




# A STUDY ON ACADEMIC ACHIEVEMENT IN RELATION TO LEARNING STYLES OF SENIOR SECONDARY SCHOOL STUDENTS

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*A learner's capacity to acquire and process information in a learning environment is their "learning style". One of the essential applications of learning styles is that teachers may easily incorporate them into their instructional strategies. Students learn in various ways; amongst the rest, the visual, auditory, and kinaesthetic (VAK) are the most prominent. This endeavour aims to identify secondary students' preferred sensory modalities for learning and analyse the association between academic achievement and learning style subscales. The study included 100 students selected using simple random sampling from Karnataka's class 8th and 9th grades secondary school students. Findings reveal that the predominant sensory modality of learning was aural and more prevalent than visual and kinaesthetic learning (34%). The relationship between learning style and academic success is statistically significant ( $p < 0.05$ ). The main effects of the three variables - visual, auditory and kinaesthetic are also substantial on academic achievement. The female students were more dominant in the blend of all (Collaborative) learning styles.*

**KEYWORDS:** Learning Style, Academic Performance, Secondary School Students

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## INTRODUCTION

"Education is the process of living through a continuous reconstruction of experiences," wrote Dewey. It is the process through which knowledge is formed by transforming experience. The fundamental goal of teaching is to facilitate the learning process, including understanding students' learning behaviours. As a result, learning styles have been a trending issue in recent literature, with various theories proposed to better understand the dynamic learning process. Aristotle first observed (as early as 334 BC) that each child has a unique learning style. Learning styles are described in various ways by which each individual acquires and possesses knowledge. Technically, a person's learning style is the way he or she prefers to observe, process, understand, and retain information. Over the last 26 years, the rise of different learning style theories has led to the impression that learning may take many forms. Some students may rarely have a dominant learning style and utilise other learning styles, while others may choose to employ several learning styles in different contexts (Awang et al., 2017; Bakar & Ali, 2016).

Learning styles vary based on cognitive, emotional, and environmental aspects. Every student is different. Educators must grasp the uniqueness of their students' learning styles (Urval et al., 2014). The world is now more similar than ever. Performance quality has become vital to every individual's advancement (Almigbal, 2015). There are several advantages to figuring out which learning style is best for everyone. These perks include academic achievement, personal development, and professional advancement. The entire structure revolves around the student's academic performance. According to Good, academic achievement is "the knowledge attained, and skills developed in school subjects, which are usually determined by test scores, marks assigned by the teacher, or both". Taylor defines school achievement scores 'as the best predictor of the student's future success.' Academic achievement is complex and a fundamental principle in judging one's performance or capacity. Success and failure depend on the learner's learning style preferences. They are a significant factor affecting the student's academic achievement, as academic achievement is critical to success in life (Demirbas & Demirkan, 2007). Learning styles can assist students and teachers in understanding how to enhance their learning and teaching methods. Identifying pupils' learning styles reveal their individual preferences. Understanding learning styles may aid in creating, modifying, and developing more efficient curricula and educational programmes (Brown et al., 2009). As a result, knowing one's learning style is beneficial to attaining more effective teaching and learning. Individual differences also play an essential role in students' learning styles. Learning styles can differ from student to student and

between average, high, and low achievers, depending on location, gender, and type of management).

Are these disparities in preferred learning styles and information processing depth connected to demographics? Do learning techniques play a role in mediating the relationship between specific demographics and academic achievement? We sought to answer these issues by examining the connections between demographic characteristics, learning styles, and academic achievement among secondary school students.

## **LEARNING STYLE MODELS**

Technically, learning style refers to the preferential way the student observes, processes, comprehends and retains information (Leung & Sabiston, 2018). Kolb states, "learning is the process whereby knowledge is created through the transformation of experience. Kolb's (1981) learning styles are an individual's preference for the four modes of the experiential learning cycle: concrete experience, reflective observation, abstract conceptualisation, and active experimentation (AE). This paradigm offers two ways to understand experience: concrete experience and abstract conceptualisation, as well as reflective observation and active experimentation. Fleming's Visual, Auditory, Kinaesthetic (VAK or occasionally VARK) model (Fleming, 2001) is another widely and extensively used classification of learning styles, in addition to Kolb's and Dunn and Dunn's learning styles. According to Ehrman (1996), learning styles are not dichotomous (black or white, present or absent). Learning styles generally operate on a continuum of multiple, intersecting continua. For example, a person might be more extroverted than introverted, more closure-oriented than open, or equally visual and auditory but with less kinaesthetic and tactile involvement. Only some people, if any, could be classified as having all or nothing in any of these categories.

## **VAK LEARNING STYLES INVENTORY**

Visual, auditory, and kinaesthetic learning styles model developed by Fleming in the 1980s to update Barbe's previous designs offer distinct learning styles. According to the VAK model, most people have a dominant or preferred learning style and choose one among the three. Someone with a visual learning style favours seeing or observing things. These people will work from lists and written directions and instructions. Auditory learners enjoy listening to themselves and others; these people enjoy verbal instructions and remember everything they hear! Kinaesthetic learners prefer hands-on, physical learning. These people will say, "let me try," and learn best by doing and never look at the instructions first.

## REVIEW OF LITERATURE

Learning styles refer to a person's preferences for understanding, organising, and processing information and learning experiences (Smith, 2010; Bali, 2013). Numerous elements that may explain for potential variations in how children learn have been uncovered through educational research. The chosen learning style of a student is one of these elements that is frequently mentioned in study (McKenna, et al., 2018; Romanelli, et al., 2009; Willingham, et al., 2015). Although the relationship between learning styles and learning achievement outcomes is still debatable (McKenna et al., 2018), it is well acknowledged that learning styles affect how well people perform and achieve learning objectives (Dalaman et al., 2019). In elegance levels or affective development to the fundamental cognitive or thinking and the way of getting and testing are three conditions that affect the differences that have already been shown to result from the teaching and learning process. These conditions are (1) learner differences in learning styles; (2) learning approaches (superficial, depth, strategic); and (3) learning approaches. Felder and Brent (1996) In addition, Felder (2005) asserted that children's learning progress is influenced by their learning style, as well as the fact that children focus on various types of information, process information differently, and achieve comprehension at various rates. There are several tests to determine learning style. The visual-aural-read/write-kinaesthetic (VARK) questionnaire is a straightforward, easily administered tool that aids students in describing their behaviour. Students will decide which learning modality (modalities) they prefer (Urval et al., 2014).

To ascertain how VAK learning approaches are used in the classroom and how they have changed over the past 40 years. The systematic review comprises varying viewpoints on VAK learning styles; everyone concurs on their core ideas, specifically what each category entails (Willis, 2017). To ascertain if various student learning preferences are related to how well students comprehend macroeconomic and microeconomic topics. According to available data, a student's performance in the principles of economics course may need to match the method utilised to present the material and their preferred learning style (Leung & Sabiston, 2018b). Despite not having any scientific backing, learning styles work well in many circumstances. It takes consideration and study to include different learning styles in course design. To entirely ignore learning styles would be premature. Over time, it is anticipated that more reliable research will be conducted, enabling educators and decision-makers to draw more accurate conclusions regarding learner-style teaching strategies and their applicability in various contexts (Li et al., 2016). It is a learning method in which students learn via physical activities

rather than lectures and demonstrations. It incorporates hands-on learning using the entire body. Students learn via emotional experiences to create long-term memories. Based on the learning preferences, numerous techniques, such as role-play, sketching, narrative, mapping, collaboration etc., can be employed. Students can participate in group activities such as dance, theatre, and athletics to help them learn more effectively.

## **RESEARCH QUESTIONS**

Most of the recent research investigated the influence of learning styles on student performance from a cross-sectional perspective of foundation phase learners. Furthermore, these investigations did not study the association between gender, location, kind of institution, as well as learning style of secondary grade learners. As a result, we devised an experiment to answer the following questions:

1. What is the distribution of learning styles among students in secondary school?
2. Are there any significant differences in academic achievement across gender, locale, and institution type when it comes to the learning style preferences?

## **RESEARCH METHODOLOGY**

### **Procedure**

The study's primary goal was to identify secondary students' preferred sensory modalities for learning and investigate the relationship between academic accomplishment and learning style sub-dimensions, which fall along one of three distinct learning styles. Secondly, it sought to determine if there was any association between gender, locale, nature of the institution and preferred learning styles concerning students' performance scores. These are included as a second variable since individual differences can influence students' performance scores.

### **SAMPLE AND SAMPLING TECHNIQUE**

The students at senior secondary schools of Karnataka's Bangalore Urban and Rural form the population of this study. The researcher drew the study's sample using a simple random sampling approach. The 100 participants in this endeavour included both males and females from urban and rural vicinity secondary school students from government and private institutions.

Descriptive and Inferential statistics such as frequencies percentile, chi-

square test, and degrees of association were adopted. The results obtained thereby have been presented and interpreted. The demographic profile of the respondents is presented in Table 1. The data shows the information based on categories of respondents like their gender, age, grade and locality.

**Table 1**

**The Demographic Profile of Respondents (N=100).**

Demographics	Freq.	Percent	Cumulative Percent
<b>Gender</b>			
Male	48	48.0	48.0
Female	52	52.0	100.0
<b>Age (In Years)</b>			
13 Yrs	2	2.0	2.0
14 Yrs	50	50.0	52.0
15 Yrs	39	39.0	91.0
16 Yrs	9	9.0	100.0
<b>Grade</b>			
8th Grade	35	35.0	35.0
9th Grade	65	65.0	100.0
<b>Location</b>			
Rural	48	48.0	48.0
Urban	52	52.0	100.0
<b>Type of Institution</b>			
Govt	55	55.0	55.0
Pvt	45	45.0	100.0
<b>Total</b>		<b>100</b>	

## INSTRUMENT USED

The VAK Learning Styles Self-Assessment Standardised Questionnaire (Chislett & Chapman, 2005) was utilised in this study as a tool for data collection.

## RESULTS OF THE STUDY

The cross-tabulation presented in Table 2 shows the information on the distribution of observations across learning style preferences of students. 31 respondents preferred for visual (V) domain whereas 39 were found to be using the auditory learning style. The kinaesthetic style users were 25 and 05 respondents who preferred a blend of all styles.

**Table 2**  
**Distribution of VAK Learning Styles and Academic Achievement.**

	Academic Achievement				Total
	Distinction	First Div.	Second Div.	Third Div.	
Visual Style	11	13	6	1	31
Auditory Style	12	14	9	4	39
Kinaesthetic Style	12	7	6	0	25
Blend of three Style	2	1	2	0	5
<b>Total</b>	<b>37</b>	<b>35</b>	<b>23</b>	<b>5</b>	<b>100</b>

### Relationship between Academic Achievement and Learning Style Across Gender

**Table 3**  
**Cross Tabulation of Academic Achievement and Learning Style across Gender.**

		Marks Classification				Total
		Distinction	First Div.	Second Div.	Third Div.	
Gender	Male	16	19	9	4	48
	Female	21	16	14	1	52
<b>Total</b>		<b>37</b>	<b>35</b>	<b>23</b>	<b>5</b>	<b>100</b>

The cross-tabulation presented in Table 3 shows the information on the distribution of Gender and Academic achievement.

**Table 4**  
**Cross Tabulation of Academic Achievement across Learning Styles and Gender.**

		Learning Style				Total
		Visual Style	Auditory Style	Kinaesthetic Style	Blend of All	
Gender	Male	14	22	10	2	48
	Female	17	17	15	3	52
<b>Total</b>		<b>31</b>	<b>39</b>	<b>25</b>	<b>5</b>	<b>100</b>

The cross-tabulation presented in Table 3 and 4 shows the information on the distribution of observation regarding academic achievement with across learning styles and gender.

## Relationship between Academic Achievement and Learning Style Across Locality

**Table 5**

**Cross Tabulation of Academic Achievement and Learning Style Across Locality.**

		Learning Style								Total	
		Visual Style		Auditory Style		Kinaesthetic Style		Blend of All			
		R	U	R	U	R	U	R	U	R	U
Academic Achievement	Distinction	6	5	7	5	10	2	2	0	25	12
	First Div.	6	7	4	10	4	3	0	1	14	21
	Second Div.	3	4	2	11	4	2	0	2	9	19
Total		15	16	13	26	18	7	2	3	48	52

*R-Rural and U-Urban*

The cross-tabulation presented in Table 5 shows the information on the distribution of observation across academic achievement and learning styles of rural and urban students.

**Table 6**

**Cross Tabulation for Academic Achievement and Learning Style Across Students of Government and Private institutions.**

		Learning Style								Total	
		Visual Style		Auditory Style		Kinaesthetic Style		Blend of All			
		G	P	G	P	G	P	G	P	G	P
Academic Achievement	Distinction	7	4	6	6	5	7	1	1	19	18
	First Div.	7	6	9	5	3	4	1	0	20	15
	Second Div.	2	4	4	5	4	2	2	0	12	11
	Third Div.	1	0	3	1	0	0	0	0	4	1
Total		17	14	22	17	12	13	4	1	55	45

*G-Government and P-Private*

The cross-tabulation presented in Table 6 shows the information on the distribution of observation across academic achievement and learning style of students of government and private institutes.

The null hypothesis of independence of academic achievement and learning style of secondary school students across their gender, locale and nature of institutions are examined using the Chi-Square test and its association is presented in Table 7.



**Table 7****Dependence between Preferred Learning Styles and Other Variables.**

Independent Variable		Chi-Square	Phi		Cramer V	
		p	Value	p	Value	p
Gender		.005**	.541	.005**	.531	.005**
Locale	Rural	.003**	.567	.003**	.589	.003**
	Urban	.765	.332	.765	.192	.765
Nature of Institution	Govt	.019*	.561	.019*	.509	.019*
	Pvt	.032*	.449	.032*	.402	.032*

\* $p < .05$ , \*\* $p < .01$

The 'p' value indicates the statistical significance. The cross-tabulation of the data set in Table 7 shows the strength of the relationship among categorical variables. It is seen that the phi co-efficient ( $\phi$ ) in terms of gender is 0.54, and Crammer's V ( $\phi_c$ ) is 0.53, showing a strong association between learning style preferences and academic achievement. Regarding locale, the rural students' learning style preferences are cutting edge over urban students. The phi coefficient ( $\phi$ ) in terms of rural is recorded as 0.56, and Crammer's V ( $\phi_c$ ) is 0.58, showing a strong association compared to urban students, which is mild (.19) with no statistical significance. Concerning the nature of the institution, the students of Government institutions where phi co-efficient ( $\phi$ ) is 0.56, and Crammer's V ( $\phi_c$ ) is 0.50, much higher and stronger than the private institution's Crammer's V ( $\phi_c$ ), which is 0.40.

## DISCUSSION AND CONCLUSION

Sternberg defines learning styles as "habitual patterns or preferred ways of doing something consistent over long periods and across various activities." According to Ehrman (1996), learning styles are not dichotomous (black or white, present or absent). Learning styles generally operate on a continuum of multiple intersecting lines. For example, a person might be more extroverted than introverted, more closure-oriented than open, or equally visual and auditory but with less kinaesthetic and tactile involvement. Only some people, if any, could be classified as having all or nothing in any of these categories.

### On The Distribution of Learning Styles

Based on the findings, the following is revealed: According to Table No. 2, for the Auditory domain (A), 12 respondents received distinction (75% and above), 14 received the First Division (60%-74%), 09 received the Second Division (50%-59%), and 04 received the Third Division (40%-49%). Kinaesthetic (K), 12 respondents were distinguished (75% and above), 07 were in the First Division (60%-74%), 06 were in the Second Division (50%-

59%), and there were no respondents in the Third Division (40%-49%). In the Visual Style Category, 11 students were in distinction (75% and above), 13 received the first class (60%-74%), and 01 respondent was found in the third division (40-49%). Finally, in a blend of all categories, there were two respondents with distinction (75% and above) in the VAK, one with the first division (60%-74%), two with the second division (50%-59%), and none with the third division (40%-49%).

The study findings generally indicate that in the highest domain of learning styles of students in terms of the total number of distinctions (and above) and First Division (60%-74%), the auditory (A) prevailed, whereas kinaesthetic (K) was ranked last.

### **On Academic Achievement and Learning Styles**

According to the findings, auditory learning styles are more prevalent than visual and kinaesthetic learning. Auditory learning is a method of learning in which a person learns best by hearing and listening. Auditory learners acquire information through sound or speech rather than written form. This type of learning is one of the three styles recognised by the VAK model of learning. Auditory learners benefit from discussion, discourse, and articulated discoveries. The acoustic style worked best for the men, and there is a statistically significant link between learning style and academic success. The main effects of the three variables—visual, auditory, and kinaesthetic—on academic achievement are also significant. According to Table 3, the female students were more dominant in the blend of all (collaborative) learning styles.

Referring to Table 7, the effect size is determined by applying the Cramer's V test which indicates the strong association between learning styles and academic achievement across gender, students of rural locality and studying in government institutions whereas the weak association is noticed in urban students and private institutions. This may lead to further investigations to understand the rationale.

These findings are congruent with the results of Sarabi-Asiabar et al. (2014), Bakar and Ali (2016), Awang et al. (2017), Timisina et al. (2021), and Nwajiuba and Onyeneke (2022), who discovered that auditory learners were the majority in their study on learning styles and academic accomplishment. Wherein the students' preferred learning styles were auditory. The results show that students like a lecture with discussion the most, while peer tutoring is the least liked way to teach.

### **On Gender and Learning Style Preferences**

The studies conducted by Greb (1999), Wehrwein et al. (2007), and Aida &

Hamidon (2015) supported the hypothesis that males and females have different learning styles and concluded that males and females learn differently. It is the responsibility of the teacher to address this diversity of learning styles and develop an appropriate learning approach. Raj & Kanagasabapathy (2019) also observed similar findings on gender.

According to the present endeavour, auditory learning styles outnumber visual and kinaesthetic learning styles. Auditory learning is a method of learning in which a person learns best by hearing and listening. Auditory learners acquire information through sound or speech rather than written form. This type of learning is one of the three styles that the VAK model recognises. Auditory learners benefit from discussion, discourse, and articulated discoveries. The men did best with the auditory style, and there is a statistically significant link between learning style and academic success. The main effects of the three variables—visual, auditory, and kinaesthetic—on academic achievement are also significant. Female students were found to be more dominant when all (collaborative) learning styles were combined (Table 3).

This finding goes against what Espinoza-Poves et al. (2019) found, which was that a person's learning style had nothing to do with their gender, level of education, or previous academic score. They also said that the results could be more in line with the context, culture, and socioeconomic background of the students.

## IMPLICATIONS TO DESIGN EDUCATION

In today's academic world, teaching and learning styles are crucially important. Learning styles boost students' self-esteem and self-image, educate them on how to use the brain effectively, and provide them with strength. Students get an understanding of your strengths, limitations, and behaviours. It allows students to enjoy any learning experience. It makes students more curious and motivated to keep learning and shows how to make the most of their natural skills and interests. The teacher must be aware of the student's learning styles and gender differences to develop appropriate teaching and learning methods that address these differences. Institutions of higher education should take gender differences into consideration while developing curricula.

## CONCLUSION

Individual variations in learning are reflected in different learning styles. Learning styles and their roles in the teaching learning process are the critical components of learning. According to learning styles, an individual's

learning style "is how he or she concentrates on, processes, internalises, and remembers new and difficult academic information or skills." Visual, auditory, and kinaesthetic senses are needed to commit information to memory. Learning styles allow students to pick their preferred learning method, giving them flexibility and control over their education. Although learning styles have become popular worldwide, others believe they do not correspond to how the brain stores knowledge. Some learning style classification systems categorise people as visual, auditory, or kinaesthetic learners. Some learning style models divide things up even more, including social forms of learning, musical learning, and others. But the aim remains the same.

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