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The Relationship Between Memory Retention, Study Techniques, and Academic Performance in College Students

Tanya Tanya, *Bachelor of Arts, Applied Psychology (Honours), Amity Institute of Psychology and Allied Science Amity University, Noida, India*
tanya10122004@gmail.com

Abstract: This study looks at how college students' academic achievement, study habits, and memory retention relate to one another. Successful study techniques are essential for improving memory retention, which in turn affects academic achievement. A sample of undergraduate students' academic records and self-reported questionnaires were used to gather data using a mixed-methods approach. The study investigated a number of study strategies, such as elaborative encoding, retrieval practice, and spaced repetition, to ascertain how well they enhanced performance and retention. Results showed that students who used active learning strategies, including concept mapping and self-testing, performed better academically and had higher retention rates than those who used passive tactics, such underlining and rereading. Furthermore, the association between study habits and memory retention was found to be significantly moderated by stress levels and sleep patterns. These findings highlight how crucial it is to use research-based study strategies in order to maximize learning and academic achievement. Longitudinal effects and strategies to improve students' study habits should be investigated in future studies.

Keywords: *Memory retention, study techniques, Academic performance*

1. Introduction

College academic success depends heavily on cognitive and behavioural factors like memory retention and study methods. Memory retention, the capability to store and recoup information over time, is essential for literacy and academic achievement. However, the

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effectiveness of memory retention is largely dependent on the study ways employed by scholars. Research has shown that different study strategies, such as spaced reiteration, active recall, and elaborative encoding, can significantly impact how well-conditioned scholars retain information and perform in academic assessments. Given the increasing demands of advanced education, understanding the relationship between study ways and memory retention is vital for optimizing academic performance. While some scholars calculate on unresistant literacy styles, such as rereading and pressing, others borrow substantiation-based strategies like tone-testing and distributed practice, which have been linked to bettered retention and recall.

Despite the growing body of exploration on learning strategies, there's still a need to explore how specific study ways impact memory retention and, accordingly, academic success among college scholars. In academic performance in college students, the independent variables study ways and memory retention play vital roles in impacting this study. This study aims to probe the relationship between memory retention, study ways, and academic performance in college scholars. By examining the effectiveness of different literacy strategies, the exploration will give perceptivity into stylish practices for enhancing memory retention and perfecting academic issues. The findings of this study may help preceptors and scholars develop further effective literacy approaches, eventually contributing to more educational gests and achievements.

1.2 Memory Retention

Storing memories is the phase where data is kept in the mind after it has been first encoded. A portion of the data that gets encoded in an event diminishes during the storage stage often rapidly while other aspects persist. For information to be retained and later recalled from memory it must be securely instilled within a neural network. This can be achieved through standard practices like repetition and linking fresh information with pre-existing knowledge. To enhance memory retention methods such as overlearning spacing proceduralizing and mnemonic devices can be utilized.

1.3 Study Techniques

Study techniques are a collection of abilities that improve a student's capacity to absorb, remember, and analyse knowledge. Most academic subjects can benefit from learning and using these methods. Here are a few instances:

1.4 Academic Performance

Academic performance is defined as a student's capacity to succeed in learning activities as determined by a variety of evaluations, including grades, test results, and general intellectual engagement. It shows how well a student understands, retains, and applies things they have

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studied in a variety of subjects. Numerous elements, such as cognitive abilities, motivation, learning tactics, contextual circumstances, and psychological well-being, all have an impact on academic performance, which is a crucial measure of educational achievement.

2. Review of literature

The ability to predict student performance in a course or program creates opportunities to improve educational outcomes. With effective performance prediction approaches, instructors can allocate resources and instruction more accurately. Research in this area seeks to identify features that can be used to make predictions, to identify algorithms that can improve predictions, and to quantify aspects of student performance. Moreover, research in predicting student performance seeks to determine interrelated features and to identify the underlying reasons why certain features work better than others. This working group report presents a systematic literature review of work in predicting student performance. Our analysis shows a clearly increasing amount of research in this area, as well as an increasing variety of techniques used. At the same time, the review uncovered several issues with research quality that drives a need for the community to provide more detailed reporting of methods and results and to increase efforts to validate and replicate work.

Comighud et al. (2022) examined how memory retention factors influence the academic achievement of Grade 7 mathematics students at Kalumboyan High School, Bayawan City Division during the 2019–2020 school year. Using a descriptive-correlational design, the study involved 160 students and assessed five domains, goal-setting and accomplishments, personalized learning, instructional strategies and learning activities, educational resources and learning devices, and motivational practices and experiences. The results showed students rated instructional strategies, learning devices, and motivational experiences highly. A moderate and significant correlation was found between their perception of memory retention factors and academic performance, indicating that these variables contribute meaningfully to success in mathematics.

Balalle (2024) investigated the role of student engagement in virtual learning environments across education levels. The study involved 33 papers analysed through PRISMA and PICO frameworks, focusing on technology use, online/distance learning, and gamification in relation to student engagement. The research highlighted that disparities in engagement may be more pronounced online and that students interact differently with digital tools. A co-occurrence keyword network visualized the thematic distance across studies. The

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research concluded with practical recommendations for enhancing digital engagement and suggested directions for future research.

Chauhan et al. (2024) explored how ancient Indian storytelling impacts memory retention, particularly through virtual reality (VR). Seventy-five participants were randomly assigned to VR, text, and control conditions. The VR group experienced immersive story scenes, the text group read the stories, and the control group was given a keyword. Results showed that both VR and text methods enhanced retention compared to control, but VR was more effective for narrative recall while text better aided concept understanding. The study emphasized the educational value of combining cultural storytelling with modern technology like VR.

Filip et al. (2024) conducted a systematic review on the effectiveness of active recall strategies, such as, flashcards, retrieval practice, and concept mapping, in higher education. Reviewing literature from multiple databases and assessing quality with the GRADE tool. The researchers found that active recall methods enhance academic performance and self-efficacy. Flashcards were the most popular and associated with higher test scores and GPAs. Concept mapping was found to boost confidence, while retrieval practices supported long-term retention. The study calls for further research on the diverse benefits of these strategies for learning.

3. Methodology

3.1 Aim

To examine the connection between college students' academic performance, study methods, and memory retention to ascertain the ways in which various study approaches affect both academic achievement and memory retention.

3.2 Research objectives

a. To explore at how different study methods (such as mnemonics, spaced repetition, and active recall) affect college students' ability to remember information.

b. To examine the relationship between academic achievement and memory retention.

3.3 Hypothesis

There is a significant positive correlation between memory retention, study techniques (habits), and academic performance in college individual.

3.4 Research Design

Descriptive statistics and Pearson's product-moment correlation analysis were used to investigate the connections between college students' academic performance (APS), study

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strategies (MFQ), and memory retention (R-SPQ). To find general patterns in the data, descriptive statistics such as mean, standard deviation, range, and skewness were computed for academic achievement, study methods, and memory recall. While the range showed the lowest and greatest scores and gave a more comprehensive picture of the response distribution, the mean and standard deviation shed light on central tendency and variability. To ascertain whether the data showed asymmetry or a normal distribution, skewness was also investigated.

Pearson's product-moment correlation coefficient (r) was utilized to evaluate the connections between academic achievement, study strategies, and memory recall. The purpose of this analysis was to ascertain whether memory retention was significantly correlated with study methods and academic achievement, as well as the extent to which study methods and academic success were correlated. The reliability of the results was ensured by evaluating the statistical significance of these connections at the $p < 0.05$ level. Effective study strategies may be essential for academic success, as the results showed that while memory retention did not significantly correlate with study techniques or academic performance, study techniques did show a weak but significant positive association with academic performance.

3.5 Sample

a. Sample Size: To guarantee a representative and varied sample, there should be between 80 college participants between 18-25 from a range of academic fields.

b. Sampling Method: To ensure variation in study strategies and academic achievement, stratified random sampling was used to include students from various majors, academic years, and institutions.

3.6 Measures

3.6.1 Revised Study Process Questionnaire (R-SPQ-2F): Biggs, Kember, and Leung (2001) created the popular self-report tool known as the Revised Study Process Questionnaire (R-SPQ-2F) to evaluate students' learning styles. It assesses two main learning strategies: the Surface Learning Approach, which uses rote memorization, extrinsic motivation, and little engagement with the subject matter, usually with the goal of simply passing exams, and the Deep Learning Approach, which is marked by intrinsic motivation, critical thinking, and a sincere interest in understanding material beyond memorization. Four subscales—Deep Motive, Deep Strategy, Surface Motive, and Surface Strategy—are produced by further breaking down each of these techniques into two components: motive (the reason a student chooses a specific approach) and strategy (the method by which the student learns). The questionnaire consists of 20 items, with responses recorded on a 5-point Likert scale, ranging from 1 (never or only rarely true of me) to 5 (often or almost always true of me). While greater

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results on the surface method imply a dependence on rote memorization, higher scores on the deep approach show meaningful learning.

3.6.2 Academic Performance Scale (APS): A standardized instrument called the Academic Performance Scale (APS) is used to evaluate different performance markers in order to determine how well kids are doing academically. It assesses important factors such learning tactics, motivation, study habits, grades, and cognitive engagement. In educational psychology research, the APS is frequently used to examine the ways in which various factors affect academic performance. The scale has multiple dimensions: motivation and effort, which assesses intrinsic and extrinsic motivation, perseverance, and goal orientation; study habits and learning strategies, which evaluate the efficacy of study techniques, time management, and self-regulation; and self-perceived academic performance, where students rate their competence and coursework performance. The scale also assesses cognitive and metacognitive abilities, emphasizing critical thinking, problem-solving, and introspection about one's own learning processes. Lastly, self-reported grades as an impartial indicator of academic success or real academic records, such as GPA and test results, are included in assessment-based performance.

***3.6.3 Memory Functioning Questionnaire (MFQ*)**: developed by Gilewski, Zelinski, and Schaie (1990), is a self-report instrument designed to assess individuals' perceptions of their everyday memory functioning. It consists of 64 items divided into four primary subscales: Frequency of Forgetting (how often a person forgets things in daily life), Seriousness of Forgetting (how serious they perceive their memory failures), Retrospective Functioning (perceived changes in memory over time), and Mnemonics Usage (use of memory strategies). Respondents rate items on a 7-point Likert scale, with higher scores indicating better perceived memory functioning (except for some reversed items). Scoring involves summing responses within each subscale to generate individual scores, which can then be interpreted separately or combined for an overall memory functioning index. The MFQ is widely used in both clinical and research settings to study subjective memory complaints, especially among older adults.

4. Statistical Analysis

Table1 : *Descriptive statistics for study techniques, memory retention and academic performance (N=120)*

Variable	N	Minimum	Maximum	M	Sd	Skewness	Se Skewness

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Memory retention	120	30.00	100.00	58.84	11.10	0.111	0.221
Study techniques	120	39.00	126.00	81.33	15.97	0.306	0.221
Academic performance	120	8.00	40.00	27.84	5.28	-0.168	0.221

Provides descriptive statistics based on a sample of 120 individuals for three psychological variables: academic performance, study techniques, and memory retention. The table shows the mean (M), standard deviation (SD), skewness, standard error of skewness (SE Skewness), and lowest and maximum scores for each variable. With a mean score of 58.84 and a standard deviation of 11.10, the Memory Retention scores showed substantial variability around the mean, ranging from 30.00 to 100.00. The standard error of skewness is 0.221, and the skewness value of 0.111 indicates that the distribution is roughly symmetrical because it is near zero.

With a mean score of 81.33 and a comparatively larger standard deviation of 15.97, Study Techniques displayed a greater range of values, ranging from 39.00 to 126.00. This suggests that participants' study technique scores varied more. With a SE Skewness of 0.221, the skewness value of 0.306 shows a tiny positive skew, indicating that some individuals scored higher than average. Nevertheless, this skewness is still within an acceptable range.

Finally, the Academic Performance scores showed reasonable consistency, ranging from 8.00 to 40.00, with a mean of 27.84 and a standard deviation of 5.28. A tiny percentage of participants scored below the average, as indicated by the skewness value of -0.168, which shows a slight negative skew. Like the other variables, this skewness is negligible in relation to the standard error of skewness (0.221), indicating that there is no discernible deviation from normalcy in the distribution.

TABLE 2: *Correlation for study techniques, memory retention, and academic performance.*

Correlation	r	P value	Interpretation
Memory retention & study techniques	.143	.119	Weak positive correlation, not statistically significant. Memory retention does not significantly influence study techniques.
Memory retention & Academic performance	.025	.790	Negligible correlation, not statistically significant. Memory retention does not predict academic performance

Study techniques & Academic performance	.183	.046	Weak positive correlation, statistically significant. Study techniques slightly improve academic performance.

Findings

The correlation analysis examined the relationships among Memory Retention, Study Techniques, and Academic Performance. The results revealed a weak positive correlation between memory retention and study techniques (r = .143), but this relationship was not statistically significant (p = .119), indicating that memory retention does not significantly influence the use of study techniques among participants.

a. Similarly, the correlation between memory retention and academic performance was found to be negligible (r = .025) and not statistically significant (p = .790), suggesting no meaningful association between how well information is retained and actual academic outcomes.

b. In contrast, the relationship between study techniques and academic performance showed a weak but statistically significant positive correlation (r = .183, p = .046). This suggests that better study techniques are modestly associated with improved academic performance, highlighting the potential importance of effective study habits in achieving academic success.

5. Discussion of Results

The research title **"***The Relationship Between Memory Retention, Study Techniques, and Academic Performance in College Students*" aimed to examine the relationships between college students' academic achievement (APS), study methods (MFQ), and memory retention (R-SPQ). To comprehend central tendencies, variability, and distribution patterns, this study uses descriptive statistics such as mean, standard deviation, range, and skewness to assess overall trends in these variables. It also looks into the relationship between study methods and memory retention to see if using efficient study approaches is facilitated by improved memory recall. To determine whether kids who have stronger memory retention also perform better academically, the study also looks at the connection between memory retention and academic achievement. Finally, it assesses the relationship between study methods and academic achievement to determine whether using efficient study techniques improves academic achievement. Using Pearson's product-moment correlation analysis, the study offers empirical proof of the interactions between these behavioural and cognitive characteristics, providing

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information that may help guide instructional practices aimed at improving academic performance and student learning.

5.1: Memory Retention and Study Techniques

The relationship between Memory Retention and Study Techniques reveals that students, on average, reported moderate memory retention (M = 58.84, SD = 11.10) with a near-normal distribution (Skewness = 0.111), while their study techniques showed greater variability (M = 81.33, SD = 15.96) and a positive skew (Skewness = 0.306), suggesting that fewer students excelled in using effective study strategies. The correlation analysis showed a weak positive but non-significant relationship (r = 0.143, p = 0.119), indicating that although students with better memory retention may use study techniques slightly more, this link is not strong enough to be considered statistically meaningful.

5.2: Memory Retention and Academic Performance

In the case of Memory Retention and Academic Performance, the descriptive data show a similar moderate level of memory retention and a slightly skewed academic performance distribution (M = 27.84, SD = 5.28, Skewness = -0.168), implying that some students performed above average. However, the correlation between these variables was negligible and not statistically significant (r = 0.025, p = 0.790). This suggests that retaining information does not directly translate into higher academic performance, and other factors—such as comprehension, critical thinking, or exam strategy—may play more pivotal roles in students' academic outcomes.

5.3: Study Techniques and Academic Performance

Lastly, the analysis of Study Techniques and Academic Performance shows that students who reported greater use of study strategies (M = 81.33, SD = 15.96) also had moderately high academic performance (M = 27.84, SD = 5.28). The correlation was weak but statistically significant (r = 0.183, p = 0.046), indicating that students who engage in more effective and structured study practices tend to perform better academically. While the strength of the association is modest, its statistical significance highlights the practical importance of promoting good study habits to enhance academic outcomes.

The combined analysis of descriptive statistics and correlation results reveals important insights into how memory retention, study techniques, and academic performance interact among college students. Memory retention scores were moderately high and evenly distributed, while study technique scores showed greater variability with a positive skew, indicating that while many students use study strategies, fewer employ them effectively. Despite this, there

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was no significant correlation between memory retention and study techniques, suggesting that using study strategies does not necessarily lead to improved memory retention.

Similarly, the relationship between memory retention and academic performance was negligible and not statistically significant, indicating that the ability to retain information alone is not a strong predictor of academic success. This challenges traditional assumptions that memory plays a central role in achievement.

In contrast, study techniques demonstrated a statistically significant, albeit weak, positive correlation with academic performance. This indicates that students who use more effective and structured study strategies are more likely to perform better academically. The findings underscore the importance of teaching and promoting evidence-based study methods over reliance on memorization alone, suggesting that how students learn is more impactful than how much they can remember.

6. Conclusion

This study explored the relationships among academic achievement, study habits, and memory retention in college students. The findings revealed that memory retention alone does not significantly predict academic performance, highlighting that simply retaining information is insufficient for academic success. In contrast, study techniques showed a weak but statistically significant positive correlation with academic achievement, suggesting that effective strategies like spaced repetition and self-testing can enhance academic outcomes. However, there was no significant link between study techniques and memory retention, challenging traditional views that organized study habits directly boost memory. The results emphasize that strategic, evidence-based learning methods have a stronger impact on academic performance than memory retention, suggesting that educators and students should prioritize active learning over rote memorization to improve both performance and understanding.

6.1 Future implication and limitation

The results of this study on the connection between college students' academic achievement, study habits, and memory retention have important ramifications for instructional strategies and student learning approaches. Teachers can create more effective teaching strategies and curriculum designs that improve student learning outcomes by knowing how various study techniques affect memory retention and academic success. Future studies should examine how technology-driven study methods, including adaptive learning platforms or digital flashcards, can enhance performance and retention. A more thorough grasp of how students maximize their study habits can also be obtained by looking into the effects of

individual differences, such as cognitive styles, motivation, and learning settings. The study's results may also inform academic support programs, guiding institutions in implementing evidence-based interventions that foster better study habits and overall academic success.

It is necessary to recognize limitations. First, the study might use self-reported information to evaluate memory retention and study strategies, which could lead to bias or inaccurate answers. Furthermore, elements that are known to affect cognitive function and academic performance—like sleep habits, stress levels, and mental health—might not be fully taken into consideration. If the study is carried out among a homogeneous student body or inside a particular school, the findings' capacity to be applied generally may also be restricted. To increase the validity of the results, future studies should include broad participant samples, objective cognitive tests, and longitudinal designs. By overcoming these obstacles, additional research can offer more thorough understandings of the intricate relationship among academic performance, study methods, and memory retention, which will ultimately improve teaching methods and student success.

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