

ASSESSMENT OF LEARNING STYLES AMONG UNDERGRADUATE AND POSTGRADUATE STUDENTS

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ABSTRACT

The present study was conducted to assess the preferred learning styles of Undergraduate (UG) and Postgraduate (PG) students of the College of Community Science, PJTAU, Hyderabad. A VARK (Visual, Auditory, Read/Write and Kinesthetic) learning style framework was used for the study. A structured questionnaire consist of 20 statements was developed and administered to 30 students (UG & PG) selected using purposive sampling technique. Responses were recorded on a five-point Likert scale ranging from strongly agree to strongly disagree. The collected data was tabulated and analysed using the SPSS package. Descriptive statistics such as frequency and percentages were discussed, while an independent t test was conducted to compare the learning style of UG and PG students. The findings revealed that kinesthetic learning was the most preferred learning style, followed by visual and auditory learning, whereas read/write learning was comparatively less preferred. The independent sample t test revealed no statistically significant difference in overall VARK learning style score between UG and PG students ($p > 0.05$). The study concludes that kinesthetic learning, visual and technology based instructional strategies can enhance student engagement, comprehension and knowledge retention. Therefore, higher education institutions should adopt learner-centred teaching approaches that combine multiple learning modalities to address diverse student preferences and improve teaching-learning outcomes.

Key Words: Auditory learning, kinesthetic learning, learning styles, read/write learning, VARK, visual learning.

Learning style refers to the way a learner concentrates, processes and retains information (Sasikala and Saxena, 2024). In higher education, understanding the learning style is important because it helps teachers design classroom methods that improve understanding and participation. According to Campbell a learning style is “specific behavioural pattern an individual displays in learning” (Elhassan and Ahmed, 2015). Identifying learners preferred styles helps teacher to create student-centered instructional environment that accommodates diverse learning needs and improve educational outcomes.

Among various models proposed to explain learning styles, the VARK model developed by Neil Fleming, a New Zealand education professor, in the 1990s, is the one of the most widely recognized and extensively used framework (Tomiaë *et al.* 2023). The VARK model classifies learning styles into four primary categories: Visual (V), Auditory (A), reading/writing (R), and kinesthetic (K). Learners with a visual style understand information more effectively when it is presented through images, diagrams, graphs, flowcharts, or other graphical representations. Auditory learners, in contrast, prefer acquiring knowledge by

listening to spoken explanations, lectures, group discussions, and verbal interactions. Individuals with a reading/writing style learn best through text-based resources, including books, articles, lecture notes, and written assignments. They often retain information more effectively by reading, writing, and organizing written material. Kinesthetic learners prefer experiential learning, gaining knowledge through direct involvement in activities, practical demonstrations, experiments, simulations, and hands-on experiences. This learning style is particularly relevant in disciplines such as kinesiology and other practice-oriented fields where physical engagement enhances understanding (Fleming and Mills, 1992; Tomiaë *et al.* 2023).

Students in community science programs are exposed to both theoretical and practical learning situations, making learning styles especially relevant. Therefore, the present study was undertaken to assess the most preferred learning styles of students and to understand the learning methods that support better engagement and retention. Assessing these learning styles can provide insights for curriculum development, instructional design and teaching methods.

MATERIAL AND METHODS

The study was conducted among 30 undergraduate (11) and postgraduate (19) students of College of Community Science, Saifabd, Hyderabad. An ex post facto research design was adopted to assess the learning styles of the respondents based on the VARK learning style framework for the study. Respondents were selected using purposive snowball sampling based on their availability and willingness to participate in the study.

Instrument for Data Collection

A structured questionnaire consisting of 20 statements was developed based on the VARK learning style framework proposed by Fleming and Mills (1992). The questionnaire included statements representing the four dimensions of learning styles, namely Visual, Auditory, Read/Write, and Kinesthetic (VARK). Responses were recorded using a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). The questionnaire was developed after reviewing relevant literature and adapting the statements to suit the objectives and context of the present study. A Google Form was created to administer the questionnaire, and the survey link was shared with the respondents through WhatsApp for data collection.

Data Analysis

The collected data were coded, tabulated and analysed using the Statistical Package for the Social

Sciences (SPSS). Descriptive statistics such as frequencies and percentages were computed to summarize the demographic characteristics and learning style of the respondents.

To examine learning style according to educational level, an independent samples t-test was performed to compare the mean VARK scores of undergraduate and postgraduate students.

Prior to conducting the t-test, Levene's test for equality of variances was used to verify the assumption of homogeneity of variances. Statistical significance was determined at the 5% level ($p < 0.05$).

RESULTS AND DISCUSSION

A total of 30 students participated in the study, comprising undergraduate and postgraduate students. The respondents represented different demographic backgrounds and their preferences for the four VARK learning styles (Visual, Auditory, Read/Write, and Kinesthetic) were analyzed using descriptive statistics.

Demographic characteristics of the respondents

The age distribution (Table 1) revealed that 66.6 per cent of the respondents belonged to the 22–24 years of age group, while 33.4 per cent were in the 19–21 years of age group. The majority of the respondents were female (96.7%), whereas only 3.3 per cent were male. With respect to educational level, 63.3 per cent of the respondents were postgraduate (PG) students, while 36.7 per cent were undergraduate (UG) students.

Table 1. Demographic characteristics of the respondents (n=30)

S.No.	Demographic characteristics	Frequency	Percentage
	Age		
1	19 - 21 years	10	33.4
2	22- 24 years	20	66.6
	Gender		
3	Male	1	3.3
4	Female	29	96.7
	Education		
5	UG	11	36.7
6	PG	19	63.3

VARK Learning Style

Table 2 Distribution of respondents according to VARK Learning style (n=30)

S.No.	Statements	SA%	A%	N%	D%	SD%	Mean
Visual learning style							
1	I learn more through visualization techniques such as mind and concept maps	46.7	36.7	10.0	-	6.7	4.16
2	I understand new concepts better when they are presented using diagrams, charts, or graphs	50.0	40.0	6.7	-	3.3	4.33
3	I prefer learning through visual presentations such as Power Point or Google Slides	30.0	60.0	6.7	-	3.3	4.13
4	Multimedia resources, including videos and animations, improve my understanding of lessons	51.7	34.5	10.3	-	3.4	4.31
5	Digital interactive whiteboards (e.g., SMART Boards) helps me visualize and understand classroom concepts more effectively	13.8	72.4	10.3	-	3.4	3.93
Auditory learning style							
1.	I learn information best through sound, music and oral instructions	20	33.3	30	13.3	3.3	3.53
2.	I find lectures, discussions and oral presentations are the best methods to learn quickly	26.7	26.7	26.7	3.3	16.7	3.43
3.	I learn more through oral presentations and participating in classroom discussions	20	43.3	26.7	6.7	3.3	3.70
4.	The use of audio and video recordings during lessons improves my understanding and engagement	48.3	41.4	6.9	-	3.4	4.31
5.	Asking and answering questions during class improves my learning	35.7	57.1	3.6	-	3.6	3.24
Read/ Write learning style							
1.	I learn more information through writing tasks such as essays and reports	10	23.3	33.3	10	23.3	2.86
2.	I prefer written instructions such as manuals, guides and worksheets for learning new concepts	6.7	23.3	50	16.7	3.3	3.13
3.	I learn information better through written text, such as books, articles and notes	13.8	34.5	41.4	6.9	3.4	3.48
4.	I find e-books and digital textbooks provides more information to learn	6.9	44.8	31	13.8	3.4	3.37
5.	Taking notes during lessons helps me to retain information	24.1	31	27.6	10.3	6.9	3.55
Kinesthetic learning style							
1.	I learn best through hands - on – experience, movement and tactile activities	23.3	36.7	33.3	3.3	3.3	3.73
2.	Incorporating moment-based learning such as dance and drama into lessons makes me understand and learn better	23.3	43.3	30	-	3.3	3.83
3.	I learn better through practical tasks and real-life situations	32.1	57.1	7.1	-	3.6	4.14
4.	Participating in roleplay and simulations helps me to understand the concept quickly	35.7	57.1	3.6	-	3.6	4.21
5.	I prefer learning through physical activities in classrooms than normal lecture	24.1	48.3	24.1	-	3.4	3.89

Visual Learning Style

The findings indicated that visual learning was the most preferred learning style among the respondents. The highest agreement was observed for using digital interactive whiteboards, with 72.4 per cent of the respondents agreed that interactive whiteboards improve visualization and understanding of classroom concepts. This was followed by PowerPoint or Google Slides, with 60.0 per cent agreeing that they prefer learning through visual presentations. Furthermore, 51.7 per cent strongly agreed that multimedia presentations, such as videos and animations, make learning more effective, while 50.0 per cent strongly agreed that images, diagrams, charts, and videos enhance learning. In addition, 46.7 per cent strongly agreed that visualization techniques such as mind maps and concept maps improve their understanding. Only a small proportion of respondents expressed neutral or negative opinions across the visual learning statements, indicating an overall positive perception of visual instructional methods (Table 2).

These findings suggest that students strongly prefer visually supported instructional strategies. The increasing use of multimedia resources and digital educational technologies may have contributed to this preference by improving comprehension, engagement, and retention of knowledge. The present study results are in line with the findings of Annamalai and Sazan (2025) and Cabual (2021) reported that majority of the respondents preferred visual learning style and also revealed that they remember most when the information is presented in the form of pictures, diagrams, flow charts, timelines, films and demonstrations.

Auditory Learning Style

The highest agreement was recorded for asking and answering questions during class, with 57.1 per cent of respondents agreeing that this improves their learning. This was followed by 48.3 per cent strongly agreeing that incorporating audio and video recordings into lessons enhances learning and engagement. In addition, 43.3 per cent agreed that classroom discussions improve learning, while 33.3 per cent agreed that sound, music, and oral instructions facilitate understanding. Responses toward conventional lectures and oral presentations were

comparatively lower, with a considerable proportion of respondents remaining neutral (Table 2).

These findings indicate that students prefer interactive auditory learning experiences over traditional lecture-based instruction, emphasizing the importance of technology-supported and participatory teaching methods.

Read/Write Learning Style

Among the read/write learning statements, the highest agreement was observed for e-books and digital textbooks, with 44.8 per cent of respondents agreeing that they provide more information for learning. This was followed by 31.0 per cent agreeing that notetaking helps retain information. In contrast, 50.0 per cent of respondents remained neutral regarding written instructions, while 41.4 per cent expressed neutral opinions toward learning through books, articles, and notes. Similarly, 33.3 per cent were neutral regarding learning through writing tasks such as essays and reports. The comparatively lower agreement and higher neutral responses indicate that students are less inclined toward conventional text-based learning approaches (Table 2).

These findings suggest that although written resources continue to support learning, students increasingly prefer digital and multimedia-based instructional methods (Kharb *et al.* 2013).

Kinesthetic Learning Style

The findings indicated a strong preference for kinesthetic learning among the respondents. The highest agreement (57.1%) was observed for the statements that practical tasks and real-life situations and role-play and simulations improve learning. Furthermore, 48.3 per cent agreed that incorporating physical activities into classroom instruction is more effective than conventional lectures, while 43.3 per cent agreed that movement-based learning activities improve understanding. Although 33.3 per cent of respondents remained neutral regarding hands-on learning experiences, only a few expressed disagreements across the kinesthetic learning statements. The similar results were reported in the study of Rubavathy (2019).

These findings suggest that students in the College of Community Science prefer learning

approaches that actively engage them through practical experiences, demonstrations, simulations, and multimedia-supported instructions.

Also, students are frequently involved in laboratory work, demonstrations, field visits, extension activities, internships, food preparation, textile practices, and community-based learning experiences. Such experiential learning opportunities enable students to apply theoretical knowledge in real-life situations, thereby enhancing their understanding, confidence, and long-term retention. Furthermore, activity-based learning encourages collaboration, critical thinking, and problem-solving skills, making learning more meaningful and enjoyable. The increasing adoption of experiential teaching methods in higher education may have further strengthened students' preference for kinesthetic learning.

In contrast, the read/write learning style received comparatively lower levels of agreement, with many respondents expressed neutral opinions on learning through textbooks, written instructions, and note-taking. The reason could be that due to advancement in technologies and multimedia resources in higher education, the students access information through YouTube videos, online tutorials, digital learning platforms and other websites rather than depending on printed documents.

Comparison of VARK Learning Style Scores between Undergraduate and Postgraduate Students

An independent-sample t-test was conducted to compare VARK learning style scores between UG and PG students. Levene's test showed that the assumption of homogeneity of variances was met, $F(1, 28) = 0.002$, $p = .966$.

Table 3. Comparison of VARK Learning Style Scores between Undergraduate and Postgraduate Students

(n=30)	Education	N	Mean	Std. Deviation	Std. Error Mean
VAR K	UG	11	3.8700	.49352	.14880
	PG	19	3.7105	.74266	.17038

Independent Samples Test

		Levene's Test for Equality of Variances		T-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Upper	Lower
VAR K	Equal variances assumed	.002	.966	.633	28	.532	.15947	.25176	-.35622	.67517
	Equal variances not assumed	.705	.27	.321	.487	.15947	.22621	-.30442	.62336	

The results of independent sample t-test revealed that there was no statistically significant difference in VARK learning style scores between undergraduate and postgraduate students, $t(28) = 0.633$, $p = .532$, mean difference = 0.159, 95% CI [-0.356, 0.675]. Therefore, the null hypothesis was accepted and indicating that educational level was not

associated with differences in VARK learning style scores in this study. This suggests that the educational level of the respondents did not significantly influence their preferred learning styles.

One possible reason could be that students of UG and PG are exposed to similar teaching methods, learning resources, and classroom

environments. Such shared educational experiences may encourage the development of comparable learning styles regardless of their level of study.

CONCLUSION

The present study concludes that undergraduate students display distinct preferences for different learning styles, with visual and kinesthetic learning emerging as the most preferred approaches. The findings revealed that students strongly agreed learning through virtual whiteboards, PowerPoint presentations, multimedia resources, images, diagrams, and videos, which highlight the importance of visually rich instructional methods. Likewise, practical applications, role-play, simulations, and other experiential activities showed significant agreement, which indicated that the students benefit from active participation and hands-on learning experiences.

Although auditory learning was positively perceived, students showed greater preference for interactive auditory activities, such as audio-video recordings and classroom simulations, than for conventional lectures. In contrast, the read/write learning style received comparatively lower levels of agreement, with many respondents expressing neutral opinions toward written instructions and text-based learning materials. These findings suggest a gradual shift from traditional learning approaches toward technology-supported, multimedia-rich, and interactive learning environments.

Overall, the study demonstrates that integrating AI-enabled educational tools, multimedia presentations, digital learning resources, simulations, and experiential teaching strategies can better align with students' learning styles and enhance engagement, comprehension, and knowledge retention. Therefore, higher education institutions should adopt learner-centered instructional approaches that combine visual, auditory, and kinesthetic methods while effectively incorporating AI technologies to improve the overall teaching-learning process.

REFERENCES

- Annamalai, N and Sazan, D. 2025. Understanding Students' Learning Preferences: The Use of VARK-Based Strategies in the LMS. Educational Process: International Journal, 19, e2025574. <https://doi.org/10.22521/edupij.2025.19.574>.
- Cabual, R.A. 2021. Learning Styles and Preferred Learning Modalities in the New Normal. Open Access Library Journal. 8: e7305. <https://doi.org/10.4236/oalib.1107305>.
- Elhassan, S. M. O and Ahmed, M. A. 2015. A novice teacher's learning styles and student-teacher development. Journal of Education and Practice. 11(07): 46-51.
- Fleming, Neil D and Colleen Mills. 1992. "Not Another Inventory, Rather a Catalyst for Reflection." To Improve the Academy. 11:137–55. Digital Commons@University of Nebraska–Lincoln. Web. 24 Aug. 2016.
- Kharb P, Samanta PP, Jindal M, Singh V. 2013. The learning styles and the preferred teaching-learning strategies of first year medical students. J Clin Diagn Res. 7(6):1089-92. doi: 10.7860/JCDR/2013/5809.3090. Epub 2013 Apr 22. PMID: 23905110; PMCID: PMC3708205.
- Rubavathy, Delgin DM. 2019. A Study on the Preferred Learning Styles of Students. The International Journal of Indian Psychology. 7(2): 102-106. DOI: 10.25215/0702.013. <http://www.ijip.in>.
- Sasikala, S and Saxena, V.L 2024. Preferred Learning Styles and Learning Modalities in Undergraduate Students. The Genesis: A Peer Reviewed Referred Indexed Journal. 11(2): 75-78.
- Tomiaë, D., Rastovski, D and Æuriæ, M. 2023. Exploring the VARK model: A review of the validity and reliability of the questionnaire and its relationship to learning outcomes. International Scientific Symposium Region, Entrepreneurship, Development. 12.