

Featured Research

Learning in Different Ways: A Study of Gender-Based Learning Style Difference

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Abstract: The phenomenon of differences in learning styles between male and female is an important issue in the field of education, because it can affect the effectiveness of the learning process and academic outcomes. This study was conducted with the aim of determining whether there are differences in learning styles between male and female. The study, which was conducted using a comparative method, had 152 respondents in the late adolescent category, consisting of 34 male and 118 female. The learning style scale, developed by the researcher, demonstrated strong reliability and validity. The analysis indicated a significant difference in learning styles between genders, without reporting detailed statistical symbols in the abstract. Female students showed higher learning style scores, suggesting that they tend to adopt more adaptive and varied learning approaches. These findings highlight the need for educators to design learning strategies that accommodate gender-related differences, thereby supporting a more effective and inclusive learning environment. Furthermore, the results provide practical implications for teachers and curriculum developers in selecting instructional methods that optimize student engagement and learning outcomes.

Keywords: Learning Styles, late adolescence, gender, academic style.

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INTRODUCTION

Learning is an activity or effort to acquire something new. Learning is an activity undertaken to transform from ignorance to understanding (Mardicko, 2022). Learning is carried out to acquire new knowledge and understanding (Henniwati, 2021) Learning activities are defined as the process of behavioral change resulting from the interaction of individuals with their environment (Faizah & Kamal, 2024). Changes in information technology-based learning systems influence learning activities (Mujianto & Suryadhianto, 2025). This enables individuals to develop lifelong learning skills (Oishi, 2020). From childhood to late adulthood, individuals engage in learning activities, including students (Malfi et al., 2023).

Students are individuals currently studying at a university and act as agents of change (Pramitha & Astuti, 2021). It is crucial for students to have a learning strategy to adapt to different learning methods than at their previous level (Lestari, 2021). This is done to support their studies. However, in real-life contexts, students often struggle to understand the material because the learning methods don't align with their learning strategies (Kolivia et al., 2022). This challenge requires students to understand and identify their learning styles (Santoso, 2023). Successful learning is characterized by the achievement of learning objectives, which are influenced by learning styles (Hasanah et al., 2025).

Learning style is a process of understanding and a student's tendency to learn or acquire new knowledge and understanding (Parwati, 2024). Learning styles play a crucial role for students because many activities in higher education require the ability to absorb information provided by lecturers (Suherman et al., 2024). Therefore, students must be aware of their learning styles to support the learning process (Rahmawati & Gumiandari, 2021). Learning styles influence the level of effectiveness and success of individuals in learning activities related to learning outcomes (Rohmah et al., 2025). Furthermore, learning styles influence learning outcomes or the achievement of results obtained after the learning process (Telaumbanua & Harefa, 2024). Learning styles come in many types, but typically fall into three categories it is visual, auditory, and kinesthetic (Budi et al., 2021). Each individual has a different learning style (Ermawati & Usman, 2024)

The learning styles of each student are different from one another and even tend to be a combination. For example, a medical student in Tamil Nadu, India, which was attended by 421 students, produced various learning styles, including 36.8% with a kinesthetic learning style, 36.1% with an auditory learning style, 16.9% with a visual learning style, and 10.2% with a reading or writing learning style (Muniyapillai et al., 2023). In Korea, 94.7% of students have diverse and varied learning style preferences, this can certainly affect learning outcomes (Lee, 2025). In the United States, 68% of students also do not have consistent learning style preferences and tend to vary (Rogowsky et al., 2020). Furthermore, in Saudi Arabia, specifically at Bisha University, which was attended by 64 students, it resulted in different learning styles, including 34.9% with a visual style, 54% with an auditory style, 17.5% who preferred note-taking and writing, and 9.5% who had a kinesthetic learning style (Aboregela, 2023). This not only occurs abroad but also occurs in Indonesia, students in the city of Bandung, showed students with the following learning style tendencies: 37% with a visual learning style, 30% with auditory learning power, and 32.5% kinesthetic (Susanti, 2024). In Palembang, students tend to have the following learning styles: 49% with a visual learning style, 36% with a kinesthetic learning style, and 15% with an auditory learning style (Rafiska & Susanti, 2023). In Rokan Hulu Regency, Riau Province, each student has a learning style preference, including a visual learning style (33%), an auditory learning style (38%), and a kinesthetic learning style (29%) (Rusli et al., 2023). This explanation demonstrates that learning styles are individual and are an important issue in supporting education both internationally and nationally, and is in accordance with research showing that the environment influences learning styles (Gustiary & Idayani, 2020)

Learning styles are also influenced by demographic factors, one of which is gender (Saxena et al., 2024). Several previous studies have shown differences in learning styles between men and women. Research conducted by Mašić et al (2020) found significant

differences between men and women in learning style preferences. Previous research also indicates a relationship between learning styles and gender (Anggraini et al., 2024). However, not all research results show similar results. For example, research conducted by Buowari et al (2025) showed statistically ($p > 0.05$), indicating no differences between men and women in learning style preferences. Furthermore, Bazán-Perkins & Santibañez-Salgado (2025) emphasized that the relationship between gender and learning styles is contextual, depending on individual experiences rather than gender alone.

These mixed findings indicate that the current body of research is inconsistent, and therefore, the issue of gender-based differences in learning styles remains inconclusive. Furthermore, previous studies have rarely focused on late adolescents in the Indonesian higher education context, leaving a gap regarding how gender differences manifest in this developmental stage. This gap is important because late adolescents are transitioning into adulthood and require learning strategies that align with their developmental characteristics (Putri et al., 2020). Thus, the novelty of this study lies in examining gender-based learning style differences specifically among Indonesian late-adolescent university students using a learning style instrument developed and validated by the researcher, which has been seldom explored in prior literature.

Based on this gap and the inconsistencies in previous findings, this study aims to analyze the extent of gender-based differences in learning styles among university students. The results are expected to contribute to the development of more adaptive and inclusive learning strategies by helping educators understand gender-related variations in how students process information.

METHOD

This study is comparative (between-groups) in nature, with the aim of comparing the learning style between two gender groups (male vs. female). Data was collected cross-sectionally through a standardized questionnaire.

1. Participant

The research sample consisted of 152 person (118 females with an average age of 101.07 and 34 males with an average age of 94.05) aged 18–22 randomly selected from the population at Indraprasta PGRI University. All participants were active undergraduate students from various faculties and were included based on the criteria of being within the late-adolescent age range and currently enrolled in university courses. Data collection was conducted through a Google Form distributed with the assistance of Guidance and Counseling lecturers. Participation was voluntary with informed consent stated in the form. A simple random sampling technique was used to ensure that each eligible student had an equal chance of being selected, making the sample representative of the broader student population.

2. Measure

This study used a learning style instrument developed based on the VAK (Visual, Auditory, and Kinesthetic) learning style theory proposed by Barbe et al (1979). Learning style is a person's way of receiving, processing, and remembering information based on

the most dominant sensory modality. The instrument, titled the Learning Style Scale, was constructed by the researcher and consists of three dimensions aligned with the VAK model: visual, auditory, and kinesthetic. The scale originally contained 42 items rated on a Likert-type scoring system ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate a stronger tendency toward a particular learning style. After conducting item analysis, 5 items were identified as invalid because they did not meet the required fit criteria, resulting in a final scale of 37 valid items. The reliability coefficient of 0.95 indicates that the instrument demonstrates excellent internal consistency and is suitable for research use.

An example item from the scale is: "I understand information better when it is presented in pictures or diagrams".

3. Procedur

This research was conducted with permission from the Guidance and Counseling (BK) study program at Indraprasta PGRI University, which helped distribute a Google Form link to students targeted by the research, aged 18-22 years or late adolescence. At the beginning of the form, there is a consent statement that respondents must check to indicate their willingness to provide data voluntarily after reading the explanation of the research objectives and data confidentiality. After providing consent, participants filled out the questionnaire according to the instructions contained in the Gform. The collected data was then checked for completeness and validity before being analyzed to compare learning style levels by gender.

4. Data Analysis

The analysis technique used is the independent sample t-test (Hariyani & Syahputra, 2019; Syahputra et al., 2019) with the help of JASP Version 95.30 (Goss-Sampson, 2018). Before conducting the t-test, preliminary data processing was carried out, including checking data completeness, scoring the learning style scale, and screening for outliers. The data were then tested for normality and homogeneity of variance to ensure that the assumptions of the independent sample t-test were met. The independent sample t-test was chosen because it is appropriate for comparing learning style scores between two groups, namely male and female students.

RESULTS AND DISCUSSION

RESULTS

The discussion of the results of this study is about the differences in male and female late adolescence learning styles. Furthermore, the results of the analysis of the difference test for male and female late adolescence of learning style are presented in Table 1 below.

Table 1. The results of the Independent Samples Test in terms of Gender

Variabel	Gender	Mean	t	df	p
Learning Styles	Male	94,05	-3.758	150	< .001
	Female	101,07			

The table shows that the independent sample t-test analysis showed a $t = -3.758$ and $p < 0.001$, indicating a significant difference in learning styles between men and women. The average learning style score for women was 101.07, higher than for men (94.05), indicating that women tend to have stronger or more diverse learning styles than men. These results also demonstrate that female students tend to have greater cognitive flexibility in selecting learning strategies. This aligns with previous research that suggests women are better able to adapt their learning styles to the demands of the learning situation (Rahmawati & Gumiandari, 2021).

This research aligns with the learning style theory proposed by Barbe et al., (1979) which states that each individual has learning preferences and that gender differences influence the dominant learning style. Meanwhile, the learning style theory proposed by Kolb (1984), states that learning styles develop from experience and social interaction. This proves that women are more active in discussions and group work and tend to develop more varied learning styles. Furthermore, the analysis results of this study align with research conducted by Rismayanti et al (2023) which found that women tend to be better able to adapt their learning styles to the learning context, while men tend to rely on a more practical approach. Therefore, it can be concluded that gender plays a role in differences in students' learning styles.

Based on the explanation above, the researcher clarifies by looking at how the learning styles conditions of late adolescence individuals are presented in Figure 1 below.

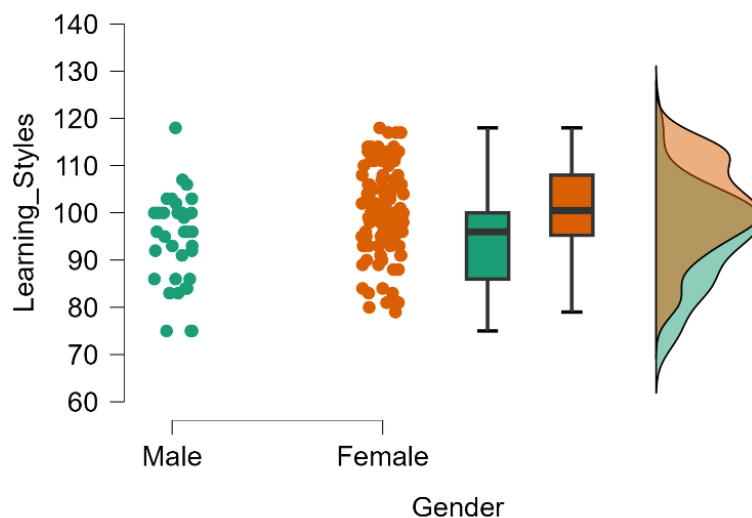


Figure 1. Differences Learning Style in terms of Gender for raincloud plot

Figure 1 shows the differences in learning style levels between boys and girls in late adolescence. Based on the data distribution, it is stated that girls are superior because they have scores of 85-125, while boys are around 70-120. This indicates that girls have higher learning style scores than boys. Meanwhile, the boxplot shows that girls are higher than boys, indicating that girls have generally higher and more consistent learning style scores, while boys' learning styles are less varied.

The violin plot shows a data density distribution, indicating that most female scores are high. This means the distribution of female scores is shifted toward high scores, while male

scores are spread across low-medium scores. Therefore, it can be concluded that the graph shows a significant difference between males and females. Thus, gender influences learning styles, indicating that females tend to have a high and consistent learning style than males.

The pattern of explanation above indicates that women have a more homogeneous and focused learning style, as they tend to follow proven effective learning strategies, such as taking notes, listening to lectures, and reviewing material regularly. Conversely, the wider distribution of men's learning styles indicates a high degree of variation in learning strategies, some of which are effective, while others tend to be sporadic or less structured.

DISCUSSION

The results of this study indicate a significant difference between learning styles and gender. This is indicated by the fact that women scored higher than men, indicating that women are stronger in learning styles. This research is supported by the statement by Daniatussalma et al (2020) which shows that there are differences in learning styles used by men and women in participating in learning. These results also support this study, which shows that there is a tendency for women to use reflective and flexible learning strategies. This research is also in line with research conducted by Andini & Prastiyowati (2021) which shows that there are differences in learning styles between women and men and also shows that women have more varied learning styles than men. The results of this analysis also prove that women have a strong tendency for reflective and verbal thinking, making it easier to understand conceptual information. In line with the findings presented by Kolb (1984) individuals with a reflective learning style tend to be more common in women.

This difference is influenced by several internal and external factors. Externally, teacher support and perceptions tend to favor females over males. Previous research has shown that teacher perceptions of gender can influence students' learning styles (Mehmood, 2020). Furthermore, environmental factors also influence how individuals engage in learning activities, thus shaping learning style preferences. This is supported by research conducted by Purba et al., (2024) that found environmental influences on learning style preferences in learning, resulting in effective achievement of learning objectives. Therefore, more positive teacher support and perceptions toward female students have the potential to increase student learning motivation and self-confidence, thus contributing to the higher learning style scores shown in this study.

Furthermore, internal factors can also influence learning styles to achieve goals. Women tend to have higher learning strategies and intelligence levels than men. This is in accordance with the results of research conducted by Anwar et al (2019) which states that women have higher levels of intellectual intelligence than men, especially in the learning process. Intellectual intelligence also influences learning styles, which is characterized by how an individual chooses and applies an effective learning style to achieve learning goals (Kristianingrum & Choiri, 2024). Therefore, an individual's intellectual intelligence is able to adapt to various learning situations. These findings also indicate that women find it easier to combine various learning styles.

In addition, according to the theory presented by Fleming (1987) which states that learning styles have 3 aspects it is visual, auditory, and kinesthetic which is also developed into VARK (visual, auditory, reading/writing, kinesthetic) and each individual has a tendency to learn through one or a combination of the three main learning styles. In this

study using 3 aspects of learning styles and the results of the study also show that women have more varied learning styles than men. In line with research conducted by Saleem et al (2021) which states that there are gender differences in learning styles with a t value = -7.757 and a p value <0.001 and the study shows that women (M = 3.81) compared to men (M = 3.44) which means that women have more varied learning styles. In his findings, it was also stated that women were superior in visual learning styles as indicated by a t value = -3.49 and a p value = 0.001, while in auditory learning styles, women were also superior as indicated by a t value = -7.66 and a p value = 0.000, while in kinesthetic learning styles, men were superior as indicated by a t value = 5.14 and a p value = 0.000, which means that women have a more dominant learning style than men.

Furthermore, another internal factor is emotional, because emotional intelligence plays an important role in managing emotions during the learning process because it can control academic stress, motivate oneself, and maintain focus when experiencing difficulties Tarigan et al (2025). Research conducted by Sari (2025) stated that women's intelligence is superior to men. In accordance with this research, because women have more varied learning styles compared to men. The results of this study are supported by the results of research conducted by Aliyya & Marsono (2025) which stated that emotional intelligence has an influence on learning styles. In addition, research conducted by Baharuddin & Tumiran (2025) which showed that individuals with high emotional intelligence are able to adjust learning methods to academic decline. This strengthens the results of research that women who have high emotional intelligence tend to be more adaptive in using various learning styles to achieve optimal learning outcomes.

The implications of this research demonstrate the need for a learning approach that considers gender differences in the learning process. Educators, such as lecturers and teachers, must develop flexible and multimodal teaching methods that combine visual, auditory, and kinesthetic elements so that students can access learning resources tailored to their individual learning styles. Furthermore, lecturers and teachers can participate in professional training on gender-based learning differentiation and learning styles to ensure effective and targeted learning. Furthermore, at the institution level, the results of this study illustrate that an inclusive and responsive learning environment, along with a variety of learning resources such as interactive media, adequate learning resources, project-based activities, and opportunities for reflection and group discussion, are essential to supporting the learning process. Therefore, the results of this study emphasize the importance of understanding differences in learning styles as a basis for designing effective, equitable, differentiated, and gender-focused learning.

However, this study has several limitations that must be acknowledged. First, the sample was limited to students from a single university, which may restrict the generalizability of the findings to broader populations. Second, the data were collected using self-report instruments, which are susceptible to response bias and subjective interpretation. Third, the study focused solely on the VAK dimensions, without exploring other learning style frameworks that might capture more nuanced variations. Lastly, demographic variables such as socioeconomic status, academic major, or cultural background were not examined, even though these factors may also influence learning style preferences.

Based on these limitations, several recommendations can be proposed for future research. Future studies should consider involving a more diverse and larger sample across multiple institutions to enhance generalizability. Researchers may also use mixed-method approaches, such as combining quantitative scales with interviews or classroom observations, to obtain more comprehensive insights into learning style differences. Additionally, future research could compare multiple learning style models to identify whether gender differences remain consistent across theoretical frameworks.

For practitioners, it is recommended that educators continuously evaluate and adapt teaching strategies to align with students' learning preferences. Institutions are encouraged to provide ongoing professional development focused on differentiated instruction, gender-responsive pedagogy, and multimodal learning design. Furthermore, curriculum developers should integrate flexible learning resources that accommodate diverse learning styles, ensuring that all students—regardless of gender—receive equal opportunities to achieve optimal learning outcomes.

CONCLUSIONS

The results of this study indicate significant differences in learning styles between male and female students. Female students demonstrated a greater tendency to use varied and adaptive learning strategies, suggesting stronger flexibility in adjusting their learning approaches to different academic demands. These findings emphasize the influence of factors such as motivation, intellectual and emotional intelligence, social support, and the learning environment in shaping these differences. The implications of this study highlight the need for educators and institutions to design inclusive, flexible, and differentiated learning approaches that accommodate diverse learning preferences. Multimodal teaching strategies may help optimize student engagement and performance across genders. The main takeaway from this research is that gender differences play a meaningful role in shaping learning style preferences, and addressing these differences can significantly improve the effectiveness of instructional practices. Future research is recommended to explore additional variables such as cultural background, field of study, personality traits, and digital learning exposure to gain a deeper understanding of the factors influencing learning styles. Studies with larger and more diverse samples, as well as qualitative approaches, may provide richer insights into gender-based learning patterns.

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