ASSESSMENT SURVEY OF METACOGNITIVE AWARENESS OF POSTGRADUATE STUDENTS IN MAHARASHTRA

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Abstract

Today the main aim of higher education is to equip students with employability skills. Problem solving and critical thinking skills are increasingly being sought by employers. In this context, metacognitive skills are of utmost importance. The present study assessed the metacognitive awareness of 219 science and social science postgraduate students in Maharashtra using Metacognitive Awareness Inventory (MAI). A cross-sectional survey design was adopted. The findings of the study clearly indicate the need for development of educational intervention programmes to enhance their metacognitive skills.

Keywords: Employability, Higher Education, Postgraduate Students, Metacognition, Critical Thinking, Problem Solving

In the coming decade, India is projected to have the largest youth population in the world, presenting both opportunities and challenges for the nation's educational system.

To harness this demographic advantage, it is essential that the young generation receives inclusive and equitable education, as emphasized in Sustainable Development Goal (SDG) 4 of the 2030 Agenda for Sustainable Development. Efforts must be directed toward increasing the Gross Enrollment Ratio (GER) in higher education and ensuring that institutions of higher learning promote multidisciplinary and flexible education to meet diverse learning needs and global standards. The National Education Policy (NEP) 2020 envisions a transformative education system aimed at making India a global knowledge superpower. It emphasizes the holistic development of students fostering critical thinking, creativity, ethical reasoning, and social responsibility while nurturing a spirit of lifelong learning that equips learners to adapt and thrive in a rapidly changing world.

Some policy changes in the Indian education system have enabled students to pursue two degrees simultaneously one in the regular mode and other in distance mode. However, studying efficiently at university level requires deep learning and regulating one's own learning enabling individuals to become lifelong learners. If learners have to involve themselves actively in their learning and assessment then the entire education system will have to be rejuvenated through the use of innovative pedagogical approaches that encourage thinking and reflection. The learners will have to be equipped with the skills to learn, unlearn and relearn. In other words, they need to think about their own thinking which leads to learning. The learners should be able to think about their own thinking and also control their thinking in order to learn effectively. Recent research studies have shown that metacognitive awareness defined as the students' ability to

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identify their strengths and weaknesses and deepen their knowledge of strategies as well as understanding how, when and why to use such strategies is related to students' learning (Tuononen, Hyytinen, Raisanen, Hailikari, and Parpala, 2023).

The present study focuses on assessing the metacognitive awareness of first year postgraduate students. Postgraduate students are a large cohort of students who stay in the education system for minimum two to four years depending on the type of professional programme that they have enrolled in. Hence, assessment of metacognitive awareness of postgraduate students will enable researchers to identify whether they have the requisite skills to become deep lifelong learners.

Metacognition means "thinking about one's own thinking"; cognition about one's own cognition. Metacognition refers to the ability to reflect upon, understand, and control one's learning. It consists of two main components – knowledge about cognition and regulation of cognition (Schraw and Dennison, 1994). The first component refers to the reflective aspect of metacognition. The second component refers to the control aspect of metacognition. It is generally referred to as self-regulation.

Flavell (1979) categorizes metacognition into two distinct yet interrelated components: metacognitive knowledge and metacognitive regulation. Metacognitive knowledge refers to the awareness of one's own thinking, while metacognitive regulation denotes the ability to monitor, control, and manage one's cognitive processes. When learners develop metacognitive knowledge, they become capable of guiding and directing their own learning effectively. Thus, metacognition serves as a foundational element for self-directed learning. Self-instruction and independent learning are successful only when students possess the skills and awareness necessary to regulate their learning processes. To cultivate self-directed learners, it is therefore essential to assess their level of metacognitive awareness (Schraw and Dennison, 1994) and explicitly teach metacognitive strategies that enhance their ability to plan, monitor, and evaluate their learning activities.

The term "metacognitive awareness" comprises "knowledge of cognition" and "regulation of cognition" (Schraw and Dennison, 1994). Metacognitive awareness of postgraduate students was assessed using Metacognitive Awareness Inventory (MAI) (Schraw and Dennison, 1994).

The most unique aspect of this study is the assessment of the present status of metacognitive awareness of PG students in Maharashtra. An exhaustive literature review conducted for this study reveals that assessment of metacognitive awareness of PG students has not been conducted in Maharashtra.

A review of related literature provides the background required for understanding the present research problem in the context of previous research. It presents a logical basis for the 'thesis position' (Machi and McEvoy, 2009, p. 4) taken by the researcher. Literature review also finds the gaps in literature on which research can be conducted in order to contribute to the field.

(Magno, 2010) regards CT to be a product of metacognition. Richard Paul, a philosopher and an international authority on critical thinking defines critical thinking as thinking about thinking while thinking in order to make thinking better (Christopher, 1998). "Thinking

about our thinking" was termed as metacognition by Flavell in 1975. This clearly indicates the role of metacognition in critical thinking. Metacognition is required for learning, particularly for self-directing one's learning which forms the most basic element of self-instruction.

Metacognition consists of two primary dimensions: knowledge about cognition and regulation of cognition (Schraw and Dennison, 1994). Knowledge about cognition encompasses three components: declarative, procedural, and conditional knowledge. Declarative knowledge refers to *knowing about things*, procedural knowledge pertains to knowing how to do things, and conditional knowledge involves knowing why and when to apply certain strategies.

Declarative knowledge, in particular, relates to an individual's understanding of the content of learning and the strategies that can be employed to enhance task performance and learning outcomes. It involves awareness of one's cognitive resources, skills, and abilities (Tuononen, Hyytinen, Raisanen, Hailikari, and Parpala, 2023).

Regulation of cognition refers to students' ability to plan, implement, monitor, and evaluate learning processes (Schraw and Dennison, 1994). It comprises three main phases, namely, (1) task analysis, goal setting, and strategic planning before taking any action, (2) using a range of methods/strategies, monitoring, observing learning during the performance/action and controlling learning during studying, and (3) evaluating and reflecting on learning during and/or after the action These different phases have been found to be cyclical in nature and tightly intertwined so that students go back and forth between the phases when they complete learning tasks Regulation of cognition involves a continuous evaluation of what is known and what still needs to be learned (Flavell, 1979). In the present study, metacognition refers to students' knowledge about their own learning and how to regulate their learning.

Objective of Problem

1. To compare the existing level of metacognitive awareness of science and social science PG students

Research Methodology

Research Problem

Young graduates and postgraduates are the human capital of a nation. It is essential for learners to acquire deep learning habits and become self-directed lifelong learners. Metacognition plays a crucial role in deep learning and lifelong learning. Therefore, the aim of the present study was to assess the metacognitive awareness of first year postgraduate students.

Research Design

For the present study, the researcher selected a cross-sectional survey research design to give a snapshot of the existing level of metacognitive awareness of the respondents.

Population

All first-year science and social science postgraduate students in the traditional affiliating state universities offering arts, science, social science, commerce and professional education in the state of Maharashtra.

Sample and Sampling Technique

The sample consisted of 219 PG students from six traditional affiliating state public universities offering arts, science, social science, commerce and professional education in each of these six administrative divisions of Maharashtra.

The sampling technique used was purposive sampling.

Finalization of Survey Instrument

Three widely used self-report instruments for assessing metacognition are:

I. The Motivated Strategies of Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia and McKeachie
II. Learning and Study Strategies Inventory (LASSI) developed by Weinstein, Schulte, and Palmer, 1987
III. Metacognitive Awareness Inventory (MAI) developed by (Schraw and Dennison, 1994)

All the three are highly reliable, cost effective, and easy to administer and score.

Rationale for choosing MAI -The first two self-report instruments – MSLQ and LASSI are intended for assessing a broader construct 'learning strategy'. In these two instruments, metacognition is included as a subscale. On the other hand, MAI was specifically developed to assess the two theoretical components of MC, namely knowledge about cognition (KC) and regulation of cognition (RC). Moreover, a relatively less amount of class time (only 10-12 minutes) was required to fill in MAI. Therefore, the researcher chose MAI for assessing metacognition of PG students.

Description of Metacognitive Awareness Inventory (MAI)- Metacognitive Awareness Inventory (MAI), a 52-item inventory, constructed and tested by Gregory Schraw and Rayne Sperling Dennison (Schraw and Dennison, 1994) was used to assess the metacognitive awareness of PG students. The MAI is a self-report instrument used to assess the metacognitive awareness of adolescents and adults. The 52 items in the inventory are categorized into two distinct but interrelated areas - knowledge about cognition (KC) and regulation of cognition (RC). 17 items assess KC and 35 items assess RC.

Time limit -There was no present time limit mentioned in MAI for filing in the inventory. However, previous research studies indicated 10-20 minutes allotted for completing MAI.

Scoring-Scoring for MAI is done using the scoring guide given for it. One point is given for selecting the true option and zero point is given for selecting the false option. The scores for each of the two components as well as their subcomponents can be calculated by using the scoring guide. The sum of these scores yields the total score on MAI which is a measure of an individual's metacognitive awareness.

Interpretation of Scores- A higher score on MAI indicates a higher level of metacognition.

Validity and Reliability of Data Collection Tool- The data collection tool used for the survey was Metacognitive Awareness Inventory (MAI). The MAI is a standardized research instrument with reliability 0.93 to 0.88 (Schraw and Dennison, 1994)

Data Collection- For data collection permission was sought from the HOD of various science and social science departments. Consent was obtained from the PG students who participated in the survey.

Planning and Execution of Survey

The researcher obtained permission from the science and social science departments of the six universities. This was done initially by contacting the HOD of various science and social science departments on phone.

The personal data sheet prepared by the researcher enabled the researcher to obtain information about the following demographic variables: university, academic discipline, subject, academic level, gender, age, caste

category, area of high school. In addition to demographic variables, personal details like permanent address, e-mail address, mobile number, WhatsApp number were obtained.

Statistical Tools used for the Survey

Data was entered and analyzed using SPSS. Mann-Whitney U test, a non-parametric test, was used for hypothesis testing.

Limitations

1. The survey was conducted by administering paper and pencil mode of MAI.
2. MAI was administered to PG students in the time slot allotted by the HOD of the respective departments.
3. MAI is in English. PG students who knew English filled in MAI.
4. The present study is quantitative in nature.

Results and Discussion

Objective 1 – To compare the existing level of metacognitive awareness of science and social science students

Dependent variable: Metacognitive Awareness Level

Independent variable (Grouping factor): Academic Discipline

Group 1: Science & **Group 2:** Social science

$H_0$1: The distribution of MA scores for science and social science PG students are equal.

H_a1: The mean ranks of science and social science students are not equal.

Table 4.1: Ranks

Academic Discipline	N	Mean Rank	Sum of Ranks
Science	115	103.56	11909.00
Social science	104	117.13	12181.00
Total	219		

Table 4.2: Test Statistic[a]

	MAI Score
Mann-Whitney U	5239.000
Wilcoxon W	11909.000
Z	-1.585
Asymp. Sig (2-tailed)	0.113

Grouping Variable: Name of the academic discipline

Observation:

MA scores of social science students (Mdn = 41.0) were higher than those of science students (Mdn = 39.0). The Mann-Whitney U test indicated that this difference was statistically non-significant, U ($N_{Science}$ = 115, $N_{Social\ science}$ = 104) = 5239.00, Z = -1.585, p > 0.05. Therefore, $H_0$1was accepted and the alternative hypothesis was rejected.

Above findings indicate there was no statistically significant difference in the metacognitive awareness level of science and social science students. A comparison of the median values indicates that the metacognitive awareness of students was above average.

India aims to have human capital that is equipped with skills of learning how to learn and to think critically thereby, enabling Indian citizens to adapt to the changing global scenario and deal with emerging societal problems in creative ways (National Education Policy 2020).

This is possible only if citizens become lifelong learners. Lifelong learning includes creation of learning environments at formal institutions such as schools, colleges and universities that encourage students to think about, regulate and participate in their own learning. In other words, they will have to be assessed for metacognition and trained to utilize their metacognitive skills for effective problem solving and critical thinking.

The results of this study indicate that metacognitive awareness can be enhanced by planning and implementing interventions for students to improve their ability to learn.

Conclusion

The average metacognitive awareness level of science and social science PG students was found to be the same. So, a common intervention programme can be designed for PG students to enhance their metacognitive awareness. UG students or even high school students can be made aware about metacognition and can be encouraged to make use of these skills so as to enhance their higher order thinking skills.

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