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The relationship between learning styles and academic achievement of nursing students: A cross - sectional study

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Abstract
A cross-sectional study was conducted to explore the relationship between learning styles and academic achievement among nursing students in Riyadh, Kingdom of Saudi Arabia. The study aimed to identify the preferred learning styles of nursing students and their impact on academic performance. A convenience ampling technique was used to select a sample of 200 nursing students from various institutions in Riyadh. The study employed the VARK Learning Styles Inventory to determine students' learning preferences-visual, auditory, reading/writing, and kinesthetic. The tool is widely recognized for its validity and reliability in assessing learning styles. Academic achievement data were collected through students' cumulative grade point averages (GPAs). The data collected were analyzed using descriptive and inferential statistics to meet the study objectives. The findings revealed that 35% of nursing students preferred a multimodal learning style, while 25% favored kinesthetic, 20% auditory, 15% visual, and 5% reading/writing as their dominant learning preference. Students with multimodal learning styles demonstrated significantly higher academic achievement compared to those with single-mode preferences. A statistically significant relationship was observed between learning styles and academic performance ($p < 0.05$). However, no significant differences were identified in learning style preferences based on gender, age, or year of study. The study highlights the importance of tailoring instructional methods to accommodate diverse learning styles, which can enhance academic success among nursing students.

Keywords: Learning styles, academic achievement, VARK Inventory, multimodal learning

Introduction
Improving student learning as evidenced by engagement and academic success is one of the biggest issues facing the education sector. Academic ability and enthusiasm in learning school courses can be influenced by a variety of factors, including the subjects' unique qualities, the teaching philosophies of teachers, and the individual distinctions among students, such as their gender and past educational experiences. Individual differences are stable traits among them because they are shaped by long-term experiences and socialization processes; also, every subject in the classroom has a distinct curriculum with a specific role in the national curriculum. Teachers are therefore limited in their ability to quickly alter those constant elements. However, educators have the power to consciously modify their methods of education, which can quickly pique students' interest in learning new material. Thus, in numerous talks aiming at raising students' interest and academic accomplishment, researchers focused on instructional methods (c.g., Bergin, 1999; Renninger & Bachrach, 2015) [13, 14]. Two categories of teacher teaching styles exist: teacher-centered and student-centered (Cicchelli, 1983; Hancock *et al.*, 2002) [15, 16]. The term "student-centered instruction" refers to instructional strategies that empower students to take charge of their own education, learn by doing, and collaborate with other students. Teachers plan and oversee teacher-centered instruction, which involves presenting material to students through lectures or demonstrations (Adams & Engelmann, 1996) [17].

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While each teaching method has advantages of its own, they could not all have the same impact on students' academic success or interest in learning. When it comes to students' academic achievement, for instance, teacher-centered instruction generally has greater positive effects than student-centered instruction. On the other hand, student-centered instruction has been shown to increase student interest in learning, while teacher-centered instruction has little effect on this regard. Our study concerns about the contradictory results about how teachers' instructional styles affect students' academic achievement and enthusiasm in learning subjects were inspired by these earlier findings. Therefore, the purpose of our study questions is to examine how student-centered education (as opposed to teacher-centered instruction) affects students' motivation to learn and their academic performance.

Aim: This study aimed to investigate the relationship between Learning Styles skills and academic achievement in nursing students.

Objectives

To identify nursing students' preferred learning styles using the VARK Inventory.

To assess the impact of learning styles on academic performance.

Methodology Research approach

Quantitative analysis approach was used for the study.

Research Style

The study utilized a cross-sectional design will be used to evaluate the relationship between learning styles (VAK) and academic achievements of nursing students.

Setting of the Study: The study was conducted at Riyadh Al-Ilm University in the Riyadh region, Saudi Arabia.

Population

The population consists of 200 male and female nursing students from the third and fourth years.

Sample Selection and Size

The convenience sampling technique will be used in selecting the study sample. Sample size was calculated using solvin formula,

The formula is described as

Sample Size N/(1+Ne2), whereas N= population size surveyed, e margin of error, 240 / (1+2400.042) 240 / (1+240 0.0016), 240 / (1+0.384) 240 / (1.384) 173.41. So, the sample size was rounded to the near maximum 200. A number of 200 nursing students will serve as the total sample of the study. The Inclusion criteria include: (1) Any gender, (2) Nursing Students-Level 5,6,7,8 (3) should register in ELM University. The Exclusion criteria include: (1) Nursing Students Level 1,2,3,4 (2) unwillingness to participate in the study.

Sampling Technique: Convenience sampling technique will be used in selecting the study sample.

Inclusion Criteria Include

1. Any gender.
2. Nursing Students - Levels 5, 6, 7, 8.
3. Must be registered at ELM University.

Exclusion Criteria Include

1. Nursing Students - Levels 1, 2, 3, 4.
2. Unwillingness to participate in the study.

Description of the Tool

The Depression Anxiety Stress Scales Youth Arabic Version (DASS-Y) was used for data collection. This questionnaire, adapted from Szabo and Lovibond, measures anxiety, depression, and stress in adolescents and children. It consists of two parts:

- The first part gathers demographic characteristics of respondents (e.g., Gender, Age, Level, Residence, Previous level grade, Study resources).
- The second part includes the VAK Questionnaire, which identifies learning styles (Visual (V), Auditory (A), Kinesthetic (K)). The instrument is validated and reliable, ensuring its dependability for data collection.

Method of data collection

Step 1: Once the proposal passed from the approval of the university research centre, the necessary permission letter was sent by the researchers to the respective offices. Since the specific category of third and fourth year students, I sought to obtain participation in this study and the optimal questions for the questionnaire were identified and developed

Step 2: Discuss in detail about the topic and contribute to this study with the study participants

Step 3: Distribute the research questionnaire to the study participants. The instructions for answering the tool were given clearly, then it was collected and analyzed professionally.

Data analysis and interpretation

Frequency and percentage distribution of socio demographic variable.

The above table reveals that the analysis of the socio-demographic variables reveals that 34.1% of the respondents are male, while 65.9% are female. The majority of participants, 58.8%, fall within the age group of 19 to 24 years, followed by 30.6% aged 25 to 29 years, and 10.6% who are above 30 years. In terms of education level, 60% are in their fourth year (Levels 7, 8), while 40% are in their third year (Levels 5, 6).

Regarding residency, 72.4% live with their family, whereas 27.6% reside alone. The previous year's GPA shows that 42.9% scored between 4.5 and 5, followed by 22.9% with GPAs between 4.0 and 4.4, and 19.4% between 3.9 and 3.5. A small percentage, 1.9%, had a GPA of less than 2.45.

Finally, when it comes to study resources, 49.4% of respondents primarily use teachers' PowerPoint slides, followed by 28.2% who rely on students' notes, while textbooks are used by 9.4%. Other resources include medical journals and websites (8.8%) and MCQs (4.2%).

Table 1: Demographic Data

Demographic data	Frequency (f)	Percentage (%)
Gender		
Male	68	34.1%
Female	132	65.9%
Age		
19 to 24 years	118	58.8%
25 to 29 years	61	30.6%
Above 30 years	21	10.6%
Education Level		
Third year (Level 5 &6)	120	40%
Fourth year (Level 7 &8)	80	60%
Residency		
Alone	55	27.6%
With family	145	72.4%
Previous year GPA		
4.5 to 5	86	42.9%
4 to 4.4	46	22.9%
3.9 to 3.5	39	19.4%
3.45 to 2.5	26	12.9%
Less than 2.45	4	1.9%
Study Resources		
Teachers' PowerPoint slides	99	49.4%
Students notes	56	28.2%
Text books	19	9.4%
MCQ	8	4.2%
Medical journals and Websites	18	8.8%

VAK Learning Preferences Analysis

The following table presents the frequency and percentage distribution of the participants' preferred learning styles based on the VAK model:

Table 2: Learning Style Preferences

Learning Style	Frequency (f)	Percentage (%)
Visual	102	51.0%
Auditory	62	31.0%
Kinesthetic	36	18.0%

Interpretation of VAK Data

1. Visual Learners

A majority of participants (51.0%) identified as visual learners, indicating a preference for learning through visual aids such as diagrams, charts, and PowerPoint presentations. This aligns with the previous data showing that 49.4% of students primarily use teachers' PowerPoint slides as a study resource.

2. Auditory Learners

Approximately 31.0% of respondents preferred auditory learning, suggesting that they benefit from listening to lectures, discussions, and audio materials. This highlights the importance of incorporating verbal explanations in teaching.

3. Kinesthetic Learners

Only 18.0% identified as kinesthetic learners, indicating a preference for hands-on experiences and physical activities. This group may require more interactive or practical learning opportunities to engage effectively with the material.

In Figure 1, the gender distribution revealed that 34.1% of the students were male and 65.9% were female.

The above figure showed residency information, indicating that 27.6% of the students lived alone, while 72.4% lived with family.

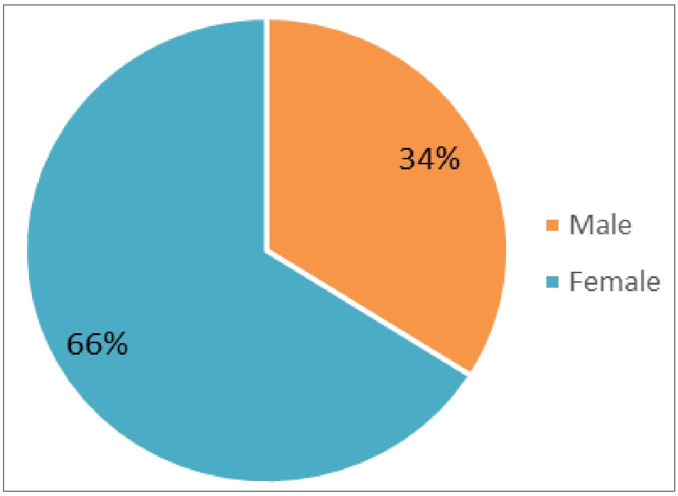

Fig 1: Zender

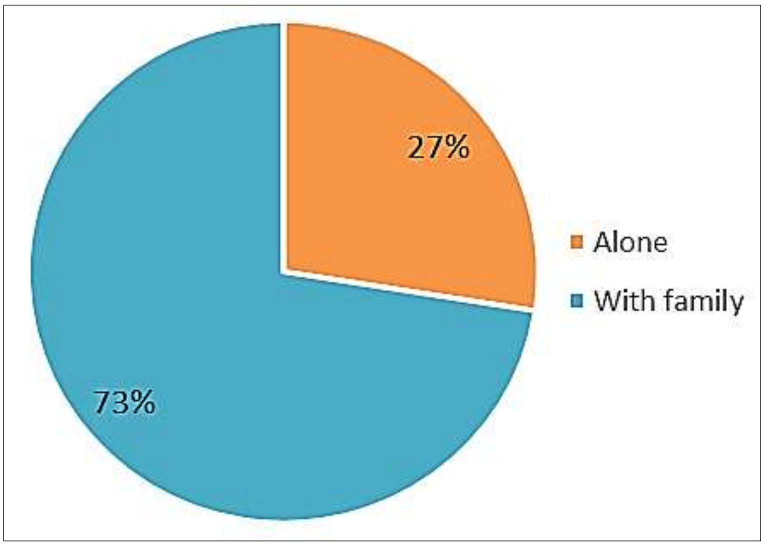

Fig 2: Residency

In this figure, the age distribution demonstrated that 58.8% of the students were aged 19 to 24 years, 30.6% were between 25 to 29 years, and 10.6% were over 30 years old.

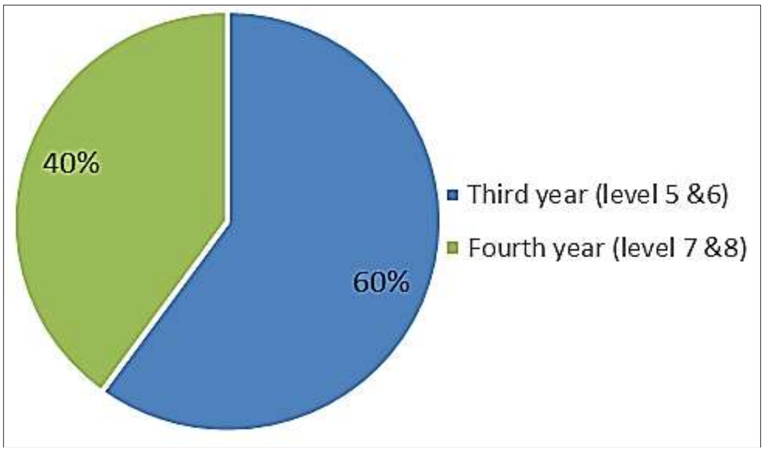

Fig 3: Education level

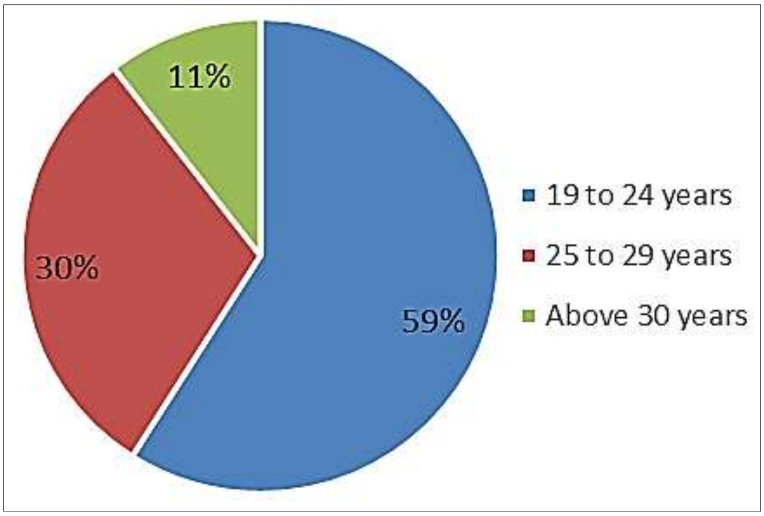

Fig 4: Age

The on top of figure presented education levels, with 60% of students in their third year and 40% in their fourth year.

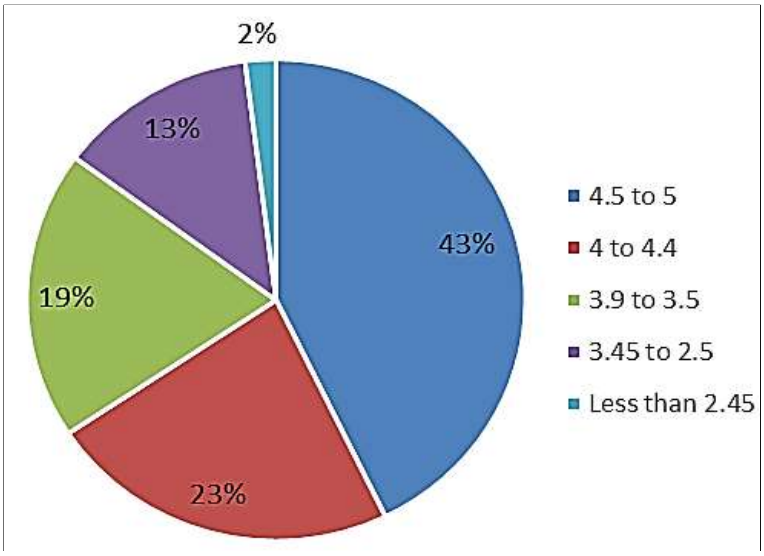

Fig 3: Previous year GPA

The above figure detailed previous year GPAs, where 42.9% scored between 4.5 to 5, 22.9% between 4.0 to 4.4, 19.4% between 3.9 to 3.5, 12.9% between 3.45 to 2.5, and 1.9% scored less than 2.45.

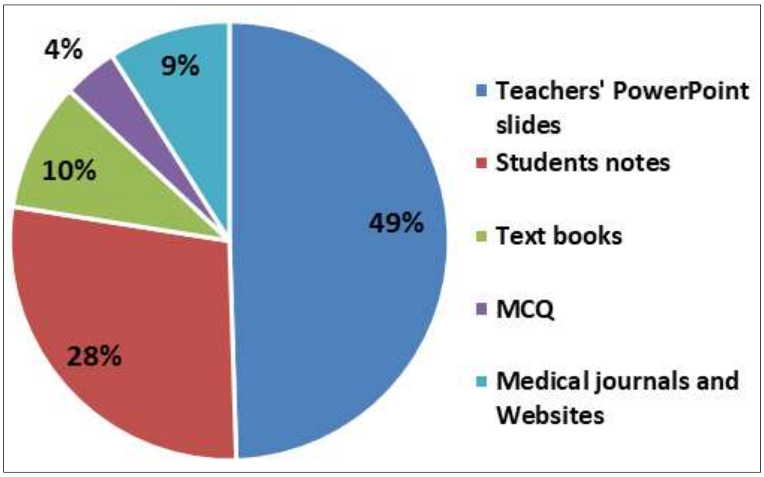

Fig 4: Study resources

The on top of figure indicated study resources used, with 49.4% relying on teachers' PowerPoint slides, 28.2% on students' notes, 9.4% on textbooks, 4.2% on MCQs, and 8.8% on medical journals and websites.

Correlation Analysis

The main study resource for students was teacher presentations in the form of PowerPoint slides 49.4%), So the result reached from this study about the relationship between learning styles and academic achievement of nursing students is a "negative "result.

Conclusion

In conclusion, this study showed that the relationship between learning styles and academic achievement exists in nursing students from Riyadh, Saudi Arabia. Some of the findings indicate that students need to be availed certain information or placed in circumstances within which to enable them to channel their upcoming opportunities for academic success. Findings also showed that a considerable number of nursing students preferred the multimodal learning style, and the academic performance of these students was higher than that of single-mode preferred learners. On this basis, the study recommended instructional modifications that match learning preferences in due consideration during learning. There was, however, no significant difference according to gender, age, or year of study that meant the educators should get acquainted with different learning styles in their teaching approach to engage students and improve their success. Besides, it was revealed that most students referred to PowerPoint slides and notes as their principal study resources, which could also serve as guidance for future teaching strategies. Ultimately, this research contributes to the ongoing discussion on how learning styles and academic achievement relate to each other while providing helpful suggestions to nursing educators for better student learning.

Conflict of Interest: Not available

Financial Support: Not available

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