Research Paper

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Learning styles preference among student nurses towards academic achievement at nursing schools, zamfara state - nigeria

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ABSTRACT

The primary objective of nursing education is to produce competent professionals capable of delivering high-quality healthcare services. This study aimed to examine the relationship between learning styles and academic achievement among nursing students in Zamfara State. A cross-sectional design was employed involving first-year students from two Schools of Nursing, with a total sample of 129 participants. Data were collected using demographic forms, the online Neil Fleming's VARK Learning Style Inventory, and first semester examination records. SPSS version 26 was used for analysis, with Pearson Product Moment Correlation (PPMC) set at a 0.05 significance level. The average age of participants was 22 years; 63% were female, 37% male; 76% were single, and 24% married. Boarding school students constituted 71%, while 29% were day students; 59% had internet access. Kinesthetic learning style was the most preferred (34.1%). The PPMC analysis revealed a significant positive relationship between learning styles and academic achievement (P=0.003). These findings suggest that understanding learning styles can enhance educational strategies and improve student outcomes. It is recommended that nurse educators be retrained to adopt student-centered learning approaches to boost academic success in Nursing institutions in Zamfara State.

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1. INTRODUCTION

In healthcare professional education, the effectiveness of instruction relies heavily on the integration of both didactic and practical teaching methods. These methods must engage students through various sensory channels to facilitate optimal learning [1], [2]. Healthcare education, by its nature, is complex, and this complexity demands a deep understanding of the preferences that students have for learning, as these preferences are integral to how well students assimilate knowledge [3], [4]. Learning preferences, which are often shaped by individual characteristics, cultural backgrounds, and personal experiences, play a significant role in determining how students engage with educational content [5]. By identifying and accommodating these preferences, educators can significantly enhance the effectiveness of the learning process and, consequently, the professional development of healthcare workers [6], [7], [8].

In the field of nursing education, the profession's continuous evolution necessitates a parallel evolution in educational strategies [9], [10]. Nursing education must respond dynamically to the ever-changing needs of the healthcare environment. Traditional teaching practices, such as long hours of direct instruction and rote memorization, are increasingly regarded as outdated, as they fail to engage students effectively or promote the deeper understanding required in modern healthcare settings [9], [11]. The shift toward more innovative teaching strategies, grounded in active learning, critical thinking, and problem-solving, is crucial to meet the demands of the nursing profession [12], [13]. These strategies not only improve the quality of education but also align nursing training with contemporary healthcare challenges [14], [15].

This study aims to explore the relationship between learning styles and academic achievement among nursing students, using established models such as VARK (Visual, Auditory, Reading/Writing, Kinesthetic) [16], [13]. These models have been widely adopted in educational research due to their reliability and validity in identifying learning preferences [16]. The VARK model, in particular, is a comprehensive tool that allows educators to assess how students prefer to receive, process, and retain information [16], [17]. By examining the correlation between students' learning styles and their academic performance, this study seeks to provide valuable insights into how nursing education can be improved by aligning teaching methods with students' preferences [18].

1.1 Objectives of the Study

1.   To identify the preferable learning styles among nursing students in Zamfara state.
2.   To evaluate the relationship between Learning styles and Academic Achievement of the student nurses in Zamfara state.

1.2 Research Questions

1.   What are the preferred learning styles (Visual, Auditory, Reading/Writing, and Kinesthetic) of nursing students in Zamfara state?
2.   Is there a relationship between the preferred learning styles and academic achievement among nursing students in Zamfara state?

2. RELATED WORK

The recognition and integration of students' learning preferences have become increasingly vital in contemporary educational practice, particularly in the field of nursing education. One of the foremost reasons for this is the growing diversity of student populations and their varied cognitive and experiential backgrounds. Understanding how students engage with academic content is crucial for improving instructional effectiveness and student performance [19]. This is especially pertinent in regions like Sri Lanka, where research has demonstrated that tailoring pedagogical approaches to students' learning styles can enhance educational outcomes in nursing programmes through the adoption of evidence-based strategies [15], [10].

Learning styles, in their broadest sense, refer to the consistent and preferred ways individuals perceive, process, and retain information. These preferences can be visual, auditory, reading/writing-

based, or kinesthetic, and they significantly shape the way students absorb and interact with knowledge [2]. Educators who acknowledge and integrate these styles into their teaching not only foster deeper learning but also promote greater engagement and retention among students [4], [20]. This becomes especially significant in nursing education, which inherently blends theoretical knowledge with hands-on clinical practice. Students who are taught using methods that align with their natural learning tendencies are more likely to perform well academically and develop professional competencies [1], [2].

There is ample empirical support for the connection between learning styles and academic achievement. Numerous studies have confirmed that the manner in which students prefer to learn can have a direct impact on their academic performance [21]. When instructional methods are mismatched with students' learning styles, it often leads to reduced motivation, surface-level learning, and lower achievement levels [18]. In contrast, alignment between teaching methods and learning preferences can create a synergistic effect that fosters academic success [2]. The significance of learning styles extends beyond just cognitive outcomes. It influences how students interact with their instructors, peers, and learning environments. For example, in classroom settings that promote only one type of instructional strategy, such as lecture-based methods, students with auditory preferences may thrive, while kinesthetic or visual learners may struggle to stay engaged [3].

One of the foundational theories that support differentiated instruction based on learning styles is Kolb's experiential learning theory. This model categorizes learners into four groups: converging, diverging, assimilating, and accommodating. Each of these types possesses distinct characteristics and learning preferences. For instance, diverging learners are often sensitive, reflective, and open-minded, thriving in environments that encourage brainstorming and group discussion. Converging learners, on the other hand, prefer technical tasks and problem-solving activities that require practical application [22]. By understanding such nuances, educators can craft a more inclusive and responsive teaching strategy that ensures no student is left behind due to a pedagogical mismatch [17]. Blended learning environments also illustrate the importance of considering diverse learning preferences. As digital platforms and online education models become more prevalent, understanding students' learning styles can inform the design of digital content, assessments, and interactive learning tools [17]. For example, kinesthetic learners may benefit from virtual simulations and interactive case studies, while reading/writing learners may perform better when provided with extensive text-based resources and written assessments [12], [4]. Such individualized approaches have been shown to increase student motivation and autonomy, both of which are critical factors in academic achievement [14].

Moreover, learning styles are essential not only for individual academic success but also for professional collaboration. Health professionals, including nurses, often work in interdisciplinary teams that demand communication, adaptability, and collaborative problem-solving. By respecting and integrating diverse learning preferences into training, institutions can better prepare students for the interpersonal demands of the workplace [23], [1]. Training environments that foster mutual respect for differing learning and communication styles can enhance teamwork and reduce conflict, resulting in more cohesive healthcare teams [24]. Despite these advantages, a consistent challenge in educational environments is the failure of instructors to recognize and accommodate learning diversity. Studies have found that even competent and experienced educators may fall short in addressing the learning needs of all students if they do not consciously evaluate their teaching methods in relation to student preferences [22]. Such oversight can result in disengagement and academic underperformance. Evidence suggests that a significant number of students who underachieve do so not because of intellectual limitations but due to the incompatibility between their learning styles and instructional methods [18], [20].

Academic achievement remains a central metric for evaluating educational effectiveness, particularly in nursing education, where curriculum goals are closely tied to both theoretical mastery and clinical competency [25], [24]. Several studies have identified a strong correlation between learning styles and academic success, confirming that students taught in ways that align with their learning styles tend to engage more deeply with course material and perform better in evaluations [16], [4], [26]. These findings underscore the importance of flexible pedagogical models that accommodate diverse learners and promote equity in educational opportunities [2]. In response to these challenges, many educators have adopted structured frameworks to assess and implement learning styles in their teaching practice. Among the most

widely used is Neil Fleming's VARK model [27], which categorizes learners as Visual, Auditory, Reading/Writing, or Kinesthetic [17]. The model has gained considerable popularity in nursing education due to its simplicity, reliability, and applicability in classroom and clinical settings [10]. Visual learners, for example, benefit from diagrams, charts, and graphical representations of information. Auditory learners prefer spoken instructions, discussions, and lectures. Reading/writing learners excel with text-based input and output, such as note-taking and essay writing. Kinesthetic learners perform best through active, hands-on engagement, such as role-playing or practical demonstrations [13], [11].

The VARK model is especially useful because it not only helps educators design more effective lesson plans but also enables students to become more self-aware and strategic in their learning. When students understand their own learning styles, they can adopt study techniques that align with their strengths, such as summarizing readings into flowcharts for visual learners or forming discussion groups for auditory learners [12], [4]. This self-regulation fosters lifelong learning habits, which are essential in fast-evolving fields like nursing. In addition to the benefits observed in conventional classroom settings, studies have also explored how learning styles affect outcomes in hybrid and fully online environments. For instance, students with a strong visual or kinesthetic preference may find it difficult to engage with text-heavy online modules unless supplemented with interactive or video content [14]. Conversely, auditory learners may thrive in podcast-based lectures or synchronous discussions. These findings highlight the need for instructional designers to create inclusive digital content that accommodates a spectrum of learning preferences [11].

Beyond theoretical support, numerous empirical studies reinforce the role of learning styles in shaping educational outcomes. Research involving undergraduate and graduate students has consistently shown that learners perform better when there is a high congruence between instructional delivery and individual learning preferences [2], [18], [5], [26]. Some studies, however, challenge the magnitude of this correlation, suggesting that other variables such as student motivation, prior knowledge, and emotional intelligence, may also play significant roles in academic performance [25], [24]. Nonetheless, even critics agree that incorporating learning styles into instructional planning improves student satisfaction and classroom engagement [6]. A growing body of literature also calls for a balanced and multimodal approach, acknowledging that most learners do not fall neatly into a single category. Many students exhibit multimodal tendencies, meaning they utilize multiple learning styles depending on the subject, task, or learning context [1], [20]. Teaching methods that integrate visual aids, interactive discussions, hands-on activities, and text-based content ensure broader appeal and greater comprehension across student populations. Such an approach not only supports learning outcomes but also cultivates critical thinking and adaptability traits highly valued in healthcare professionals [23].

To this end, while learning styles are a valuable tool for personalizing education, they should not be viewed in isolation. Effective instruction requires the integration of learning styles with other pedagogical elements such as curriculum design, formative assessment, feedback mechanisms, and cognitive load management. By adopting a holistic educational model that addresses cognitive, emotional, and experiential aspects of learning, educators can foster an environment where all students, regardless of their preferred style, are positioned to succeed [15], [17].

3. METHODOLOGY

3.1 Research Design

Cross sectional descriptive research design was adopted for this study. Zamfara State College of Nursing (ZSCONS) Department of Nursing and Umar Bin Khaddabi College of Nursing Sciences, Kaura Namoda (UBKCONS), Department of Nursing was selected as the institution for conducting the study with particular emphases on the first year undergraduate student nurses of both schools. The target population comprises seventy six (76) students from School of Nursing, Gusau and fifty-three students (53) from Umar Bin Katthab College of Nursing Sciences, Kaura Namoda. Hence, one hundred and twenty-nine student nurses (129) participated in the study (College Admission Record 2023).

3.2 Sample and Sampling Technique

The sampling method employed was census sampling, meaning that all eligible students (126) were recruited in the study. Purposive sampling technique was adopted as the participants were eligible and met the criteria for which the study was conducted.

3.3 Data Collecting Instruments

The questionnaire form included questions regarding participants' demographic characteristics, such as age, gender, marital status, place of residence, Institutions, access to internet. [27] Introduced an inventory in 1987 that was designed to help students learn more about their individual learning preferences. According to the Online VARK inventory questionnaire model, learners are identified by whether they have a preference for a one or more learning styles. This questionnaire comprised 16 questions, each offering four response options. The response options were defined as follows [17].
Option 1: Relates to learning Visual learning through (pictures, movies, diagrams)
Option 2: Relates to learning through Auditory learning (music, discussion, lectures)
Option 3: Relates to learning through Reading and writing (making lists, reading textbooks, taking notes)
Option 4: Relates to learning through Kinesthetic learning (movement, experiments, hands-on activities)
Participants were instructed to rate how well each option matched their learning preferences using online evaluating scoring system. However, those without internet access were guided on manual process. First semester examination assessment of the student nurses was analyzed in order to evaluate the relationship between learning styles and Academic Achievement of the student nurses. Validity and reliability of the instruments were ascertained to be 0.8 as the instrument was adopted VARK model [27].

3.4 Data Analysis

The collected data were entered into SPSS software version 26 for analysis. Data were described using frequency distribution tables, means, and percentages were calculated. Pearson Product Moment correlation coefficients were calculated to evaluate the relationship between learning styles and academic achievement. A significance level of 0.05 was considered for the statistical tests.

4. RESULTS AND DISCUSSION

4.1 Participants' Characteristics

Table 1. Participants' Characteristics

Participants' Characteristics	Percentage (%)
Average Age	22 years
Gender Distribution	
- Female	63%
- Male	37%
Marital Status	
- Single	76%
- Married	24%
School Type	
- Boarding School	71%
- Day School	29%
Access to Internet	
- Yes	59%
- No	41%

The average age of the participants was 22 years as indicated in Table 1. Regarding gender distribution, 63% participants were female, and 37% were male. Regarding marital status, 76% were single, and 24% were married. 71% of the respondents run boarding school type while 29% run day school type. 59% of the participants has access to internet while 41% has no access to internet.

4.2 Learning Style Dimensions

Table 2. Distribution of the Students Nurses According to their Preferable Learning Styles among Nursing Students in Zamfara State (N=129)

Students Learning Styles	School of Nursing Gusau. n =76		School of Nursing Kaura Namoda. n-53	
	F	%	F	%
Visual	22	28.9	12	22.6
Auditory	11	14.5	13	24.5
Reading and writing	13	17.1	14	26.4
Kinesthetic	30	39. 5	14	26.4

Table 2 showed the distribution of the two schools according to the learning styles adopted. On Visual learning styles, A total of 34 representing 26.3% of student nurses preferred visual learning style, On Auditory learning styles, A total of 24 representing 18.6% of student nurses preferred Auditory learning style, On Reading and writing learning styles, a total of 27 representing 20.9% of student nurses preferred Reading and writing learning style while On Kinesthetic learning styles, a total of 44 representing 34.1% of student nurses preferred Kinesthetic learning styles as shown in Figure 1. The finding above affirmed that Kinesthetic learning styles was the preferable methods of learning even though multi modal styles were also used among student nurses in Zamfara state.
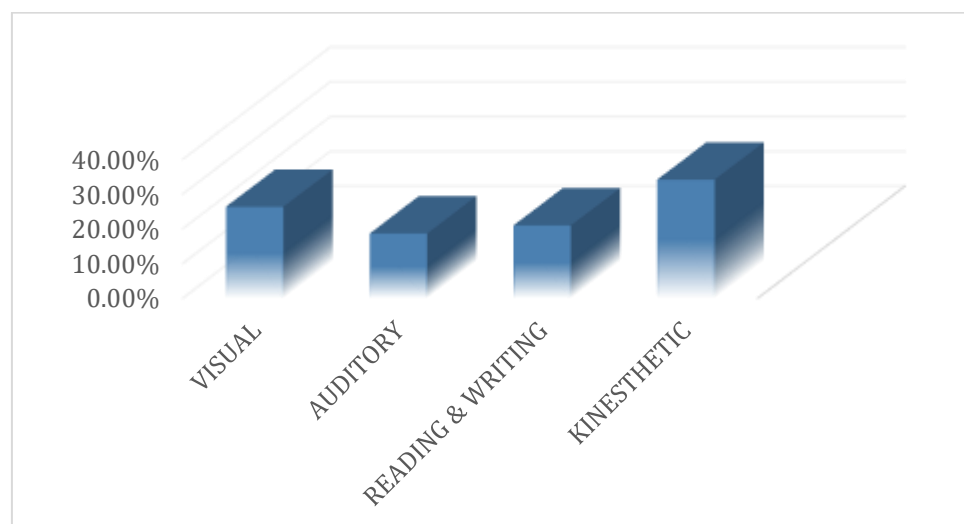

Figure 1. Preferable Learning Styles among Nursing Students in Zamfara State

4.3 Correlation Analyses

Table 3. Relationship between Learning Styles and Academic Achievement of the Student Nurses

Variables	N	Mean	STD	Df	Correlation Index	Critical R	P
Performance	129	63.65	10.39				
				127	0.564**	0.197	0.003
Learning styles	129	3.1395	1.00580				

p < 0.05, Correlation index > critical rat df 127

The outcome of the Pearson Product Moment Correlation (PPMC) statistics in Table 3 showed that significant relationship exists between Learning styles and Academic Achievement of the student nurses in Zamfara state. Reasons being that the calculated p value of 0.003 is below the 0.05 alpha level of significance and the correlation index value of 0.564 is greater than the critical r value of 0.197.

The findings of this study indicated that the most preferred learning istyle among student nurses was the kinesthetic learning style, although other styles such as visual, auditory, and reading/writing were also utilized by a considerable number of students. The prominence of kinesthetic learning preferences

among nursing students is understandable, considering the practical and hands-on nature of nursing education. Consistent with these findings, existing literature supports the observation that kinesthetic and visual learning styles are dominant among students in health-related fields.

One study revealed that students preferred both visual and kinesthetic styles, and those who adopted these methods demonstrated exemplary academic performance [4]. Another study identified that while first-year students tend to use multiple learning styles, second-year students tend to develop a preference for a single style, often gravitating toward kinesthetic learning as their exposure to practical tasks increases [20]. These findings suggest a developmental trend in learning preferences as students' advance in their academic journey.

Contrastingly, some studies have shown different patterns of learning style preferences. For example, research involving dental students revealed that auditory learning was the most commonly preferred style among participants [12]. Furthermore, an investigation into the learning preferences of medical students reported that students in the second and third semesters predominantly favored visual styles, while those in higher semesters increasingly leaned toward auditory, reading/writing, and multimodal learning styles, with auditory styles being most common in advanced stages [22].

These differences may reflect the nature of the academic programmes, instructional methods, and stages of learning across different healthcare disciplines. The present study also established a statistically significant relationship between learning styles and academic achievement among the participating nursing students. Students whose preferred learning styles were supported by the instructional approaches demonstrated significantly better academic performance ($p = 0.003 < 0.05$, $r = 0.564 >$ critical $r = 0.197$). This finding is in line with results from other studies, which affirm that aligning instructional strategies with students' preferred learning styles positively affects their academic outcomes [5].

However, not all findings in the literature unanimously support a strong link between learning styles and academic achievement. One study found no significant association between GPA and learning styles, suggesting that other variables such as motivation, study habits, or instructional quality might play more significant roles in student performance [20]. Additionally, a study comparing students with multiple learning preferences to those with specific skill-based styles observed that the former group had lower average GPAs, though the difference was not statistically significant [23].

Such discrepancies may arise due to variations in curriculum content, learning environments, or the tools used to measure academic performance and learning style preferences. These mixed results indicate that while learning styles may influence academic outcomes, they should be considered as one of several factors contributing to educational success.

5. CONCLUSION

This study examined the relationship between learning styles and academic achievement among nursing students in Zamfara State. The results showed that kinesthetic learning was the most preferred style, followed by reading and writing, auditory, and visual styles. A significant positive correlation was found between learning styles and academic performance, indicating that students who aligned their learning methods with their preferences achieved better results.

The findings emphasize the importance of incorporating diverse learning styles, particularly kinesthetic methods, in nursing education to enhance student engagement and academic success.

5.1 Implication for Nursing Education
The use of Neil Fleming's VARK online questionnaire enable students' nurses identify their strength and weaknesses in learning styles with the intent aimed at improving their academic Achievement

5.2 Recommendations
1.   It is recommended that there is need to retrain nurse educators to achieve competencies and meet high standards in teaching to promote deeper and active students' learning.

2. Kinaesthetic learners prefer live examples and lots of interaction. Interactive and real-life experiences as teaching methodologies are the preferred methods of nursing students and are seen as a holistic approach that links all of their senses of seeing, feeling, smelling, hearing and sometimes tasting.

Authors' Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Aminu Abdulmajeed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Ibrahim Rabiu	✓	✓		✓	✓	✓	✓	✓		✓	✓			✓
Ibrahim Ahmed Gado		✓		✓		✓	✓			✓				✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis

I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting

Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

No actual or potential conflicts of interest with respect to the research.

Informed Consent

Informed consent was obtained from all participants before commencement of the study.

Ethical Approval

Ethical approval was obtained from Ethical Research Committee of State Ministry of Health (SMOH) with ethical approval number ZSHREC31102021/107 delivered to ZSCONS Gusau and Umar Bin Khaddabi College of Health Sciences Kaura Namoda all in Zamfara State.

Data Availability

Data are available on request.

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