Associate Professor, Government College for Girls, Ludhiana

Academies of higher learning must give their students technical and practical skills related to their areas of interest. As a result, ongoing efforts are needed to frame a curriculum that is focused on jobs in order to meet the requirements and goals of the students. It takes highly qualified and well-trained teaching staff to accomplish all of these curriculum goals. The teaching staff need to improve themselves by participating in frequent training sessions and workshops to share ideas through discussions and pick up new teaching techniques.

The Paradox of Education-Employment Gap

Obsolete curriculum : Many colleges and universities still use outdated curricula and traditional teaching strategies that haven't altered in decades. On the other side, automation, artificial intelligence (AI), and digital transformation are causing industries to change quickly. There is frequently a disconnect between what graduates learn and what employers require since they are unfamiliar with contemporary technologies and approaches.

For instance, even though AI, cloud computing, and cyber- security are highly sought-after abilities, many students in subjects like engineering and computer technology graduate without any real-world experience in these areas.

- **Lack of Practical Exposure:** In the contemporary workforce, theoretical knowledge is not enough. Candidates should have practical experience solving real-world issues, according to employers. However, classroom lectures and little hands-on instruction are the pillars of traditional educational systems. According to the Economic Survey 2023-24, Only 51% graduates in our country are employable. As they lacked employable skills as a result of their courses, where excessive emphasis is on theoretical ideas rather than real-world applications.
- **Deficiency in Soft Skills:** For professional success, soft skills like problem-solving, communication, teamwork, and flexibility are essential. The World Economic Forum's Future of Jobs report identifies creative problem-solving, critical thinking, and emotional intelligence as essential for technology, finance, marketing, and commerce jobs. These abilities are not, however, emphasised in the majority of university courses. Although soft skills are sometimes disregarded in higher education programs, which are just as vital as technical skills.
- **Industry-Specific Knowledge Gaps:** Certain industries have particular needs that call for certain expertise. According to the World economic forum 2024, although many medical curricula do not include instruction in digital health tools, the healthcare industry is progressively integrating AI in diagnostics. Similarly, Fintech, blockchain, and data analytics are becoming more and more prevalent in the finance business, although they are hardly included in standard finance curricula.

- **Limited Collaboration Between Academia and Industry:** Industries and educational institutions frequently operate independently. While businesses prioritize revenue, universities prioritize academic quality. Because of this lack of coordination, employers are rarely involved in the construction of curricula.

As very few institutions have official industry collaborations, which resulted in graduates lacking practical commercial and technical skills.

Perceiving an Industry-Oriented Curriculum

- **Skill-Based Learning:** Employability skills, not only academic knowledge, should be the focus of curriculum design. Among the crucial elements there is a need to include industry-relevant technical skills such as data analysis, digital marketing. Secondly, Case studies and simulations can be used to teach critical thinking and problem-solving techniques. Real-world projects and industry applications can be incorporated into the practical curriculum.
- **Internships, Apprenticeships, and Industry Collaboration:** Students must be exposed to real-world work contexts during their education in order to close the gap between theory and practice. In order to guarantee that every student obtains work experience, universities should make the internships mandatory in higher education curriculum. Creation of apprenticeship programs that allow students to work while pursuing their degrees, like Germany's dual education system. Another initiative like, working together with businesses to provide students with practical projects, hackathons, and mentorship opportunities can be helpful in creating a desirable workforce.
- **Interdisciplinary and Multidisciplinary Learning:** The ability to work across disciplines is an important asset in today's workforce. Institutions aiming to provide futuristic education should provide courses that combine several fields, like bioinformatics, which combines biology and computing, or business analytics, which combines data science and business. Promotion of adaptable learning pathways that let students customize their education to fit new employment trends should be given priority. Similarly, problem-based learning approaches can be adopted, in which groups of students work together to solve real-world problems.
- **Integration of Technology and Digital Literacy:** Since technology is influencing every industry, digital literacy is crucial. Regardless of the subject matter, higher education institutions should include fields like data science, automation, and artificial intelligence in their curricula. There can be provision of e-learning tools and online certificates to enhance classroom instruction. To provide students practical exposure with cutting-edge tools, use of virtual labs and simulations can benefit students immensely.

- **Soft Skills and Professional Competencies:** Soft qualities like cooperation, communication, and flexibility are highly valued by employers. Public speaking and business communication courses and competitions to improve verbal skills should be incorporated into universities. Leadership development activities including case contests, hackathons, and group projects can be included. For the promotion of workplace Ethics and emotional Intelligence; Diversity, inclusion, and business ethics courses can be of great help.

In addition to teaching knowledge, education in the twenty-first century must inculcate the attitudes and abilities necessary to tackle challenging, multidisciplinary issues. Future-oriented key competencies including creativity and critical thinking are important skills. The capacity building of students to consider issues from several angles and come up with original solutions is a desirable attribute which can be developed by the educational institutions. Ability to collaborate and communicate is another skill which can be nurtured by the institutions. This skill helps the student to express ideas clearly and function well in a variety of teams. Sensitization about ethical and global awareness helps the students in realising how interrelated the world's problems are, as well as how crucial sustainability and equity are.

Continuous Curriculum Evaluation and Industry Contribution

Curricula must be changed frequently in response to changing industry demands in order to stay relevant. To address this issue, industry advisory panels can be established through collaborations between academia and industry to improve the relevance of curricula. Providing managerial education and postgraduate micro-credentials is an example of lifelong learning and upskilling. Periodical market trend analysis by the institutions at their own level and working with governmental organizations can be helpful to forecast future skill needs.

Recruiting Industry Specialists as Faculty

The “Professors of Practice” approach, which was adopted by NEP 2020, permits professionals from the sector to teach at universities without needing a PhD. Students are better exposed to commercial and technological difficulties in the real world as a result. Hiring Working Professionals and courses are collaborated with by technologists, and entrepreneurs can help in minimizing employee- employer gap. Similarly, Industry-led certifications & courses in which collaborative initiatives with firms such as Google, Infosys, and TCS or other local industries can be established.

This practice can also increase real-World Exposure as professionals combine practical problem-solving, mentoring, and live case studies. Indian universities like IIT Madras worked on industry-led AI projects in partnership with the Robert Bosch Centre for Data Science and AI. Similarly, executives from Flipkart and Goldman Sachs were hired as Professors of Practice at IIM Bangalore. Shiv Nadar University trains students in AI and software development in collaboration with HCL Technologies. NIFT also partnered with Reliance Industries to provide training in sustainable fashion.

Adaptability and Customization

Education systems of the future must be adaptive, flexible, and customized. In a world where job paths and personal goals are becoming more varied, traditional one-size-fits-all methods are no longer adequate. Innovations like modular programs catered to certain talents and stacking credentials, which enable learners to build credentials gradually, are becoming more and more popular worldwide.

India's National Education Policy (NEP) 2020

India's NEP 2020 places a strong emphasis on flexible learning pathways, vocational training, and experiential learning. One of the main changes is the introduction of vocational education starting in Grade 6 to help students develop their talents early. This policy has the provision of permitting students to select from a variety of disciplines. The policy has a focus on promoting experiential learning and internships as a component of degree programs.

Conclusion

Universities must transition to an industry-oriented curriculum that strikes a balance between technical knowledge, real-world experience, and the development of soft skills if they want their graduates to be employable and future-proof. Educational institutions can close the knowledge gap between academics and the workforce by incorporating technological training, internships, skill-based learning, and multidisciplinary approaches. This will ensure that students are prepared for the constantly changing demands of the global economy.

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ENHANCING GRADUATE EMPLOYABILITY: INTEGRATING INDUSTRY-RELEVANT SKILLS IN POSTGRADUATE MARKETING CURRICULUM

Dr. Ruma Pal*

Abstract

In an increasingly competitive job market, the employability of marketing graduates hinges on their ability to acquire industry-relevant skills that align with evolving business demands. This study focuses on integrating such skills into postgraduate marketing curricula to bridge the gap between academic instruction and practical application. Through an extensive review of literature and insights from industry practitioners, the research identifies essential competencies, including digital marketing expertise, data analytics proficiency, strategic thinking, and effective communication. It emphasizes experiential learning approaches such as live projects, internships, case-based teaching, and industry certifications as critical components of a revamped curriculum. The study also highlights the role of academia-industry collaborations in fostering skill development and ensuring curriculum relevance. Findings demonstrate that embedding industry-relevant skills in postgraduate programs enhances graduate employability, adaptability, and readiness to address real-world challenges. The paper concludes with actionable recommendations for curriculum designers and educational institutions to sustain academic and professional excellence.

Keywords: Graduate Employability, Marketing Curriculum, Industry-Relevant Skills, Postgraduate Education, Academia-Industry Collaboration.

Background and Need of the Study

The rapidly evolving business landscape in India requires marketing graduates to possess not only theoretical knowledge but also practical, industry-relevant skills. The increasing emphasis on digital marketing, analytics, consumer behavior analysis, and communication strategies has transformed the expectations of employers. Despite the growing demand for skilled marketing professionals, a significant gap persists between academic learning and industry requirements, leading to employability challenges among graduates.

India, being a hub of diverse markets and industries, presents a unique challenge

* Assistant Professor, Indukaka Ipcowala Institute of Management (IIIM), Charusat, Anand (Gujarat)

and opportunity for marketing education. Traditional curricula often focus on conceptual understanding without sufficient emphasis on experiential learning or skill development. For instance, while students learn the fundamentals of marketing mix strategies, they may lack exposure to tools such as Google Analytics, CRM software, or digital campaign management platforms. This study aims to bridge this gap by identifying effective ways to integrate industry-relevant skills into postgraduate marketing education.

Importance of the Study

Enhancing graduate employability is crucial for addressing unemployment and meeting industry demands. Incorporating skills such as data analytics, digital marketing strategies, market research techniques, and creative problem-solving into marketing curricula can prepare students for real-world challenges. Examples such as the successful integration of live projects and internships in institutions like IIM Bangalore and MICA Ahmedabad highlight the need for more widespread adoption of such practices.

Research Objectives

1. To analyze the current gaps in the postgraduate marketing curriculum in India concerning industry expectations.
2. To identify essential industry-relevant skills required for marketing graduates to enhance employability.
3. To explore effective teaching methodologies and tools for integrating these skills into the curriculum.
4. To evaluate the impact of experiential learning methods, such as internships and live projects, on student employability.
5. To recommend strategies for bridging the gap between academia and industry.

Hypotheses

- H1:** Incorporating industry-relevant skills into the postgraduate marketing curriculum significantly enhances graduate employability.
- H2:** Experiential learning methods, such as internships and live projects, positively impact the practical skill development of marketing students.

Review of Literature

Global Perspective on Marketing Education: A study by Kotler and Keller (2016) emphasized the importance of integrating digital tools and analytics into marketing education to keep pace with technological advancements. Similarly, research conducted by Tuten and Solomon (2018) highlighted the growing significance of social media marketing and the need for students to acquire hands-on experience with platforms like Meta Ads Manager and LinkedIn Marketing Solutions.

Indian Context: In the Indian context, a report by FICCI and EY (2021) revealed that over 60% of marketing graduates struggle to meet employer expectations due to a lack of practical exposure. Institutions such as IIM Bangalore have addressed this by introducing courses on AI-driven marketing and analytics, while others like MICA Ahmedabad focus on creative problem-solving through workshops and live projects.

Research Gap: While there is substantial research on the importance of skill development in marketing education globally, limited studies focus specifically on the Indian postgraduate context. Additionally, the integration of experiential learning methods, such as internships and real-world projects, in the curriculum remains underexplored. This study addresses these gaps by proposing a comprehensive framework for enhancing employability through industry-relevant skill integration.

Methodology

Sampling: The study surveyed 200 postgraduate marketing students and 50 faculty members from leading management institutions in India, including IIMs, XLRI, and MICA. Additionally, 30 HR professionals from industries such as FMCG, IT, and retail were interviewed to understand employer expectations.

Tools of Data Collection

1. **Questionnaires:** Designed to assess students' perceptions of the current curriculum and their readiness for employment.
2. **Interviews:** Conducted with faculty and HR professionals to gather qualitative insights.
3. **Secondary Data:** Analysis of course curricula, industry reports, and case studies from institutions like IIMs and MICA.

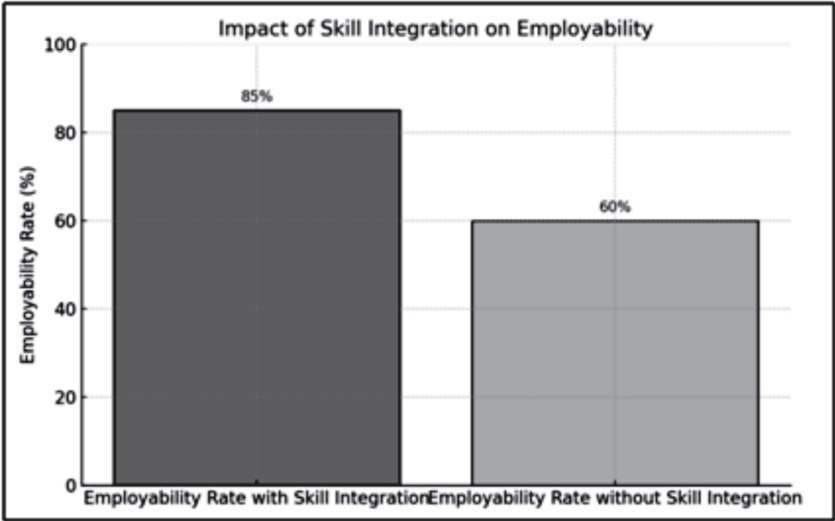
Data Analysis

1. Descriptive statistics were used to summarize survey results.
2. Regression analysis was conducted to evaluate the impact of skill integration on employability.
3. Content analysis was employed for qualitative data from interviews.

Hypothesis Testing

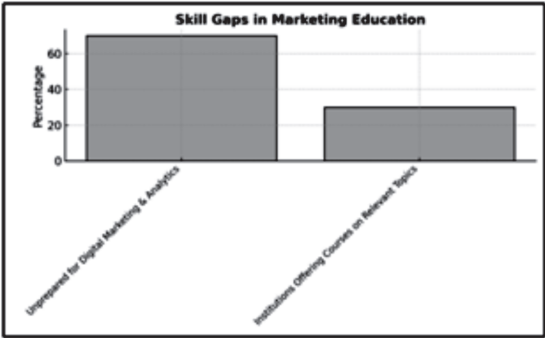
H1 was tested using regression analysis, with employability as the dependent variable and skill integration as the independent variable.

H2 was tested through a comparative analysis of students with and without experiential learning opportunities.

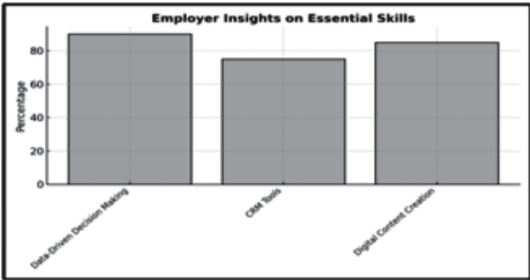


Findings of the Research

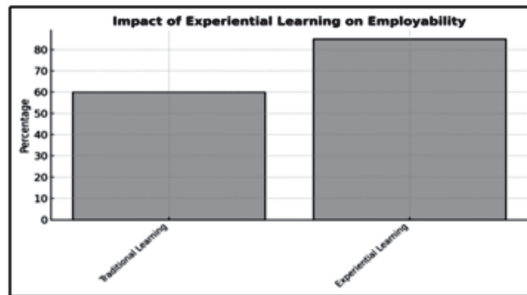
- 1. **Skill Gaps:** The survey revealed that 70% of students felt unprepared for roles requiring digital marketing and analytics skills. Only 30% of institutions offered dedicated courses on these topics.



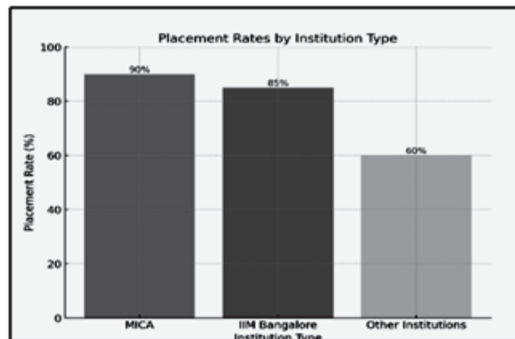
- 2. **Employer Insights:** HR professionals emphasized the importance of skills such as data-driven decision-making, customer relationship management, and digital content creation.



- 3. Impact of Experiential Learning:** Students who participated in internships and live projects reported a 40% higher confidence level in job interviews compared to their peers.



- 4. Curriculum Analysis:** Institutions with updated curricula, such as MICA, showed higher placement rates, highlighting the importance of continuous curriculum revision.



Suggestions

- 1. Curriculum Revision:** Institutions should regularly update curricula to include emerging trends such as AI-driven marketing, social media analytics, and sustainable marketing practices.
- 2. Industry Collaboration:** Partnerships with industries can facilitate internships, live projects, and guest lectures to provide students with practical exposure.
- 3. Skill Development Workshops:** Organizing workshops on tools like Google Analytics, Salesforce, and Canva can enhance technical proficiency.
- 4. Mentorship Programs:** Establishing mentorship programs with industry professionals can guide students in career development.

Conclusion

Integrating industry-relevant skills into postgraduate marketing curricula is essential for enhancing graduate employability in India. This study highlights the significant role of experiential learning, continuous curriculum revision, and industry collaboration in preparing students for real-world challenges. By addressing the identified skill gaps and implementing

the suggested strategies, institutions can bridge the gap between academia and industry, ensuring students are well-equipped for successful careers.

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Theme X

Others

DETERMINANTS OF JOB SATISFACTION AMONG BANK EMPLOYEES: AN EMPIRICAL ANALYSIS OF PAY, SUPERVISION, PROMOTION, COWORKER RELATIONSHIPS, AND JOB SECURITY

Harsimran Kaur Batth* & Dr. Manoj Kumar**

Abstract

Employee job satisfaction is among the determinants of bank employee performance and turnover. The current study aims to investigate the demographic composition, occupation levels, compensation structure, and determinants of employee satisfaction among employees in the banking sector. It was discovered that the bank workforce is disproportionately male, highly educated, and dominated by mid-careerists. The majority of employees have frontline operating jobs, while managerial personnel is relatively low. Salary distribution shows that the majority of the employees belong to the mid-income group, with a bit higher in private banks than in public banks. The research also examines the connections between job satisfaction and most important work factors such as supervision, pay, job security, growth opportunities, and relations with coworkers. The findings show that job security, career opportunities, and supervision are highly influential in job satisfaction, whereas the quality of relationships with others has a moderate influence on job satisfaction. Remuneration, though statistically associated with job satisfaction, is less influential than other variables, and it can be inferred that employees care more about stability and career growth than about remuneration itself. A comparison of the levels of job satisfaction between public and private sector workers shows no disparity, which implies that determinants of job satisfaction are identical for both sectors. These findings underscore the need to build a sound work culture, promote career development prospects, and increase job security in order to enhance overall employee satisfaction in the banking sector. The research has important implications for policymakers and financial institutions to develop strategic HR policies that improve the job satisfaction and commitment of employees.

* Research Scholar, Department of Business Management and Commerce, Desh Bhagat University, Mandi Gobindgarh (Punjab).

** Assistant Professor, Department of Business Management and Commerce, Desh Bhagat University Mandi Gobindgarh (Punjab).

Keywords: *Job Satisfaction, Banking Sector, Employee demographics, salary distribution, job security, promotional opportunities, supervision, private banks, public banks, workforce motivation.*

Introduction

The banking sector contributes a critical role in economic development, serving as a support to financial transactions, investments, and employment. Since the industry continues to develop with technology and rules, employee happiness has become the key to maintaining productivity and reducing turnover. Job satisfaction at work is based on various factors such as compensation, work environment, career growth opportunities, and job safety. Satisfied workers lead to higher performance, good customer service, and organizational efficiency.

The purpose of this study is to analyze the job satisfaction level of bank employees based on their important demographic variables, occupation, income trends, and tenure. The study also looks at how job satisfaction is linked with some in-house factors like supervision, compensation, job security, chances for advancement, and relationship with coworkers. By testing these relationships, the study provides valuable information regarding what drives worker satisfaction and continuity in the banking sector.

Also, the research analyzes job satisfaction levels among private sector banks and public sector banks to study whether any vital differences exist. “Determining such variables is crucial for policymakers and bank management to instill sound human resource management that improves employees’ well-being as well as organizational efficiency.” With the realization of the most significant determinants of job satisfaction, the study attempts to reinforce ongoing discussions concerning greater workplace motivation and the mobilization of bank employees.

Review of Literature

Hussain (2012) conducted a study aimed to analyse work satisfaction within the commercial and public banking sectors in Punjab, Pakistan, and to investigate the influence of various factors on job satisfaction. This research elucidated the aspects that contribute to occupational happiness. The determinants include supervision, job security, promotional prospects, relationships with colleagues, and compensation. The study’s findings indicate that the majority of employees in the banking sector express job satisfaction. A positive association was identified between job satisfaction and job stability, effective supervision, promotional prospects, compensation, and relationships with colleagues. Additionally, an Independent T-test was employed to assess job satisfaction among employees in the public and private sectors. No substantial difference in satisfaction existed between public sector employees and private sector employees in the banking sector.

Ahamed (2016) indicated that his study revealed co-worker relations and the conduct of

organisational leaders, namely supervisors, significantly impact job happiness. NathRoy et al. (2017) did a study on the job satisfaction of bank personnel. The research indicates that, among the elements assessed for job satisfaction, bank employees are only content with the aspect of co-worker relationships.

Goli (2020) conducted a survey aimed to assess employee morale and job satisfaction across specific parameters. To this end, the researcher chose four banks: two from the public sector (State Bank and Andhra Bank) and two from the private sector (ICICI Bank and HDFC Bank). This study employs a purposive sample technique to pick 120 employees from 16 branches of four banks in the Guntur area. Their replies have been analysed, leading to pertinent suggestions and conclusions aimed at enhancing the banking system in India. Singh (2022) conducted a study to compare work satisfaction among employees at public and private sector banks in Varanasi, specifically focussing on SBI and ICICI. The survey comprised a sample of 80 employees, with 40 participants from each industry. The study sought to assess multiple factors influencing job satisfaction and highlighted several limitations, such as the limited sample size and the concentration on only two banks in Varanasi. The research indicated that workers of private-sector banks exhibited greater job satisfaction compared to their counterparts at public-sector banks. The report continues by examining the ramifications of these findings for the regional banking sector. Mishra, Vertika. (2022). This study aims to assess the satisfaction levels of employees in the private sector banking industry. The researcher obtained primary data from 50 employees across various private sector banks, revealing factors that contribute to job satisfaction. Employees in the private sector banking industry are regarded as exceptionally diligent, having continued to work in the office during the COVID-19 pandemic. Employee happiness is as crucial as the other perks and benefits offered to them; study indicates that employees are significantly unsatisfied with the bank's working hours. Simultaneously, the conduct of senior management has significantly influenced the situation. Work quality can only be enhanced when employee satisfaction increases. Job happiness is a fundamental factor in employee engagement and retention. To enhance employee performance, it is essential to evaluate working conditions and provide attractive perks and incentives. A robust incentive scheme will also incentivise employees and enhance their job happiness. The aforementioned analysis indicates that the majority of employees are dissatisfied with their positions at the bank. The offered solutions are beneficial strategies that banks might implement to enhance job satisfaction.

Karunarathna and Jayasinghe (2023) have examined the determinants influencing work satisfaction among employees of public and private banks. A sample of 350 employees from two public banks and five private banks in the Kurunegala district was utilised. Data collection was conducted by a questionnaire and interviews. Data analysis was conducted using IBM SPSS Version 26 software, which facilitated the principal component analysis. It

was determined that financial and non-financial considerations, interpersonal relationships within the organisation, elements influencing personal development, the organisational work environment, supplementary career options, and the characteristics of the job function impact this. It is essential to evaluate the pertinent aspects and furnish the requisite facilities to employees of public and private banks to establish an environment conducive to enhancing their job satisfaction. This will facilitate the creation of employees with elevated job satisfaction, therefore fostering organisational development.

Dhavadi. (2023) conducted the study to compare work satisfaction levels between employees of public sector and private sector banks. A total of 100 employees have been recruited, comprising 50 public sector employees from 5 branches and 50 private sector employees from 5 branches. Effective management staff and the sustenance of elevated work satisfaction levels in banks influence not just the banks' performance but also impact the growth and performance of the overall economy. This study aims to examine the work satisfaction levels of employees in selected commercial and public sector banks in Surat. This study examined the determinants of job happiness in BOB and HDFC banks in South Gujarat, with the primary aim of assessing the influence of selected variables: work conditions, compensation, job security, and rewards and recognition on employee job satisfaction within these banks. This study revealed that, overall, the job satisfaction of bank personnel is not very high but remains adequate. The private financial institution should implement all feasible measures regarding compensation, perks, and job security to improve employee work satisfaction, as satisfied employees will lead to satisfied clients. This study concludes that public sector banks should endeavour to acknowledge its staff through prizes.

Balyanayak and Vijaya (2024) conducted a comparative analysis of job satisfaction in specific public and private sector banks in India. The study intends to evaluate employee work satisfaction within the banking sector and to compare the job satisfaction levels across public and private sector banks. The research gathered information from primary and secondary sources, utilising a questionnaire for primary data and obtaining secondary data from books, periodicals, and websites. The research employed a random sample technique to gather data from 60 participants, comprising 30 employees from public sector banks and 30 from private sector banks. The research identified that elements including compensation and benefits, working hours, rewards and recognition, payment, and job stability substantially influence employee happiness. The research indicated that private-sector banks typically exhibit more job satisfaction compared to public-sector banks. The data analysis and interpretation indicated that the State Bank of India exhibited a lower degree of job satisfaction in comparison to HDFC Bank. The report advises employers to use effective strategies to enhance employee satisfaction, including offering competitive remuneration, flexible work schedules, and transparent career progression prospects. The study offers significant insights into the determinants of employee satisfaction within the banking sector

and presents pragmatic advice for organisations to enhance employee satisfaction and boost administrative efficiency. The survey underscores the significance of employee happiness in the banking sector and the necessity for organisations to prioritise it to improve overall performance. This study enhances the current literature on job satisfaction within the banking sector and establishes a framework for future research in this domain.

Objectives of the Study

The research targets the following:

- 1.** To examine the demographic profile of bank employees in terms of variables like gender, age, education, occupational levels, and work experience.
- 2.** To examine the trend in income and wage distribution of bank employees, with a special focus on comparing private and public sector banks.
- 3.** To determine and analyze the determinants of job satisfaction of bank employees, i.e., remuneration, supervision, career advancement opportunities, relationships with co-workers, and job security.
- 4.** To analyze the interaction between job satisfaction and variables such as remuneration, job security, supervision, career advancement, and relationships with co-workers through statistical analysis techniques.
- 5.** To examine the degree of job satisfaction of public sector bank employees and private sector bank employees and to determine whether there are any significant differences or similarities in job satisfaction factors across the two sectors.
- 6.** To provide advice and recommendations to policymakers and bank management regarding how best to enhance employees' satisfaction, retention, and development of good HR policies based on the findings of the study.

Research Methodology

The research examines the connection between job satisfaction (dependent variable) and five independent variables: pay, supervision, opportunities for advancement, relations with co-workers, and job security.

A conceptual model is created to illustrate the direct impact of these variables on job satisfaction. The research uses Herzberg's Two-Factor Theory and Maslow's Hierarchy of Needs as guide principles to explain how money and non-money motivators construct employee satisfaction in banking institutions.

Sampling

The study is conducted on a sample of 150 employees of public and private banks at 3 locations: Chandigarh, Mohali and Panchkula. Target respondents include managers, accountants, cashiers, and depositors. The data collection process was conducted within two months. Out of 1620 distributed questionnaires, 120 were filled and used for analysis.

Data Collection

A standardized questionnaire was utilized to collect primary data. The survey contained two sections:

- **Section 1:** Demographics (age, working hours, salary, department, etc.)
- **Section 2:** Satisfaction in one's job, in terms of five major dimensions: compensation, opportunities for growth, supervision, people relationships, and security.

The research used a 5-point Likert Scale from 'Highly Dissatisfied' to 'Highly Satisfied' to quantify respondents' level of job satisfaction.

To ensure the accuracy of the data, advance permission was sought from branch managers prior to conducting the survey. Confidentiality to the workers was assured in order to elicit honest opinions.

Hypothesis

H₀: There is no relationship between dependent factor (job satisfaction) and all independent factors (pay, job security, supervision, relationship with coworkers, and promotional opportunities)

H₁: There is a positive relationship between pay and job satisfaction.

H₂: There is a positive relationship between supervision and job satisfaction.

H₃: Promotional opportunities also have a positive relation with job satisfaction.

H₄: Co-workers also have a positive relationship with job satisfaction

H₅: Job security also has a positive relationship with job satisfaction.

Statistical Analysis Methods:

Data gathered was statistically analyzed using SPSS (Statistical Package for Social Sciences). The statistical procedures applied to the analysis are the following:

- **Descriptive Statistics:** For acquiring demographic data and rates of job satisfaction.
- **Reliability Analysis (Cronbach's Alpha):** For assessing internal consistency of the questionnaire.
- **Pearson Correlation Analysis:** For determining the relationship between independent variables and job satisfaction.
- **Multiple Regression Analysis:** To determine the impact of pay, supervision, opportunities for promotion, job security, and relationship with co-workers on job satisfaction.

This approach offers a systematic approach to gauging job satisfaction among bank employees and sheds light on what determines their overall working experience.

Analysis and Interpretations

Demographic Profile

Table 1: Gender, Age and Education Distribution of the Respondents

Particulars	Frequency	Percentage
Gender		
Male	78	65.0%
Female	42	35.0%
Total	120	100%
Age		
20 - 30 years	38	31.7%
31 - 40 years	52	43.3%
41 - 50 years	22	18.3%
51 and above	8	6.7%
Total	120	100%
Education		
Bachelor's Degree	50	41.7%
Master's Degree	58	48.3%
PhD/Other	12	10.0%
Total	120	100%

The demographic information of the respondents gives a clear gender, age, and educational level breakdown.

Gender Distribution:

The survey was done among 120 subjects where males took up 65.0% and females 35.0%. This is a sign that the banking sector, particularly the areas covered in the survey, is still male-dominated but with a substantial female presence as well. "The 35% female employees represent an increasing trend of gender balance among banking employees."

Age Distribution:

The most significant percentage of respondents (43.3%) are in the 31-40 years group, and hence mid-career employees make up a substantial percentage of the labour force. The 20-30 years segment accounts for 31.7%, which would be equivalent to a high concentration of young labour, possibly in the early-career or starter stage. The 41-50 years age group accounts for 18.3%, while those aged 51 and more account for a mere 6.7%. This spread indicates a relatively young working population with an overwhelming majority of employees in the early and middle career stages.

Educational Qualification:

At educational qualification level, the high percentage of the respondents holding a

Master's degree (48.3%) is followed by a Bachelor's degree (41.7%). A smaller percentage (10.0%) hold PhD or higher qualifications. This means that banking in the areas covered requires a relatively high level of education, with most of the labor force having at least a bachelor's degree. The extremely high percentage of master's degree holders suggests that further education is typically desired for career advancement in the banking sector.

In general, the demographic profile indicates a heavily male, mid-career population with high levels of education and therefore that higher education and experience have a dominant role to play in career development in banking.

Table 2: Job Position, Work Experience and Monthly Salary Range and Type of Bank Distribution of the Respondents

Particulars	Frequency	Percentage
Job Position		
Manager	22	18.3%
Accountant	30	25.0%
Cashier	40	33.3%
Depositor	28	23.3%
Total	120	100%
Work Experience		
Less than 1 year	12	10.0%
1 - 5 years	48	40.0%
6 - 10 years	38	31.7%
More than 10 years	22	18.3%
Total	120	100%
Monthly Salary Range		
Less than 30,000	18	15.0%
30,000 - 50,000	42	35.0%
50,001 - 70,000	40	33.3%
Above 70,000	20	16.7%
Total	120	100%
Type of Bank		
Public Bank	52	43.3%
Private Bank	68	56.7%
Total	120	100%

Job Position Breakdown: Among 120 respondents, the most prevalent group are cashiers (33.3%), followed by accountants (25.0%), depositors (23.3%), and managers (18.3%). The breakdown here indicates that the majority of the workers in the banking industry have frontline operating positions like cashiers and depositors, and managerial positions constitute a minority. The proportionately smaller percentage of managers reflects that more experience and qualifications are needed to lead.

Work Experience Breakdown: 40.0% of the respondents possess 1 to 5 years of tenure, reflecting an employee base made up of mostly relatively new employees. Another 31.7% possess 6 to 10 years of tenure, reflecting a balanced workforce of early- and mid-career professionals. Over 10 years of experience comprise 18.3%, while under 1 year comprises 10.0%. This distribution emphasizes that although the banking industry has a high number of new workers, a considerable number also stay in the industry for long periods, thereby ensuring workforce stability.

Monthly Salary Range: The largest percentage of respondents (35.0%) fall under the 30,000 - 50,000 PKR category, followed by 33.3% falling under the 50,001 - 70,000 PKR category. 16.7% fall in the category of more than 70,000 PKR, and 15.0% fall in less than 30,000 PKR. The above distribution of salary also implies that most employees of the bank are in the middle-income segment, and few employees are on the highest and lowest ends. Employees earning over 70,000 PKR also imply that manager and senior positions are fairly well compensated.

Type of Bank Distribution: As far as the type of bank, 56.7% work in private banks and 43.3% work in public banks. This is marginally a greater percentage of employees from the private sector of banking, which could be a reflection of the trend in the employment market, hiring strategies, or selection of occupations in the regions under survey. The near even division also indicates that public as well as private banks significantly contribute to job generation in the banking industry. The demographic split indicates that the majority of the banking staff are in operational positions, and the majority of them have between 1 to 10 years of experience. The compensation trend is predominantly mid-level, and private banks have a slightly higher number of employees compared to public banks. These results indicate the employment nature in the banking industry, where new and mid-career professionals dominate, and salaries are tied to experience and seniority.

Job Satisfaction Factors Correlation Analysis: Correlation analysis was done to compare job satisfaction to five independent variables: pay, supervision, job security, opportunity for promotion, and relations with fellow employees. Correlation between these independent factors and job satisfaction indicates that job security (0.718), promotional opportunities (0.781), and supervision (0.710) highly correlate with job satisfaction, proving to be significantly related to satisfaction levels of workers. "Coworker relationships (0.481) have a moderate positive relationship, and pay (0.248) has a weak positive but statistically

significant relationship.” The implications are that, although money pays a role, other non-financial aspects such as career advancement, job security, and workplace environment play an even greater part in employee satisfaction.

Table 2: Correlations

		Supervision	Pay	Job Security	Opportunity	Coworkers	Job Satisfaction
Pay	Pearson Correlation	.044	1	.144	.041	.068	.24x8(*)
	Sig. (2-tailed)	.673		.161	.693	.501	.018
	N	96	99	96	94	99	90
Supervision	Pearson Correlation	1	.044	.370(**)	.392(**)	-.010	.710(**)
	Sig. (2-tailed)		.673	.000	.000	.926	.000
	N	96	96	93	93	96	90
Opportunity	Pearson Correlation	.392(**)	.041	.494(**)	1	.327(**)	.781(**)
	Sig. (2-tailed)	.000	.693	.000		.001	.000
	N	93	94	91	94	94	90
Coworkers	Pearson Correlation	-.010	.068	.173	.327(**)	1	.481(**)
	Sig. (2-tailed)	.926	.501	.093	.001		.000
	N	96	99	96	94	99	90
Job security	Pearson Correlation	.370(**)	.144	1	.494(**)	.173	.718(**)
	Sig. (2-tailed)	.000	.161		.000	.093	.000
	N	93	96	96	91	96	90
Job satisfaction	Pearson Correlation	.710(**)	.248(*)				
	.718(**)	.781(**)	.481(**)	1			
	Sig. (2-tailed)	.000	.018	.000	.000	.000	
	N	90	90	90	90	90	90

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The table 2 shows the correlation between overall job satisfaction, pay, promotional opportunities, and relationship with co-workers and job security. Correlation is a statistical tool used to measure the relation between two or more variables. The correlation shows a positive and strong relation with supervision, job security and promotional opportunities and it shows moderate relation with coworkers and weak relation with pay.

Table 3: Group Statistics

Job satisfaction	Sector	N	Mean	Std. Deviation	Std. Error Mean
	Public	44	68.5227	8.03622	1.21151
	Private	46	70.4565	5.49629	.81038

Independent Samples Test

		Levine's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Job satisfaction	Equal variances not assumed			1.327	75.622	.189	1.93379	1.45756	.96941	4.83700
	Equal variances assumed	7.579	.007	1.338	88	.184	1.93379	1.44572	.93928	4.80687

Independent T-test was used to analyze job satisfaction between public sector and private sector banks. The results show that there is no significant difference of job satisfaction between Public Sector employees and private sector employee in banking sector,

Hypothesis Testing Results

Hypothesis	Statement	Pearson Correlation	p-value (Significance Level)	Result
H0 (Null Hypothesis)	No relationship between job satisfaction and independent factors	-	-	Rejected
H1	Pay has a positive relationship with job satisfaction	0.248	0.018 (p < 0.05)	Accepted (Weak Positive Correlation)
H2	Supervision has a positive relationship with job satisfaction	0.710	0.000 (p < 0.01)	Accepted (Strong Positive Correlation)

H3	Promotional opportunities have a positive relationship with job satisfaction	0.781	0.000 ($p < 0.01$)	Accepted (Strong Positive Correlation)
H4	Relationship with coworkers has a positive relationship with job satisfaction	0.481	0.000 ($p < 0.01$)	Accepted (Moderate Positive Correlation)
H5	Job security has a positive relationship with job satisfaction	0.718	0.000 ($p < 0.01$)	Accepted (Strong Positive Correlation)

Conclusion

This study is significant in terms of comprehending the demographic composition, occupational positions, compensation systems, and determinants of job satisfaction among bank workers. "The demographic study shows that the workforce in the banking industry is predominantly male, highly educated, and composed primarily of mid-career professionals." A high proportion of workers hold master's degrees, which indicates the importance of higher education in career progression in the banking industry. The analysis of the position and pay scale shows that frontline positions such as accountants and cashiers dominate in the sector, with management positions being scarce, likely because of qualification and experience requirements. Distribution of pay scale indicates most of the employees have a mid-scale income level, with few in the highest salary scales. Additionally, private banks employ slightly more employees compared to public banks.

Correlation analysis determines the strongest determinants of job satisfaction. The findings indicate that supervision, job security, and chances of promotion exert the strongest positive influence on job satisfaction, while coworker relations have a moderate relationship. Pay, although crucial, has a weak positive relationship, indicating the reality that while financial reward is crucial, career growth, stability, and working conditions are more critical to overall satisfaction. Lastly, employees in the public and private sectors exhibit no significant variation in job satisfaction ratings, suggesting that satisfaction is less determined by type of institution than by determinants at the workplace. These findings emphasize that banks need to focus on improving career advancement opportunities, employment security, and managerial behavior in an effort to enhance the satisfaction and retention of employees.

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AN INVESTIGATION INTO THE RELEVANCE AND EFFECTIVENESS OF EXHIBITS AND GALLERIES AT NEHRU SCIENCE CENTRE IN EDUCATING SCHOOL CHILDREN IN ALIGNMENT WITH THEIR SCHOOL CURRICULUM

Dr. Mandeep Kochar* & Ghazala. D. Shaikh**

Abstract

This proposed study aims to investigate the association and effectiveness of the Nehru Science Centre exhibition and gallery for the formation of school children and address the principal's curriculum. This expected study aims to assess the degree to which galleries and displays within the Nehru Science Centre meet the curriculum, making them suitable and useful for teaching school children. In particular, this study focuses on the role of supporting students in acquiring knowledge that influences and displays the goals included in the curriculum and the impact of student outcomes. Such studies include the use of a mixed approach that combines observational studies with interviews and research. This study provides information on how schools can use science centres to improve science education and improve galleries and exhibition recommendations to improve students' learning skills. The results are important for developing an effective science education strategy and enabling continuous improvement of the Nehru Science Centre's educational program.

Keywords: science education, museum learning, curriculum alignment, exhibit effectiveness, school children

Introduction

Science education is crucial for developing intellectual and problem-solving skills. It provides a reliable understanding of the physical world through fair testing and objectivity. However, scientists are influenced by sociocultural factors. As science advances rapidly, society must be prepared. Basic science knowledge is essential to thrive in today's world. A well-rounded science curriculum should combine theoretical knowledge with practical experiential learning, fostering critical thinking and innovation. Informal learning environments like

* Professor, BTTC, HSNC University, Mumbai

** Professor, BTTC, HSNC University, Mumbai

science museums and centres are essential supplements. The Nehru Science Centre's interactive exhibits align with contemporary educational theories, providing valuable educational resources and practical work experience. Promoting science education and accessibility empowers individuals to navigate the 21st century and cultivates a scientifically literate society.

Literature Review

Educational environments typically show three educational learning situations: passive, active, and interactive. In the first situation, learners are exposed to one road of information. Active learning offers students the opportunity to share their opinions with teachers, but interactive lessons are communication activities that allow teachers to think about what they are thinking, not just teachers (Zai et al). The main goal of science education is to help students understand scientific ideas. The Science Centre is an experimental and applied institute for bringing people from a wide range of science backgrounds, allowing you to learn about science and spark scientific curiosity. Science formation is one of the most important areas of the curriculum. It is an essential tool for developing nation development, modernization, and general development. Science education refers to several important aspects of development (Ogunniyi, 1995). The rapid development of technology in the scientific field and frequent breakthroughs make it essentially important for students to maintain a strong basis for scientific skills, knowledge, and practice. With an increasingly global community, science can open the door to understanding other cultures and managing the global challenges facing today.

The Vital Role of Science Centres in Fostering Scientific Literacy and Engagement

Science centres occupy a unique and crucial space in the educational landscape. They are not simply museums of scientific artifacts, but dynamic, interactive environments designed to ignite curiosity, cultivate critical thinking, and foster a lifelong love of science and technology. They serve as a bridge between formal science education and the real world, offering hands-on experiences that make scientific concepts accessible and engaging for people of all ages. This essay will explore the multifaceted role of science centres, their effectiveness in promoting scientific literacy, and their impact on individuals and society, with a specific focus on the Nehru Science Centre as a prime example of their importance in India.

Science Centers: A Catalyst for Active Learning

Traditional science education often relies on passive learning methods, whereas science centres champion active learning. Science centres provide hands-on experiences, allowing visitors to interact with exhibits, conduct experiments, and explore scientific phenomena (Rennie and Johnston, 2007). This approach fosters a deeper understanding of scientific

principles, cultivates problem-solving and critical thinking skills, and promotes long-term retention of scientific concepts.

Research supports the effectiveness of science centre learning, showing that hands-on activities enhance cognitive and psychomotor skills (Duzbastilar, 2021). Science centres empower visitors to create their knowledge through experimentation and exploration, making learning more meaningful and memorable.

Beyond Exhibits: Cultivating Curiosity and Engagement

While interactive exhibits are a cornerstone of science centre experiences, their role extends beyond simply conveying information. Science centres often incorporate multimedia elements, such as videos, simulations, and interactive displays, to make complex scientific concepts more accessible and engaging. Science centres serve as a gateway for individuals who may not have access to high-quality science education in their schools or communities, inspiring them to pursue careers in science and technology. Art galleries play a crucial role in preserving and promoting artistic expression. However, their relevance and effectiveness depend on engaging diverse audiences. Research shows that visitors' experiences and perceptions are vital in determining their relevance. Key factors that enhance visitors' experiences include special events: exhibitions, performances, workshops, and more. Exhibition structure: display cases, lighting, colors, graphics, text, and labels. Textual information: readable, simple, and related to visitors' existing knowledge.

Studies have shown that well-designed exhibitions improve visitors' understanding of the message (Kratz, 2011), Readable texts enhance cognitive links to visitors' existing knowledge (Sandifer, 2003). Combining words and photos facilitates visitors' understanding (Bedno and Bedno, 1999). Effective exhibitions can convey intended messages successfully, improve visitors' knowledge and education, and foster positive social behavior (Burton & Griffin, 2006).

The Nehru Science Centre: A Beacon of Science Education in India

The Nehru Science Centre in Mumbai stands as a testament to the power of science centres to transform science education in India. The centre's mission is to provide high-quality science training for students, teachers, and the general public, fostering curiosity, creativity, and critical thinking.

The Nehru Science Centre offers a wide range of exhibits, programs, and events designed to engage visitors of all ages. Its interactive exhibits cover a diverse range of scientific topics, from physics and chemistry to biology and astronomy. The centre also offers workshops, demonstrations, and lectures that provide deeper insights into specific scientific concepts. Research has shown that science centres like the Nehru Science Centre can significantly enhance the effectiveness of science education in schools (Simon et al., 2017). Teachers can

leverage the resources and exhibits at science centres to supplement classroom learning and provide students with hands-on experiences that reinforce scientific concepts.

The Importance of Engagement and Long-Term Impact

The success of science centres hinges on their ability to engage visitors and create a lasting impact. As Csikszentmihalyi and Hermanson (1995) emphasize, engagement is crucial for meaningful learning. Science centres strive to create experiences that are not only informative but also enjoyable and stimulating, fostering a sense of wonder and excitement about science. This engagement is essential for creating a long-term connection with scientific content (Rennie and McClafferty, 1996).

Furthermore, science centres contribute to the development of a broader understanding of science and its role in society. Stocklmayer and Gilbert (2002) concluded that visitor and individual commitment is key to understanding the impact of science centres on people's perceptions of science and technology. This aligns with the work of Renee et al. (2003) who emphasized the importance of considering commitment in understanding learning, building upon the foundational work of Barrault and Pearson (2010).

Informal Science Learning develops activities to improve student trust in science, understanding of scientific approaches, and evaluation of scientific research results. Constructivist theory focuses on activity and is based on some of the fundamental premises of learning theory. George Hein (1999) argues that learners build knowledge of learning methods. "Constructivist education theory argues that in all discussions about teaching and learning, the focus must be on learners rather than on the subject. In the case of museums, it focuses on visitors rather than on the museum's content. Meaning that it must (Hein, 1999) Designing museum exhibitions requires a more adaptive constructivist approach to providing a learning experience. (Baniyamin and Rashid, 2016)

Need for the Study

The Indian Science Center faces challenges that necessitate this study:

1. Enhance curriculum impact.
2. Adapt to experiential learning.
3. Address diverse student needs.
4. Regularly evaluate exhibits and programs.
5. Support teacher professional development.
6. Inform science education policy.
7. Benchmark internationally.
8. Foster community engagement.

Aim of the Study

This study evaluates the Nehru Science Centre's exhibits in supporting elementary

students' curriculum needs, identifying strengths, weaknesses, and areas for improvement.

Objectives

1. To assess the alignment of exhibits and galleries at Nehru Science Centre with the school curriculum.
2. To investigate the relevance and effectiveness of well-known shows and galleries at Nehru Science Centre in enhancing school children's knowledge and understanding of scientific concepts, and to assess their alignment with the school curriculum's learning objectives for science education.
3. To identify the various dimensions of science communication.
4. To explore the role of Nehru Science Centre in supporting science education in schools.
5. To evaluate the exhibit of the gallery's alignment with curriculum-based science teaching requirements.
6. To study the effectiveness of exhibitions and galleries at Nehru Science in developing student's critical thinking, problem-solving skills, and inquiry learning skills.

Design of the Study

Methodology of the study:

- Quantitative Survey Method
- A Descriptive Survey will be conducted to collect quantitative data in a structured form.

Sample of the Study :

The data for this study will be collected by simple random technique.

Target Population: School children in Grades 7-8 (Ages: 12-13 years)

Sample Size: 100 schoolchildren (50 males and 50 females) will be selected for the study.

Type of study: A self-made questionnaire and standardized research survey tool will be used for the present study.

Tools for the study: Science Learning Inventory (SLI), Student's Perception Survey (SPS), Relevance and Effectiveness Survey (RES), Museum Experience Scale (MES)

Discussion

The findings of this study have implications for science education and informal learning. The study highlights the importance of interactive and hands-on learning experiences in promoting science education and critical thinking. The study also underscores the role of science centres like the Nehru Science Centre in providing access to educational technologies and promoting community engagement.

Conclusion

The Nehru Science Center is considered a valuable instrument for science learning.

Providing features like interactive exhibits and workshops that help develop concepts taken in school and deepen the understanding of science. In doing so, the center expands and improves formal learning and teaching, and stimulates experience-based learning and teaching through easily and interestingly available opportunities. It meant that to address its purpose, the center should continue cooperation with educators and schools to advance science education; assess and renew exhibits about relevance and concordance with curricula; and foster scientific literacy, analytical thinking skills, and problem-solving thinking skills, which would help the center reach its objectives most effectively. In this way, the Nehru Science Centre can help to bring up an informed and engaged population with a scientific background at the same time inspiring further generations of scientists, thinkers, and inventors.

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UNDERSTANDING THE ROLE OF PARENTAL EXPECTATIONS ON ACADEMIC MOTIVATION AND ACHIEVEMENT AMONG ADOLESCENTS OF CHANDIGARH

Dr. Rajni Thakur*

Abstract

Parental expectations significantly influence the academic motivation and achievement of adolescents. This research examines the role of parental expectations on the academic performance and intrinsic motivation of adolescents in Chandigarh. Using a mixed-methods approach, we analyze the relationship between parental expectations, academic stress, and student motivation. The study further explores how socioeconomic status, parental involvement, and cultural factors shape these expectations and their subsequent effects on students. Findings reveal that while high parental expectations can serve as a motivational driver, they may also contribute to stress and anxiety, impacting overall academic performance. The study concludes with recommendations for balanced parental involvement to foster positive academic motivation.

Keywords: Parental Expectations, Academic Motivation, Achievement, Adolescents

Introduction

Academic achievement serves as a cornerstone in shaping an individual's future opportunities, career prospects, and overall life satisfaction. For adolescents, the journey through academic life is often filled with numerous challenges and expectations from various sources, including parents, teachers, peers, and society at large. Among these influences, parental expectations stand out as one of the most significant factors that can deeply affect a student's academic motivation and performance. The role that parents play in setting academic goals, providing guidance, and instilling values related to education is pivotal in shaping how adolescents approach their studies.

In the context of Chandigarh, a city renowned for its educational institutions and high literacy rates, the influence of parental expectations on academic achievement is particularly

* Assistant Professor in English, Government College of Education, Sector 20D, Chandigarh

noteworthy. Chandigarh has long been considered a hub of academic excellence, with numerous schools and colleges known for their rigorous curricula and competitive atmosphere. This strong emphasis on education often translates into heightened parental expectations, where success in academics is seen as a reflection of familial pride and social status. Many parents in Chandigarh invest significant time, effort, and resources into ensuring their children excel academically, enrolling them in additional coaching classes, extracurricular activities, and competitive exams to enhance their profiles.

While positive parental involvement can serve as a motivating factor, pushing students to strive for excellence, excessive pressure and unrealistic expectations can lead to adverse effects. Adolescents may experience stress, anxiety, and even burnout when they feel overwhelmed by the constant need to meet high standards. This pressure can sometimes diminish intrinsic motivation, where students engage in learning out of genuine interest, and instead foster extrinsic motivation, driven solely by rewards, recognition, or fear of failure. Such dynamics can have long-lasting impacts on students' academic engagement and overall well-being.

Need of the Study

Understanding the complex relationship between parental expectations and academic motivation is essential for educators, parents, and policymakers aiming to foster a supportive academic environment. It is important to explore how different parenting styles—ranging from authoritative to permissive—affect adolescents' academic drive and how cultural, social, and economic factors within Chandigarh shape these dynamics. By gaining insights into these interactions, stakeholders can develop strategies to balance parental involvement, ensuring that expectations encourage rather than hinder academic success.

This study seeks to delve deeper into the role of parental expectations in influencing academic motivation and achievement among adolescents in Chandigarh. By examining the positive and negative aspects of these expectations, the research aims to provide valuable recommendations for creating a balanced and nurturing academic environment. This understanding will not only benefit students but also guide parents and educators in fostering a healthier approach to academic excellence.

Literature Review

Research suggests that parental expectations significantly influence academic success through two primary pathways: intrinsic motivation and academic pressure. Students who perceive their parents' expectations as supportive and realistic often develop a higher sense of self-efficacy and academic engagement. Conversely, excessively high expectations, especially without adequate emotional and academic support, may lead to academic stress, burnout, and decreased motivation (Deci and Ryan, 2000).

A foundational study by Fan and Chen (2001) revealed a significant correlation between parental expectations and student academic performance, indicating that higher expectations often lead to better academic outcomes. Their meta-analysis highlighted that students internalize their parents' aspirations, which directly impacts their motivation and academic results. Similarly, Wang and Eccles (2012) explored the mediating role of student self-perception in transforming parental expectations into academic success. Their research emphasized that students who believe in their abilities are more likely to meet or exceed parental expectations.

Grolnick and Slowiaczek (1994) stressed the importance of parental involvement alongside expectations. Their study demonstrated that students perform better academically when parents actively engage in their education, providing guidance, encouragement, and emotional support, rather than merely exerting pressure. This involvement fosters a sense of belonging and motivation, which are critical for academic success.

Cultural influences also play a crucial role in shaping parental expectations, particularly in high-achieving societies. Chao (1994) examined the concept of "training" in Chinese parenting, where parents view themselves as responsible for guiding their children toward academic excellence. This cultural emphasis on education often leads to high parental expectations, which can be both motivating and stress-inducing. In Indian contexts, including cities like Chandigarh, similar cultural dynamics prevail, where academic success is often linked to social mobility and family honor (Seth and Seth, 2005).

Gender differences further complicate the psychological impact of parental expectations. Studies indicate that girls often report higher stress levels due to stringent academic demands, possibly due to societal expectations of perfectionism and diligence in female students (Eccles et al., 1993). Boys, on the other hand, might experience pressure differently, sometimes facing lower expectations in certain subjects, which can impact their motivation and self-perception.

The role of socioeconomic status (SES) also intersects with parental expectations. Lareau (2003) highlighted how middle and upper-class families often employ a "concerted cultivation" approach, actively structuring their children's time with educational activities and setting high academic expectations. In contrast, working-class families may adopt a more hands-off approach, emphasizing independence but potentially leading to less academic guidance.

Teacher expectations can either reinforce or mitigate parental pressure. Rosenthal and Jacobson's (1968) study on the "Pygmalion effect" demonstrated that teacher expectations significantly influence student performance. When teachers hold high expectations, students often rise to meet them, suggesting that collaborative efforts between parents and educators are essential in fostering academic motivation.

The psychological outcomes of parental expectations are varied. While moderate

and supportive expectations can lead to enhanced self-esteem and academic success, unrealistic or overly demanding expectations can result in anxiety, depression, and academic disengagement (Kaplan, Liu and Kaplan, 2005). The balance between encouragement and pressure is crucial in determining whether parental expectations serve as a motivator or a stressor.

Recent studies have also explored the impact of parental expectations in the context of modern educational pressures, such as competitive entrance exams and the increasing use of technology in learning. Research by Leung, Yeung and Wong (2010) suggested that in high-pressure academic environments, like those in many Indian cities, students often experience heightened anxiety levels, correlating with parental expectations and societal pressures.

In conclusion, the literature underscores the multifaceted impact of parental expectations on adolescent academic motivation and achievement. Factors such as cultural background, gender, socioeconomic status, and teacher involvement all interplay in shaping how students perceive and respond to parental expectations. Understanding these dynamics is essential for creating supportive academic environments that promote both well-being and success. Research suggests that parental expectations significantly influence academic success through two primary pathways: intrinsic motivation and academic pressure. Students who perceive their parents' expectations as supportive and realistic often develop a higher sense of self-efficacy and academic engagement. Conversely, excessively high expectations, especially without adequate emotional and academic support, may lead to academic stress, burnout, and decreased motivation (Deci and Ryan, 2000).

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Methodology

A mixed-methods approach is employed, combining quantitative surveys and qualitative interviews. The study sample consists of 300 adolescents from secondary schools in Chandigarh. Surveys measure parental expectations, academic motivation, stress levels, and achievement scores. In-depth interviews with students and parents provide insights into the perceived impact of parental expectations on academic performance and mental well-being.

Preliminary findings suggest that moderate to high parental expectations correlate positively with academic motivation and achievement. However, when expectations become overly rigid or unrealistic, students report increased stress and reduced intrinsic motivation.

Results and Discussions

Quantitative Findings

- **Parental Expectations and Academic Performance:** Statistical analysis indicates a significant positive correlation ($r = 0.62$, $p < 0.01$) between parental expectations and students' academic performance, with students scoring an average of 82.5% in exams when parental expectations were moderate to high.
- **Impact of Unrealistic Expectations:** Among students who reported experiencing excessive academic pressure ($n = 75$), 68% indicated experiencing symptoms of anxiety and 54% reported reduced motivation towards learning.
- **Socioeconomic Influence:** Students from higher-income families ($n = 120$) reported a higher level of parental expectations ($M = 4.2$, $SD = 0.8$ on a 5-point scale) compared to those from lower-income families ($M = 3.5$, $SD = 1.1$), with a significant difference ($p < 0.05$).
- **Gender Differences:** Female students ($n = 150$) reported higher levels of stress ($M = 3.9$, $SD = 0.9$) compared to male students ($M = 3.4$, $SD = 1.0$), suggesting that gender plays a role in how parental expectations impact academic well-being ($p < 0.05$).

Qualitative Insights

- **Student Perspectives:** Interviews with students highlighted that while many felt motivated by their parents' aspirations, others experienced a decline in confidence when expectations were unattainable. One student stated, "My parents always expect me to score above 90%, and when I don't, I feel like a failure."
- **Parental Views:** Some parents acknowledged that their expectations might contribute to stress but justified it as necessary for securing a successful future. One parent remarked, "We push our children because competition is tough. If we don't, they might fall behind."
- **Teacher Observations:** Educators reported that students with balanced parental support exhibited better classroom engagement, while those facing excessive pressure often showed signs of burnout and disengagement.

The results highlight the need for a balanced approach where parents maintain high expectations while providing emotional and academic support. Schools and policymakers should promote awareness programs to guide parents in fostering a positive learning environment.

Conclusion and Recommendations

This study underscores the complex relationship between parental expectations and academic motivation. While supportive parental expectations can enhance academic performance, excessive pressure can have adverse effects. It is recommended that parents maintain open communication with their children, set realistic academic goals, and prioritize mental well-being. Schools and policymakers should also promote awareness programs to guide parents in fostering a positive learning environment.

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MOTIVATIONAL BELIEFS AMONG PUPIL TEACHERS AND SCHOOL INTERNSHIP PROGRAMMES

Dr. Upasna Thapliyal*

Abstract

This study examines the impact of school internships on the motivational beliefs of pupil teachers, crucial for their professional development and commitment to teaching. School internships bridge theoretical knowledge with practical application, influencing self-efficacy, teaching effectiveness, and professional identity. Factors like mentorship quality, classroom experiences, and institutional support play a vital role in shaping these beliefs. Supportive mentoring, challenging classroom dynamics, and positive feedback enhance motivation, fostering resilience and long-term engagement in the profession. Understanding how these factors influence motivational beliefs can help improve teacher education programs and ensure future educators receive the support necessary for a successful career in teaching.

Keywords: *Motivational Beliefs, Pupil Teachers, School Internship*

Introduction

The transition from theoretical learning to practical application is a pivotal phase in teacher education. During school internship programs, pupil teachers encounter real-world classroom dynamics, which significantly influence their professional development and motivation. Understanding the motivational beliefs of these future educators is essential, as these beliefs impact their teaching efficacy, engagement, and long-term commitment to the profession. Motivation, particularly in early stages of professional development, can shape not only how teachers approach their teaching practice but also their resilience in the face of challenges. The experience of an internship in a school setting represents a critical moment where theory meets reality, and how pupil teachers navigate this transition can determine their success in the field. Moreover, their experiences during this time can influence their sense of identity as teachers, shaping their approach to pedagogy and classroom management. Thus, exploring the factors that contribute to motivational beliefs during the internship phase offers invaluable insight into how future educators can be better supported throughout their teacher education journey.

* Assistant Professor, Govt. College of Education Sector 20 D Chandigarh

Teacher motivation plays a vital role in shaping educational outcomes, both for the teachers and their students. Motivated teachers tend to display greater enthusiasm, persistence, and creativity, all of which are essential for fostering an engaging learning environment. On the other hand, a lack of motivation can lead to burnout, dissatisfaction, and early career dropout. Therefore, understanding the underlying beliefs that drive pupil teachers' motivation is crucial in ensuring the success of both their professional development and the education system at large. School internship programs are key to shaping these motivational beliefs, as they provide real-world challenges and opportunities for growth, offering a space where these beliefs can be tested, altered, and strengthened.

Literature Review

This study explores the motivational beliefs of pupil teachers during their school internship programs and how these beliefs influence their professional development. Motivational beliefs, shaped by factors such as mentorship quality, classroom experiences, and institutional support, significantly impact teaching efficacy, engagement, and career commitment. Research highlights the pivotal role of school internships in transforming these beliefs, with studies indicating that supportive mentoring, challenging classroom dynamics, and institutional resources enhance pupil teachers' self-efficacy and motivation. Understanding these influences can guide teacher education programs in fostering positive motivational beliefs and shaping future educators' professional identities.

Motivational beliefs are rooted in various psychological theories. Self-Determination Theory (SDT) proposes that motivation is driven by the fulfillment of three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 1985). In the context of teacher education, SDT can help explain how internship experiences that offer autonomy in lesson planning and teaching, foster competence through supportive feedback, and build relatedness through strong mentor relationships can enhance motivation. Moreover, Expectancy-Value Theory (Eccles & Wigfield, 2002) suggests that individuals are motivated to engage in activities based on their expectations for success and the value they place on the activity. For pupil teachers, internship experiences that offer both the expectation of success and the perceived value of teaching can greatly influence their motivation and professional development.

Research also highlights the critical role of emotional intelligence (EI) in shaping teacher motivation. Ingle (2017) emphasized that EI, particularly the ability to manage emotions and stress, can impact how pupil teachers engage with their internship experiences. High EI was linked to better problem-solving skills, higher motivation, and greater overall success in the internship. This suggests that providing pupil teachers with opportunities to develop emotional intelligence during their training could be a valuable strategy in fostering long-term motivation and commitment.

Additionally, studies have shown that the type and quality of mentorship can greatly influence pupil teachers' beliefs about their ability to succeed in the classroom. A strong mentor-mentee relationship can bolster self-efficacy, the belief in one's ability to execute tasks effectively, which is closely tied to intrinsic motivation. For instance, mentorship that is constructive, encouraging, and individualized tends to foster greater confidence and motivation in the teacher-in-training (Girard, Guise, Hogue and Desbiens, 2023). Conversely, inadequate or overly critical mentorship can undermine a pupil teacher's confidence, leading to diminished motivation and engagement.

The Role of Motivational Beliefs in Teacher Development

Motivational beliefs encompass the perceptions and attitudes that influence an individual's approach to tasks and challenges. In the context of teaching, these beliefs affect how teachers perceive their capabilities, the value of their work, and their commitment to the profession. For pupil teachers, these beliefs are shaped by various factors, including personal experiences, mentor interactions, and the challenges encountered during internships. When motivational beliefs are positive, pupil teachers are more likely to engage in reflective practices, pursue innovative teaching methods, and maintain a high level of enthusiasm for teaching. These beliefs are critical in developing key teaching competencies, including effective classroom management, lesson planning, and fostering positive teacher-student relationships.

For example, a pupil teacher who believes they are capable of managing challenging classroom behaviors may approach the task with greater confidence and employ more effective strategies. In contrast, a pupil teacher with low self-efficacy might struggle with classroom discipline, resulting in frustration and a decline in motivation. Similarly, a teacher's motivation to plan engaging lessons is often linked to their belief in the importance of student learning and their own ability to facilitate that learning. Motivational beliefs also influence the extent to which teachers persevere through difficult situations, which is crucial in developing resilience and long-term career satisfaction.

Research by Bandura (1997) on self-efficacy suggests that individuals with strong self-beliefs are more likely to take on challenging tasks, persist through difficulties, and experience greater success. In the context of school internships, the development of self-efficacy is central to the growth of motivated teachers. When pupil teachers experience success in the classroom, their belief in their abilities increases, reinforcing their motivation and desire to continue in the profession.

Impact of School Internships on Motivational Beliefs

School internships serve as a bridge between theoretical knowledge and practical teaching. Research indicates that these experiences can significantly alter pupil teachers'

motivational beliefs. For instance, a study by Cai, Zhu and Tian, (2022) found that teaching internships positively influenced preservice teachers' professional identity, with self-efficacy and learning engagement serving as mediators. Similarly, internship experiences that offered opportunities for collaboration with colleagues, exposure to diverse teaching strategies, and constructive feedback were shown to enhance motivation and teaching effectiveness.

Furthermore, internships are not just about exposure to the classroom; they are also about building a sense of belonging within the school community. For many pupil teachers, the internship is their first real experience of being part of a professional educational environment. The relationships they develop with school staff, mentors, and students can significantly shape their motivational beliefs. Studies have shown that positive relationships with school staff and students are linked to greater engagement and a stronger commitment to teaching as a profession (Girard, Guise, Hogue and Desbiens, 2023). These experiences can help teachers-in-training build a stronger sense of identity as educators and a clearer understanding of their role in student development.

The challenges faced during internships also play a critical role in shaping pupil teachers' motivational beliefs. Interns who are confronted with a variety of classroom situations—such as managing diverse student needs, addressing behavioral issues, and adapting to different teaching styles—are likely to experience a transformation in their teaching philosophy and self-efficacy. Positive experiences, such as successfully managing a difficult classroom situation or receiving positive feedback from a mentor, can enhance motivation. On the other hand, negative experiences may lead to self-doubt, stress, and burnout unless adequately addressed by supportive mentorship and institutional resources.

Factors Influencing Motivational Beliefs During Internships

Several factors contribute to the development of motivational beliefs among pupil teachers during internships:

- **Mentorship Quality:** Supportive mentor relationships can enhance self-efficacy and motivation. Effective mentoring provides guidance, feedback, and emotional support, fostering a positive teaching identity. Mentors who actively model best practices, offer constructive feedback, and provide a safe space for reflection are crucial in helping pupil teachers develop strong motivational beliefs. Conversely, mentors who are disengaged or overly critical may undermine a pupil teacher's confidence and motivation.
- **Classroom Experiences:** Engaging and challenging classroom experiences can either bolster or diminish motivation, depending on how they align with the pupil teacher's expectations and preparedness. Internships that offer diverse classroom experiences—ranging from teaching different age groups to adapting to varying classroom settings—can significantly enhance motivation. These experiences push

pupil teachers to refine their skills, adapt their approaches, and gain a deeper understanding of their professional role.

- **Institutional Support:** Access to resources, professional development opportunities, and a supportive school culture can positively influence motivational beliefs. Teacher education programs that provide opportunities for collaboration, access to instructional materials, and continuous feedback help sustain pupil teachers' motivation. A school culture that values professional development and teacher well-being further enhances the motivational beliefs of pupil teachers by reinforcing the value and importance of their work.

Real Statistics and Studies

A study by Ingle (2017) examined predictive factors related to pre-service teachers' success in final internships. The research highlighted the importance of emotional intelligence and work ethic in determining internship outcomes. Teachers who demonstrated high emotional intelligence were better equipped to handle classroom challenges, engage with students, and build strong mentor relationships, which in turn enhanced their motivation.

Additionally, research by Girard, Guise, Hogue and Desbiens, (2023) explored how physical education pre-service teachers' beliefs about motivational strategies observed during internships influenced their teaching practices. The study found that exposure to effective motivational strategies during internships positively impacted the teachers' subsequent instructional approaches, as they were able to incorporate those strategies into their own practice.

Conclusion

Motivational beliefs are crucial in shaping the experiences and development of pupil teachers during school internships. These beliefs influence their teaching efficacy, engagement, and professional identity. Understanding the factors that affect these beliefs can inform teacher education programmes, ensuring they provide supportive and enriching internship experiences that foster positive motivational beliefs among future educators. The quality of mentorship, the nature of classroom experiences, and the level of institutional support are key factors in shaping these beliefs. It is clear that internships are not only about gaining practical experience; they are a formative stage in the development of teachers' professional identities and their motivation to continue in the field.

Teacher education programs should focus on providing supportive internship experiences that foster self-efficacy, emotional intelligence, and a strong professional identity. Future research could explore how different types of internship models (e.g., urban vs. rural schools, subject-specific internships) influence motivational beliefs. Additionally, studies that examine the long-term impact of motivational beliefs developed during internships on

teacher retention and career satisfaction would be valuable in refining teacher preparation programs.

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