# LEARNING STYLES AS PREDICTORS OF PROCRASTINATION IN MATHEMATICS: A STUDY WITH CLASS VII STUDENTS

https://doi.org/10.5281/zenodo.18335850

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***ABSTRACT***

*This school-based research explores the relationship between students' learning styles and their tendency to procrastinate in mathematics among Class VII students. 152 students from two schools were assessed using a Learning Styles Inventory and an age-appropriate Procrastination Scale. Results showed no significant association between learning-style preference and procrastination level .The paper discusses classroom implications, intervention strategies, and suggestions for teachers and future research.*

***Keywords*** *Learning styles, Procrastination ,Mathematics*

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## INTRODUCTION

Mathematics plays a vital role in intellectual development and is considered to be an important core subject.Mathematics achievement in early adolescence is determined not only by cognitive skills and prior knowledge but also by motivational, affective and self-regulatory processes (e.g., goal setting, time management, anxiety management). Two constructs that intersect with these processes are learning style (preference) and academic procrastination. Learning-style frameworks (e.g., VARK, Kolb) highlight stable or semi-stable preferences for perceiving and processing information (visual, auditory, read/write, kinesthetic), while academic procrastination

is a pervasive self-regulatory failure in which students voluntarily delay academic tasks despite expecting negative consequences (Steel, 2007). Considering both together is useful because task engagement and the subjective aversiveness of tasks (which influence procrastination) can depend on whether the task format aligns with a student's preferred way of learning. While a large body of research has examined

Mathematics learning during earlyadolescence represents a critical stage in students' cognitive and academic development(Vashisht,2024).At this level, learners move from concrete operational reasoning toward abstract thinking, which demands greater independence, self-regulation, and persistence. However, many students experience difficulties sustaining motivation and managing time effectively when confronted with challenging mathematical tasks. These challenges often manifest as academic procrastination, defined as the voluntary delay of intended academic actions despite knowing the potential negative consequences (Steel,2007). Procrastination in mathematics is particularly concerning because mathematics learning is cumulative and sequential; delaying study or practice can lead to gaps in conceptual understanding that are difficult to bridge later (Gao, 2025; Sharma Chapai, 2024). Learning styles refer to preferred ways students take in and process information (e.g., visual, auditory, read/write, kinesthetic).Among the many psychological and pedagogical factors influencing student engagement and persistence in mathematics, learning styles have attracted extensive attention in educational research and classroom practice. Frameworks such as Kolb's (1984) experiential learning model and the VARK model proposed by Fleming and Mills (1992) identify broad categories of learner preferences, typically visual, auditory, read/write, and kinesthetic. Although debates continue about the empirical strength of the "matching hypothesis," which claims that teaching matched to style enhances learning outcomes. Recent studies have revisited learning styles in light of modern educational concerns such as engagement, metacognition, and personalized learning. These findings are particularly relevant for middle school mathematics, where engagement, effort regulation, and perceived task value strongly predict achievement. Parallel to the research on learning styles, studies on academic procrastination have expanded rapidly in the last decade,

highlighting its prevalence even among younger learners. González and Suárez (2023) synthesized evidence showing that procrastination emerges as early as late primary school and intensifies during adolescence due to developmental changes in self-regulation and executive functioning. In mathematics, procrastination is strongly correlated with math anxiety, low self-confidence, and avoidance-oriented coping behaviors (Rad et al., 2025).Though learning styles and procrastination have been explored independently, the intersection of these two constructs remains under explored, particularly in the context of mathematics learning at the middle-school level. Hussin and Matore (2023) provided one of the first empirical links between learning styles and procrastination in mathematics, revealing that visual and kinesthetic preferences together explained 14.1% of the variance in math-specific procrastination. This suggests that learning preferences may influence how students perceive and engage with mathematical tasks, thereby affecting their tendency to delay such tasks. For Class VII students, this relationship holds particular significance. At this stage, learners are developing abstract reasoning skills but still benefit from concrete multi-sensory experiences. When instructional delivery fails to align with students' dominant learning preferences, the perceived difficulty of mathematical tasks may increase, leading to reduced motivation and greater procrastination. Conversely, when teaching methods cater to multiple learning modes-combining visual representations, verbal explanations, and hands-on activities-students are more likely to experience engagement, self-efficacy, and timely task completion (Hussin & Matore, 2023; Hattie, 2025).

Therefore, exploring the relationship between learning styles and procrastination in mathematics is crucial for understanding how instructional approaches and learner characteristics jointly shape engagement and achievement during early adolescence. Ultimately, such insights can guide teachers in designing mathematics instruction that not only supports conceptual understanding but also mitigates maladaptive behavioral tendencies such as procrastination.This study examinesthe distribution of learning styles among Class VII students, the prevalence of procrastination in math homework and study and seeks to determine the relationship between learning styles and

academic procrastination in mathematics among Class VII students. Specifically, it aims to identify whether certain learning style preferences are associated with higher or lower levels of procrastination in mathematics.

## REVIEW OF LITERATURE

### Learning Styles:

Fleming (2001) emphasized that learners benefit when instruction matches their preferred learning modalities. Mismatch between teaching style and student preference can lead to reduced engagement, loss of interest in academic activities, and difficulties in understanding concepts. Sarasin (2006) further highlighted that students who study using strategies aligned with their preferred learning styles show better attention and greater persistence in academic tasks.The effectiveness of learning style theories has also been critically examined. Coffield et al. (2004) conducted a comprehensive review of learning style models and argued that although learning styles help teachers understand learner diversity, instructional practices should be flexible rather than rigidly matched. Similarly, Pashler et al. (2008) concluded that empirical evidence for strict "learning-style matching" is weak, but they acknowledged that acknowledging learner differences improves engagement and classroom interaction.

### Academic Procrastination:

Pychyl (2013) highlighted that procrastination is not simply poor time management but an emotional regulation failure where individuals avoid tasks that generate discomfort or anxiety. In the context of schooling, persistent procrastination negatively impacts academic performance, self-esteem, and long-term educational outcomes.More recently, Svartdal et al. (2020) provided evidence that academic procrastination is a measurable psychological construct associated with irrational delay, lack of self-control, and task aversion. Their work emphasized accurate measurement as vital for understanding and addressing procrastination patterns in students.

**Relationship Between Learning Styles and Procrastination:**

Several studies have explored the relationship between learning preferences and procrastination behaviour.Schraw, Wadkins, and Olafson (2007) explained procrastination as a response to task difficulty and disengagement, which often occurs when instructional style fails to suit learners' cognitive preferences. Their findings suggested that when students struggle to connect with material, procrastination becomes an emotional avoidance strategy. Akpunar (2011) examined teacher education students and found that learning styles significantly influenced procrastination behaviour. Students whose learning preferences were mismatched with instructional methods were more likely to exhibit academic delay.Cakır (2013) reported similar findings, noting that students with ineffective learning style patterns procrastinated more frequently than those with structured or reading-oriented styles. Khan et al. (2014) further found that learning style types influenced academic behaviour, with kinesthetic learners demonstrating higher levels of procrastination than visual and read/write learners.

**Learning Styles and Procrastination in Mathematics:**

According to Deci and Ryan (2000), a lack of autonomy and competence in learning environments reduces intrinsic motivation, thereby increasing procrastination.Kinesthetic learners, in particular, experience difficulty when mathematics is taught through lecture and textbook-based methods. The absence of hands-on activities and real-life applications may result in disengagement, causing students to delay tasks related to mathematics (Khan et al., 2014).A recent review by González et al. (2023) demonstrated that academic procrastination in children and adolescents is strongly associated with learning dissatisfaction, cognitive overload, and teaching difficulties. Their review emphasized the importance of tailoring teaching strategies to suit student diversity as a means of reducing delay behaviour.Several studies have investigated learning styles in relation to mathematics achievement. Research by Sarasin (2006) and Lister (2014) showed that aligning instructional strategies with students' preferred learning modes enhances

comprehension and retention in mathematics. For example, visual learners perform better when concepts are supported with diagrams, while kinesthetic learners benefit from manipulatives and activity-based learning.

However, meta-analyses (Pashler et al., 2008; Coffield et al., 2004) caution against over reliance on the "matching hypothesis," suggesting that teaching tailored strictly to learning styles may not always lead to improved academic outcomes. Rather, they emphasize multimodal instruction-engaging multiple sensory channels—to reach diverse learners effectively.Akinsola, Tella, and Tella (2007) found a significant negative relationship between academic procrastination and mathematics achievement among secondary school students, suggesting that procrastinators typically spend less time on problem-solving and review. In the Indian context, Kaur and Kaur (2019) found that secondary school students displayed a mix of visual and kinesthetic preferences in mathematics, indicating the importance of blended teaching strategies.

Recent studies (Svartdal et al., 2020) emphasize that the learning environment and teacher feedback also play a role in shaping procrastination behaviors. Supportive classroom climates, clear deadlines, and scaffolded assignments can mitigate the negative effects of procrastination by promoting self-discipline and motivation. A study by Hussin and Matore (2023) involving secondary school students revealed a statistically significant correlation between certain learning styles and academic procrastination in mathematics. Specifically, learners who preferred reflective observation and read/write modes showed higher tendencies to delay assignments, possibly due to over dependence on structured instruction and fear of errors. On the other hand, students with visual and kinesthetic learning styles reported lower procrastination, indicating greater adaptability to different teaching formats.

## NEED OF THE STUDY

In recent years, educators and researchers have increasingly recognized that students do not learn in the same way. Differences in learning styles-the preferred ways individuals perceive, process, and retain information have been shown to significantly influence academic achievement and classroom engagement. In mathematics, a

subject often perceived as abstract and challenging, the alignment between teaching methods and students' learning styles can play a critical role in shaping their understanding and confidence.

At the same time, procrastination tendency, a common behavioral pattern among adolescents, has emerged as a major barrier to effective learning. Many students postpone mathematical tasks due to fear of failure, lack of interest, or poor time management, resulting in lower performance and increased anxiety. The middle school years (particularly Class VII) mark a developmental stage where self-regulation, academic habits, and motivation undergo crucial changes, making this an ideal age group for studying these interrelated factors.

Existing literature has explored learning styles and procrastination separately, but limited research has examined the relationship between the two within the context of mathematics learning. Understanding how a student's preferred learning style may influence (or be influenced by) their procrastination behaviors could offer valuable insights for teachers. Thus, this study emerges from the need for exploring the distribution of learning styles among ClassVII students in mathematics,assessing their tendency toward academic procrastination and further examining the relationship between learning style preferences and procrastination tendencies.By identifying how these psychological and pedagogical factors interact, the research aims to contribute to the development of more personalized and supportive learning environments that foster motivation, discipline, and conceptual understanding in mathematics.

## TOOLS EMPLOYED

**1.Learning Styles Inventory (LSI) -**Short (adapted from VARK Questionnaire,2019): 12 items, 3 items per modality (Visual, Auditory, Read/Write, Kinesthetic). Students choose the option that best reflects their preference. Scoring: the modality with highest cumulative score is the preferred learning style.

**2.Student Procrastination Scale (SPS) short (adapted):** 10 statements about studybehaviour specific to mathematics (e.g., "I delay starting math homework until the last minute"), rated on 1 (Never) to 4 (Always). Possible score range 10–40. Cut-offs: 10–18 = Low, 19–28 = Moderate, 29–40 = High procrastination.

## SCOPE AND DELIMITATION

This study focuses on Class VII students enrolled in mathematics classes in a selected school or group of schools. It is limited to identifying students' learning styles based on the VARK model (Visual, Auditory, Read/Write, and Kinesthetic) and measuring their level of academic procrastination specifically in mathematics-related tasks, such as homework, test preparation, and project submissions.The study does not attempt to measure overall intelligence, general study skills, or other personality factors such as perfectionism, anxiety, or motivation.

## OBJECTIVES OF THE STUDY

- To identify the relationship between class VII students' learning styles and their level of a procrastination in mathematics.
- To examine the difference in procrastination with different learning styles among class VII students.

## HYPOTHESES OF THE STUDY

H01: There is no significant relationship between learning styles and procrastination in mathematics among class VII students.

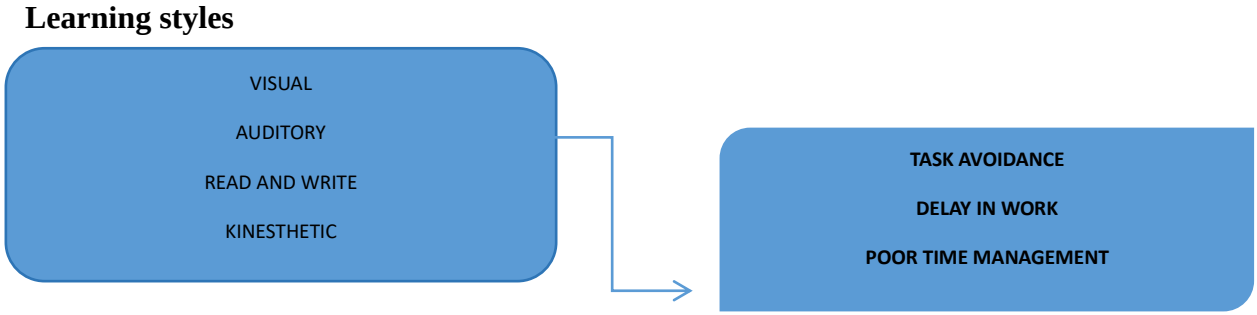
H01: There is no significant difference in procrastination with different learning styles among class VII students.

## METHODOLOGY

The Descriptive survey method was used in the present study.For the purpose, a sample of 152 students of class VII from two private CBSE affiliated schools were randomly chosen.Their age group lied between 12 to 13 years.

## RESEARCH DESIGN

The present study adopted a descriptive–correlational research design with a quantitative approach to examine the relationship between learning styles and procrastination in mathematics among Class VII students.Data were collected through standardized questionnaires and analyzed using statistical techniques such as correlation and regression analysis to interpret the relationship between learning styles and procrastination behavior.




## STATISTICAL ANALYSIS AND INTERPRETATION OF DATA

Descriptive analysis was used to analyse the general trend of learning styles and procrastination.Following are the tables and figures for the analysis of data.

**Table1**

**Mean and Standard Deviation of Variables**

| Variable | N | Mean | S.D. | Minimum | Maximum |
|---|---|---|---|---|---|
| **LearningStyles** | 152 | 71.40 | 18.43 | 40 | 100 |
| **Procrastination in Mathematics** | 152 | 48.01 | 17.67 | 20 | 80 |

Table 1 reveals the mean score of learning styles as 71.40 and that of procrastination as 48.01 with their maximum and minimum values.Standard deviation values for learning styles and procrastination in mathematics were found to be 18.43 and 17.67 respectively.

**Table2**

**Correlation between Learning Styles and Procrastination in Mathematics**

| | | **Procrastination Score** | **Learning Style Score** |
|---|---|---|---|
| **Pearson Correlation** | **Procrastination Score** | 1.00 | -0.58 |
| | **Learning Style** | -0.58 | 1.00 |
| **Sig(one -tailed)** | **Procrastination Score** | | .238 |
| | **Learning Style** | .238 | |
| **N** | **Procrastination Score** | 152 | 152 |
| | **Learning Style** | 152 | 152 |

From the above table 2, it can be seen that pearson correlation indicate a weak negative and statistically non- significant relationship between learning styles and procrastination in mathematics. Therefore H01:there is no significant relationship between learning styles and procrastination among class VII students is accepted.

**Table3**

**Model summary(Regression)**

| **Model** | **R** | **R-Square** | **Adjusted R-Square** | **S.E. Mean** |
|---|---|---|---|---|
| 1 | 0.058 | 0.003 | 0.003 | 17.695 |
| | | | | |

**Table 4**

**ANOVA (for Regression)**

| Model | Sum of Squares | Df | Mean Square | F | Significance |
|---|---|---|---|---|---|
| **Regression** | 160.596 | 1 | 160.596 | 0.513 | 0.475 |
| **Residual** | 46969.378 | 150 | 313.129 | | |
| **Total** | 47129.974 | 151 | | | |

Table 3 and 4 revealed that learning style did not significantly predict procrastination in mathematics as p=0.475.

**Table 5**

**Descriptive statistics for Different Learning Styles**

| Learning Style | N | Mean | Std.Deviation |
|---|---|---|---|
| **Visual** | 38 | 45.32 | 16.41 |
| **Auditory** | 36 | 47.18 | 17.26 |
| **Read/Write** | 39 | 43.57 | 15.89 |
| **Kinesthetic** | 39 | 55.04 | 18.63 |
| **Total** | 152 | 48.01 | 17.67 |

From the above table 5, it can be seen that mean scores of procrastination is highest among kinesthetic learners, whereas the mean scores of procrastination among read/write learners demonstrated lowest value.

**Table 6**

**One way ANOVA for comparison between Procrastination among Different Learning Styles**

| Source | Sum of Squares | Df | Mean Square | F-value | Sig. |
|---|---|---|---|---|---|
| **Between groups** | 3485.12 | 3 | 1161.71 | 3.78 | 0.012 |
| **Within groups** | 42169.86 | 148 | 284.93 | | |
| **Total** | 45654.98 | 151 | | | |

From table6, it can be seen that p-value is less than the table value at 0.05, therefore the null hypothesis ,H02:There is no significant difference in procrastination among different learning styles among class VII students,is rejected.

**Table 7**

**Post-Hoc Test for multiple comparisons**

| Group Comparison | Mean Difference | Significance |
|---|---|---|
| Visual versus Auditory | -1.86 | Not significant |
| Visual versus Read/ write | 1.75 | Not significant |
| Visual versus Kinesthstic | -9.72 | 0.011 |
| Auditory versus Kinesthstic | -7.86 | 0.028 |
| Read/write versus Kinesthstic | -11.47 | 0.004 |

From the post-hoc test, it can be interpreted that kinesthetic learners exhibit significantly higher procrastination as compared to visual, auditory and read/write learners.However ,no significant difference is observed among visual, auditory and read/write learners.

## RESULTS AND CONCLUSIONS

The results of the Pearson correlation indicated a weak negative and statistically non-significant relationship between learning style and procrastination in mathematics ($r = -.058$, $p > .05$). Simple linear regression analysis further revealed that learning style did not significantly predict procrastination in mathematics ($\beta = -.058$, $p = .475$). The regression model accounted for only 0.3% of variance in procrastination, indicating that learning style is not a strong predictor variable in this study.which is in agreement in the study by Masoumi,H.(2023). Kinesthetic learners showed the highest procrastination which is not in agreement with the study by Hussin and Matore(2023), whereas Read/Write learners demonstrated the lowest Visual and Auditory learners fell in the mid-range.

Although correlation and regression analyses showed that total learning style score did not significantly predict procrastination, the categorical analysis using different learning styles revealed significant group differences. This indicates that while learning adaptability alone does not influence procrastination, the type of learning preference plays a more meaningful role. In particular, kinesthetic learners exhibited significantly higher levels of procrastination. This suggests that procrastination is influenced more by how students prefer to learn rather than how strong their learning styles.

## EDUCATIONAL IMPLICATIONS AND RECOMMENDATIONS

This study is expected to provide both theoretical and practical contributions to the understanding of learning behavior in mathematics.

For Students: The findings will help learners to become aware of their preferred learning styles and how these preferences may influence their study habits and tendencies to delay mathematics tasks.

For Teachers: The results will support teachers in designing lessons that incorporate multimodal learning experiences -integrating visual, auditory, verbal, and kinesthetic elements to engage diverse learners.

For Curriculum Developers and School Administrators: Insights from this research can inform the development of learner-centered curricula and classroom policies that balance cognitive diversity with academic discipline. By recognizing the role of learning preferences in motivation and time management, curriculum planners can create environments that promote timely learning and active participation.

For Future Researchers: This study contributes to the growing body of research on self-regulated learning and educational psychology at the middle-school level, providing a framework for further exploration of the interactions between personality, motivation, and learning behavior.

**REFERENCES**

Akinsola, M. K., Tella, A., & Tella, A. (2007). Correlates of academic procrastination and mathematics achievement of secondary school students. Eurasia Journal of Mathematics, Science and Technology Education, 3(4), 363–370.

Akpunar, B. (2011).Learning styles and academic procrastination behaviors of teacher candidates. *Educational Research and Reviews*, 6(5), 408–414.

Çakır, S. G. (2013).An analysis of academic procrastination and learning styles. Educational Research and Reviews, 8(3), 114–120.

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). Learning styles and pedagogy in post-16 learning. Learning and Skills Research Centre,London

Fleming, N. D., & Mills, C. (1992). Not another inventory, rather a catalyst for reflection.ToImprove the Academy,11(1),137–155. https://digitalcommons.unl.edu/podimproveacad/1245

Fleming, N. D. (2019). VARK: A Guide to Learning Styles. (adapted inventory).

Gao, B. (2025).What factors affect student procrastination on mathematics homework? *Behavioural Education Research* https://www.sciencedirect.com/science/article/pii/S0001691825003336

González-Brignardello, M. P., & Suárez-Álvarez, J. (2023). Academic procrastination in children and adolescents: A systematic review. Frontiers in Psychology, 14, 10297372. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10297372/

Hattie, J. (2025). Learning styles, preferences, or strategies? Explaining the persistence of learning-style beliefs in education. Educational Psychology Review. https://link.springer.com/article/10.1007/s10648-025-10002-w

Hussin, W. A. S. W., & Matore, M. E. E. M. (2023). The influence of learning styles on academic procrastination among students in mathematics. Frontiers in Psychology. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10637392/

Kaur, J., & Kaur, S. (2019). Impact of academic self efficacy on test anxiety and procrastination of students. *Suraj Punj Journal For Multidisciplinary Resarch*, *9*(4), 342–357. Google Scholar

Khan, M. J., Farooq, S. U., & Khan, M. N. (2014).Learning styles and academic procrastination among students. Pakistan Journal of Social Sciences, 34(2), 489–500.

Masoumi.H.(2023).Investigating the relationship between learning styles and students' academic procrastination.*International Journal of New Findings in Health and Educational Sciences*,1(2),104-110.

Murazanty, T. A., & Amelia, S. (2025). The effect of self-regulated learning on academic procrastination in mathematics of junior high school students in Pekanbaru City. Indonesian Journal of Teaching and Learning. https://osf.io/preprints/indonesiaedu/murazanty2025

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. Psychological Science in the Public Interest, 9(3), 105–119.

Pychyl, T. A. (2013).Solving the procrastination puzzle: A concise guide to strategies for change. New York, NY: Tarcher.

Rad, H. F., Baghcheghi, N., Hosseini, Z., & Ghazanfari, M. (2025). Predicting academic procrastination based on academic self-efficacy and emotion regulation

difficulties. Scientific Reports, 15(1), 1–10. https://doi.org/10.1038/s41598-025-87664-7

Santos, J. P. E. (2023). Students' time management, academic procrastination, and mathematics performance. International Journal of Learning, Teaching and Educational Research, 22(5), 145–162. https://doi.org/10.26803/ijlter.22.5.8

Schraw, G., Wadkins, T., & Olafson, L. (2007).Doing the things we do: A grounded theory of academic procrastination. *Journal of Educational Psychology*, 99(1), 12–25.

Sharma Chapai, K. P. (2024). Role of students' academic procrastination in shaping mathematics achievement in Nepali schools. Education Inquiry, 15(2), 215–234. https://www.tandfonline.com/doi/full/10.1080/20004508.2024.2418151

Steel, P. (2007). The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure.*Psychological Bulletin*, 133(1), 65–94. https://doi.org/10.1037/0033-2909.133.1.65

Svartdal, F., et al. (2020). How study environments foster academic procrastination: A review. Frontiers in Psychology, 11, 563.

Warniasih, N. (2024). Analysis of the level of academic procrastination on mathematics assignments among middle school students. Journal of Mathematics Education Research, 8(1), 45–58. https://doi.org/10.32672/jmer.v8i1.2024

Vashisht,R.(2024).Effect of Advance Organizer and Synectics Models of Teaching on Acquisition of Mathematical Concepts in relation to Self-regulated Learning,*Unpublished Doctoral Thesis*,Panjab University,Chandigarh.