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Effect of Metacognition and Learning Style on Academic achievement of college Students

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Abstract
Metacognition and learning styles play a crucial role in shaping academic achievement. This study investigates the connection between these factors and their impact on students' academic performance. This research seeks to identify the connections between metacognition, learning styles, and academic achievement and to ascertain whether or not these elements significantly impact students' performance. A descriptive survey design was adopted, and 270 undergraduate humanities and science students from Hooghly district colleges in West Bengal, India, were selected. The Metacognitive Inventory (MCI) and the Learning Style Inventory (LSI) questionnaires were used for data collection. Pearson's Product Moment Correlation and multiple regression analysis were conducted to analyze the data. The study's results depict strong positive relations between metacognition and academic performance, learning styles and academic performance, and metacognition and learning styles. The research concludes that both metacognition and learning styles have a general impact on academic performance, implying that students with greater awareness of metacognition and responsive learning styles would perform better at college.

INTRODUCTION

Metacognition and learning style are crucial elements that can significantly affect the efficiency of learning. Metacognition refers to the process of examining one's own thinking and learning processes, whereas learning style is the preferred method an individual uses to acquire knowledge and learn. A teachers must have a comprehensive understanding of their students' learning styles to provide effective support for their learning. Equally important is the need to enhance students' metacognitive skills. Recent studies have discovered distinct connections between learning styles and metacognitive skills, according to Sadler and Smith (2012).Cultivating metacognitive skills and promoting an adaptive learning style can have a positive effect on academic performance (Huang, Li, & Wang, 2019). to support their students in this, teachers can create opportunities for metacognitive reflection and encourage an adaptive learning style. By recognizing the interrelationship between metacognition and learning style, teachers can develop more effective teaching approaches to aid their students' academic success (Zhao, Guo, & Zhang, 2020).

Recent research has explored the relationship between metacognition, learning style, and academic achievement. Sadler and Smith's (2012) study found that certain learning styles were associated with higher academic performance in specific subjects and more frequent use of particular metacognitive strategies. Meanwhile, López-Pérez et al.'s (2021) systematic review and meta-analysis demonstrated a positive correlation between metacognitive skills, learning style, and academic achievement. They also revealed that the link between metacognition and academic performance was partially influenced by learning style. Furthermore, Chang et al.'s (2021) research indicated that metacognitive awareness and certain learning styles were significant predictors of academic achievement. They also found that students who used more metacognitive strategies tended to have higher academic achievement. These studies suggest that the relationship between metacognition, learning style, and academic achievement is intricate and multidimensional. However, they also indicate that enhancing metacognitive skills and promoting adaptable learning styles can positively affect academic performance.

Metacognition and learning style are crucial factors that can significantly impact academic achievement. Recent research has highlighted the interrelationship between learning styles and metacognitive strategies. Additionally, studies have shown that students who possess a strong sense of metacognitive awareness and self-regulation tend to perform better academically. Teachers play a vital role in promoting these skills by creating an environment that encourages metacognitive reflection and adaptation of teaching methods to accommodate diverse learning styles. By providing students with effective learning strategies that cater to their individual needs, teachers can help students develop the necessary skills to achieve academic success.

Significance of the Study

In this globalized and innovative era we all need to be very reasonable, thoughtful and skilled to fulfill the desires and reach the ultimate goals of life. In this point we also stepped to gain experiences and learning from it. Today, most of the learning theorists assume that when otherwise alike, the students with better metacognition and learning style are possibly to be better learners. So it is relevant that metacognition and learning style is appropriate for the learners at various stages specially for college going students, because they are the future of our nation and if these college going students have the enough Metacognition awareness then they can have a better decision making as well as problem solving ability. Therefore metacognitive awareness can be devised and incorporated in the curriculum as an important element. Hence the results of this study might provide useful direction to policymakers regarding the desired changes to be made in teacher development programme, fine-tuning of the curriculum and motivate them to develop and use metacognitive skills and strategies in educational contexts. This would help in promoting self-regulated learning and academic competency of the students. It would also help students to identify and solve problems in learning situations through metacognitive awareness, which subsequently helps in preventing failures and improving academic achievement. That’s why researcher attempts to study the metacognition and learning style of college students to explore the different possibilities of it.

Objectives of the Study

1. To find out the relationship between Metacognition and Academic achievement of college students.
2. To find out the relationship between Learning style and Academic achievement of college students.
3. To find out the relationship between Metacognition and Learning style of college students

4. To find out the effect of Metacognition and Learning style on academic achievement of college students.

Hypotheses

The following null hypotheses were formulated for the present study

$H_0$1: There is no significant correlation between Metacognition and Academic achievement of college students.

$H_0$2: There is no significant correlation between Learning style and Academic achievement of college students.

$H_0$3: There is no significant correlation between Metacognition and Learning style of college students.

$H_0$4: There is no significant effect of Metacognition and Learning style on Academic achievement of college students.

METHODS

Research Design

Descriptive survey method of research was used in the execution of the present study.

Population

The population of the present study consists of the students who are studying in under graduate humanities and science colleges in Hooghly district specifically from sadar subdivision of West Bengal.

Sample and Sampling technique

In the present study, the sample consists of 270 college students from five college of hooghly district selected by the method of stratified random sampling technique from the target population constituted the sample for the present investigation.

Tool

In order to carry out the present study, the appropriate tool were used, which are mentioned below

1. Meta Cognitive Inventory (MCI) developed and standardized by Govil (2003).

The tool used was metacognitive inventory by Punita Govil. Researcher modified this questionnaire according to the need of the study and translate into Bengali. The questionnaire consists of thirty items that are rated on a 5-point scale. The scale has been standardized, and it has a high reliability coefficient of 0.932, indicating high reliability. The reliability has been determined using the Cronbach alpha coefficient method. To ensure validity, content validity has been employed.

2. Learning Style Inventory constructed by Mishra (2012)

The tool used was Learning Style Inventory by Karuna Shankar Misra. Researcher modified this questionnaire according to the need of the study and translate into Bengali. The survey questionnaire comprises forty-two items, rated on a 4-point scale. The scale has been standardized and exhibits high reliability, with a reliability coefficient of 0.945. The reliability of the scale has been established using the Cronbach alpha coefficient method, and content validity has been employed to ensure validity.

Data Analysis

Data were analyzed through SPSS 20.0 packet statistical program. Then, the correlations between metacognition, learning style scores and the academic achievement scores were studied using Pearson's Product Moment Correlation and regressions to access the degree of relationship

among dependent and independent variable under study as well as with various dimensions of independent variables in the light of set objectives and hypotheses

FINDINGS AND DISCUSSION

Findings

Data analysis and interpretation were made from the collected raw data, which were responded by the participants in the respective questionnaire and scored first then analysed.

Objective 1. To find out the relationship between Metacognition and Academic achievement of college students.

This section deals with the relationship of metacognition and academic achievement. Therefore, Pearson Product Moment Coefficient (r) was computed for finding out the relationship between metacognition and academic achievement.

Table 1. Relationship between the Metacognition and Academic Achievement

		Metacognition	Academic Achievement
Metacognition	Pearson Correlation	1	.634**
	Sig. (2-tailed)		.000
	N	270	270
Academic Achievement	Pearson Correlation	.634**	1
	Sig. (2-tailed)	.000	
	N	270	270

(** Correlation is significant at the 0.05 level)

Table 1. shows the relationship between metacognition and academic achievement of college students. The "r" value is 0.634 which is significant at 0.05 level of significance. It shows that there is a positive and significant relationship between metacognition and academic achievement. So, the null hypothesis ($H_0$1) is rejected. It indicates that metacognition and academic achievement of college students are positively correlated with each other. So it could be concluded that students with high and low academic achievement are respectively having high and low levels of metacognition. It is also found large effect size (r^2=0.401) through R squared (Becker, 2000)

Objective 2: To find out the relationship between Learning style and Academic achievement of college students.

Pearson Product Moment Coefficient (r) was computed for finding out the relationship between learning style and academic achievement.

Table 2. Relationship between the Learning style and Academic Achievement

		Learning Style	Academic Achievement
Learning Style	Pearson Correlation	1	.508**
	Sig. (2-tailed)		.000
	N	270	270
Academic Achievement	Pearson Correlation	.508**	1
	Sig. (2-tailed)	.000	
	N	270	270

(** Correlation is significant at the 0.05 level)

Table 2 shows the relationship between learning style and academic achievement of college students. The "r" value is 0.508 which is significant at 0.05 level of significance. It shows that there is a positive and significant relationship between learning style and academic achievement. .So, the null hypothesis ($H_0$2) is rejected. It indicates that learning style and academic achievement of college students are positively correlated with each other. So it could be concluded that students with high and low academic achievement are respectively having high and low levels of learning style. It is also found large effect size (r^2=0.258) through R squared (Becker, 2000).

Objective 3: To find out the relationship between Metacognition and Learning style of college students.

Pearson Product Moment Coefficient (r) was computed for finding out the relationship between metacognition and learning style.

Table 3. Relationship between the Metacognition and Learning style

		Metacognition	Learning Style
Metacognition	Pearson Correlation	1	.598**
	Sig. (2-tailed)		.000
	N	270	270
Learning Style	Pearson Correlation	.598**	1
	Sig. (2-tailed)	.000	
	N	270	270

(** Correlation is significant at the 0.05 level)

Table 3 shows the relationship between metacognition and learning of college students. The "r" value is 0.598 which is significant at 0.01 level of significance. It shows that there is a positive and significant relationship between metacognition and learning style. So, the null hypothesis ($H_0$3) is rejected. It indicates that metacognition and learning style of college students are positively correlated with each other. So it could be concluded that students with high and low metacognition are respectively having high and low levels of learning style. It is also obtained large effect size (r^2=0.357) through R squared (Becker, 2000).

Objective 4: To find out the effect of Metacognition and Learning style on academic achievement of college students.

Multiple regression was computed for finding out the effect of Metacognition and Learning style on academic achievement of college students.

Table 4. Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin- Watson
1	.654[a]	.428	.424	10.465	1.787

a. Predictors: (Constant), Learning Style, Metacognition
b. Dependent Variable: Academic Achievement

Table 5. Multiple Regression ANOVA[a] Summary

Model		Sum of Squares	df	Mean Square	F	**Sig.**
1	Regression	21908.160	2	10954.080	100.018	.000[b]
	Residual	29242.047	267	109.521		
	Total	51150.207	269			

a. Dependent Variable: Academic Achievement
b. Predictors: (Constant), Learning Style, Metacognition

From the output table, it was observed that Academic achievement is a dependent variable and Metacognition and Learning style is an independent variable. The overall model explains about 42% (R value – 0.428) by predicting independent variable. F Statistics shows higher value which means the model is fit for further interpretation. The significance value is .000 which is less than 0.05 at 5% significance level and it indicates the independent variable has positive and significant impact on dependent variable. So the null hypothesis ($H_0$4) is rejected. Therefore it can be concluded that Metacognition and Learning style have a significant effect on academic achievement of college students.

Discussion

The findings of the study are discuss below:

1. Metacognition and academic achievement of college students are found significantly and positively correlated. So it could be concluded that students with high and low academic achievement are respectively having high and low levels of metacognition. These results get support from investigation carried out by Young and Fry (2008), Zulkiply (2006), Abdelrahman (2020) also revealed positive relationship between student's academic performance and metacognition. Jayaprab (2013) also found a significant relationship between metacognition and achievement and recommended that metacognitive instruction be adopted regularly in the classroom so as to help students learn material more efficiently and enhance academic achievement. In addition to this Abdellah (2015) revealed the positive relationship between metacognition and academic achievement. Research highlights the importance of metacognition in learning. To improve academic achievement and teaching performance, college professors should use teaching strategies that encourage the use of metacognitive skills by presenting information in a manner that facilitates their utilization by students.
2. The result indicates that learning style and academic achievement of college students are positively correlated with each other. Hence it could be concluded that students with high and low academic achievement are respectively having high and low levels of learning style. Findings of the study get supported by Vaishnav (2013) and Chakrabarti (2017) which revealed positive high correlation between learning style and academic achievement. Another study by Vidyakala et al. (2019), Cecilia et al. (2019) also shows that there is a relationship between Learning style and academic performance. Hence it is clear that academic performance of the students varies according to their learning styles.
3. A significant and positive relationship is found between metacognition and learning style of college students. Findings of the study get supported by Elevera et al. (2021) which also revealed that individual learning style of the students in terms of visual, auditory, and tactile have a great impact on their metacognition in terms of knowledge about cognition and regulation of cognition. Tiwan (2019) study also revealed that there was a significant and positive correlation between learning style and their metacognition. Another study by Gupta (2017) also found significant relationship between metacognition of students and their academic achievement. From the result it can inferred that metacognition is the significant predictors of academic achievement of secondary school students.
4. The result indicates that metacognition and learning style of the college students have a significant effect on their academic achievement. This finding is supported by earlier studies Tiwan (2019). Hence present research conclude that metacognition and learning style can play an important role for improving students' academic achievement.

CONCLUSION

It may be concluded from the findings of the present study that metacognition is significantly related with the academic achievement of the students. The connection between metacognition and academic achievement is significant when it comes to college students. As a result, the researcher recommends that educational institutions prioritize metacognition by providing training programs and emphasizing its importance in the regular classroom teaching and learning process. This approach would enhance the learning abilities and style of college students, which would benefit them in various aspects of their lives.

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