ISSN: 2582-7162

Original Article

Impact of Learning Thinking Styles On Academic Achievement Among Secondary School Students

Sheetal Udar[1], Aruna Anchal[2]

[1]Ph.D. Research Scholar, Department of Education, Baba Mastnath University, Asthal Bohar, Rohtak
[2]Professor, Department of Education, Baba Mastnath University, Asthal Bohar, Rohtak

Corresponding Author: Dr. Aruna Anchal, Professor, Department of Education, Baba Mastnath University, Asthal Bohar, Rohtak
Email: dr.arunaanchal@gmail.com

Abstract

This study investigates the impact of learning styles, specifically hemispheric dominance (right, left, and integrated), on academic achievement among secondary school students. The problem centers on understanding whether students' cognitive preferences significantly influence their academic performance, given the traditional educational system's focus on logical and analytical skills. The objective was to explore the relationship between learning styles and academic achievement and identify which style correlates most strongly with academic success. The hypothesis posited that there would be significant differences in academic achievement among students with different hemispheric dominance. The study utilized a descriptive survey method, with a purposive sample of 500 secondary school students (250 male and 250 female) from South Delhi, equally distributed across Class XI. Parents of these students were also included to measure involvement. The Style of Learning and Thinking (SOLAT) by D. Venkataraman was employed to assess cognitive preferences, while academic achievement data were analyzed using descriptive statistics (mean, standard deviation) and inferential statistics (ANOVA, Tukey HSD). Findings revealed that left-hemisphere dominant students scored the highest, reflecting their strength in logical, analytical tasks aligned with traditional educational assessments. Integrated thinkers demonstrated moderate performance, while right-hemisphere dominant students scored the lowest, highlighting the educational system's lesser emphasis on creative and holistic skills. The results underscore the need for balanced teaching strategies that cater to diverse learning styles, including visual, kinesthetic, and creative approaches. These findings have significant implications for curriculum design and instructional practices, emphasizing the importance of inclusive education to enhance overall academic achievement.

Keywords: Academic achievement; learning thinking style; left hemisphere; right hemisphere; secondary school students

How to cite this article: Udar S, Anchal A. Impact of Learning Thinking Styles On Academic Achievement Among Secondary School Students. SDES-IJIR; 2024; 5-6: 880-885

Submitted: 10-December -2024; **Accepted:** 04-January-2024; **Published:** 10-January-2025

Introduction

Academic achievement is a multidimensional construct that reflects a student's performance in educational settings. It is commonly assessed through metrics such as grades, test scores, and completion rates, serving as an indicator of the knowledge and skills acquired during the learning process (Narula & Sindhwani, 2016). At its core, academic achievement encapsulates the outcomes of both personal effort and the efficacy of educational systems, playing a significant role in individual and societal progress. Academic achievement is not merely a measure of scholastic ability; it is deeply interconnected with cognitive, psychological, and environmental factors. The term encompasses the success in mastering curricular content, which is often aligned with predefined educational goals (Monika & Kaur, 2017). It serves as a critical benchmark for assessing the effectiveness of teaching methodologies, educational policies, and individual student effort (Ullrich & Strong, 2019).

In prestigious higher education programs, academic achievement is perceived through a multifaceted lens that integrates cognitive competencies, extracurricular accomplishments, and the ability to balance academic rigor with personal growth (Nyström, Jackson & Karlsson, 2019). Thus, it acts as a reflection of both individual capability and systemic efficiency.

The importance of academic achievement transcends educational contexts, influencing career pathways and societal contributions. It is positively correlated with life outcomes, including employability, social mobility, and personal satisfaction (Kushwaha, 2023). Moreover, academic success fosters an environment of innovation and cultural development, essential for national progress.

In India, academic achievement often plays a decisive role in competitive scenarios, impacting access to higher education and employment opportunities. Studies highlight the criticality of socio-economic status, motivation, and parental encouragement in shaping academic success (Boruah & Saikia, 2019). Globally, the concept underscores the importance of fostering motivation, developing critical thinking skills, and providing quality education (Morales Rodríguez, 2012).

Academic achievement is more than a measure of knowledge; it is a composite of intellectual, emotional, and social factors that contribute to an individual's overall development. As educational systems evolve, there is a growing emphasis on understanding and addressing the diverse determinants of academic success. This perspective not only supports the personal aspirations of learners but also drives societal innovation and global competitiveness.

Learning Style – Right and Left Hemisphere

The concept of learning styles revolves around individual preferences for acquiring, processing, and retaining information. These preferences are often categorized by hemispheric dominance—right-brain or left-brain orientation—each influencing cognitive and learning processes differently. Understanding these learning styles enables educators to tailor instructional methods to optimize student outcomes.

Meaning and Concept

Learning styles represent the habitual patterns through which individuals engage with content. The left hemisphere of the brain is traditionally associated with logical reasoning, analytical thinking, and sequential processing, favoring learners who excel in structured, verbal, and detail-oriented tasks. Conversely, the right hemisphere is linked to creativity, intuition, and holistic thinking, often resonating with visual, spatial, and artistic learners (Gomathi & Krishna, 2017).

A study by Mi-soon Lee and Siegle (2009) highlighted that learning preferences can also be shaped by cultural and neurological factors, emphasizing the role of personalized teaching approaches. These styles are not mutually exclusive but rather complementary, as individuals may exhibit mixed traits depending on the task or context.

Understanding and accommodating diverse learning styles is critical for effective education. When educators align their teaching strategies with students' learning preferences, engagement and comprehension significantly improve (Riyanti & Sungkono, 2020). For instance, students with a dominant right hemisphere may benefit from visual aids and hands-on activities, while left-dominant learners may excel with structured lectures and written instructions (Kadam, Gaikwad & Bhamre, 2021).

https://doi.org/10.47997/sdes-ijir/5.6.2024:880-885

Furthermore, recognizing hemispheric influence supports the development of balanced cognitive skills. Educational strategies that integrate both hemispheric strengths—like combining analytical exercises with creative projects—can foster comprehensive learning. The findings by Gomathi and Krishna (2017) underscore the importance of integrating diverse teaching methods in engineering education to address varied cognitive needs.

Objective

1. To compare academic achievement of senior secondary students in relation to their types of learning style

Hypothesis

1. There exists no significant difference in academic achievement of senior secondary students in relation to their types of learning style.

Materials & Methods

The present study adopts a descriptive survey method to investigate the research objectives. This method is appropriate for collecting data from a large sample and analyzing trends, relationships, and characteristics within the population.

Population and Sample: The study's sample comprises 500 secondary school students from South Delhi, with an equal representation of male and female students (250 each) from Class XI. Additionally, the parents of these students are included to measure their involvement in the educational process. A purposive sampling technique is employed to ensure the relevance of the selected participants.

Tool Used: The Style of Learning and Thinking (SOLAT), standardized by D. Venkataraman, is utilized to assess the learning styles and cognitive preferences of the participants. This tool is known for its reliability and validity in measuring learning and thinking styles.

Statistical Techniques: To analyze the data, descriptive statistics such as mean and standard deviation are calculated, and inferential statistics, including the ANOVA test, are employed. These techniques are used to examine differences and relationships within the sample, ensuring comprehensive data analysis.

Data Analysis: To compare the academic achievement in relation to learning thinking style, Mean, SD and ANOVA tests were used given in tables below:

Table 1: Comparison of academic achievement in relation to learning style (all dimensions)

Academic Achievement	N	Mean	Std. Deviation
Student with right hemisphere	208	65.28	8.300
Students with left hemisphere	204	83.47	10.674
Students with integrated hemisphere	88	71.36	10.579
Total	500	73.77	12.807

Table 1.1: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
16.438	2	497	.000

Table 1.2: ANOVA SUMMARY

Academic Achievement					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	34720.456	2	17360.228	183.066	.000
Within Groups	47130.639	497	94.830		
Total	81851.095	499			

https://doi.org/10.47997/sdes-ijir/5.6.2024:880-885

Table 1.3:Post Hoc Tests (Tukey HSD)

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Student with right hemisphere	Students with left hemisphere	-18.19624*	.95956	.000	-20.4519	-15.9405
	Students with integrated hemisphere	-6.08566*	1.23835	.000	-8.9967	-3.1745
Students with left hemisphere	Student with right hemisphere	18.19624*	.95956	.000	15.9405	20.4519
	Students with integrated hemisphere	12.11058*	1.24196	.000	9.1910	15.0301
Students with integrated hemisphere	Student with right hemisphere	6.08566*	1.23835	.000	3.1745	8.9967
	Students with left hemisphere	-12.11058*	1.24196	.000	-15.0301	-9.1910

Table 1.4: Homogeneous Subsets

Academic Achievement					
	Group	N	Subset for alpha = 0.05		
			1	2	3
Tukey HSD[a,b]	Student with right hemisphere	208	65.283654		
	Students with integrated hemisphere	88		71.369318	
	Students with left hemisphere	204			83.479902
	Sig.		1.000	1.000	1.000

Table 1 provides a comparison of academic achievement among students with different learning styles—right hemisphere, left hemisphere, and integrated hemisphere. The data includes the mean scores, standard deviations, and overall analysis of variance (ANOVA) to examine if there are significant differences in academic performance based on these learning styles. The results from Table 4.10 and the associated statistical tests offer important insights into how cognitive preferences impact educational outcomes.

The mean academic achievement scores for the groups are as follows: students with right hemisphere dominance had a mean score of 65.28, students with left hemisphere dominance scored significantly higher with a mean of 83.48, and students with integrated hemisphere dominance had a mean score of 71.37. These differences suggest that students who prefer left-hemisphere thinking—often associated with logical, analytical, and sequential processing—tend to perform better academically than those who favor right-hemisphere thinking, which is more associated with creativity, holistic, and visual-spatial skills. Students with integrated thinking styles, who use both hemispheres effectively, scored in the middle range, indicating balanced performance.

The Levene Statistic (16.438) with a significance level (p-value) of .000 (Table 1.1) indicates that there is a significant difference in variances among the groups. This confirms that the assumption of homogeneity of

https://doi.org/10.47997/sdes-ijir/5.6.2024:880-885

variances has been violated, suggesting variability in academic achievement across the different learning style groups. Due to this violation, further analysis through ANOVA was necessary to identify where the differences lie.

The ANOVA results (Table 1.2) show that there is a statistically significant difference in academic achievement between the learning style groups, with an F-value of 183.066 and a p-value of .000. This indicates that the differences in mean scores observed across the right, left, and integrated hemisphere groups are unlikely to be due to chance. The high F-value further highlights the strength of this difference, leading to the conclusion that learning style is a significant factor affecting academic performance.

The Tukey HSD Post Hoc tests (Table 1.3) provide a detailed comparison between each pair of groups to identify where the specific differences lie. The following observations were noted:

1. Students with left hemisphere dominance scored significantly higher than those with right hemisphere dominance, with a mean difference of 18.20 (p = .000). This shows a clear advantage for students who excel in analytical, logical thinking.
2. Students with left hemisphere dominance also outperformed those with integrated hemisphere dominance, with a mean difference of 12.11 (p = .000), indicating their superior performance even when compared to balanced thinkers.
3. Students with integrated hemisphere dominance had a higher mean score than those with right hemisphere dominance, with a mean difference of 6.09 (p = .000), suggesting that balanced cognitive processing leads to better academic outcomes than a purely creative or holistic approach.

The homogeneous subsets in Table 1.4 further illustrate the distinctions between the groups. Students with right hemisphere dominance form a distinct group with the lowest academic performance (mean = 65.28). Students with integrated hemisphere dominance fall into a middle subset with a mean of 71.37, while students with left hemisphere dominance form the highest performing group (mean = 83.48). These subsets confirm that left-hemisphere thinking correlates with higher academic achievement, while integrated thinkers achieve moderate success, and right-hemisphere thinkers tend to have lower scores.

The comprehensive analysis provided in Tables 1 through 1.4 leads to the conclusion that learning style has a significant impact on academic achievement. Students who predominantly use left-hemisphere cognitive skills—which include logical reasoning, structured analysis, and sequential thinking—tend to perform the best academically. This is likely due to the traditional structure of educational curricula, which often emphasizes verbal, mathematical, and analytical skills. Students with integrated thinking styles, who utilize a mix of both hemispheres, perform moderately well, suggesting that a balanced cognitive approach has its advantages. In contrast, students who rely on right-hemisphere skills, such as creativity, visual thinking, and holistic processing, tend to score lower, possibly due to the lesser emphasis on these skills in standard academic assessments.

Findings of the Study

The study reveals significant differences in academic achievement based on students' cognitive preferences and hemispheric dominance. Students with left-hemisphere dominance scored the highest, indicating a strong correlation between logical, analytical thinking styles and academic success. Those with integrated hemisphere dominance demonstrated moderate performance, suggesting that a balanced cognitive approach positively influences learning outcomes. Conversely, students with right-hemisphere dominance, associated with creativity and holistic thinking, scored the lowest, reflecting the traditional educational system's preference for analytical skills. The Levene Statistic confirmed variability among groups, and the ANOVA results established that these differences were statistically significant. Post Hoc tests further highlighted specific group differences, with left-hemisphere thinkers consistently outperforming their peers, emphasizing the importance of logical and structured processing in academic achievement.

Conclusion with Implications and Suggestions

The study concludes that learning styles, influenced by hemispheric dominance, significantly impact academic performance. The findings underline the need for educational systems to adapt curricula to support diverse cognitive preferences. While left-hemisphere thinkers excel due to the analytical nature of traditional

https://doi.org/10.47997/sdes-ijir/5.6.2024:880-885

assessments, students with right-hemisphere and integrated thinking styles would benefit from more inclusive approaches that value creativity and balanced cognitive processing.

Educational institutions should incorporate teaching strategies that cater to all cognitive preferences. For instance, integrating visual aids, hands-on activities, and creative assignments can enhance engagement for right-hemisphere thinkers, while structured problem-solving tasks can support left-hemisphere learners. Professional development for teachers should focus on recognizing and addressing diverse learning styles, ensuring that all students have an equitable opportunity to excel.

Future research should explore the long-term benefits of a balanced educational approach that fosters both creative and analytical skills, preparing students for holistic personal and professional development. Implementing these suggestions could lead to more inclusive and effective educational practices, ultimately enhancing student achievement across cognitive domains.

Financial support and sponsorship: Nil

Conflicts of interests: The authors declare that they have no conflict of interest with regard to the content of the report.

References

01. Awang, H., Abd Samad, N. A., Mohd Faiz, N. S., Roddin, R., & Kankia, J. D. (2017). Relationship between the learning styles preferences and academic achievement. IOP Conference Series: Materials Science and Engineering, 226(1), Article 012193. Retrieved from https://dx.doi.org/10.1088/1757-899X/226/1/012193.
02. Boruah, D., & Saikia, P. (2019). Influence of socio-economic status on classroom achievement of Tiwa students at primary level in Morigaon district of Assam. Retrieved from https://dx.doi.org/.
03. Gomathi, A., & Krishna, K. V. (2017). Brain's hemisphere lateralization and learning styles in engineering education. Indian Journal of Psychology, 4(2), 182-196.
04. Kadam, P. R., Gaikwad, U. K., & Bhamre, P. (2021). Student-centred learning using student's learning style. Journal of Engineering Education Transformations, 34(1), 157-185.
05. Kushwaha, A. (2023). Study of awareness about academic achievement of student teachers. International Journal of Future Management Research, 5(5), 63-77.
06. Lee, M.-S., & Siegle, D. (2009). A multilevel analysis of gifted Korean American students' characteristics and school context effects on learning style preferences. Retrieved from https://dx.doi.org/10.1080/15332276.2009.11674858.
07. Li, M., & Alduais, A. (2018). A study on learning styles and their possible effect on academic performance among university students in Glasgow. Review of Social Studies, Law and Psychology, 4(2), 3-10.
08. Mior Yusup, F. N., & Balakrishnan, K. L. (2014). Learning styles among TESL undergraduates in University Putra Malaysia. Advances in Language and Literary Studies, 5(4), 92-97.
09. Monika, & Kaur, G. (2017). Self concept as a correlate of academic achievement: A review analysis. International Journal of Indian Psychology, 5(1), 93-103.
10. Morales Rodríguez, F. M. (2012). School motivation and achievement of students in secondary education. Problems of Psychology in the 21st Century, 4, 39-51.
11. Narula, R., & Sindhwani, A. (2016). Construction of achievement test in English for XI class students. Research Journal of Education, 6(2), 32-45.
12. Nyström, A.-S., Jackson, C., & Salminen K., M. (2019). What counts as success? Constructions of achievement in prestigious higher education programmes. Retrieved from https://dx.doi.org/10.1080/02671522.2018.1452964.
13. Resti, M. R., Hadriana, & Johar, R. (2015). An analysis on student learning style and academic achievement of the second year students of English study program FKIP University of Riau. Retrieved from https://dx.doi.org/.
14. Resti, M. R., Hadriana, & Johar, R. (2015). An analysis on student learning style and academic achievement of the second year students of English study program FKIP University of Riau. Journal of Educational Studies, 3(1), 54-68.
15. Riyanti, A., & Sungkono. (2020). Pemilihan gaya belajar untuk meningkatkan keaktifan siswa dalam pembelajaran Bahasa Indonesia. Bahtera Indonesia, 5(1), 62-74.