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THEORY-BASED STUDIES

An integration of Benner's theory to explore the learning styles and motivation as predictors of academic achievement among nursing students in Iraq

Rownaq Mohamed Jasim Alneama[1], Radhwan Hussein Ibrahim[2]

Author information
[1] College of Nursing, University of Mosul, Iraq
[2] College of Nursing, Ninevah University, Iraq

prof.dr.radhwan@uomosul.edu.iq

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Abstract
Effective nursing education relies on understanding diverse student learning styles and motivational factors to enhance academic performance and prepare competent healthcare professionals. Despite the recognized importance, there has been limited research that has comprehensively explored these interactions in Iraq. The study aimed to investigate the learning styles among nursing students, assess their motivational levels, and examine the relationship between variables. A cross-sectional descriptive study was conducted from 1 December 2024 to 31 January 2025, involving 200 undergraduate nursing students at the College of Nursing, Ninevah University, Mosul, Iraq. The study integrates the Patricia Benner's Novice to Expert Theory, as it had aligned more appropriately with study's focus on nursing students' motivation, experiential learning, and professional development. A structured questionnaire assessed demographic data, preferred learning styles (visual, auditory, kinesthetic), motivation types (intrinsic and extrinsic), and academic achievement. The tool's reliability and validity were confirmed by an expert panel review and a Cronbach's alpha value of greater than 0.80. Statistical analyses included Pearson correlation, t-tests, ANOVA, and multiple regression. The study documented that visual learning was the predominant style (40%), followed by auditory (35%) and kinesthetic (25%). Intrinsic motivation was more prevalent (60%) compared to extrinsic motivation (40%). Pearson correlation analysis revealed significant positive associations between intrinsic motivation and academic achievement (r=0.68, p < 0.01) and kinesthetic learning and academic performance (r=0.45, p < 0.01). Regression analysis confirmed intrinsic motivation (β=0.52, p < 0.001) and kinesthetic learning style (β=0.31, p < 0.001) as significant predictors of academic performance. The findings highlight the importance of intrinsic motivation and kinesthetic learning strategies in nursing education. It is essential for nursing educators to use interactive and practical teaching methods to boost intrinsic motivation and optimize learning.

Keywords: Academic achievement, extrinsic motivation, intrinsic motivation, learning styles, nursing education

Introduction

The primary mission of nursing education is to prepare competent nurses who can provide high-quality care (Fabry et al., 2024; Nagai et al., 2024). Nursing competencies can be developed through the integration of diverse teaching methodologies and learning strategies (Lin et al.,2024). However, students have varied learning preferences, which requires nursing educators to appreciate and accommodate these differences (Choperena et al., 2025; Hoshino et al., 2024). In appreciating such differences, educators can quickly identify students' preferred learning styles and develop practical teaching approaches that best suit with their various needs (Al-Roomy, 2023). Learning style frameworks have been valuable tools in attempting to improve learning outcomes at all levels of education (Abdullah et al., 2024). Learning styles refer to the ways people approach learning and process information within a particular learning environment (Chooniedass et al., 2025; Metzger et al., 2020). In addition, learning styles are personal characteristics that determine how students perceive information, interact with peers and instructors, and involve themselves in learning activities (Yotta, 2023). Learning styles reflect characteristics that shape how individuals approach tasks and process information (Darcy-Mahoney et al., 2020). Teachers frequently use one of the other learning style models to structure their teaching approach to enhance students' learning (Hernandez et al., 2020). Other well-known models used are by Neil Fleming and Colleen Mills, VARK-Visual, Aural, Read/Write, Kinesthetic; Kolb's LSI-Learning Style Inventory; LSQ-Learning Style

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Figure 1. Learning process of nursing students in Iraq (Documented by authors).

Questionnaire by Honey and Mumford, and GRSLSS-Grasha-Reichmann Student Learning Style Scale (Prithishkumar & Michael, 2014; El-Saftawy et al., 2024).

The foundation on which each one of these is based is different, referring to sensory modality, interaction style, or cognitive approach **(Figure 1)**. For example, the VARK model focuses on sensory-based learning and categorizes learners as visual, auditory, read/write, or kinesthetic; many have multimodal preferences (Sumpter et al., 2022; Vanegas et al., 2024). Students generally utilize all their senses in information processing, but they tend to prefer one method over others (Gangadharan et al., 2025). A visual learner finds learning easy with charts, diagrams, and demonstrations (Koohestani & Baghcheghi, 2020). On the other hand, an auditory learner is more concerned with lectures, discussions, and verbal instructions (Kannappan et al., 2025). At the same time, the tactile learner enjoys creating models, taking notes, and engaging in role-playing (Farsi et al., 2022). Understanding the interrelationship between learning style and motivation and their impact on academic achievement has become essential for improving educational outcomes in nursing education (Bally et al., 2022). Nursing students need to integrate theory and practice to deliver quality patient care, which relies on effective learning strategies (Younas & Quennell, 2019).

The nursing education system in Iraq is structured across the diploma, bachelor's, and postgraduate levels, aiming to prepare qualified nurses to meet the country's healthcare needs (Sulaiman et al., 2023). Nursing institutes offer diploma programs, while universities provide four-year Bachelor of Science in Nursing (B.Sc.N) programs, followed by optional clinical internships (Yaas et al., 2023). Some universities also offer master's and PhD degrees to develop advanced practice nurses and educators. The curriculum combines theoretical and clinical training, delivered in both Arabic and English (Attia & Ibrahim, 2023). Despite progress, the system continues to face challenges including workforce shortages, limited resources, and the need for curriculum reform. Recent efforts focus on modernization, international collaboration, and strengthening the role of nurses in the healthcare system (Hamarash et al., 2023). In this study, learning styles and motivation were specifically chosen as they are critical yet often underexplored components of effective nursing education. Understanding how students prefer to learn (visual, auditory, kinesthetic) can help educators develop teaching methods to enhance knowledge retention and skill acquisition. Similarly, motivation—mainly the distinction between intrinsic and extrinsic types—plays a vital role in driving student engagement, persistence, and academic success. Notwithstanding the established importance of these variables, studies about nursing education in developing countries like Iraq haven't often looked at how these factors work together or affect grades (AlKhasawneh, 2013; Alrashdi et al., 2024; Saaid & Yousef, 2016). Most prior studies have focused on either learning styles or motivation in isolation, without exploring their combined predictive value. This gap highlighted the need for a more comprehensive investigation into how these factors collectively impact nursing students' academic achievement, ultimately informing more personalized and effective educational strategies.

In addition to the study, integration Benner's "Novice to Expert" theory offers a pertinent framework for examining the learning styles and motivation of nursing students in Iraq due to its emphasis on experiential learning and the progressive development of skills crucial for nursing practice. This theory acknowledges that expertise evolves through practical experience and contextual understanding that making it relevant to the specific environment of Iraq (Murray et al., 2019). with considering Benner's stages of skill acquisition (novice to expert), researchers can investigate how students at different educational levels exhibit varying learning preferences and motivational drivers. Furthermore, the theory's implicit link between increasing competence and motivation allows for an exploration of how students' perceived progress influences their engagement and academic achievement (Quinn, 2020). Benner's theory offers a complete way to understand how nursing students in Iraq learn and succeed academically by looking at their thinking skills, practical decision-making, and ethical awareness. Finally, this study aims to provide a deeper understanding of how different learning styles impact academic performance and how intrinsic and extrinsic motivation can enhance learning outcomes.

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The findings of this study will thus help nursing educators apply teaching strategies that align with students' preferred learning styles, thereby establishing an effective learning environment.

Method

A cross-sectional descriptive survey design **(Figure 2)** was selected for this study due to its efficiency in gathering data from a large group at one specific time (Wang & Cheng, 2020). This approach is well-suited for identifying patterns and relationships between variables like learning styles, motivation, and academic achievement. This design is particularly suitable for exploratory studies aiming to describe current trends, perceptions, and associations within a specific population (Capili, 2021)—in this case, nursing students. Given the study's goal to assess the various learning styles and motivation types and to examine their correlation with academic performance, the cross-sectional approach provided a practical and cost-effective method for gathering relevant data without manipulating variables or requiring long-term follow-up. The study was conducted at Nineveh University's College of Nursing in Mosul, Iraq which offers a Bachelor of Science in Nursing (B.Sc.) program. Data collection occurred from 1 December 2024 to 31 January 2025. These two months aligned with the academic calendar to minimize disruptions and stress fluctuations that ensured accurate along with quality data collection.

Figure 2. Illustration of survey study (Courtesy of www.unsplash.com).

The study targeted a population of 200 undergraduate nursing students enrolled across all four academic years at the College of Nursing, Ninevah University. A stratified random sampling method was employed to ensure proportionate representation from each academic year (first to fourth year). Initially, the students were grouped according to their academic year. Each student within a group was assigned a unique number. Random numbers were generated for each student using Excel's randomization tool. The list was sorted based on these random numbers, and students were selected proportionally from each year to form the final sample, ensuring that every student had an equal chance of being included. The total population was first divided into four strata by academic year. Then, from within each stratum, students were selected using simple random sampling procedures so that approximately equal numbers were drawn from each year's level. This method allowed the researchers to account for shifts in how students learn and their level of motivation that could happen as they advance in their nursing education. Consequently, this strengthens how widely and in what situations the findings can be applied across different phases of academic training. Written informed consent was obtained from nursing students at Nineveh University after a detailed orientation regarding the study's objectives, procedures, potential risks, and benefits. Participation was voluntary and confidential, and withdrawal was permitted without penalty. Participants were assigned numerical identifiers to ensure confidentiality, and all data was securely stored. The Collegiate Committee for Medical Research Ethics at Ninevah University approved the study (CCMRE-Nur-23-7) on 8 November 2024.

The instrument used in this study was a comprehensive, structured, self-administered questionnaire specifically designed to assess the learning style preferences, motivation levels, and academic achievement. Integrating Benner's theory will strengthen the instruments to depict the study outcomes. It was developed in Arabic to ensure clarity and cultural relevance. The questionnaire was divided into two main sections: demographic information and core items related to learning styles, motivation, and academic achievement. The first section consisted of three items focused on collecting demographic data. These included the student's gender (male or female), academic year (ranging from first to fourth year), and confirmation of their enrolment at the Ninevah University. This stage aimed to provide a contextual understanding of the respondents' educational backgrounds and ensure representation across all academic levels. The second section consisted of 48 items, organized into thematic areas. The first subsection (Items 1–31 and Item 41, totalling 32 items) evaluated learning style preferences using a format inspired by the VARK model, which encompasses Visual, Auditory, read/write, and Kinesthetic learning styles. Questions were tailored to the nursing education environment, addressing how students prefer to absorb, retain, and apply information. For instance, students were asked

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how they preferred to study for exams, recall medical information, interact during lectures, and perform nursing skills such as intravenous injection. Responses helped identify whether students leaned toward visual aids, verbal instruction, reading and writing tasks, or hands-on learning. The next part of the questionnaire (Items 32–51, totaling 20 items) focused on assessing motivation and academic achievement. These items explored both intrinsic and extrinsic motivational drivers, such as passion for nursing, goal setting, the desire for professional success, or external pressures like family expectations. Other questions addressed factors influencing academic performance, including time management, stress, support systems, financial challenges, use of learning strategies, and future academic aspirations **(Figure 3)**. Responses were recorded using a combination of multiple-choice and Likert-scale formats, allowing students to express levels of agreement or preference with clarity. Responses regarding preferences and experiences were scored from 1 (Do Not Prefer) to 4 (Strongly Prefer), assessing intensity in learning styles, motivation, and external academic achievement factors such as time management.

Figure 3. Clinical learning skills of nursing students in Iraq (Documented by authors).

A panel of 20 multidisciplinary experts confirmed the questionnaire's content validity by reviewing it for clarity, relevance, and applicability, thus ensuring robust content validity. Reliability was assessed using test-retest analysis with 20 nursing students. Cronbach's alpha was calculated, indicating strong internal consistency ($p > 0.80$), which confirms reliability. A pilot study involving 20 female nursing students (excluded from the final sample) was conducted to refine questionnaire clarity, address ambiguities, assess completion time, and ensure the practicality of data collection methods.

Data were analyzed using SPSS version 26.0 to provide both descriptive and inferential statistical insights. Descriptive statistics, including frequencies, means, and standard deviations, were used to summarize participants' demographic information, learning style preferences (visual, auditory, kinesthetic), and types of motivation (intrinsic and extrinsic). These descriptive statistics offered an overview of the distribution and central tendencies of the main variables. For inferential analysis, multiple statistical tests were employed to examine relationships and differences among variables. Pearson correlation was used to explore the strength and direction of associations between continuous variables, particularly between types of motivation (intrinsic, extrinsic) and academic achievement, as well as between each learning style and academic performance. This test was appropriate because it helped identify whether increases in specific learning styles or motivation levels were associated with higher academic outcomes. Independent t-tests were applied to compare the mean scores of learning styles and motivation across two distinct groups, such as male and female students or first- and fourth-year students. This test helped determine whether there were statistically significant differences in learning preferences or motivation levels between different subgroups within the sample. One-way ANOVA (Analysis of Variance) was used to assess differences in learning style preferences and motivational levels across more than two groups, particularly among students from different academic years (first to fourth year). This allowed the researchers to identify whether learning styles or motivation changed as students progressed through their nursing education. Where significant differences were found, post hoc Tukey tests were conducted to specify which groups differed. Finally, regression analysis was performed to determine the predictive power of the independent variables—namely, learning styles (visual, auditory, and kinesthetic) and motivation (intrinsic and extrinsic)—on the dependent variable, academic achievement. This analysis was crucial in identifying the factors that had the most significant influence on academic performance while controlling for the effects of other variables. The significance level was considered at 0.05 for hypothesis testing.

Results

A total of 200 nursing students from the College of Nursing at Ninevah University participated in this study. The sample included a balanced representation across academic years and genders, with 60% female and 40% male students **(Table 1)**. Students were evenly distributed among the four academic years, ensuring proportional representation for analyzing

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differences by level of study. The mean age of participants was 21.5 years (SD=1.9), indicating a relatively young and homogeneous sample in terms of age. The finding documented that visual learning emerged as the dominant learning style, with 45% of students showing a strong preference for visual materials such as diagrams and charts. This was followed by auditory learners (30%), who preferred lectures and discussions, and kinesthetic learners (25%), who favored hands-on activities and learning by doing. The mean score for visual learners was the highest (M=3.15, SD=0.56), suggesting that most students benefit from visual stimuli in learning environments. However, the lower proportion of kinesthetic learners highlights the need to ensure that practical elements are effectively incorporated into the curriculum to engage this minority group **(Table 2)**.

In terms of motivation, the table indicates that intrinsic motivation was more prevalent, reported by 60% of students (M=3.30, SD=0.65), while extrinsic motivation was reported by 40% (M=2.85, SD=0.70). This suggests that the majority of students were driven by internal factors, such as personal interest in the field and a desire for self-improvement, rather than external pressures or rewards. Nonetheless, a considerable portion still relied on extrinsic motivators, underlining the need for a supportive academic environment that nurtures both types of motivation **(Table 3)**. The Pearson correlation analysis revealed significant positive relationships between intrinsic motivation and academic achievement (r=0.68, $p < 0.01$), indicating that students who are internally motivated tend to perform better academically. Additionally, a moderate but significant correlation was found between the kinesthetic learning style and academic performance (r=0.45, $p < 0.01$). These findings suggest that hands-on, practical learning methods have a positive impact on academic outcomes. Interestingly, extrinsic motivation showed only a weak correlation with academic achievement (r=0.15, $p < 0.05$), suggesting that external incentives alone may not be sufficient to drive academic success **(Table 4)**.

Table 1. Demographic characteristics.

Variables	Frequency (n)	Percentage (%)
Age (Mean ± SD)	21.5 ± 1.9	
Gender		
Male	80	40%
Female	120	60%
Academic Year		
First Year	50	25%
Second Year	50	25%
Third Year	50	25%
Fourth Year	50	25%

Table 2. Learning style preferences.

Learning styles	Mean ± SD	Percentage (%)
Visual	3.15 ± 0.56	40%
Auditory	2.89 ± 0.68	35%
Kinesthetic	2.90 ± 0.75	25%

Table 3. Motivation level.

Motivation type	Mean ± SD	Frequency (n)	Percentage (%)
Intrinsic Motivation	3.30 ± 0.65	120	60%
Extrinsic Motivation	2.85 ± 0.70	80	40%

Table 4. Correlation analysis.

Variables	*r*	*p*
Intrinsic motivation and academic achievement	0.68	< 0.01
Kinesthetic learning and academic achievement	0.45	< 0.01
Extrinsic motivation and academic performance	0.15	< 0.05

The comparative analysis using independent t-tests and ANOVA revealed significant differences in learning style preferences across academic years. Senior students (third- and fourth-year students) demonstrated a stronger preference for visual and auditory learning compared to first-year students (t=3.25, $p < 0.01$). The ANOVA test confirmed

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these differences across all academic years (F=4.32, $p < 0.01$). This trend suggests that as students advance in their studies, their learning preferences may shift toward more visual and lecture-based learning methods, possibly due to increased exposure to clinical scenarios and theoretical content **(Table 5)**. The regression analysis identified two key predictors of academic achievement: intrinsic motivation (β=0.52, $p < 0.001$) and kinesthetic learning style (β=0.31, $p < 0.001$). These two variables accounted for a substantial portion of the variance in academic performance, reinforcing the importance of internal drive and experiential learning in nursing education. In contrast, visual (β=0.12, p=0.12) and auditory learning styles (β=0.08, p=0.23) did not significantly predict academic outcomes, despite being commonly preferred learning styles. This discrepancy suggests that while many students identify with visual and auditory styles, these preferences alone may not directly enhance performance without the active engagement fostered by kinesthetic learning and intrinsic motivation **(Table 6)**.

Table 5. Comparative analysis of learning styles by academic year.

Comparison groups	Statistical test	*p*
First-year students versus seniors	t-test	< 0.01
Across all academic years	ANOVA	< 0.01

Table 6. Regression analysis predicting academic achievement.

Predictor variables	β coefficient	*t*	*p*
Intrinsic motivation	0.52	5.45	<0.001
Kinesthetic learning style	0.31	3.89	<0.001
Visual learning style	0.12	1.55	0.12
Auditory learning style	0.08	1.20	0.23

Discussion

The present study indicated that intrinsic motivation and kinesthetic learning styles were significant predictors of higher academic performance, while extrinsic motivation showed only weak associations. Consistent with prior research, intrinsic motivation strongly correlated with academic success (Torkani et al., 2025). Similar findings were reported that intrinsic motivation significantly impacts students' active engagement and retention of knowledge, thereby improving academic outcomes (Bally et al., 2022). This alignment underscores the vital importance of supporting intrinsic motivation through educational strategies that actively engage students (Singh et al., 2022). The dominance of kinesthetic and visual learning styles among students aligns with findings reported that nursing students frequently prefer active and sensory-based learning methods (Sumpter et al., 2022). This preference suggests the need for practical sessions and hands-on experiences integrated into theoretical lessons (Leask et al., 2020). Interestingly, extrinsic motivation demonstrated only a weak correlation with academic performance, contrasting with study explained external motivators had a significant impact on students' performance (Darcy-Mahoney et al., 2020). This divergence may result from cultural or contextual differences unique to the educational environment in Mosul. The finding highlighted those extrinsic factors (e.g. family expectations and financial pressures) might differently affect academic motivation in this context.

The comparative analysis by academic year revealed significant differences between first-year and final-year students. Similar patterns were documented by a study where learning preferences evolved over time with greater exposure to clinical practice (Farsı et al., 2022). Early-stage students often rely on structured, sensory learning styles, while advanced students develop self-directed, reflective, and experiential learning skills. This evolution supports the Benner's Novice to Expert Theory, which describes the progression of nursing students from novices—relying heavily on rules and instructions—to experts, who operate based on experience. As students advance through their academic journey, intrinsic motivation and self-directed learning become critical that reinforcing the importance of educational frameworks. Incorporating Benner's theory into curriculum design emphasizes the importance of scaffolding learning experiences (Murray et al., 2019; Thomas & Kellgren, 2017). Early-stage students benefit from structured support and concrete skill acquisition, while advanced students require complex clinical scenarios and autonomous learning opportunities to nurture expert thinking. Thus, educational strategies must evolve as students' progress, recognizing the dynamic interplay between learning style development and motivational drivers (Alruwaili et al., 2024; Payne, 2015; Scheel et al., 2008).

From a broader perspective, the findings carry important implications for healthcare policymakers and the Ministry of Higher Education in Iraq. Policymakers should prioritize investments in modernizing nursing education,

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including equipping colleges with simulation centers, technologically enhanced classrooms, and access to clinical internships that promote active, kinesthetic, and visual learning. Moreover, government initiatives should focus on creating environments that enhance intrinsic motivation, such as offering scholarships tied to academic engagement and professional identity formation, rather than solely relying on financial or parental pressures. National healthcare policies must recognize that building a competent nursing workforce begins with cultivating internally motivated, practice-ready graduates who are empowered to adapt to complex clinical environments **(Figure 4)**. Finally, the study offers practical implications for nursing educators. Teaching strategies must be individualized to accommodate diverse learning styles and motivational profiles. Faculty development programs should train instructors to integrate motivational interviewing techniques, adaptive teaching methods, and reflective clinical education into daily practice. Supporting students' autonomy, fostering a sense of competence, and reinforcing the relevance of coursework to future professional roles are crucial to building intrinsic motivation.

Figure 4. Building nursing competency activities (Documented by authors).

The study had several limitations that could affect the interpretation and generalizability of the findings. Firstly, the study was carried out solely among Ninevah University students, and therefore generalizability to other settings or institutions could be limited. The use of convenience sampling could have led to selection bias and therefore affected the representativeness of the sample. Additionally, a cross-sectional design does not permit cause-and-effect relationships to be determined. Self-report measures could be affected by socially desirable responses or errors of recall, affecting data validity. Moreover, the study's narrow scope regarding learning styles and motivation did not control for additional variables that might be significant. Cultural and contextual variables specific to Mosul, Iraq, might limit the generalizability of the findings to other cultural settings. Finally, the relatively short data collection period could not have captured the extent of variability in the responses of the students over time.

Conclusion

This study underscores the crucial impact of intrinsic motivation and kinesthetic learning preferences on the academic success of nursing students. The findings suggest that students who are driven by a genuine interest in the field of nursing and who learn best through hands-on experiences tend to perform better academically. Educators can play a pivotal role in supporting these students by incorporating diverse teaching strategies that cater to various learning styles. For instance, incorporating more practical sessions, simulations, and clinical practices can help kinesthetic learners engage more effectively with the material. Future research should employ longitudinal designs to examine changes in learning styles and motivational factors over extended periods of time. Incorporating diverse nursing institutions and a broader geographical scope could improve generalizability. Investigating additional influencing factors could further enrich the understanding of the determinants of academic achievement among nursing students such as psychological resilience, teaching methods, and socio-economic variables.

Author's declaration

Each author was involved in the manuscript writing process and gave their approval for the final version.

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Authors' insight

Key points

- The study integrates Benner's theory to understand the learning styles and motivation of nursing students in Iraq that providing insight into their academic achievement.
- The research explores the relationship between learning styles, motivation, and academic achievement among nursing students as potential predictors of success.
- The study offers a unique perspective on the intersection of learning styles, motivation, and academic achievement in a specific cultural context in Iraq.

Emerging nursing avenues

- What learning styles are most prevalent among high-achieving nursing students in Iraq according to the present study?
- What role does motivation play in predicting academic achievement and another aspect of education among nursing students in Iraq?
- How can Benner's theory inform the development of tailored educational interventions to support nursing students in Iraq and enhance their academic achievement?

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