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Learning styles of Zahedan dental students by using the VARK model in 2019-2020

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Background: A learning style is a unique way of acquiring knowledge and skills obtained through study and experience. It is one of the most effective factors in learning, as well as the most important goal of an educational system. This study aimed to analyze the learning style of Zahedan general dentistry students in 2019-2020.

Methods: In this descriptive-analytical cross-sectional study, the research population included all dentistry students of Zahedan University of Medical Sciences who were selected by using the enumeration method. The VARK Questionnaire was employed to collect data and the results were then analyzed through the chi-square and ANOVA test in SPSS 23. $P < 0.05$ was considered significant.

Results: Eighty-two percent of the students were unimodal learners and the aural style with a frequency of %43.32 was the preferred method among participants. Regarding the multimodal approaches, aural-read/write style with a frequency of %6.8 was the most common method. The results showed no significant relationships between the test variables and the learning style ($p \geq 0.05$).

Conclusion: According to the results of the present research, the unimodal style was the most common learning style. In addition, the aural style was the most preferred learning style. None of the studied variables, even the educational stage, had any effects on the preferred learning style. Finally, the aural style was identified as the preferred learning style in all groups.

Keywords: Learning style, VARK Questionnaire, Dentistry students

أساليب التعلم لطلاب طب الأسنان في زاهدان باستخدام نموذج وارك في عامين ١٣٩٩-١٣٩٨

الخلفية والهدف: أسلوب التعلم هو طريقة فريدة لاكتساب المعرفة و المهارات التي يتم الحصول عليها من خلال الدراسة و الخبرة. يعد أسلوب التعلم من أكثر العوامل فاعلية في التعلم حينما هو أهم هدف للنظام التعليمي. لذلك كان الغرض من هذه الدراسة هو التعرف على أسلوب تعلم طلاب طب الأسنان العام في زاهدان التي أجريت خلال عامين ١٣٩٨ – ١٣٩٩ هجريا شمسيا.

المنهج: الدراسة الحالية عبارة عن دراسة مقطعية تحليلية وصفية، تكون مجتمع الدراسة من طلاب طب الأسنان بجامعة زاهدان للعلوم الطبية الذين دخلوا المشروع بطريقة التعداد. كانت أداة جمع البيانات عبارة عن استبيان" وارك". تم استخدام برنامج spss23 واختبارات مربع كاي واختبار ANOVA للتحليل الإحصائي للنتائج، واعتبرت P <0.05 معنوية.

النتائج: ٨٢٪ من الطلاب لديهم أسلوب واحد وكانت الطريقة السمعية بتكرار ٤٣٫٣٢٪ هي الطريقة المفضلة لديهم. كانت الطريقة ذات النمطين للاستماع و القراءة - الكتابة بتردد ٨٢٫٦٪ هي الطريقة الأكثر شيوعًا بين الأنماط متعددة الأسلوب. لم تظهر نتائجنا أي علاقة ذات دلالة إحصائية بين متغيرات الاختبار وأسلوب التعلم (0.05≤p).

الخلاصة: بناءً على نتائج هذه الدراسة ، كان طريقة "الأسلوب الواحد" هو الاكثر شيوعا بين الاساليب. أيضًا ، فيما يتعلق بنوع أسلوب التعلم ، كان أسلوب "الاستماع" هو المفضل بين انواع الاساليب للتعلم. لم تؤثر المتغيرات التي درسناها على أسلوب التعلم المفضل حتى في الدرجة ، وفي جميع المجموعات كان أسلوب التعلم المفضل "سمعيا".

الكلمات المفتاحية: أسلوب التعلم ، استبيان وارك ، طلاب طب الأسنان

سبک های یادگیری دانشجویان دندانپزشکی زاهدان با استفاده از مدل وارک در سال های ۱۳۹۹- ۱۳۹۸

زمینه و هدف : سبک یادگیری یک روش منحصر به فرد جهت کسب دانش و مهارت است که از راه مطالعه و تجربه بدست می آید. سبک یادگیری یکی از عوامل بسیار مؤثر در یادگیری است و یادگیری مهمترین هدف سیستم آموزشی است. لذا هدف از این تحقیق بررسی سبک یادگیری دانشجویان دندانپزشکی عمومی زاهدان در سال ۱۳۹۹- ۱۳۹۸ بود .

روش: پژوهش حاضر، مطالعه مقطعی تحلیلی – توصیفی بود. جامعه مورد مطالعه کلیه دانشجویان دندانپزشکی دانشگاه علوم پزشکی زاهدان بودند که به روش سرشماری وارد طرح شدند. ابزار جمع آوری داده ها پرسشنامه وارک بود و برای تجزیه و تحلیل آماری نتایج از نرم افزار spss23 و تست های chi square و ANOVA استفاده شد. p<0.05 معنی دار در نظر گرفته شد.

یافته ها: ۸۲ درصد دانشجویان دارای روش تک سبکی بودند و روش شنیداری با فراوانی ۴۳/۳۲ درصد روش ترجیحی دانشجویان بود . در میان روش های چند سبکی نیز روش دو سبکی شنیداری و خواندنی- نوشتنی با فراوانی ۶/۸۲ درصد رایج ترین روش چند سبکی دانشجویان بود. نتایج آماری هیچ رابطه معنی داری را بین متغیرهای آزمون و سبک یادگیری نشان نداد(0.05≤p).

نتیجه گیری: بر اساس نتایج حاصل از این تحقیق روش تک سبکی رایج ترین سبک یادگیری بود. ضمناً در خصوص نوع سبک یادگیری، سبک شنیداری بیشترین سبک ترجیحی بود. در متغیرهای مورد بررسی، حتی مقطع تحصیلی در سبک ترجیحی یادگیری تأثیر نداشت و در همه گروهها سبک یادگیری ترجیحی، شنیداری بود.

واژه‌های کلیدی: سبک یادگیری، پرسشنامه وارک، دانشجویان دندانپزشکی

وارک ماڈل کے ذریعے زاہدان میں ڈینٹل اسٹوڈنٹس کی تعلیم کا جائزہ (دوہزار انیس، دوہزار بیس)

بیک گراونڈ : تعلیم حاصل کرنے کی روش ہر انسان کی اپنی خاص روش ہوتی ہے جو مطالعہ اور تجربے سے حاصل ہوتی ہے۔ تعلیم حاصل کرنے کا طریقہ حصول علم میں بنیادی حیثیت رکھتا ہے اور تعلیم دینا تعلیمی نظام کا بنیادی ہدف ہے۔ ان حقائق کی روشنی میں اس تحقیق کا ہدف دوہزار انیس اور دوہزار بیس میں ڈینٹل اسٹوڈنٹس کی روش تعلیم کا جائزہ لینا ہے۔

روش : اس تحقیق میں زاہدان میں یونیورسٹی آف میڈیکل سائنسس میں ڈینٹل شعبہ کے تمام اسٹوڈنٹس شریک تھے۔ انہیں 'وارک ' کا سوالنامہ دیا گیا تھا۔ ڈیٹا کا تجزیہ ایس پی ایس ایس تئیس ، چی اسکوائر ٹسٹ اور اینووا سے کیا گیا تھا۔ مین اسکور p<0.05 رکھا گیا تھا۔

اس تحقیق سے پتہ چلا ہے کہ بیاسی فیصد طلباء ایک ہی طرح کے طریقے سے تعلیم حاصل کرتے ہیں اور کلاس میں لکچر کے ذریعے تعلیم حاصل کرنا بیالیس اعشاریہ تین دو فیصد طلباء کی اختیارکردہ روش تھی۔ متعدد طریقوں سے علم حاصل کرنے کے لئے اکثر طلباء نے دو طریقے جو پڑھنے ، سننے اور لکھنے سے عبارت ہیں اپنائے ہیں۔

ہمارے اعداد و شمار سے یہ ظاہر ہوتا ہے کہ طلباء کی تعلیم حاصل کرنے کی روشوں اور امتحانات کے طریقوں میں کوئی ربط نہیں پایا جاتا ہے۔

نتیجی : اس تحقیق کے مطابق طلبا کی اکثریت ایک ہی روش سے تعلیم حاصل کرتی ہے ، اس کے علاوہ تعلیم حاصل کرنے کے سارے طریقوں پر سننے (لکچر سننے) کے طریقے کو طلباء کے نزدیک ترجیح حاصل رہی ۔ اس تحقیق سے پتہ چلتا ہے کہ طلباء کے حصول تعلیم کا ترجیحی ذریعہ لکچر سننا ہی تھا۔

کلیدی الفاظ : زاہدان یونیورسٹی آف میڈیکل سائنسس، تعلیمی روش ، وارک سوالنامہ

INTRODUCTION

Learning has various definitions including "a relatively permanent change in a learner's thinking, feeling, and functioning" or "a relatively permanent change in the behavior or ability resulting from experience rather than a temporarily physical change"(1).

Learning styles are personal approaches by which individuals process information as they are learning concepts and principles. This definition demonstrates that these styles are not necessarily absolute; however, they vary from person to person (2).

Teachers, learners, curricula and other variables are systematically organized in the context of the teaching-learning process, so that the predetermined goals can be achieved (1, 2).

Currently, various types of teaching methods are used in medical education including lectures, seminars, self-study, and practice (3).

Learning is the most important goal of the educational system; however, it is affected by many factors such as intelligence, motivation, appropriate environment, family factors, community, school quality, and teaching quality. Therefore, identifying these factors is critical for solving educational problems (4, 5).

In recent decades, different methods have been proposed to determine the learning style by offering a different and distinctive representations related to preferences of learning styles (6, 7).

Up to now, more than 70 models have been proposed for explaining different learning styles which makes it a relatively complex area requiring more adaptive studies (8).

The VARK (Visual, Aural, Read/Write, and Kinesthetic) model is one of such models.

The VARK learning style is divided to the visual, aural, read/write, kinesthetic subgroups as well as learners with multiple functions, *i.e.* those who simultaneously use two or more abilities for learning (2, 7, 9).

According to the findings in the literature section, students have different individual characteristics for learning; in addition, teaching can be challenging regardless of the students' learning styles. Therefore, it is necessary to identify the learning styles of students in different disciplines. In this regard, this study aimed to analyze the learning styles of general dentistry students of Zahedan University of Medical Sciences.

METHODS

This descriptive-analytical study was conducted on 337 out of 420 dentistry students of Zahedan University of Medical Sciences during the first semester of 2019-2020. Participants were selected through the enumeration method. The research goal was first explained to the students and they were assured of confidentiality of their identity information in the result section. The study was done by the consensus of all participants. The data were collected by using a questionnaire of demographic information including gender, age, GPA, and admission year in the first part, as well as the VARK Learning Styles Questionnaire in the second part.

The VARK Questionnaire consists of 16 items and assesses four learning styles of visual, read/write, aural, and kinesthetic. The items are four-choice questions, each of which evaluates one learning style. Each respondent can select more than one option; therefore, every individual can acquire a maximum of 16 and a minimum of zero scores in each style. Finally, the style with the highest score was introduced as every student's main learning style; however, the multimodal style was considered when the scores of two or more styles were equal.

The reliability and validity of the questionnaire was previously confirmed by Fleming in 2004 and then by researchers such as Amini (9, 10). The data were analyzed by SPSS software (version 23, IBM Corporation, Armonk, NY, USA). Analysis of variance (ANOVA) test was used to evaluate the relationship between students' learning style with GPA and age; chi-square test was performed to assess the relationship of learning style preferences with sex, and educational levels. P values of smaller than 0.05 were regarded as significant.

RESULTS

The research questionnaires were filled by 337 out of 420 dentistry students (80.2%). Their age was between 17 and 56. Table 1 shows the demographic information of the students. Regarding GPA, only 288 students were evaluated because 49 students (14.5%) were freshmen and, hence, had no recorded GPA yet (Table1).

Table 1. Demographic information of the students

Variable		N(%)
Sex	Male (23.45±5.51year)	166(49.3%)
	Female (21.92±3.14year)	171(50.7%)
Educational level	Basic science	138(40.9%)
	Clinical	199(59.1%)
GPA	17-20	79(23.4%)
	14-16.99	197(58.5%)
	12-13.99	12(3.6%)

According to the research findings, 276 students (81.9%) used the unimodal style, 57 students (16.9%) used the bimodal style, and 4 students (1.2%) used the tri-modal and quad-modal styles (Table 2).

Table 2. Percentage and frequency of learning style of dental students

Learning Style	Frequency	Percentage
Unimodel style	276	81.9
Bi modal styles	57	16.9
Tri modal styles	2	0.6
Quad-modal styles	2	0.6
Total	337	100

In addition, due to the low frequency of the tri-modal and quad-modal styles in statistical computations, the bi-, tri-, and quad-modal styles were regarded collectively as the multimodal style. The aural style had the highest frequency of 43.3% (n=146) among students with the unimodal style and those with the bimodal style; the aural and read/write styles had the highest frequency of 6.8% (n=23)

According to the research findings, the unimodal style was the preferred learning style among female and male students with a frequency of 81.3% and 83%, respectively.

The aural style with a frequency of 41.5% was the preferred method in female students with unimodal style. Among male students, the preferred learning styles were similar to those of females; however, the frequency rates of aural style and multi model styles were 45.2% and 17.5%, respectively (Table 3). The chi-square test showed no significant relationship between gender and learning style (p=0.412).

The research results showed that the unimodal style was the most common learning style in both basic sciences and clinical stages with a frequency of 83% (n=115) and 80.9% (n=161), respectively. Regarding the basic sciences, the aural style with a frequency of 42% (n=58) was the preferred style. In fact, 16.7% of the participants used the multi-modal style. In the clinical stage, the aural style with a frequency of 44.2% (n=88) was the common method, and 19.1% students had the multi-model style. The chi-square test showed no significant relationship between educational stage and learning style (p=0.303) (Table 3). Concerning the effect of GPA on learning style, the ANOVA test showed no significant relationship between GPA and learning style (p=0.102) (Table 3).

DISCUSSION

This study aimed to analyze the learning styles of general dentistry students and their relationships with age, gender, GPA, educational stage, admission year, and admission type. The VARK Questionnaire was utilized for this purpose.

The results showed that 82% of the students had the unimodal style; however, 18% of them had the multimodal style. The aural style was preferred in 43.32% of students.

Among the multimodal styles, the bimodal style with the frequency of 16.91% was the most common style, while the aural and read/write styles with the frequency of 6.82% were the preferred bimodal styles.

Mehdipour et al. showed that the unimodal style with a frequency of 86% and the aural style with a frequency of 34.4% were the preferred learning styles among dentistry students of Shahid Beheshti University of Medical Sciences (2).

Peyman et al. showed that the unimodal style with a frequency of 41.6% was the learning style of the medical first-year students in the Ilam University of Medical Sciences. In addition, the aural style with a frequency of 17.7% was the most common unimodal learning style, while the quad-modal style with a frequency of 27.6% was the most common multimodal style (11).

Another study done in Islamic Azad University by Zamani et al. showed that 47.5% of female medical students had the unimodal style, while the aural and read/write methods were the most common learning styles with a frequency of 17.5% (12).

The results of these studies are in line with those of the present study which can be attributed to the similar learning environments.

Ardekani et al. demonstrated that the aural style was the preferred learning style in medical and pharmacy students in the Yazd University of Medical Sciences, whereas the kinesthetic style was preferred among dentistry students (13).

Hejazi et al. showed that the read/write style with a frequency of 31.9% was the preferred learning style of students in the North Khorasan University of Medical Sciences; however, the kinesthetic style with a frequency of 33.3% was the preferred learning style among dentistry students. The difference in the preferred learning styles of mentioned studies and the present study can be attributed to the teaching technologies and different teaching methods used in different universities (14).

In the Isfahan University of Medical Sciences, Hedayati et al. showed that the aural style with a mean of 39.27 ± 6.87 was preferred among medical and dentistry students. There was significant conformity between the students 'visual style and the visual technologies used by the teachers. Although the unimodal style was preferred as what there was in the present study, the learning style was different; this can be related to the teaching technology (15).

Among foreign studies, the findings of Tar et al. in India were quite in line with those of the present study. They showed

Characteristics		Learning styles					P value
		Aural	Read/write	Kinesthetic	Visual	Multimodal	
Age (year) (mean ± SD)		22.8 ± 5.05	22.6 ± 5.03	22.9 ± 4.8	21.8 ± 2.07	22.6 ± 2.9	0.888
Sex (%)	Male	45.2	14.5	16.9	6	17.5	0.412
	Female	41.5	20.5	11.7	7.6	18.7	
GPA (mean ± SD)		15.8 ± 1.4	16.2 ± 1.4	16 ± 1.5	16.5 ± 1.5	15.9 ± 1.3	0.102
Educational level (%)	Basic	42	22.5	11.6	7.2	16.7	0.303
	Clinical	44.2	14.5	16.1	6.5	19.1	

Table 3. Learning style and characteristics of dental students

that 76% of medical students preferred the unimodal style and the aural learning style with a frequency of 37% was the most common style (16).

Asiry et al. in Saudi Arabia concluded that only 41.6% of dentistry students had the unimodal style and the aural and kinesthetic styles were the most common unimodal style with a frequency of 35.1% each (17).

In Pakistan, Daud et al. represented that 69% of medical students had a multimodal style and the aural style with a frequency of 14% was common among unimodal students. Although this study was similar to the present study, the aural style was the common learning unimodal style. In contrast to the present study, most students preferred the multimodal style (18).

In Thailand, Paiboonsithiwong et al. showed that medical students preferred the quad-modal style with a frequency of 43.57% and the frequency of the unimodal style was 35%. The kinesthetic style was the most common unimodal style with a frequency of 12.1% (3).

Mashhood et al. concluded that only 1.5% of Karachi medical and dentistry students had a unimodal style and all unimodal students preferred the kinesthetic style. Like the present study, they found no significant relationship between learning style and gender (19).

In Saudi Arabia, Al Aldosari showed that only 36% of dentistry students had a unimodal style and, among the unimodal styles, the aural and kinesthetic styles were the common styles with a frequency of 12.23%. However, the quad-modal style was the students' preferred style with a frequency of 23.64% (20).

In Nepal, L. Khanal et al. indicated that 46.48% of surgical and dentistry surgery students had the unimodal style and 26.06% of them had bimodal learning styles. However, the kinesthetic style with a frequency of 29.06% was the most common style. They found no significant difference between the learning style and certain variables such as age, gender, and nationality (21).

The differences between findings of this study and those of other studies, especially with respect to other countries, seem to be related to the teaching technologies, individual characteristics, geographical location, and culture.

According to the results of the present research, the unimodal style was the most common learning style. In addition, the aural style was the preferred learning style. For future research, it is recommended that senior students take a practical test, so that the relationship between practical grades and students' learning styles can be analyzed. Relying solely on aural learning style up to the end of educational stages may cause students to perform poorly in future clinical environments, something which can challenge the health system.

Ethical considerations

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