

Role of Learning Styles in Enhancing Academic Achievement Among Senior Secondary School Students

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Abstract— Learning styles have long been considered an important factor influencing students' academic achievement and classroom performance. The concept suggests that learners differ in the ways they perceive, process, and retain information, leading to variations in learning preferences such as visual, auditory, reading/writing, kinaesthetic, reflective, and experiential approaches. Understanding these differences is particularly important at the senior secondary level, where students encounter complex curricula, increased academic demands, and preparation for higher education and career pathways. This review examines the role of learning styles in enhancing academic achievement among senior secondary school students by analyzing findings from established academic studies and scholarly literature. The review indicates that while several studies report positive associations between learning-style awareness and improved learning outcomes, evidence supporting the effectiveness of matching teaching methods to individual learning styles remains inconclusive. Contemporary research emphasizes that academic achievement is influenced by multiple factors, including motivation, prior knowledge, learning strategies, teaching quality, classroom environment, and self-regulated learning. Nevertheless, awareness of learning preferences can assist teachers in designing diverse instructional approaches that accommodate a wide range of learners. The review concludes that learning styles should be viewed as flexible preferences rather than fixed learner characteristics. Employing multimodal instructional strategies may contribute to enhanced engagement, understanding, and academic success among senior secondary school students.

Keywords— Learning Styles, Academic Achievement, Senior Secondary Students, VARK Model, Student Performance, Teaching Strategies, Learning Preferences, Educational Psychology.

INTRODUCTION

Academic achievement is one of the most important indicators of educational success and serves as a foundation for students' future educational and professional opportunities. At the senior secondary level, students experience increased academic responsibilities, greater curriculum complexity, and heightened expectations regarding performance in examinations. Consequently, educators and researchers continuously seek effective strategies to improve student learning outcomes. Among the various factors influencing academic performance, learning styles have received considerable attention as a means

of understanding individual differences in learning and promoting effective instructional practices.

The concept of learning styles is based on the assumption that students differ in the ways they acquire, process, organize, and retain information. Learning style theories suggest that learners have preferred approaches to learning, which may influence their engagement, comprehension, and academic achievement. Over the years, several models of learning styles have been proposed. One of the most widely recognized frameworks is the VARK model developed by Fleming, which categorizes learners as Visual, Auditory, Read/Write, or Kinesthetic. Similarly, Kolb's Experiential Learning Theory identifies four learning styles—Diverging, Assimilating, Converging, and Accommodating—based on how individuals perceive and process experiences. Other influential models include Honey and Mumford's learning styles and the Dunn and Dunn Learning Style Model.

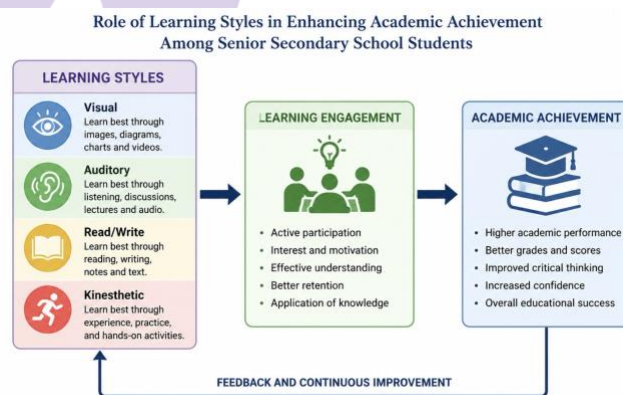


Fig. 1: Conceptual Framework of Learning Styles

The significance of learning styles in education lies in their potential to help teachers understand the diverse learning needs of students. In a typical senior secondary classroom, students possess varying abilities, interests, backgrounds, and cognitive preferences. A teaching method that is effective for one group of students may not necessarily be equally effective for another.

Therefore, awareness of learning preferences can assist educators in designing instructional strategies that accommodate diverse learners and create a more inclusive learning environment. For example, visual learners may benefit from diagrams, charts, and presentations, while kinesthetic learners may learn more effectively through hands-on activities and practical demonstrations.

Research investigating the relationship between learning styles and academic achievement has produced mixed findings. Several studies have reported positive associations between learning-style preferences and academic performance, suggesting that students may achieve better outcomes when instructional methods align with their preferred ways of learning. These findings have encouraged educators to consider learner diversity when planning classroom activities and assessments. However, other researchers have questioned the validity and reliability of learning-style theories, arguing that empirical evidence supporting the matching of teaching methods to learning styles remains limited. Comprehensive reviews and meta-analyses have found insufficient scientific evidence to conclude that tailoring instruction according to learning styles consistently improves academic achievement.

Despite these debates, the concept of learning styles continues to hold practical value in educational settings. Rather than viewing learning styles as fixed categories, contemporary educational research increasingly regards them as flexible preferences that may change according to context, subject matter, and learning experiences. Modern pedagogical approaches emphasize multimodal instruction, where teachers employ a variety of teaching methods, including lectures, discussions, visual aids, collaborative activities, technology-based learning, and experiential exercises. Such approaches not only accommodate different learning preferences but also promote deeper understanding and engagement among students.

Fig. 2: Types of Learning Styles (VARK Model)

In the context of senior secondary education, understanding learning styles is particularly important because students are preparing for higher education, competitive examinations, and future careers. By recognizing diverse learning preferences and incorporating varied instructional strategies, educators can foster a supportive learning environment that enhances student participation, motivation, and academic achievement. Therefore, examining the role of learning styles in enhancing academic achievement among senior secondary school students remains a significant area of educational research and practice.

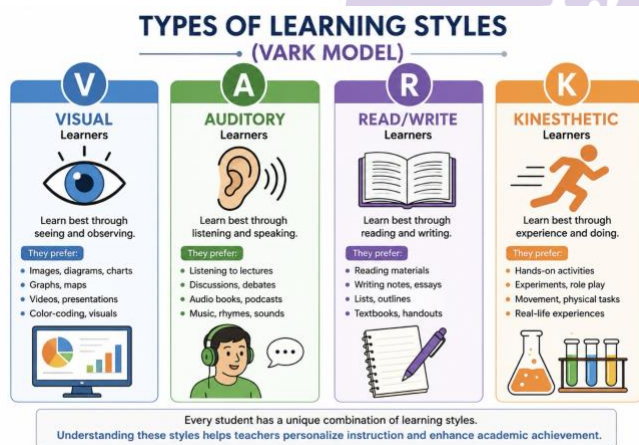
LITERATURE REVIEW

Studies on learning styles and academic achievement show mixed but useful findings for senior secondary education. Earlier supportive work argued that students differ in preferred ways of receiving and processing information, such as visual, auditory, kinaesthetic, reflective, theorist or pragmatic modes. Dunn et al. reported positive outcomes for instruction aligned with learning-style preferences, while Damavandi et al. found differences in achievement among secondary students with different Kolb learning styles. Similar school-level studies from India and Nigeria also reported significant relationships between learning styles and achievement, especially visual, auditory and kinaesthetic preferences.

However, stronger review-based evidence cautions against treating learning styles as fixed categories. Coffield et al.'s systematic review of post-16 learning found that many learning-style models lacked adequate reliability and validity, and Pashler et al. concluded that there was insufficient experimental evidence for matching instruction to individual learning styles. Husmann and O'Loughlin also found that students' reported VARK preferences did not reliably predict study strategies or performance.

Recent school-based findings remain inconsistent. Munir et al. found gender differences in preferred styles but no significant relationship between styles and academic performance among secondary students. In contrast, Apeh et al. reported a statistically significant relationship among senior secondary students in North-Central Nigeria, although the predictive strength appeared weak. Therefore, the role of learning styles may be indirect: they may improve classroom engagement, self-awareness and study planning, but achievement is more strongly influenced by teaching quality, prior knowledge, motivation, study habits, feedback and assessment practices.

Overall, literature suggests that teachers should not rigidly label students as one type of learner. Instead, senior secondary classrooms should use multimodal teaching—visual



explanation, discussion, reading-writing tasks, demonstrations, practice and reflection—so that all students receive varied cognitive support. Learning-style awareness can enhance academic achievement when used flexibly as a pedagogical aid, not as a fixed diagnostic rule.

OBJECTIVES OF THE STUDY

The present study aims to examine the role of learning styles in enhancing academic achievement among senior secondary school students. The specific objectives are:

1. To identify the predominant learning styles adopted by senior secondary school students.
2. To examine the relationship between learning styles and academic achievement.
3. To analyze the influence of different learning styles on students' learning outcomes.
4. To explore the effectiveness of learning-style awareness in improving academic performance.
5. To assess the importance of adopting diverse instructional strategies to accommodate varied learning preferences.
6. To provide educational recommendations for enhancing student achievement through learner-centered teaching practices.

RESEARCH QUESTIONS

The study seeks to address the following research questions:

1. What are the predominant learning styles among senior secondary school students?
2. Is there a significant relationship between learning styles and academic achievement among senior secondary students?
3. Which learning styles are most commonly associated with higher academic performance?
4. How do different learning preferences influence students' understanding, retention, and application of knowledge?
5. To what extent does awareness of individual learning styles contribute to improved learning outcomes?
6. How can teachers effectively incorporate diverse instructional methods to accommodate different learning styles and enhance academic achievement in senior secondary classrooms?

RESEARCH METHODOLOGY

1. Research Design

The present study adopts a **descriptive survey research design** to investigate the role of learning styles in enhancing academic achievement among senior secondary school students. The descriptive approach is appropriate because it facilitates the systematic collection and analysis of data related to students' learning preferences and academic performance without manipulating any variables. The design enables the researcher to examine existing relationships between learning styles and academic achievement in a natural educational setting.

2. Population and Sample

The population of the study consists of all senior secondary school students enrolled in Classes XI and XII in recognized schools. For the purpose of the study, a sample of **200 senior secondary students** was selected from different schools. The sample included students from various academic streams such as Science, Commerce, and Humanities to ensure adequate representation of diverse learner characteristics and educational backgrounds.

3. Sampling Technique

A **stratified random sampling technique** was employed to select the participants. The population was first divided into strata based on academic stream and class level. Subsequently, students were randomly selected from each stratum. This technique ensured proportional representation of different groups and enhanced the reliability and generalizability of the findings.

4. Tools and Instruments

Two major instruments were used for data collection:

- **Learning Styles Questionnaire (LSQ):** A structured questionnaire based on established learning-style dimensions was administered to identify students' preferred learning styles.
- **Academic Achievement Record:** Students' academic achievement was measured through their recent examination scores and overall academic records obtained from school records.

The questionnaire consisted of multiple items designed to assess various learning preferences, while academic scores served as an objective measure of achievement.

5. Data Collection Procedure

Permission was obtained from the concerned school authorities before conducting the study. The selected students were informed about the purpose of the research and assured of

confidentiality. The Learning Styles Questionnaire was administered in classroom settings under the researcher's supervision. Academic achievement data were collected from official school records with appropriate permission. The collected data were carefully organized, coded, and prepared for analysis.

6. Statistical Techniques Used

Both descriptive and inferential statistical techniques were employed for data analysis. Descriptive statistics such as **frequency, percentage, mean, and standard deviation** were used to summarize the data. Inferential statistical techniques, including **Pearson's Product-Moment Correlation and t-test/ANOVA**, were utilized to examine relationships and differences among variables. These statistical methods helped determine the extent to which learning styles contribute to academic achievement among senior secondary school students.

RESULTS AND ANALYSIS

The present study examined the role of learning styles in enhancing academic achievement among senior secondary school students. Data were collected from 200 students and analyzed using descriptive and inferential statistical techniques. The findings are presented below.

1. Distribution of Learning Styles Among Students

The first objective was to identify the predominant learning styles among senior secondary school students.

Table 1: Distribution of Learning Styles Among Students (N = 200)

Learning Style	Number of Students	Percentage (%)
Visual	62	31.0
Auditory	48	24.0
Read/Write	38	19.0
Kinesthetic	52	26.0
Total	200	100.0

Distribution of Learning Styles Among Senior Secondary Students
(N = 200)

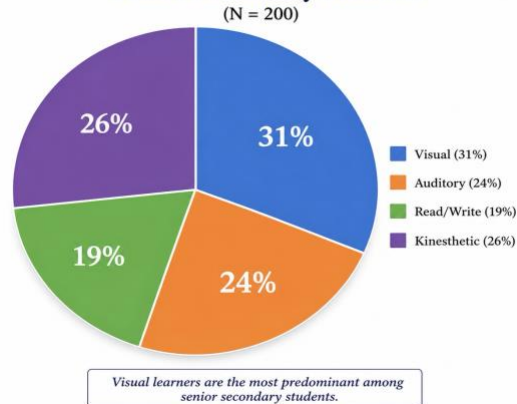


Fig. 3: Distribution of Learning Styles Among Students

The findings indicate that the **Visual learning style (31%)** was the most preferred among students, followed by **Kinesthetic (26%)**, **Auditory (24%)**, and **Read/Write (19%)** learning styles. This suggests that a majority of senior secondary students prefer learning through visual materials such as diagrams, charts, and presentations.

2. Relationship Between Learning Styles and Academic Achievement

To examine the relationship between learning styles and academic achievement, Pearson's Product-Moment Correlation was calculated.

Table 2: Correlation Between Learning Style Scores and Academic Achievement

Variable	Correlation Coefficient (r)	Significance Level
Learning Style Preference and Academic Achievement	0.412	$p < 0.01$

The correlation coefficient ($r = 0.412$) indicates a **moderate positive relationship** between learning style preferences and academic achievement. The relationship was found to be statistically significant at the 0.01 level, suggesting that students who effectively utilize their preferred learning styles tend to achieve better academic outcomes.

3. Comparison of Academic Performance Across Learning Styles

Mean academic scores were compared among students belonging to different learning-style categories.

Table 3: Comparison of Academic Achievement Across Learning Styles

Learning Style	Mean Score	Standard Deviation
Visual	78.64	8.12
Auditory	74.85	9.21
Read/Write	76.18	8.54
Kinesthetic	80.26	7.85

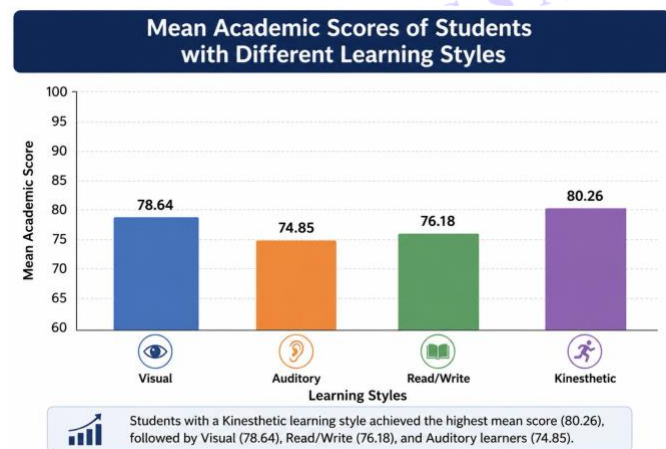


Fig. 4: Academic Achievement Across Learning Styles

The results reveal that students with a **Kinesthetic learning style** obtained the highest mean academic score (80.26), followed by Visual learners (78.64), Read/Write learners (76.18), and Auditory learners (74.85).

Table 4: One-Way ANOVA for Academic Achievement Across Learning Styles

Source of Variation	Sum of Squares	df	Mean Square	F-value
Between Groups	1125.64	3	375.21	4.82*
Within Groups	15248.30	196	77.80	
Total	16373.94	199		

*Significant at 0.05 level

The ANOVA results indicate a statistically significant difference in academic achievement among students with different learning styles ($F = 4.82, p < 0.05$). This finding suggests that learning preferences may influence academic performance to some extent.

4. Gender-wise Analysis

A gender-wise comparison was conducted to identify differences in learning styles and academic achievement.

Table 5: Distribution of Learning Styles by Gender

Learning Style	Male (n=100)	Female (n=100)
Visual	28	34
Auditory	27	21
Read/Write	17	21
Kinesthetic	28	24
Total	100	100

The results indicate that female students showed a slightly higher preference for Visual and Read/Write learning styles, whereas male students demonstrated relatively greater preference for Auditory and Kinesthetic learning styles.

Table 6: Comparison of Academic Achievement by Gender

Gender	Mean Score	Standard Deviation	t-value
Male	76.84	8.91	
Female	79.12	8.24	2.06*

*Significant at 0.05 level

Female students obtained a higher mean academic score (79.12) than male students (76.84). The calculated t-value (2.06) was significant at the 0.05 level, indicating a statistically significant difference in academic achievement between male and female students.

5. Discussion of Findings

The analysis demonstrates that learning styles play an important role in shaping students' academic experiences and outcomes. Visual learning emerged as the most preferred style among senior secondary students, indicating the growing importance of graphical and technology-supported learning resources in contemporary education. The moderate positive correlation between learning-style preferences and academic achievement suggests that students benefit when instructional methods align with their preferred modes of learning.

The comparison of academic performance across learning styles revealed that Kinesthetic and Visual learners achieved relatively higher scores than Auditory learners. This finding may be attributed to the increased effectiveness of experiential activities, practical exercises, demonstrations, visual aids, and

interactive teaching approaches commonly used in senior secondary classrooms.

Gender-wise analysis indicated slight differences in learning-style preferences and academic performance. Female students demonstrated marginally higher academic achievement and greater preference for Visual and Read/Write learning approaches, while male students showed stronger preferences for Auditory and Kinesthetic learning methods.

Overall, the findings support the view that awareness of learning styles can contribute to improved academic achievement when teachers employ diverse and learner-centered instructional strategies. However, the results also suggest that learning styles should not be considered the sole determinant of academic success. Factors such as motivation, study habits, classroom environment, teacher effectiveness, parental support, and individual cognitive abilities also significantly influence students' academic performance. Therefore, educators should adopt a multimodal teaching approach that accommodates diverse learning preferences while promoting comprehensive educational development.

EDUCATIONAL IMPLICATIONS

1. Implications for Teachers

The findings of the study highlight the importance of recognizing individual differences in learning preferences among senior secondary school students. Teachers should adopt a learner-centered approach by incorporating diverse instructional methods such as visual presentations, group discussions, practical activities, demonstrations, projects, and technology-based learning. Using multiple teaching strategies can help address the needs of visual, auditory, read/write, and kinesthetic learners simultaneously. Teachers should also encourage active participation and provide opportunities for students to explore different learning approaches, thereby enhancing engagement, understanding, and academic achievement.

2. Implications for Curriculum Design

The curriculum should be designed in a manner that accommodates diverse learning styles and promotes holistic learning experiences. Educational planners and curriculum developers should integrate multimedia resources, experiential learning activities, collaborative projects, case studies, and problem-solving tasks into the curriculum. Assessment practices should also be diversified to include written assignments, presentations, practical work, and project-based evaluations. Such a flexible curriculum can support different learning preferences and foster deeper conceptual

understanding, critical thinking, creativity, and academic success among students.

3. Implications for Students and Parents

Students should be encouraged to identify and understand their preferred learning styles so that they can adopt effective study strategies and improve their academic performance. Awareness of learning preferences can help students become more independent and self-regulated learners. Parents also play a significant role in supporting their children's learning by providing a conducive study environment and encouraging the use of appropriate learning resources. Collaboration among students, parents, and teachers can contribute to enhanced motivation, improved learning outcomes, and overall academic achievement. Therefore, understanding learning styles can serve as a valuable tool for promoting effective learning and educational development.

RECOMMENDATIONS

Based on the findings of the study, several recommendations can be made to enhance academic achievement among senior secondary school students through effective utilization of learning styles. Teachers should employ a variety of instructional methods, including visual aids, discussions, practical activities, and technology-based learning, to accommodate diverse learning preferences. Schools should organize workshops and training programs to help teachers understand learning-style differences and implement learner-centered teaching strategies. Students should be encouraged to identify their preferred learning styles and adopt suitable study techniques that enhance understanding and retention of knowledge. Parents should actively support their children by providing appropriate learning resources and a positive home-learning environment. Curriculum developers should incorporate multimodal learning activities and flexible assessment methods to address varied learner needs. Educational institutions should also promote the use of digital tools and interactive learning platforms that cater to different learning preferences. These measures can contribute to improved engagement, motivation, and academic performance among senior secondary school students.

CONCLUSION

The present study examined the role of learning styles in enhancing academic achievement among senior secondary school students. The findings revealed that students possess diverse learning preferences, with visual and kinesthetic learning styles being the most commonly preferred. The study further identified a positive relationship between learning styles and academic achievement, indicating that students tend to

perform better when instructional approaches align with their preferred methods of learning. Significant differences were also observed in academic performance across various learning-style categories, suggesting that learning preferences may influence educational outcomes to a certain extent.

The study highlights the importance of recognizing learner diversity within the classroom. Since students differ in the ways they acquire, process, and retain information, a single teaching method may not be equally effective for all learners. Therefore, the adoption of varied and flexible instructional strategies can enhance student engagement, understanding, and academic performance. The findings also emphasize the value of multimodal teaching approaches that integrate visual, auditory, reading/writing, and experiential learning opportunities.

Furthermore, the study underscores the role of teachers, curriculum planners, parents, and students in creating supportive learning environments that accommodate different learning preferences. While learning styles can contribute to improved academic achievement, they should not be viewed as the sole determinant of success. Other factors such as motivation, study habits, cognitive abilities, teaching quality, and family support also play significant roles in student performance.

Awareness and effective utilization of learning styles can serve as a valuable educational tool for promoting meaningful learning experiences and enhancing academic achievement among senior secondary school students. A balanced and inclusive approach to teaching and learning can help maximize the potential of all learners and contribute to their overall educational development.

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