Clinical Cancer Investigation Journal-ISSN: 2278-0513

The relationship between learning styles and academic achievement in BEHVARZI students at the universities of medical sciences in the northeast of Iran

Abstract

Understanding students' learning styles can help organize the learning environment and influence their academic achievement. This study aims to investigate the relationship between learning styles and Behvarzi students' academic achievement. In this descriptive-analytical study, 132 Behvarzi students were selected using quota-stratified random sampling from medical universities in northeast Iran. The data collection tool was the standard ISALEM-97 questionnaire. The last semester's grade point average (GPA) of students was used as a yardstick of their academic achievement. Accordingly, students were divided into two groups strong (GPA ≥15) and weak (GPA ≤14.99). Descriptive and analytical statistics were used to analyze the data, including Chi-square and Fisher's exact tests.

Out of 132 participants, 72 (54.54%) were in the strong student group, most of whom were female (73.6%), 21-25 years old (55.6%), and single (58.3%). In the group of weak students, most were male (56.7%), over 26 years of age (50%), and married (55%). The intuitive learning style had the highest frequency in both groups of strong and weak students. There was a significant difference between gender and the type of learning style, and academic achievement. No significant correlation was found between learning style and academic achievement in both strong and weak student groups. However, paying attention to the learning style in the student's teaching and learning process is necessary.

Keywords: *Academic performance, ISALEM-97, Learning, Students*

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Introduction

Background/rationale

Academic achievement, one of the criteria that can demonstrate the educational status of learners, is usually evaluated based on general yardsticks such as GPA [1]. Academic achievement is influenced by learning styles [2]. The findings of studies suggest that people have diverse and unique learning styles [3]. Hence, knowledge of learners' learning styles can have a significant bearing on the organization and adjustment of the learning environment, educational content, selection and utilization of teaching methods, arrangement of learning activities, evaluation of student learning, and the nature of teacher-student interactions [4]. Also, ease of processing, organization, and representation of information, saving of learning time, augmented motivation and interest in learning, and finally, higher efficiency of teaching and learning are some of the benefits derived from considering students' learning styles [4].

In many medical schools worldwide, students' learning style is assessed continuously as a mandatory program to keep professors abreast of students' capacities so that professors can adjust and tailor their teaching methods relative to the style of their learners and attain the highest educational efficiency. However, the teaching method of most professors revolves around lecturing [5], and most learning systems, when targeting and implementing educational materials, provide a similar training method. Besides, it has been demonstrated that the learning process can be significantly improved if the learning materials are personalized and tailored to the knowledge and capabilities of the learning field [6]. Therefore, as instructors of medical students, it is essential that we design curricula that inspire students to maintain and develop a profound approach to learning that boosts the incentive to acquire knowledge [7].

There are several ways to identify a learning style. The present study, a relatively new technique, explores the learning situations in their academic or daily life. ISALEM learning style theory proposes four types of preferential reactions for each learning situation; pragmatic-intuitive, reflective-intuitive, pragmatic-methodical, and reflective-methodical, which can be identified and measured on the ISALEM -97 system of coordinates [8].

A large body of research has examined the relationship between learning styles and academic achievement in students of different disciplines. In some of these studies, a significant correlation has been detected between learning style and academic achievement [9-10], while others have not reported any significant relationship [11-13].

Behvarzi students represent a group of health workers trained and employed to provide primary health care at the first level of the country's health care system, i.e., rural health centers. Given the enactment and notification of the new curriculum for

the Behvarzi Associate Degree program by the Ministry of Health and Medical Education to medical universities across the country, there is a paucity of information about the learning styles of health workers.

Objectives

Therefore, given the importance of primary health care in the health system and also the effectiveness of adopting the teaching-learning process in academic achievement, this study aims to determine the learning styles of Behvarzi students based on the ISALEM-97 model and explore its link with academic achievement in medical science universities in Northeastern Iran.

Methods

Study design

The study was a descriptive-analytical research.

Setting

This study was conducted in Behvarzi education centers affiliated with the northeastern Iranian universities of medical sciences in 2021.

Participants

The study population consisted of all students (male and female) studying at Behvarzi education centers of medical universities, including Mashhad (Imam Reza (AS), Mo'oud, Kashmar, Chenaran, Quchan, Sarakhs, Taybad, Khaf), Sabzevar, Neishabour, Torbate Heydariyeh, and Torbate Jam, (about 210 people). The inclusion criterion was spending at least one semester in the Behvarzi training center, and the exclusion criterion was the unwillingness to cooperate or failure to fill out the questionnaire.

Variables

The student's previous semester's GPA grade was used as a yardstick to determine the educational status. Accordingly, the students were divided into two groups based on GPA: strong (GPA ≥15) and weak (GPA ≤14.99).

To collect data, the total number of male and female students of each Behvarzi center in the 2021-22 academic year was inquired from the universities. Then, based on the total number of students in each center, the male and female quotas in the total sample were determined, and an electronic questionnaire was sent to students. A briefing meeting was held with the directors of the Behvarzi centers. After explaining the research goals and process, they assisted researchers in completing the questionnaire in their respective centers. To do so, the questionnaires were distributed by the researchers and directors among the sample groups. The completed forms were retrieved at the end. After the final review, unfinished questionnaires were discarded, and data analysis was carried out using descriptive and analytical statistics.

Data sources/ measurement

The data gathering instrument was the standard ISALEM-97 questionnaire, which comprised two sections: demographic information and the ISALEM-97 learning style inventory. This questionnaire was developed by Honorez, Remy, Montfort, Cahay, and Therer (2000), inspired by Kolb's Learning Styles Inventory (LSI) [8]. In Iran, this questionnaire was validated and standardized by Minakari [14]. His research reported an average of 6.05 to 6.75 out of 7 for face validity, and 0.46 to 0.59 for consensus validity with Kolb's LSI. Regarding the reliability of learning methods, 79%, 83%, 89%, and 87% reliability for intuitive, methodical, reflective, and pragmatic learning styles have been reported, respectively [14]. The learning methods of this questionnaire are bipolar (intuitive vs. methodical, pragmatic vs. reflective). This questionnaire identifies four learning styles of "pragmatic intuitive," "reflective intuitive," "pragmatic methodical," and " reflective methodical " in people over a wide age range from middle school (eleven years) to university graduation and adulthood. As posited by the developers of this questionnaire, all people have these four learning styles to varying degrees, but 75% of them possess a specific learning style. ISALEM-97 describes twelve learning situations in the academic world or everyday life. For each situation, there are four types of reactions, each pertaining to one of the above learning methods, which is ranked on a scale of 1 to 4 (almost always, often, sometimes, and rarely, respectively). One marks the corresponding box next to each item according to one's preferences. In this questionnaire, the suggested reactions to situations are developed in such a way that, unlike Kolb's Learning Styles, no direct and blatant bias of answers to specific learning methods is evident. The questionnaire can be filled out individually and collectively in 20 min [14].

Study size

Using Krejcie & Morgan's (1970) table of sample size estimation, a sample size of n= 132 was calculated. Then, male and female students studying at Behvarzi education centers were selected based on the quota and stratified random sampling method.

Statistical methods

Chi-square and Fisher's exact tests were applied to investigate the association of learning style with academic achievement and demographic characteristics. All data descriptions and analyses were conducted using SPSS 21 software. A significance level of .05 was considered in all statistical tests.

Findings

Participants

Four of the 132 completed questionnaires were discarded due to distortion (response rate of 97.05%). The mean age of students was 24.99 ±3.02 years. Also, 79 (59.8%) participants were female, and 69 (52.3%) were single. Most participants had a diploma in experimental sciences (n=87; 65.9%). In the group of strong students, the majority of participants were

between 21-25 years old, but in the group of weak students, most subjects were more than 26 years of age (Table 1).

Main results

According to the results, the number of students in the strong group (n=72) surpassed that of the weak group (n=60). In the strong group, the pragmatic-intuitive style and reflective-methodical had the highest and lowest frequency, respectively. In the same vein, in the weak group, the pragmatic intuitive and interactive styles had the highest and lowest frequencies, respectively. There was no statistically significant difference between strong and weak students regarding learning styles (Table 2).

Among male students, pragmatic-intuitive and reflective-methodical had the highest frequency, but pragmatic-intuitive and pragmatic-methodical were dominant among female students. In both married and single students, the pragmatic-intuitive style had the greatest frequency. In all age groups, the predominant style was pragmatic-intuitive and pragmatic-methodical. Among students with various types of diplomas, the pragmatic-intuitive style was more prevalent among graduates of experimental sciences.

There was a statistically significant relationship between gender and learning style ($p=0.012$), but no significant difference was observed between other demographic variables and learning style (Table 3). Also, the association between learning style and academic achievement was investigated at different levels. The results of Fisher's exact test did not exhibit a significant relationship between learning styles and academic achievement ($p=0.919$). There was a statistically significant correlation between gender and academic achievement ($p <0.001$).

Discussion

Key results

The present cross-sectional study was undertaken to examine the relationship between the type of learning style and academic achievement in Behvarzi students. As suggested by the findings, the pragmatic-intuitive style was most prevalent in both groups of strong and weak students.

Interpretation

Learners with a pragmatic intuitive cognitive style are more likely to roll up their sleeves and engage in learning. They relish new experiences and projects and seek information from others when attempting to solve a problem. The main forte of these people is their vast talent in executing projects, leading others, and taking risks. However, their weakness is the dispersive management of taking actions for the sake of activities. Among the various learning styles in this study, the characteristics of the pragmatic intuitive style are more congruent with the preferences of learners in this field of study, which is due to the type of Behvarzi training to undertake the activities of this profession in the future, which is more practical and skill base.

Asadzadeh [4], in his study on psychology students, reported that most students had a tendency for was pragmatic-methodical learning style. Learners with a pragmatic-methodical cognitive style are highly skilled in adopting ideas and theories. They can usually make decisions for solving problems without hesitation and compromise to come up with the best solutions. The ability to solve problems, make decisions, and use deductive reasoning are among the strengths of these individuals. This finding is not aligned with the results of the present study, which may be due to disparity in the individual characteristics of the research population, field of study, curriculum, and teaching methods [4].

Comparison with previous studies

The results also revealed the lack of a significant relationship between learning style and academic achievement. Mozaffari et al. [11] in Iran, Almigbal et al. [15] in Saudi Arabia, and Urval et al. [16] in India did not find a significant relationship between learning style and academic achievement. Nevertheless, Armandeh et al. [10] in Iran and Samarakoon et al. [17] in Sri Lanka reported a significant relationship between learning style and academic achievement in students. Jiraporncharoen et al. [18] found that the association between learning styles and academic achievement among students may vary depending on the learning content and teaching methods. Students should be encouraged to be flexible in their learning styles to successfully adopt various methods and adapt to changes in the curriculum.

Moreover, instructors should also be stimulated to provide various educational resources tailored to varying learning styles. Selecting a teaching method tailored to students' learning styles can boost their interest in the course, foster their participation in the classroom and affect their academic achievement [18]. Therefore, the relationship between learning style and academic achievement may vary under different situations.

In the present study, a statistically significant difference was observed between gender and type of learning style, which is consistent with the findings of Asadzadeh [4] but at odds with Armandeh et al. [10].

Sarabi et al. [19] concluded that male and female students have different learning styles. Knowledge of students' learning styles in educational institutions is precious, as it helps address learning problems enabling students to become more efficient learners [19]. This study observed no statistically significant difference between age, marital status, and learning style. This is comparable to the studies of Armandeh et al. [10].

Limitations

One of the limitations of this study was evaluating each individual's learning style and the differences in the learning

style of senior students, which was influenced by experience and maturity. This can restrict the generalizability of the findings.

Generalizability

It is suggested that educators and instructors account for discrepancies in learning styles among students when drafting lesson plans.

Suggestions

As such, it is suggested that future studies with larger sample sizes be conducted in other universities and more attention be paid to the association between teachers' teaching style and academic achievement and the learning styles of students.

Conclusion

The most prevalent learning style in strong and weak students was the pragmatic-intuitive cognitive style. In fact, they had identical learning style preferences, and no significant relationship was observed between the learning style and academic achievement. However, considering learning style in teaching, motivating, and learning students is essential and can contribute to modifying and revising future curricula. Hence, further research is warranted to shed light on these aspects.

According to the results of this study and the new educational curriculum for the Behvarzi associate degree program, knowledge of the learning preferences of Behvarzi students can be conducive to designing educational strategies to promote more effective learning.

Instructors must also adjust their training model from traditional teaching methods to new ones while maintaining and stressing practical training. They need to adopt various learning materials to exploit students' full potential and ability. Given the spread of virtual education triggered by the Covid-19 disease, it is helpful to consider multiple scenarios of practical content in virtual contexts. Ethics statement

In this study, in compliance with ethical issues, after obtaining informed consent from individuals, they were asked to complete the questionnaires. In addition, the participants were ensured of the confidentiality of the questionnaire data. This study was approved by the ethics committees of Mashhad University of Medical Sciences (code: IR.MUMS.REC.1398.272).

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Conceptualization: HE, HZN, AV. Data curation: HE, MV, HZN. Formal analysis: HE, VG, HZN. Funding acquisition: HE. Methodology: HE, AV, VG, HZN. Project administration: HE. Visualization: HE, MV, VG, HZN. Writing–original draft: HE, GH, HZN. Writing–review & editing: HE, AV, MV, GH, HZN.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

Funding

This article was drawn from a research project (No 970936) sponsored by Mashhad University of Medical Sciences.

Data availability

None.

Acknowledgments

This article was drawn from a research project (No 970936) sponsored by Mashhad University of Medical Sciences. We highly appreciate the Student Research Committee of Mashhad University of Medical Sciences.

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Table 1 Demographic Characteristics of Study Subjects (n=132)

Demographic Variables		Groups	
		Strong Students Number (%)	Weak Students Number (%)
Sex	Female	53 (73.6)	26 (43.3)
	Male	19 (26.4)	34 (56.7)
Marital status	Single	42 (58.8)	27 (45)
	Married	30 (41.7)	33 (55)
Age (year)	18-20	7 (9.7)	3 (5)
	21-25	40 (55.6)	27 (45)
	26<	25 (34.7)	30 (50)
Diploma	Humanities	9 (12.5)	13 (21.7)
	Experimental	50 (69.4)	37 (61.7)
	Mathematics	13 (18.1)	10 (16.6)

Table 2 Relationship Between Types of Learning Styles and Academic Achievement in Study Subjects

Groups	Learning Styles				Test Result
	Pragmatic intuitive Number (%)	Pragmatic methodical Number (%)	Reflective intuitive Number (%)	Reflective methodical Number (%)	
Strong students (GPA* ≥15)	51 (58)	10 (55.6)	6 (46.2)	5 (38.5)	$\chi 2=2.234$** P=0.919
Weak students (GPA ≤14.99)	37 (42)	8 (44.4)	7 (53.8)	8 (61.5)	

Notes: *Grade Point Average. **Fisher's exact test.

Table 3 Relationship Between Types of Learning Styles and Demographic Characteristics in Study Subjects

Demographic Variables		Learning Styles				Test Result
		Pragmatic intuitive Number (%)	Pragmatic methodical Number (%)	Reflective intuitive Number (%)	Reflective methodical Number (%)	
Sex	Female Male	60 (68.2) 28 (31.8)	10 (55.6) 8 (44.4)	6 (46.2) 7 (53.8)	3 (23.1) 10 (76.9)	$\chi 2$=11.011* P=0.012
Marital status	Single Married	46 (52.3) 42 (47.7)	6 (33.3) 12 (66.7)	7 (53.8) 6 (46.2)	10 (76.9) 3 (23.1)	$\chi 2$=5.767* P=0.124
Age (year)	18-20 21-25 26<	6 (6.8) 46 (52.3) 36 (40.9)	1 (5.6) 9 (50) 8 (44.4)	1 (7.7) 5 (38.5) 7 (53.8)	2 (15.4) 7 (53.8) 4 (30.8)	$\chi 2$=2995** P=0.823
Diploma	Humanities Experimental Mathematics	13 (14.8) 60 (68.2) 15 (17)	2 (11.1) 12 (66.7) 4 (22.2)	2 (15.4) 9 (69.2) 2 (15.4)	5 (38.5) 6 (46.2) 2 (15.4)	$\chi 2$=4.907** P=0.555

Notes: * Pearson Chi-Square Tests. **Fisher's exact test.