



An Analysis of Learning Styles Among Kunduz University Students Using Kolb's Inventory

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Article History:

Received: 21. 7.2026

Accepted: 11. 8.2026

Online First: 18.9.2026

Citation:

Aesar,H. R. & Sadry, A.M.
(2026). An Analysis of Learning
Styles Among Kunduz
University Students Using Kolb's
Inventory.*Kdz Uni Int J Islam
Stud and Soc Sci*;3(3):305-316

e-ISSN: 3078-3895

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Abstract

Learning style comprises a combination of cognitive, affective, and physiological characteristics through which individuals perceive, organize, process, and retain information. The main objective of this study was to identify the learning styles of students at Kunduz University based on Kolb's Learning Style Inventory. The present research is descriptive in nature, applied in terms of objective, and mean comparison in terms of data analysis. The statistical population consisted of all Kunduz University students, reported by the Directorate of Student Affairs to be 3,335 students in the fall semester of 2025. The sample size was determined to be 327 students using Cochran's formula, with a 95% confidence level and a 5% margin of error. Data were collected through cluster-random sampling. The Kolb Learning Style Inventory, developed by Kolb in 1989, was used to assess students' attitude for learning styles. The collected data were analyzed using IBM SPSS Statistics (version 26). The findings revealed that the Converging learning style is the most prevalent (38.5%) among students, while the Assimilating style is the least common (15.0%). It can be concluded that students at Kunduz University are largely practical learners who prefer active engagement and direct experience in their educational pursuits.

Keywords: Kolb's Inventory, Kunduz University, Learning Styles, Learning Methods, Students.

Introduction

Among the concerns of professors, university officials, and students' families is the academic status of students. The education of students is aimed at their progress. Teaching and learning have been considered a two-way process (Sayyadi et al., 2020). The foundation of any human's progress in today's world is learning, which is one of the most difficult concepts to define (Rahiminia et al., 2016). Education is a complex process, and any oversimplification regarding it can lead to the waste of resources and facilities and cause efforts to fail. Therefore, the expansion of education and transformation within it requires an understanding of the educational process and awareness of modern methods of its implementation. One of the important factors in education is learning. Teaching and learning have always been considered a two-way process, and learning is the process of a

relatively lasting change in an individual's potential behavior that is gained through experience (Farmanbar, Mohammadi & Ranjbar, 2012).

Today, the goal of all universities is to cultivate individuals who are lifelong learners. A prerequisite for lifelong learning is having basic knowledge, a desire to learn, and knowing the methods of learning. To achieve this goal, understanding the characteristics related to student learning is undeniable. Students differ from each other in terms of feelings, attitudes, mental and cognitive abilities, learning methods, learning style and speed, and so on. Therefore, considering students' individual differences in learning is important. In recent decades, learning styles have been considered an important individual factor in facilitating learning. Given the various definitions that have been proposed for learning, it must be acknowledged that a comprehensive and uniform definition acceptable to all psychologists with different theories has not yet been achieved. However, many psychologists and educators believe that "learning" is a change that occurs in the behavior of a living organism as a result of experience or training (Moradi , Yousefi & Karami , 2015).

For nearly a century, psychologists have been extensively trying to identify factors influencing better learning methods and predictors of academic achievement (Arman et al., 2018). In the past, it was believed that an individual's innate intelligence, inherited from parents, was the important factor in learning. Currently, it is believed that an important part of intelligent behaviors is formed by cognitive functions, and cognitive functions are considered acquired and changeable (Amini, 2016).

Several factors affect learning, including intelligence, personality traits, task difficulty, and differences in learning styles (Sourinejad, Haghani, Beigi & Adibmoghaddam, 2020). The factors affecting learning are very extensive and wide-ranging. One of these factors is learning style. Every individual has a different physiological, psychological, and cognitive structure. These differences create different learning styles (Rezaei et al., 2014). Research on learning styles as an individual trait has been the focus of educational psychologists in recent years. In these studies, Kolb's learning model has attracted much attention (Rezaei, 2010).

Definition of Learning Styles: Various definitions of learning styles exist in the literature. Learning style is the method personally selected and used by an individual to understand and process information (Masoumi, Hosseini, & Karimi , 2021). A learning style is a combination of cognitive, affective, and physiological characteristics that are formed from the interaction of how a learner perceives and responds to the learning environment (Sepehrian Azar & Eghbali, 2014).

Kolb's Learning Style: In 1974, David Kolb proposed his theory of learning styles to provide a better understanding of the different ways individuals learn (Arman et al., 2018). One of the methods for assessing learning style is the Kolb model, based on which learning occurs in four stages: feeling, observing, thinking, and doing (Abbas & Alami, 2014). Types of learning styles are cognitive, affective, and physiological, which represent, in a relatively stable manner, how one perceives, interacts with, and responds to the learning environment. Cognitive learning styles have various classifications, one of which is learning styles based on Kolb's experiential learning model (Farmanbar et al., 2012). Based on the theories of Dewey, Lewin, and Piaget, Kolb presented a hypothetical four-stage cycle called the experiential learning cycle (Rezaei, 2010).

Kolb considered the learning process as a cycle and defined four types of learning styles within this cycle. These learning methods are:

- I. Concrete Experience
- II. Abstract Conceptualization
- III. Active Experimentation
- IV. Reflective Observation

Among these four learning methods, one is prioritized for individuals. It is also inevitable that this cycle occurs in relation to the learning experience. An individual's learning style is a combination of two of these four learning methods:

- I. The combination of Concrete Experience and Reflective Observation is Diverging.
- II. The combination of Reflective Observation and Abstract Conceptualization is Assimilating.
- III. The combination of Abstract Conceptualization and Active Experimentation is Converging.
- IV. The combination of Active Experimentation and Concrete Experience is Accommodating (Masoumi et al., 2021).

By combining these four methods, Kolb identified four learning styles—Diverging, Converging, Assimilating, and Accommodating—to determine individuals' learning styles (Rahiminia, Abbasi & Ahmadi, 2016).

Diverging: These individuals learn mostly through observation and thinking. They prefer to view situations from different angles and explore ideas. They are creative and perform well in problem-solving through ideation.

Converging: These individuals learn mostly through thinking and doing. They are skilled in solving practical problems and applying ideas in the real world. They are interested in the practical applications of theories.

Accommodating: Learning occurs through action and direct experience. These individuals tend to learn by experimenting, experiencing, and engaging in practical activities. They are more inclined towards pragmatism than theoretical analysis.

Assimilating: Learning occurs through observation and logical thinking. These individuals are more interested in theories and concepts than practical aspects. They are interested in organizing information and fully understanding concepts.

To date, various learning styles have been proposed by researchers and theorists; however, Kolb's learning style is the most recognized and widely used theory in the discussion of learning styles. Considering that recognizing students' inclination towards specific learning styles can help professors in adjusting educational programs to develop and strengthen students' professional capacities and specialized knowledge, this research is of particular importance (Arman et al., 2018).

Literature Review: Sepehrian Azar and Eghbali (2014), in an article titled "Kolb's Learning Styles and Positive and Negative Academic Emotions with Self-Regulated Learning," found that the relationship between Kolb's learning styles and self-regulated learning is not significant. The relationship between enjoyment of class and hope with self-regulated learning is positive and significant. Furthermore, the relationship of anxiety, boredom, and anger with self-regulated learning is negative and significant. Farmanbar et al. (2012), in an article titled "The Relationship between Kolb's Learning Styles and Positive and Negative Academic Emotions with Self-Regulated Learning," found that given that most students possess Converging, Diverging, and Assimilating learning styles, it is suggested that

learning environments appropriate to these styles be used, including emphasizing the practical application of material and prompting students to scrutinize problems in education. Sayyadi et al. (2020), in an article titled "Investigating the Relationship between Learning Styles Based on Kolb's Theory and Academic Status in Dental Specialty Assistant Students of Tehran Azad Islamic University of Medical Sciences," found that considering the predominant Converging learning style among students, providing learning environments suited to this style is particularly important for better learning and acquiring or strengthening the necessary capabilities in future educational and work environments. Rahiminia et al. (2016), in an article titled "Investigating Learning Stages and Styles Based on Kolb's Theory in Students of Qom University of Medical Sciences," found that since the preferred style of most students was Converging and Assimilating, it is suggested that teaching methods such as visual instruction (visuals, maps, diagrams), self-study, individual instruction, and an emphasis on the practical applications of the material be used. Ahmadi and Alami (2014), in an article titled "A Comparative Study of Learning Styles Using VARK and Kolb Questionnaires and Their Relationship with Academic Achievement," found that assessing learning style using the Kolb and VARK methods does not yield consistent results, and that using both methods likely provides more accurate information about learners' characteristics. The majority of students of both sexes had Diverging and Read/Write learning styles and used the Visual style less in semi-attend courses. Rezaei et al. (2015), in an article titled "Predicting Achievement Motivation Based on Kolb's Learning Styles in High School Students in Tehran," found that among Kolb's learning styles, after removing the Assimilating, Converging, and Accommodating learning styles which did not have a significant effect on achievement motivation, only the Diverging learning style variable was significantly able to predict students' achievement motivation. Rezaei (2010), in an article titled "The Relationship between Kolb's Learning Methods and Honey and Mumford's Learning Styles with Students' Age and Academic Performance," found that the Concrete Experience learning method had a positive and significant relationship with the Activist style, but a negative and significant relationship with the Reflector, Theorist, and Pragmatist styles. Eskandari, Ashraf, Arab, & Naghavi (2013) in an article titled "The Relationship between Kolb's Learning Styles and Students' Personality Traits and Academic Performance," found that there is a significant relationship between students' learning styles and personality traits with their academic performance, and each of the students' learning styles is related to some of their personality traits. Amini and Talebi (2016), in an article titled "Investigating the Relationship between Personality Types and Learning Style in Accounting Students Using Kolb's Learning Style Theory," found that there is a positive and significant relationship between personality types and learning styles of accounting students based on David Kolb's learning theory at the Shahr-e Kord Branch of Azad Islamic University. Soort Nejad et al. (2020), in an article titled "Learning Style of Midwifery Students in Iran Based on Kolb's Theory," found that given that the dominant learning style in midwifery students is Converging and Assimilating, while considering individual differences, educational planning and teaching method selection should be tailored to students' different learning styles, and diverse and modern educational methods should be used. Arman et al. (2018), in an article titled "Investigating the Relationship between Kolb's Learning Styles and Thinking Preferences in Students of Farhangian University of Kerman," found that by informing students about their learning styles and thinking preferences, they can achieve

greater academic success. The topic of learning styles is very complex; according to recent reviews, seventy different models of learning styles have been introduced, among which five models—Kolb, VARK, Felder-Silverman, Dunn, and Gregorc—are important and prominent (Rahiminia et al., 2016). Learning styles, which are individuals' habits of processing received information, are one of the effective factors in learning. Knowledge of learning styles can be used in organizing the learning environment, how instructors interact with students, and how teaching and learning of content occur (Farmanbar et al., 2012).

Material and Method

The main objective of this research is to identify the learning styles of students at Kunduz University based on the Kolb Learning Style Inventory in the year 2025. The statistical population is a collection of individuals who share one or more common traits. The statistical population of this research consists of all students of Kunduz University, reported by the Directorate of Student Affairs to number (3,356) in the autumn semester of 1404. The sample size in this study, considering a 95% confidence level and a sampling error of 0.05%, was determined to be (327) individuals using the Cochran formula, and questionnaires were distributed to them. The present research is descriptive in nature, applied in terms of objective, and mean coparison in terms of data analysis. The Kolb Learning Style Inventory, developed by Kolb in (1989), was used to assess the tendency towards learning styles among students. This questionnaire consists of 12 sentences, and for each sentence, four options are proposed. The respondent ranks the proposed answers from 1 to 4 according to their own learning style. In this way, for each sentence, the option that most closely matches the respondent's learning style is given a score of 4, the option that moderately matches the respondent's learning style is given a score of 3, the option that weakly matches the respondent's learning style is given a score of 2, and the option that does not match the respondent's learning style is given a score of 1.

Findings

The data obtained in Excel were coded, tabulated, and then analyzed in IBM SPSS-26 software using descriptive statistics (mean, standard deviation, frequency distribution), inferential statistics (Chi-Square correlation analysis).

Table 1. Mean and Standard Deviation of Learning Method in the Statistical Population

Learning Method	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Concrete Experience	327	12	75	31.39	12.002	144.048
Reflective Observation	327	13	43	29.39	5.206	27.105
Abstract Conceptualization	327	15	46	29.99	4.639	21.521
Active Experimentation	327	12	48	31.70	7.439	55.334

The statistics in Table 1 indicate that participants' scores on the Concrete Experience learning method range from a minimum of 12 to a maximum of 75, showing the widest dispersion range (75-12=63). This reflects considerable variation among students in their preference for learning through feeling and direct experience. The mean score for this mode is relatively high at 31.39, and it also has the highest standard deviation (12.002), indicating substantial heterogeneity among learners. The Active Experimentation method also shows a relatively wide range (48-12=36), suggesting diversity in students' attitude toward learning through action and hands-on experimentation. With a mean of 31.70, the second highest after Concrete Experience, and a standard deviation of 7.439, this mode reflects a notable tendency toward experiential and applied learning. In contrast, the Reflective Observation mode has scores ranging from 13 to 43, with a dispersion range of 30. Its mean is 29.39, and the standard deviation is 5.206, indicating relatively lower variability and a more moderate preference among students for learning through observation and reflective thinking. The Abstract Conceptualization method displays a dispersion range of 31, a mean of 29.99, and the lowest standard deviation (4.639) among all four methods. This suggests that students are relatively more homogeneous in their preference for learning through logical thinking and theoretical analysis.

From the analysis of the above table, it can be concluded that the Active Experimentation and Concrete Experience methods have higher mean scores. This indicates that students at this university tend to prefer learning through practical engagement and direct experience rather than through mere observation or theoretical analysis.

Table 2. Frequency of Students' Tendency towards Learning Method

Learning Method	Frequency	Percent	Valid Percent	Cumulative Percent
Concrete Experience	102	31.2	31.2	31.2
Reflective Observation	53	16.2	16.2	47.4
Abstract Conceptualization	48	14.7	14.7	62.1
Active Experimentation	124	37.9	37.9	100.0
Total	327	100.0	100.0	

The statistics in Table (2) show the distribution of four learning method among 327 students at Kunduz University. Out of the 327 participants in this study, 102 students (31.2%) preferred the Concrete Experience learning method, 53 students (16.2%) preferred the Reflective Observation method, 48 students (14.7%) preferred the Abstract Conceptualization method, and 124 students (37.9%) preferred the Active Experimentation method. From these findings, it can be concluded that more than two-thirds of the students (about 69%) tend to prefer practical and experiential learning methods (Active Experimentation and Concrete Experience), while only about 31% show a preference for reflective and theoretical learning method.

Table 3. Frequency of Learning Styles among Students

Learning Styles	Frequency	Percent	Valid Percent	Cumulative Percent
Diverging	77	23.5	23.5	23.5
Assimilating	49	15.0	15.0	38.5
Converging	126	38.5	38.5	77.1
Accommodating	75	22.9	22.9	100.0
Total	327	100.0	100.0	

The statistics in Table (2) show the distribution of four learning styles among students at Kunduz University. Out of the 327 participants in this study, 77 students (23.5%) showed a preference for the Diverging learning style, 49 students (15%) preferred the Assimilating style, 126 students (38.5%) tended to use the Converging style in their learning, and 75 students (22.9%) showed a tendency toward the Accommodating style. From the findings in this table, it can be concluded that the distribution of learning styles among students is heterogeneous. The highest preference is for the Converging style (practical and problem-oriented), while the lowest preference is for the Assimilating style (theoretical and abstract). This distribution indicates that students are more interested in the practical application of concepts rather than merely theorizing.

Table 4.Two-Dimensional Table Comparing Learning Approaches and Learning Sty

Learning Method	Learning Styles				Total
	Diverging	Assimilating	Converging	Accommodating	
Concrete Experience	54	0	2	46	102
	70.1%	0.0%	1.6%	61.3%	31.2%
Reflective Observation	23	29	1	0	53
	29.9%	59.2%	0.8%	0.0%	16.2%
Abstract Conceptualization	0	20	28	0	48
	0.0%	40.8%	22.2%	0.0%	14.7%
Active Experimentation	0	0	95	29	124
	0.0%	0.0%	75.4%	38.7%	37.9%
Total	77	49	126	75	327
	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square=349.747^a

Sig=0.000

This table is a 4×4 cross-tabulation that shows the relationship between two categorical variables: Row Variable: Learning Approaches (the four stages of Kolb's learning cycle). Column Variable: Learning Styles (Kolb's four main learning styles).

Analysis of Frequency Distribution

Diverging Style: The highest frequency is related to the Concrete Experience approach, with 46 individuals (61.3%). 23 individuals (29.9%) use the Reflective Observation approach. This distribution is completely consistent with Kolb's theory, as the Diverging style is based on the combination of Concrete Experience and Reflective Observation.

Assimilating Style: 29 individuals (59.2%) use the Reflective Observation approach. 20 individuals (40.8%) utilize the Abstract Conceptualization approach. This pattern aligns with the definition of the Assimilating style (combination of Reflective Observation and Abstract Conceptualization).

Converging Style: 95 individuals (75.4%) use the Active Experimentation approach. 28 individuals (22.2%) utilize the Abstract Conceptualization approach. This distribution indicates a strong predominance of Active Experimentation in this style, which is consistent with the theory.

Accommodating Style: 54 individuals (70.1%) use the Concrete Experience approach. 23 individuals (29.9%) use the Active Experimentation approach? (unclear text). This pattern is compatible with the Accommodating style (combination of Concrete Experience and Active Experimentation).

Pearson Chi-Square Value is (349.747) and the Significance Level is (0.000). These values indicate that: The relationship between learning approaches and learning styles is significant at the level of $P < 0.000$ with 99% confidence, it can be stated that there is a significant relationship between these two variables. The high Chi-Square value (349.747) indicates a strong correlation between the variables.

Discussion

The present study examined the distribution of learning methods and learning styles among 327 students at Kunduz University using Kolb's Experiential Learning Theory framework. The findings reveal distinct patterns in how these students prefer to learn, with important implications for educational practice in this context.

The analysis of learning methods (Table 1) demonstrates that Active Experimentation ($M = 31.70$, $SD = 7.439$) and Concrete Experience ($M = 31.39$, $SD = 12.002$) have the highest mean scores among the four learning methods. This indicates that students at Kunduz University show a stronger preference for learning through practical engagement and direct experience compared to Reflective Observation ($M = 29.39$, $SD = 5.206$) and Abstract Conceptualization ($M = 29.99$, $SD = 4.639$). Notably, Concrete Experience exhibited the widest range of scores (range = 63) and the largest standard deviation (12.002), suggesting substantial individual differences among students in their preference for learning through feeling and direct experience. This heterogeneity implies that while many students favor experiential learning, there exists considerable variation in the strength of this preference. In contrast, Abstract Conceptualization showed the smallest dispersion ($SD = 4.639$), indicating greater uniformity among students in their approach to theoretical and abstract reasoning.

The frequency distribution of learning methods (Table 2) corroborates these findings, with 37.9% of students identifying Active Experimentation as their primary mode and 31.2% preferring Concrete Experience. Collectively, more than two-thirds of students (approximately 69%) favor practical and experiential learning approaches, while only 31% prefer reflective observation or abstract conceptualization. This predominance of action-oriented and experience-based learning preferences suggests that the student population at this institution is characterized by a pragmatic orientation toward knowledge acquisition.

Regarding learning styles (Table 3), the Converging style emerged as the most prevalent (38.5%), followed by Diverging (23.5%), Accommodating (22.9%), and Assimilating (15.0%). The predominance of the Converging style—which combines Abstract Conceptualization and Active Experimentation—indicates that most students excel in problem-solving, decision-making, and the practical application of ideas. This finding aligns with the mode-level analysis showing strong preferences for active experimentation. The Assimilating style, characterized by Abstract Conceptualization and Reflective Observation, was least common, further supporting the conclusion that students at this

university demonstrate less inclination toward theoretical and abstract reasoning compared to practical application.

The cross-tabulation analysis (Table 4) provides validation for the internal consistency of the learning style classifications. Among students classified as Divergers, 77.1% reported Concrete Experience as their primary mode and 29.9% reported Reflective Observation, with no students reporting Abstract Conceptualization or Active Experimentation as their primary mode. This pattern precisely matches Kolb's theoretical conceptualization of the Diverging style as combining Concrete Experience and Reflective Observation. Similarly, among Assimilators, 59.2% preferred Reflective Observation and 40.8% preferred Abstract Conceptualization, with no students reporting Concrete Experience or Active Experimentation. These findings confirm the construct validity of the learning style measurements used in this study.

The consistency across all four tables strengthens the reliability of the overall finding: students at Kunduz University demonstrate a marked preference for concrete, active, and practical approaches to learning over abstract, reflective, and theoretical approaches. This pattern may reflect broader cultural, educational, or contextual factors that shape how students in this setting engage with the learning process. The predominance of practical learning orientations suggests that instructional strategies emphasizing hands-on activities, real-world problem-solving, and experiential learning opportunities would likely be most effective for this student population. Conversely, teaching methods heavily reliant on abstract lectures and passive observation may be less congruent with students' natural learning preferences and potentially less effective in promoting meaningful learning outcomes.

These findings contribute to the growing body of literature on learning styles in diverse educational contexts and highlight the importance of considering student learning preferences when designing instructional approaches. Future research might explore the relationship between these learning style patterns and academic performance across different disciplines, as well as investigate whether these preferences evolve over time in response to instructional experiences.

Conclusion

This study investigated the learning methods and learning styles of 327 students at Kunduz University within Kolb's Experiential Learning Theory framework. The findings lead to several key conclusions: Students at Kunduz University demonstrate a predominant preference for concrete and active learning methods. The higher mean scores for Active Experimentation ($M = 31.70$) and Concrete Experience ($M = 31.39$), together with 69% of students identifying these as their primary learning methods, clearly establish that the student population favors learning through practical engagement, hands-on activities, and direct experience over abstract theorizing or passive observation. The Converging learning style is the most prevalent (38.5%) among students, while the Assimilating style is the least common (15.0%). This pattern confirms that the majority of students excel in problem-solving, decision-making, and the practical application of ideas, characteristics that align with the pragmatic orientation observed in the mode-level analysis. The cross-tabulation analysis validates the internal consistency of the learning style classifications, as the distribution of learning methods within each style precisely matches Kolb's theoretical

framework. This confirmation strengthens the reliability of the findings and supports the validity of the measurements employed. The substantial individual differences observed, particularly within Concrete Experience (range = 63, SD = 12.002), indicate that while the overall tendency favors experiential learning, there is considerable diversity among students that educators should acknowledge and accommodate. A statistically significant relationship was found between learning methods and learning styles among students at Kunduz University ($\chi^2 = 349.747$, $p < 0.000$). The high Chi-Square value indicates a strong correlation between these two variables at the 99% confidence level. Students at Kunduz University are mostly practical learners who prefer active engagement and direct experience in their educational pursuits.

Acknowledgment

The authors also thank the anonymous reviewers for their helpful comments and suggestions.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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