R.N.I. No.: PUNENG/2014/59759 ISSN: 2348-9936

METACOGNITION AND SELF-REGULATED LEARNING OF SECONDARY SCHOOL STUDENTS

*Dr. Parwinderjit Kaur**

ABSTRACT

The present study aimed to examine the relationship of metacognition and self-regulated learning of secondary school students and differences of these two variables with respect to gender (male & Female) and type of school. A sample of 200 students from private and government secondary schools from Amritsar District, Punjab, was selected randomly. Two tools: (i) Metacognition Scale (Sing and Bali; 2021) and Self-Regulated Learning Scale (Gupta and Mehtani; 2017) were used. The findings revealed no significant gender differences were found in metacognition of secondary school students. A significant difference was found in the self-regulated learning of male and female secondary school students; self-regulated learning in female students is more than male students. Furthermore, no significant difference was found in the metacognition as well as self-regulated learning of the students studying in private and government secondary schools. Further, a positive and significant relationship was found between academic achievement and metacognition of secondary school students.

Keywords: *Metacognition, Self-regulated Learning, Learning Environment, Secondary School Students*

Education is a cumulative process of development of intellectual abilities, skills and attitudes, all of which form our various outlooks and dispositions to action in life generally (Bamisaiye, 1989). In this sense education is that constructive process, which drags a person out from the darkness, poverty and misery and lead him on the path of enlightenment, prosperity and happiness by developing his individually in all its aspects i.e., physical, mental, emotional and social (Sodhi, Suri and Sodhi, 2012).

Today, metacognition and self-regulated learning are considered as the most determining factors in educational achievement of the students. Metacognition is essential for high-quality learning and might be a common element to all problems solving (Lynn, Pressley and Waller, 1984). It is important to improve the learners' skills because it is correlated to planning, monitoring, and evaluating problem-solving (Hassan and Rahman, 2017). The learners who already had metacognitive skills could manage and control their learning (Rahmat and Chanunan, 2018). Metacognition is one's knowledge about one's own cognitive processes and one's resulting attempts to regulate those cognitive processes to maximize learning and memory (Ormord, 2006). It is also categorized as higher-order thinking that engages active control over the cognitive procedures involved in the learning process (Barnes and Stephens, 2019) and self-improvement (Balashov, Pasichnyk, Kalamazh and Zdrobylko, 2020). The metacognition concept consists of metacognitive knowledge, metacognitive skill, and metacognitive experience (Sengul and Katranci 2012). It is considered as one of the basic pillars of academic performance and learning excellence (Ibrahim, Baharun and Harun, 2017).

* Assistant Professor, Khalsa College of Education, Ranjit Avenue, Amritsar (Pb.)

Self-regulated learning is considered as a form of learning, through which the learner sets goals and makes plans before starting to learn; monitors and regulates his/her cognition, motivation and behaviour during the learning process and then reflects on his/her learning process and outcomes (Pintrich and Zeidner, 1995; Pintrich, 2000; Zimmerman, 2001). Zumbrunn, Tadlock and Roberts (2011) and Schunk (1996) described SRL as an active, purposeful constructive process by which a learner sets a goal, monitors his learning and controls his motivation, behaviour and cognition. Self-regulation abilities include goal setting, self-monitoring, self-instruction, and self-reinforcement (Harris and Graham, 1999). self-regulated learning refers to how students could handle all supporting stuff related to the goal of learning (Hertel and Karlen, 2021) and also support students to achieve the learning's goal (Ejubovic and Puska, 2019). Researchers have also shown that self-regulation is essential to the learning process (Jarvela and Jarvenoja; 2011; Zimmerman, 2008) and those having better self-regulation skills typically learn more with less effort and show higher levels of academic satisfaction (Pintrich, 2000).

Jagadeeswari and Chandrasekaran (2013) reported that metacognitive awareness of girl students was higher than that of boys; while no significant difference was found in the metacognitive awareness of higher secondary school students on the basis of type of schools. Kadian (2016) reported that as far as the type of schools was concerned, the mean score of metacognition of private school students came out to be higher than that of government school students. Jaleel and Premachandran (2016) found no significant difference in the metacognitive awareness of secondary school students on the basis of gender and types of school. Mitali and Mun (2017) found no significant difference between male and female students of provincialized and private Institutions of Dibrugarh Town with respect to metacognitive awareness. Mir and Peerzada (2022) reported no significant difference in the metacognition of males and females students. Bala, Kumari and Meenu (2023) reported that meta-cognition and educational adjustment were positively correlated with each other. Boys were more higher than girls at secondary level w.r.t. their meta-cognition and girls had higher educational adjustment than boys. Dangin, Setyawan, and Hartati (2023) showed that there were positive correlations between students' metacognitive awareness and self-regulated learning on academic achievements.

Banarjee and Kumar (2014) reported that on the different dimensions of self-regulated learning, male and female science graduate students do not differ significantly. Feraco, Resnati, Fregonese, Spoto and Meneghetti (2023) found that soft skills were directly positively associated with students' achievement emotions, self-regulated learning, motivation, and life satisfaction. Kaur, Saini and Vig (2018) revealed that metacognition, self-regulation and perceptions pertaining to the overall learning environment were significantly positively contributing towards the academic achievement of respondents. Efrenata (2022) found that metacognition, achievement motivation had an influence on self-regulated learning. Mustapha, Bello and Alabi (2024) revealed that a significant relationship existed among meta-cognition, self-efficacy, and self-regulated learning strategies.

Hypotheses of the Study

1. There exists no significant difference in metacognition of male and female students of secondary school.

2. There exists no significant difference in self-regulated learning of male and female students of secondary schools.
3. There exists no significant difference in metacognition of students studying in private and government schools.
4. There exists no significant difference between self-regulated learning of students studying in private and government schools.
5. There exists no significant relationship between metacognition and self-regulated learning of secondary school students.

Research Design

Keeping in view the nature of the study, a descriptive survey method was used for the present study.

- ***Sample:*** In order to collect the data, a sample of 200 students of IX grade was selected randomly from secondary schools of Amritsar District.
- ***Tools Used:***
  (i) Metacognition Scale (Sing and Bali, 2021)
  (ii) Self-Regulated Learning Scale (Gupta and Mehtani, 2017)

Analysis and Discussion

Analysis of Mean Scores of Metacognition and Self-Regulated Learning with respect to Gender (Boys and Girls)

The Mean Scores and S.D. of metacognition and Self-Regulated Learning of male and female secondary school students were calculated. The obtained mean, standard deviation, standard error of difference and t- value of metacognition and Self-Regulated Learning of male and female students have been given in Table 1 below:

Table 1: Showing Mean, S.D., and t-value of Metacognition and Self-Regulated Learning of Male and Female Students

Variable	Gender	N	Mean	S.D.	$S.E_D$	t-value
Metacognition	Male	100	190.66	8.86	1.26	0.37
	Female	100	191.13	9.00		
Self-Regulated Learning	Male	100	179.74	13.26	1.80	2.71*
	Female	100	184.61	12.13		

Table 1 depicts that the mean score of metacognition of male and female students was 190.66 and 191.13 respectively with S.D. 8.86 and 9.00. The t-value comes out to be 0.37, which is insignificant at 0.05 level of confidence. It means that there exists no significant difference in the metacognition of male and female students. Thus, the Hypothesis-1, "There exists no significant difference in metacognition of male and female students", is not rejected. It is concluded that male and female students of secondary schools possess the same level of metacognition. The present result coincide with findings of Jaleel and Premachandran (2016); Mitali and Mun (2017) and Mir and Peerzada (2022) but are inconsistent with the results of Jagadeeswari and Chandrasekaran (2013) who reported that metacognitive awareness of girl students was higher than that of boys.

Table 1 also depicts that the mean scores of self-regulated learning of male and female secondary school students were 179.74 and 184.61 respectively with S.D. 13.26 and 12.13. The t-value comes out to be 2.71, which is

significant at 0.05 level of confidence. It means that there exists a significant difference in the self-regulated learning of male and female secondary school students. Thus, the Hypothesis-2, "There exists no significant difference in self-regulated learning of male and female students", is rejected. It is concluded that the self-regulated learning between female students is more than male students. The present result is inconsistent with the results reported by Banarjee and Kumar (2014) that self-regulated learning of male and female science graduate students do not differ significantly.

Analysis of Mean Scores of Metacognition and Self-Regulated Learning with respect to Type of School (Government and Private)

The Mean Scores and S.D. of metacognition and Self-Regulated Learning of students studying in Government and Private secondary school students were calculated. The obtained mean, standard deviation, standard error of difference and t- value of metacognition and Self-Regulated Learning of students have been given in Table 2 below:

Table 2: Showing Mean, S.D., and t-value of Metacognition and Self-Regulated Learning of Government and Private School Students

Variable	Type of school	N	Mean	S.D.	$S.E_D$	t-value
Metacognition	Government	100	191.76	8.57	1.26	1.36
	Private	100	190.04	9.20		
Self-Regulated Learning	Government	100	182.30	12.77	1.83	0.13
	Private	100	182.05	13.10		

Table 2 depicts that the mean scores of metacognition of students studying in government and private schools were 191.76 and 190.04 respectively with S.D. 8.5 and 19.20. The t-value comes out to be 1.36, which is insignificant at 0.05 level of confidence. It means that there exists no significant difference in metacognition of students studying in private and government schools. Thus, the Hypothesis-3, "There exists no significant difference in the metacognition of students studying in private and government schools ", is not rejected. It is concluded that students studying in private and government schools possess the same level of metacognition. The present result coincide with findings of Jagadeeswari and Chandrasekaran (2013) and Jaleel and Premachandran (2016) but are inconsistent with the results of Kadian (2016), who reported that metacognition of private school students came out to be higher than that of government school students.

Table 2 also depicts that the mean scores of self-regulated learning of students studying in government and private schools were 182.30 and 182.05 respectively with S.D. 12.77 and 13.10. The t-value comes out to be 0.13, which is insignificant at 0.05 level of confidence. It means that there exists no significant difference in the self-regulated learning of students studying in private and government schools. Therefore, the Hypothesis-4, "There exists no significant difference in the self-regulated learning of

students studying in private and government schools", is not rejected. It is concluded that students studying in private and government secondary schools possess the same level of self-regulated learning. The present result coincides with findings of Banarjee and Kumar (2014).

Correlation Analysis of Metacognition and Self-Regulated Learning of Secondary School Students:

To find out the relationship between Metacognition and Self-regulated Learning of secondary school students, Pearson's correlation was computed and has been given in the Table 3 below:

Table 3: Showing the Correlation between Metacognition and Self-Regulated Learning of Secondary School Students

Variables	Metacognition	Self-regulated Learning
Metacognition	.413*	1
Self-regulated Learning	1	.413*

Table 3 depicts the coefficient of correlation between Metacognition and Self-regulated Learning of secondary school students which comes out to be.413; significant at 0.01 level of confidence. It becomes vivid that there is a significant relationship between Metacognition and Self-regulated Learning of secondary school students. It shows that both variables are positively correlated. Thus, the Hypothesis-5, "There exists no significant relationship between academic achievement and metacognition of secondary school students', is rejected. The present result coincides with findings of Dangin, Setyawan and Hartati (2023); and Mustapha, Bello and Alabi (2024).

Findings of the Study

- No significant difference was found in the metacognition of male and female secondary school students.
- A significant difference was found in the self-regulated learning of male and female secondary school students. Furthermore, the self-regulated learning in female students is more than male students.
- No significant difference was found in the metacognition of the students studying in private and government secondary schools.
- No significant difference was found in the self-regulated learning of the students studying in private and government schools.
- A positive and significant relationship was found between academic achievement and metacognition of secondary school students.

Educational Implications

This study investigated the metacognition and self-regulated learning as predictors of academic achievement among secondary school students. On the basis of research findings and conclusion this study suggests few implications.

- Since both male and female students exhibited similar metacognitive abilities, interventions aimed at developing self-regulation, reflection, and critical thinking can be designed inclusively, without the need to differentiate based on gender. This promotes equal opportunities for all students to improve their learning strategies and academic outcomes.
- A significant difference was found in the self-regulated learning of male and female secondary school students. Furthermore, the self-regulated learning in female students was more than male students. So, in order to increase self-regulated learning of male students, teachers should motivate self-regulated learning like goal planning, self-monitoring, rehearsing and memorizing,

appropriate help-seeking and self-evaluation among students.

- There was no significant difference in the metacognition as well as self-regulated learning of the students studying in private and government secondary schools. So, no separate intervention is needed to improve the metacognition on the basis of type of school.
- A significant and positive relationship was found between Metacognition and Self-regulated Learning of secondary school students. If the metacognition is increased among students, so is the academic achievement. Therefore, more emphasis should be given on the enhancement of the metacognition of the students. So, the teachers should use a wide variety of teaching methods, problem-solving activities and focus learning on students.

Conclusion

It is concluded that metacognition and self-regulated learning play a critical role in the academic success of secondary school students. Moreover, the positive and significant relationship between metacognition and self-regulated learning among secondary school students highlights the interdependence of these two cognitive processes in promoting academic success. When students actively engage in metacognitive practices such as planning, monitoring, and evaluating their learning they enhance their self-regulation abilities, leading to improved goal-setting, time management, and task persistence. This synergy empowers students to take greater responsibility for their learning, adapt strategies to overcome challenges, and achieve better academic outcomes. Therefore, fostering metacognitive awareness is crucial in developing effective self-regulated learners in secondary education.

References

Bala, A., Kumari, M., & Meenu (2023). Meta-Cognition of secondary school students in relation to their educational adjustment. *The International Journal of Indian Psychology, 11*(2), 1-7.

Balashov, E., Pasichnyk, I., Kalamazh, R., & Zdrobylko, T. (2020). Reflexive competence in metacognitive monitoring of learning activity of HEI students. *Trends in Cognitive Sciences, 17*(1), 28-36.

Bamisaiye, R. (1989). *A Practical Approach to Philosophy of Education*. Ibadan: AMD Publishers.

Banarjee, P., & Kumar, K. (2014). A study on self-regulated learning and academic achievement among the science graduate students. *International Journal of Multidisciplinary Approach and Studies, 1*(6), 329.342.

Barnes, E. M. & Stephens, S. J. (2019). Supporting mathematics vocabulary instruction through mathematics curricula. *The Curriculum Journal. 30* (33). 1-20.

Dangin, Setyawan, A. H., & Hartati, E. (2023). Metacognitive awareness and self-regulated learning toward students' academic achievement: Prediction study. *International Journal of Social Science and Human Research,* 6(11), 1-6.

Efrenata, F. S. (2022). Metacognition, achievement motivation and self-regulated learning on working students. *Febriani Sura Efrenata Sembiring / International Journal of Research Publications (IJRP.ORG).*

Ejubovic, A., & Puska, A. (2019). Impact of self-regulated learning on academic performance and satisfaction of students in the online

environment. *Knowledge Management and E-Learning, 11*(3), 345–363.

Feraco, T., Resnati, D., Fregonese, D., Spoto, A., & Meneghetti, C. (2021). Soft skills and extracurricular activities sustain motivation and self-regulated learning at school. *The Journal of Experimental Education,* 1–20.

Harris, K. & Graham, S. (1999). Programmatic intervention research: Illustrations from the evolution of self-regulated strategy development. *Learning Disability Quarterly, 22*, 251-262.

Hassan, N. M., & Rahman, S. (2017). Problem solving skills, metacognitive awareness, and mathematics achievement: A mediation model. *The New Educational Review, 49*(3), 201-212.

Hertel, S., & Karlen, Y. (2021). Implicit theories of self-regulated learning: Interplay with students' achievement goals, learning strategies, and metacognition. *British Journal of Educational Psychology, 91*(3), 972–996.

Ibrahim M., Baharun H., & Harun H. (2017). Othman N. Antecedents of intrinsic motivation, metacognition and their effects on students' academic performance in fundamental knowledge for matriculation courses. *Malaysian Journal of Learning and Instruction. 14*(2). 211-246.

Jagadeeswari, A. S. & Chandrasekaran, V. (2013). Promoting metacognitive awareness among higher secondary students. *An International Journal for Interdisciplinary Studies, 2*(24), 1888-1897.

Jaleel, S., & Premachandran, P. (2016). A study on the metacognitive awareness of secondary school students. *Universal Journal of Educational Research, 4*(1), 165-172.

Jarvela, S., & Jarvenoja, H. (2011). Socially constructed self-regulated learning and motivation regulation in collaborative learning groups. *Teachers College Record, 113* (2), 350-374.

Kadian, A. (2016). Relation between academic achievement, executive function, intelligence and metacognition. *The International Journal of Indian Psychology, 3* (4), 166-174.

Kaur, P., Saini, S., & Vig, D. (2018). Metacognition, self-regulation and learning environment as determinants of academic achievement. *Indian Journal of Health and Well-being, 9*(5), 735-739.

Lynn, D., Pressley, F., & Waller, G. T. (1984). *Cognition, Metacognition and Reading*. New York. Springer-Verlag.

Mir, A. A., & Peerzada, N. (2022). A Study of metacognition and academic achievement among college students of kashmir. *International Journal of Advanced Research in Science, Communication and Technology, 2* (1), 266-270.

Mitali, S., & Mun, K. (2017). A study on metacognitive awareness and academic achievement of higher secondary level students of Dibrugarh town of Assam, India. *International Multidisciplinary Journal, 6*(1), 69-74.

Mustapha. M. A., Bello. G. & Alabi. H. I. (2024). Influence of meta-cognition, self-efficacy, and self-regulated learning on students' achievement in biology in Ibadan, Nigeria. Retrieved from https://www.researchgate.net/publication/378224876_Influence_of_Meta-cognition_Self-efficacy_and_Self-regulated_Learning_on_Students'_Achievement_in_Biology_in_Ibadan_Nigeria

Ormord, J. E. (2006). *Educational Psychology: Developing Learners* (5th ed.). Upper Saddle River. New Jersey: Pearson Education Inc.

Pintrich, P. & Zeidner, M.(1995). *Handbook of Self-regulation*. San Diego, CA. Academic Press.

Pintrich, P. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, Paul R. Pintrich, Moshe Zeidner, Handbook of Self-Regulation, Academic Press, 451-502.

Rahmat, I., & Chanunan,S. (2018). Open inquiry in facilitating metacognitive skills on high school biology learning: An inquiry on low and high academic ability. *International Journal of Instruction. 11*(4), 593.606.

Schunk, D. (1996). Goal and self-evaluative influences during children's cognitive skill learning. *American Educational Research Journal, 33*(2), 359-382.

Sengul, S., & Katranci, Y. (2012). Metacognitive aspects of solving function problems. *Procedia-Social and Behavioral Sciences. 46*(1), 2178-2182.

Sodhi, T. S., Suri, A. & Sodhi, H. K. (2012). *Philosophical and Sociological Foundation of Education*. Patiala: Bawa Publications.

Zimmerman, B. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*(1), 166-183.

Zimmerman, B. J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed., 1–37). Lawrence Erlbaum Associates Publishers.

Zumbrunn, S., Tadlock, J., & Roberts, E. D., (2011). Encouraging self-regulated learning in the classroom: A Review of the literature, Virginia. Metropolitan Educational Research Consortium (MERC), Virginia Commonwealth University.