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Learning Style Preferences of Undergraduate Female Students in Public Colleges

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Abstract

The purpose of this quantitative study was to assess the learning styles and preferences of undergraduate students at female colleges. A sample of 252 female undergraduate students enrolled in B. Ed programs were selected as sample. An adapted questionnaire based on VARK theory was used comprising three factors (visual, auditory, and kinesthetic) of learning styles. The instrument consisted of 24 items based on 5-point Likert scale. Chronbach's alpha reliability statistic was 0.85. The collected data was analyzed by using SPSS. The results revealed that visual learning style is a more prevalent learning style among female students. The results also revealed that there is no difference in students' learning styles and time spent on study. It is recommended that students have diverse learning preferences and styles. The teachers may design instructional activities and materials that accommodate various modalities such as visual, auditory, and kinesthetic learning.

Keywords: Learning styles, Visual, Auditory, Kinesthetic

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Title**Learning Style Preferences of Undergraduate Female Students in Public Colleges****Abstract**

The purpose of this quantitative study was to assess the learning styles and preferences of undergraduate students at female colleges. A sample of 252 female undergraduate students enrolled in B. Ed programs were selected as sample. An adapted questionnaire based on VARK theory was used comprising three factors (visual, auditory, and kinesthetic) of learning styles. The instrument consisted of 24 items based on 5-point Likert scale. Chronbach's alpha reliability statistic was 0.85. The collected data was analyzed by using SPSS. The results revealed that visual learning style is a more prevalent learning style among female students. The results also revealed that there is no difference in students' learning styles and time spent on study. It is recommended that students have diverse learning preferences and styles. The teachers may design instructional activities and materials that accommodate various modalities such as visual, auditory, and kinesthetic learning.

Keywords: [Learning Styles](#), [Visual](#), [Auditory](#), [Kinesthetic](#)

Introduction

According to Ariastuti & Wahyudin (2022), learning style is the way a person learns for self-development. The way a person learns has a significant impact on the learning process. Each person has a particular learning style that affects the action according to their learning situation. One of the main purposes of investigating learning style is to achieve a better understanding of the connection linking learning style and

the learning process. Easy or difficult in processing new information is either easy or difficult (Ariastuti & Wahyudin, 2022). Every scholar has an exclusive style of learning to remarkably enhance academics.

The theory that underlies research on learning styles is that individuals have preferred modes of receiving input from stimuli, organizing information, and thinking about new material. Research on learning styles provides information



that can be used to improve both the quality of learning and the learning environment. Numerous efforts have been made to define learning styles, but not even one has managed to produce a widely accepted definition. Instead of caring about what learners learn, learning style researchers care about how they prefer to learn. Within the framework of learning styles, Cassidy (2004) identifies nine styles while Kleiner (1999) categorizes learning styles into five primary categories. Cassidy (2004) defines learning strategies as three primary concepts consisting of information processing, instructional preference, and learning strategies. Information processing is defined as an individual's intellectual capacity to internally understand the information process. Instructional preference is defined as an individual's preferred learning situation; however, preferences are difficult to measure. Typically, learning styles describe the different ways humans learn. They are the collection of cognitive, psychological, and emotional factors that are described as gratifiers of how a learner perceives, interacts with, and responds to the learning environment.

Fleming, N. D., & Mills, C. (1992) introduced the VARK model as a practical framework for understanding individual learning preferences and fostering self-directed learning strategies among university students and educators. This model is used for undergraduate students regarding system analysis and development (da Silva et al., 2020). In the view of Boussaha and Drissi (2021), a learning style model similar to the VARK model is described. Barsh presented a learning style inventory in 1996. He proposed that individuals' learning styles include auditory, visual, tactile, and kinesthetic. Kahtz and Kling (1999) proposed that the selection and construction of instructional materials that suit learners' learning styles should be a priority of teachers. Keefe (1991) developed a diagnostic-prescriptive model for assessing and addressing students' learning styles in educational programs. The University students and educators were the participants of the study. The study proposed a systematic approach for diagnosing students' learning styles and designing instructional programs tailored to individual needs, emphasizing the importance of personalized learning experiences in higher education. These research studies offer valuable insights into the assessment of university students' learning styles, ranging from theoretical frameworks and model development to practical applications in educational settings.

Research studies on learning styles typically do not conclude that one learning style is universally "best" or more practiced than others. Instead, they emphasize the importance of recognizing and accommodating diverse learning preferences among students. However, some studies have examined the prevalence or effectiveness of certain learning styles in specific contexts. Pashler et al. (2008) extracted shreds of evidence from previous studies to understand the effectiveness of learning styles in educational settings. They found insufficient empirical evidence in support of matching instructional methods to students' preferred learning styles. Coffield et al. (2004) investigated the relationship between learning styles and pedagogy in post-secondary education. While the study did not identify a single "best" learning style, it emphasized the importance of varied instructional approaches that cater to different learning preferences.

Biggs and Tang (2011) advocated for a constructive alignment approach that emphasizes aligning teaching methods and desired learning outcomes. They emphasize the importance of active, student-centered approaches that promote deep learning instead of catering the learning styles. Kolb and Kolb (2005) investigated the relationship between learning styles and learning spaces in higher education, particularly focusing on experiential learning. They selected students from various disciplines of the university. A Mixed-methods approach involving surveys, interviews, and classroom observations was used. The study found that matching learning spaces with students' preferred learning styles enhanced engagement and learning outcomes, particularly for experiential learning activities.

Undergraduate students, like any population of learners, exhibit a variety of learning styles. Although individuals may have a dominant style, they frequently employ a mixture of different styles depending on the context and the subject matter. Among undergraduate students, common learning styles include visual learners who learn best with images, diagrams, charts, and other visual aids. They like to see information presented in graphic form. The second kind is auditory learners who learn best through hearing. They may favor lectures, discussions, and audio recordings as their primary learning methods. They often benefit from verbal explanations and discussions.

Individuals who learn kinesthetically learn practically and physically. They favor interaction, touch, and movement concerning materials. Hands-on laboratory work,

experiments, and simulations are some of the methods that work well for these students. Verbal-linguistic learners, those who do well in traditional linguistic and literary work, prefer reading and writing as their major modes of learning. Printed materials such as books, articles, and taking notes are preferred. Summarizing or making notations are some of the ideas that work well with them. Furthermore, we found social learners who greatly enjoy being in groups and working in groups with others collaboratively. Interaction and collaboration with other students, classmate discussion, group projects, and cooperative learning activities all are preferred. In a recent research study, Ashraf (2022) studied how kinesthetic learning improves academic achievement amongst kinesthetic students in the Pakistani context.

Promoting inclusivity in the classroom through the recognition and valuing of different learning styles is important because it recognizes students as individuals with varying cognitive preferences and abilities, acknowledges a mixed student body, and ensures that all students have equal opportunities for success regardless of their learning styles. Roldán et al. (2021) analyzed an inclusive interactive academic environment that considers the special needs of the students. Assessing learning styles in these processes is meant to enhance self-awareness of preferred methods of learning and studying. With this autonomy to identify what purposeful learning looks like, and to project an environment commensurate with our styles will heighten our achievements as college students. Similarly, those who teach these college students will be able to adapt their presentation to our diverse student population. As a result, this often not only: encourages a complete alteration of their teaching strategy, it: also enhances a high level of student pleasure connected to their learning experience. Being able to figure out and criticize how different people learn is efficacious in helping individuals improve their current learning. Using different learning styles can help in working with individuals with different strengths and weaknesses with what they learn best. Understanding how students learn can help in designing curriculum and creating courses. By addressing different learning styles, curriculum designers can make learning more engaging, accessible, and successful for all students.

It is important to identify the student's learning styles for better teaching. Understanding and assessing university students' learning styles is meaningful for multiple reasons: by recognizing students' preferred learning styles, instructors can adapt their teaching methods and instructional materials

to correspond better to students' needs and preferences. This personalized approach could improve students' engagement, motivation, comprehension, and critical thinking. Critical thinking is a twenty-first-century skill that has been focused on by several studies in the Pakistani context like secondary school science teachers' practices regarding critical thinking skills development (Jamil & Muhammad, 2019); Jamil et al. (2021b). critical thinking perceptions and practices by the teachers about critical thinking (Jamil et al., 2021a). Science curriculum documents were explored by Jamil et al. (2020), regarding critical thinking, and textbook analysis for the development of higher-order thinking (Jamil, et al., 2024). Curriculum related to Physics, Chemistry, Biology, and mathematics focusing on these science subjects (Jamil, et al., 2024; 2024a; 2024b).

Assessing university students' learning styles is a topic that has been explored in many research studies (Ariastuti & Wahyudin, 2022; Chung et al., 2020; Hassan et al., 2021). This research has been substantial, as was revealed by the abundance of studies. These studies demonstrate the ongoing quest to delve deeper into the learning preferences of individuals and how they can be used to shape instruction and in turn, foster students' academic achievements in higher education. A variety of learning style models and assessment instruments in higher education were identified in the study, highlighting the significance of accommodating each student's uniqueness in the planning and delivery processes of instruction. In conclusion, although some studies have extensively examined the prevalence or effectiveness of certain learning styles, in the field of educational research as a whole, there is a shared perspective stating that teaching and learning are not one size fits all. In its place is an array of instructional methods and strategies that can make instruction accessible for students to grasp after being tailored to complement the diverse learning preferences and meaningful learning results.

Research Objectives

The following research objectives were developed:

1. To identify the learning styles and preferences of students at the undergraduate level.
2. To determine the difference in students' learning styles concerning time spent on study.

Research Question

1. Which learning style is more prevalent among female students at the undergraduate level?

Research Hypothesis

H0: There is no significant difference in students' learning styles concerning time spent on study.

Research Methodology

Design of the Study

Survey research was employed for this study. Surveys can obtain information from a large sample of the population. Survey research is a dominant method in research for data collection systematically from a sample to identify trends and patterns (Creswell & Creswell, 2017). Quantitative research was used to find out the assessment of students' learning style preferences at the affiliated college of Lahore College for Women University (LCWU). A cross-sectional Design survey was used. Depending on the nature of the problem, survey research and a questionnaire were used to collect data from the graduate level.

Sample

The sample of the study was comprised of students of B.Ed Secondary Education students of semesters IV, VI, and VIII from three public sector female colleges of Lahore affiliated

with LCWU, Lahore. 28 students from each semester were selected having 84 from each college. A total of 252 female students were included in the study.

Instrumentation and data collection

The data was collected using an adapted learning style questionnaire. The questionnaire was based on the VARK learning style model and was officially introduced by Neil D. Fleming in 1987 in his article "Towards a synthesis of styles: proposals and perceptions in teaching and learning. The questionnaire was based on 24 items. There were three factors of the questionnaire: Auditory learning style, Visual learning style, and kinesthetic learning style. There were 7 items to measure auditory style of learning, 6 items to measure visual style, and 11 items to measure kinesthetic learning style. A four-point scale was used ranging from often, sometimes, rarely, and never. The researchers collected data by visiting the colleges. The confidentiality of information was ensured.

Data Analysis and Interpretation

A pilot test study was conducted to assess the instrument's reliability. A pilot study is a small feasibility study designed to test various aspects of the methods planned for a larger, more rigorous, or confirmatory investigation (Arain, 2012). The questionnaire was pilot-tested with a sample of 100 respondents to determine the validity. Cronbach's alpha value is given in the following table which shows good reliability.

Table 1

Cronbach Alpha Reliability of the Instrument

Variable	No of Items	Reliability of Coefficients
Learning Style	24	.85

The table shows that there were 24 items in the learning styles preferences questionnaire. The Cronbach's alpha value of 0.85 showed that the instrument was reliable.

Table 2

Frequencies of Students Time Spent on Study

S. No	Study Hours	Frequency	Percent
1	Half an hour	34	13.5
2	1 hour	30	11.5
3	2 hours	25	9.9
4	3 hours	60	23.8
5	4 hours	50	19.8
6	More than 4 hours	53	21.0

S. No	Study Hours	Frequency	Percent
7	Total	252	99.6
Total		252	100.0

Table 2 shows students' study hours at home. It showed that there were 252 participants in the study and most of them (N=60) 24% spent almost three hours on the study. Similarly, 19% of students spend four hours on study. While 21%

percent of students also claim that they spend more than 4 hours on study. Only nine percent of students (N=25) mentioned that they study for 2 hours.

Table 3

Factor-wise Descriptive Mean and SD of Statements

Factor	No. of items	Mean	SD
Auditory Learning	7	3.60	.628
Visual Learning	6	3.70	.738
Kinesthetic Learning	11	3.52	.713

Table 2 shows the factor-wise descriptive mean of auditory learning is (M = 25.9520 and SD = 4.10518), visual learning (M = 23.9440 and SD = 4.34464), and kinesthetic learning (M

= 1.2900E0 and SD = 19.20223). It showed that the kinesthetic learning style is more prevalent among students.

Table 4

Students' Preferences Towards Auditory Learning Style

Statement	Always	Often	Sometime	Rarely	Never	Mean	SD
1- It is hard	16.0	30.4	30.4	13.6	9.6	3.06	1.204
2- I remember	39.2	22.4	20.0	10.4	8.0	3.42	1.170
3- I learn	24.0	11.2	29.6	11.2	24.0	3.80	1.237
4-I prefer	63.2	15.2	13.6	2.4	5.8	3.13	1.502
5-I prefer	50.4	24.0	16.8	6.4	2.4	4.20	1.129
6-I can.....	23.2	20.0	32.8	11.2	12.8	4.06	1.053
7-I follow.....	54.4	21.6	16.8	4.0	3.2	3.70	1.268

Table 4 shows the frequencies and average responses of students on each statement. The mean value of 3.06 (SD= 1.204) on statement 1 showed that students occasionally prefer reading handwritten notes. The mean value of statement 2 showed that 39% of students prefer auditory learning (M=3.42, SD= 1.170). Similarly, most of the students

63% always prefer to read aloud. Almost, 50 % of students prefer to study in loneliness. On statement 7, 54% of students follow oral directions better than written ones. 16.0 %, where the mean was 4.06 (SD= 1.05) showed that students often prefer this style.

Table 5

Preferences of Students towards Visual Learning Style

Statement	Always	Often	Sometime	Rarely	Never	Mean	SD
8-I remember	55.2	24.8	15.2	3.2	1.6	3.85	1.190
9-I prefer visual objects	32.0	31.2	21.6	8.0	7.2	3.75	1.325
10-I recognize	32.0	27.2	26.4	6.4	8.0	3.53	1.333
11-I learn	45.6	23.2	20.8	5.6	4.8	3.79	1.160

Statement	Always	Often	Sometime	Rarely	Never	Mean	SD
12-I like.....	47.2	18.4	23.2	5.6	5.6	3.69	1.257
13-I require	60.0	16.0	18.4	4.0	1.6	3.74	1.250

Table 5 shows the frequencies and average responses of students on each statement. The mean value of 3.85 (SD= 1.190) on statement 8 showed that 55% of students remember something if they write it down. Statements 9, 11, 12, and 13 were related to students' preferences towards visual objects,

facial expressions, and explanatory diagrams. The mean values of 3.75, 3.79, and 3.74 showed that students often prefer reading by facial expressions and 60 % by visual graphs and diagrams. The mean value of 3.79 (SD= 1.333) showed that students often prefer to write difficult words for learning.

Table 6

Preferences of Students towards Kinesthetic Learning

Statement	Always	Often	Sometime	Rarely	Never	Mean	SD
14-I enjoyed	55.2	22.4	15.2	5.6	1.6	4.05	1.118
15-I learn	27.2	18.4	24.0	13.6	16.8	3.84	1.259
16-I learn	28.0	29.6	26.4	11.2	4.8	3.42	1.342
17-I am	34.4	28.0	22.4	8.8	6.4	3.57	1.219
18-I tend to	33.6	22.4	36.0	4.8	3.2	3.68	1.256
19-I can	34.4	24.8	30.4	6.4	4.0	3.52	1.256
20-I prefer	54.4	23.2	13.6	3.2	5.6	3.92	1.105
21-I more	40.0	20.8	23.2	10.4	5.6	3.90	1.183
22-I grip	31.2	25.6	31.2	5.6	6.4	3.68	1.238
23-In discussion.....	41 .6	30.4	18.4	6.4	3.2	3.80	1.141
24-I pay	54.4	23.2	13.6	5.6	3.2	4.01	1.069

Table 6 shows the frequencies and average responses of students on each statement. The mean value of 4.05 (SD= 1.11) on statement 14, showed that 55% of students prefer to learn through experiential learning. Similarly, the mean value of 3.84 (SD= 1.259) on statement 15 showed that 27% of students sometimes need the opportunity to learn by doing. The mean values of statements 16 (M=3.42, SD=1.342), 17 (M= 3.57, SD= 1.219), and 18 (M=3.68, SD= 1.256) showed

that undergraduate female students sometimes pay attention to flow charts and contingency plans. They sometimes prefer learning by “finger spelling” and practical ways. The mean values on statements 20 (M=3.92, SD=1.105) and 24 (M=4.01, SD= 1.069) showed that more than 50 % of students prefer theory and details about an idea. Sometimes students prefer discussions to create spontaneous ideas.

Table 7

One-Way ANOVA for Difference in Students' Learning Styles concerning Study Hours

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1268.232	4	317.058	2.007	.094
Within Groups	38870.588	246	158.011		
Total	40138.821	250			

The above table shows the difference in students' learning styles concerning study hours. It showed that there is no significant difference in students' learning styles concerning time spent on study as the $p > 0.05$, $F(44, 24) = 2.007$. The null

hypothesis “There is no significant difference in students' learning styles concerning study hours” is accepted.

Conclusion

Based on the findings, it is concluded that visual learning style is more prevalent among female students enrolled in undergraduate programs in public colleges. The auditory learning style is also widely used and preferred learning style. The kinesthetic learning style is less preferred among female students. It is also concluded that most of the students spend three hours for study. It is also concluded that there is no difference in students' learning styles concerning varying study hours. It is also concluded that most of the students prefer to read aloud to remember content and study alone. It is also concluded that most students learn best by visual representations, such as diagrams or charts at the undergraduate level. The female students occasionally prefer practical ways to get things done.

Discussion

The current study aimed to shed light on the learning style preferences of female students who study at public sector colleges in Lahore, Pakistan. It focused on the kinds of teaching and learning techniques that work best for these students. Most of the students who participated in the study said they preferred learning through visuals, watching, or seeing things clearly, and only to a much lesser extent did they say they preferred to experience learning through other sensory modalities such as listening or moving. The strong "visual" style preference of these students is not so different from what researchers have found to be true of many other populations (Ariastuti & Wahyudin, 2022). According to the findings, a large part (55.2%) of the students stated that they remember the things they wrote down, which is one of the properties of visuals. In addition, the highest proportion which is the preferences of visual aids such as drawings, charts, and helping with illustrations derived from the style of learning were selected in the visual items was selected as 60% (Pashler et al., 2008). The research also found that the majority of them learn by hearing. Over sixty percent of the participants (63.2%) selected that they preferred reading

aloud as their study method. That is commonly used by auditory learners. Additionally, 54.4% of the participants pointed out that they learn better by listening than by reading, which is well grounded by the figure (Wahab & Nuraeni, 2020). Surprisingly, the kinesthetic modality received the smallest percentage of first preference: only 8 percent listed it first. A considerable number of students (55.2 percent) reported liking to learn by doing. Even so, it is not the dominant preference of students in this study but does suggest that we need to try to build in kinesthetic experiences in the form of hands-on activities, simulations, and lab experiments. The implications for the study's findings are relevant to higher educational practice, in terms of teaching and instructional design. By knowing how students' learning styles differ, educators and instructional designers can create their curricula and courses to better suit students' needs. They can shape how they teach to better mesh with the different ways that students can learn. Matching their instruction to the student's preferred learning style can help motivation in the classroom and yield better performances in the classroom (Biggs & Tang, 2011; Kolb & Kolb, 2005).

Recommendations

Keeping in view the findings of the study, the following recommendations are made.

The teachers should design instructional activities to accommodate different modalities like auditory, visual, and kinesthetic learning.

1. Teachers should incorporate group activities, lectures, discussions, and hands-on activities in the classroom.
2. Teachers should develop self-awareness of students' learning styles.
3. Different methods should be used for the achievement of learning objectives like multiple assignment options.
4. Incorporation of an inclusive learning environment is needed regarding inclusive learning environment.

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