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ORIGINAL RESEARCH

Learning style preferences among medical students in the College of Medicine, University of Bisha, Saudi Arabia (2018)

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Objectives: This research aims to describe the learning styles among undergraduate medical students at the College of Medicine, University of Bisha.

Materials and methods: Type of study is a cross-sectional. Students preference of learning styles was assessed through VARK (abbreviation stands for Visual, Aural, Read/Write, and Kinesthetic learning style) inventory questionnaire version 7.1. The questionnaire was bilingually translated. Data from the questionnaire were analyzed by SPSS (V20). Data were presented in the form of descriptive statistics. One-way ANOVA and Kruskal–Wallis test were used to assess the relations between study variables.

Results: One hundred and eighteen students (86.8%) were unimodal in their learning preference, and 18 students (13.3%) were multimodal. The dominant unimodal style was aural (55.9%), and the lowest was reading (5.1%). Among multimodal the commonest preference was AK (77.8%) followed by VR and VK equally (11.1%). The multimodal pattern is limited to students in level one. Visual style increases in percentage with the academic levels.

Conclusion: Students in the College of Medicine, University of Bisha (UBCOM) have different patterns and types of learning style. Aural is the dominant unimodal style. The visual style is widely distributed among students of different levels. Planning and implementation of educational activities that satisfy all learning styles will support the learning process.

Keywords: learning style, Saudi, academic level, student, medical

Introduction

Learning style is a term that refers to the learner's method (s) of gathering, processing, interpreting, organizing, and thinking about information.[1,2] In literature, learning style is defined as "a set of factors, behaviors, and attitudes that facilitate learning for an individual in a given situation" and also defined as "people's consistent ways of responding to and using stimuli in the context of learning".[2–4] In terms of instructional strategies, it defines as "the way through which students typically pursue the act of learning".[5] According to the definitions, students may have different learning styles in the form of unimodal or multimodal patterns. Learning style instruments (questionnaires) are categorized into personality, information-processing, social interaction, and instructional preference models.[1] VARK inventory uses the instructional preference model. This model classifies the learning styles according to the preferred sensory method or the way through which informations are acquired.[6]

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VARK inventory was developed by Neil D. Fleming.[7] VARK abbreviation stands for Visual, Aural, Read/Write and Kinesthetic preference modalities. Knowing the learning style of the learner per se is not beneficial unless he considered how and when to learn as a part of a reflective, metacognitive process with action to follow.[7] Generally, knowing or identifying the learning styles is important for understanding the differences between learners, enhancing the learning process through strengthening areas of power and supporting areas of weakness in each style and designing and developing learning tools.[8]

According to Fleming (1995),[9] students with visual preference are able to process information best if they can see it. They learn best from materials presentation using pictures, charts, graphs, and diagrams. Aural students prefer to learn through hearing and discussion of information. Aural's students process information through listening to lectures, attending tutorials, and playback recorders of learning sessions. "R" learners prefer to process information through writing and reading. These learners are interested in making and reviewing notes, and, they like to read texts over and over again. Kinesthetic learners "K" gain a better understanding of information through experience and practicing of materials that have connections to reality. They prefer concrete examples and applications. Multimodal pattern incorporates the students who can acquire or process information through more than one style of learning.[1,6,9–11]

Many international and national studies have targeted the students learning styles in different settings and colleges.[12–17] In UBCOM, this is the first study discussing the learning styles among medical students and the first study in this region.

The result of this research work will be beneficial for both students and teachers. Students, when knowing their learning style, can augment their learning and support the areas of weakness in their styles. Teachers or educators, on other hand, can use the generated data to address the different styles and matching them to their teaching styles or even adjust curriculum activities. This study aims to describe the different learning styles among students at UBCOM.

Materials and methods

Study design and setting

The study type is cross-sectional. The study was conducted at the College of Medicine, University of Bisha, Bisha, Saudi Arabia from October 2018 to March 2019.

College of Medicine University of Bisha (Bisha, Saudi Arabia) is a recently established. Students are admitted to UBCOM annually following passing both of university admissions exam (General Aptitude Test, QUDRAT), and the Standard Achievement Admission Test (SAAT).[15] UBCOM uses a 5-point GPA scale as most of the Saudi universities.[15] The college uses innovative SPICS curriculum (Student-centered teaching, Problem-based learning, an Integrated Curriculum, Community-based teaching, Electives with Core, and the use of Systematic methods). The curriculum is adopting student centers teaching strategies such as PBL, TBL, CBL, and Seminars; bedside teaching, interactive lectures, practical's, skill labs, filed visit, and bedside teaching. All of PBL, TBL, CBL, and Seminars are conducted as once per week, interactive lectures are 5–7 per week. Conduction of the other instructional strategies depends on the nature of each course. Students graduated after successful completion of 12 semesters. UBCOM uses constructive alignment, whereas learning supported by objectives (outcomes), instruction methods, and assessment. The first accepted patch of students is in level nine.

Population and sample size

The total number of registered students at study commencement was 215. All participants were shown in the academic year 2018–2019, the first semester. The calculated sample size was 139 students. Probability sampling technique was used to determine the representative number of students per patch.[18] Since the college not admitting female's students yet, all the participants were males' students.

Data collection and procedure

Data were collected through a questionnaire, formed in two parts. The first part is about the sociodemographic data, including age, the academic level, and GPA. The second part was formed using the VARK inventory questionnaire version 7.1. The questionnaire is free to use and download from the VARK home page (http://www.vark-learn.com/English/page.asp?p=questionnaire). It consists of 16 multiple-choice questions. The used questionnaire was bilingual (English and Arabic), the authors obtained necessary permission for the use of this questionnaire. Satisfactory levels of reliability and validity of VARK inventory were approved in many studies.[8,13,19–24] A brief presentation was made for students regarding the procedure to fill the questionnaire and the expected benefits for them. The questionnaires were distributed in the

form of hard copies to students who accepted to participate in the study. The authors did data collection.

Ethical consideration

The study approved by the research and ethics committees at UBCOM. Students responded anonymously to the study questionnaire.

Statistical analysis

Data generated from the VARK questionnaire were analyzed according to the method described in VARK inventory website.[14] To calculate the percentage of students for each VARK component, the number of students who preferred each learning style modality was divided by the total number of students participating in the study. Data from the questionnaire were tabulated and entered into SPSS V.20 and then statistically analyzed. Results were presented in the form of descriptive statistics and relations between study variables.

Results

Demographic data

The total number of participants was 136 male students, and the response rate was 90.7%. The mean age and GPA of students were 21.2±1.4 and 3.16±0.45, respectively. The majority of students were in level 5 (45), followed by level 3(38), 9 (20), 7 (19), 8(8), and 6 (2).

Learning styles

Students learning styles were categorized into unimodal (86.2%) and multimodal (13.2%) patterns. Among unimodal pattern (118), the dominant learning style was aural (55.9%) followed by kinesthetic (32.2), and the least presented was visual (6.8%). All the multimodal patterns were of bimodal. Among the multimodal pattern (18), the dominant combination was AK (77.8%) followed by VR and VK (11.1%) equally (Figure 1). Other combinations or categorizes of multimodal pattern were not reported.

Academic level

The unimodal pattern of learning style is present in all academic levels. Among unimodal style, the widely distributed learning style in the academic levels is visual (4.8) followed by aural (3.8), R (2.8), and kinesthetic (2.3). Multimodal pattern is limited to level one generally (1.3) (Figure 2).

Kruskal–Wallis test shows a significant relation between A and K learning styles and the academic level (Table 1).

GPA

Students with aural learning style have the highest average GPA than others (Figure 3). Non-significant relationship was reported between the preferred learning style and student GPA.

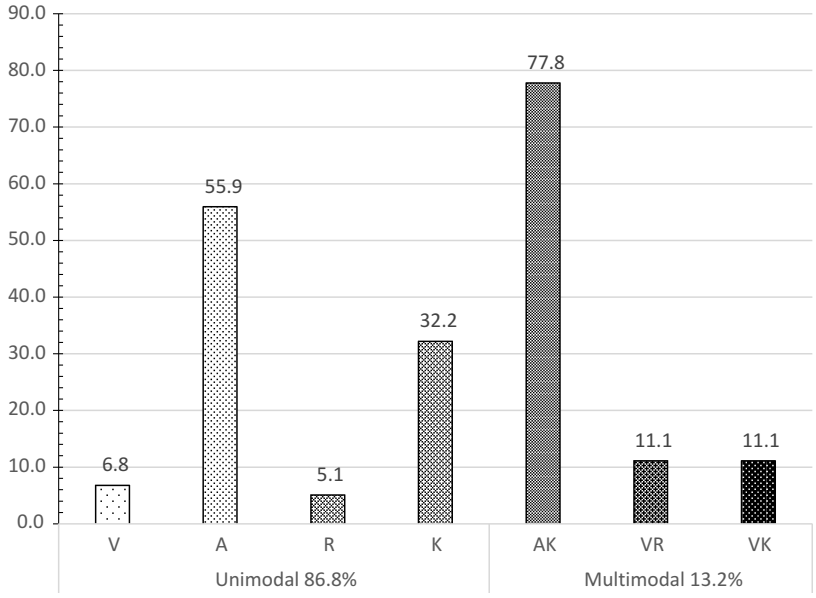

Figure 1 The distribution of learning styles among medical students (n=136), College of Medicine, University of Bisha, Saudi Arabia, 2018.
Abbreviations: V, visual; A, aural; R, read/write; K, kinesthetic; Unimodal, unimodal pattern of learning style; Multimodal, multimodal pattern of learning style.

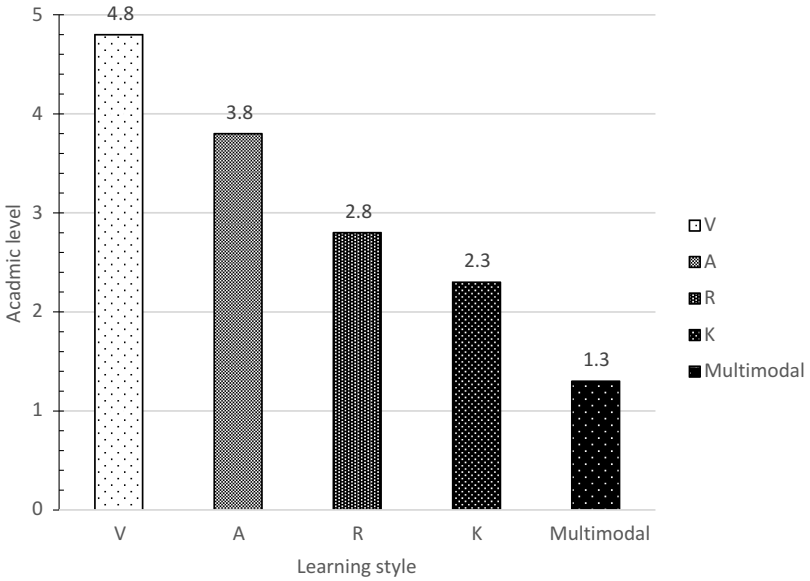

Figure 2 The distribution of learning styles in the academic levels of medical students (n=136), College of Medicine, University of Bisha, Saudi Arabia, 2018.
Abbreviations: V, visual; A, aural; R, read/write; K, kinesthetic; Multimodal, multimodal pattern of learning style.

Table 1 The relation between learning style and academic level among medical students (n=136) College of medicine, University of Bisha, Saudi Arabia, 2018

	Null hypothesis	Test	Sig	Decision
1	The distribution of V is the same across the academic level	Independent – samples Kruskal–Wallis test	0.326	Retain the null hypothesis
2	The distribution of A is the same across the academic level	Independent – samples Kruskal–Wallis test	0.033	Reject the null hypothesis
3	The distribution of R is the same across the academic level	Independent – samples Kruskal–Wallis test	0.555	Retain the null hypothesis
4	The distribution of K is the same across the academic level	Independent – samples Kruskal–Wallis test	0.017	Reject the null hypothesis
5	The distribution of multimodal is the same across the academic level	Independent – samples Kruskal–Wallis test	0.214	Retain the null hypothesis

Notes: Asymptotic significances are displayed. The significance level is 0.05.
Abbreviations: V, visual; A, aural; R, read/write; K, kinesthetic; Multimodal, multimodal pattern of learning style.

Discussion

Definitions of learning styles such as "the ways through which students typically pursue the act of learning" and "The consistent ways of responding to and using stimuli in the context of learning" support the fact that students or learners may have more than one learning style. The current results reported the presence of unimodal (86.8%) and multimodal (13.2%) patterns of learning styles. These results in agreement with previous studies conducted in Saudi Arabia. They reported the presence of unimodal and multimodal patterns of learning styles among male students in different percentages.[13–17,25]

Our findings in agreement with the work of Almigbal (2015) and Liew et al (2015).[16,26] Both the previous and current findings found that the majority of students are unimodal. Meanwhile, the present findings are in controversy to previous local studies using VARK; they reported that the dominant type is multimodal.[14,15,17,25] International data regarding the domination of unimodal or multimodal patterns of learning styles have different results. Murphy et al[27] and ELtantowi[28] from the USA, and Baykan[29] from Turkey reported the domination of multimodal. While Siddiqi et al[30] and Haq et al[31] from Pakistan support the domination of unimodal. Global data from the VARK website database in

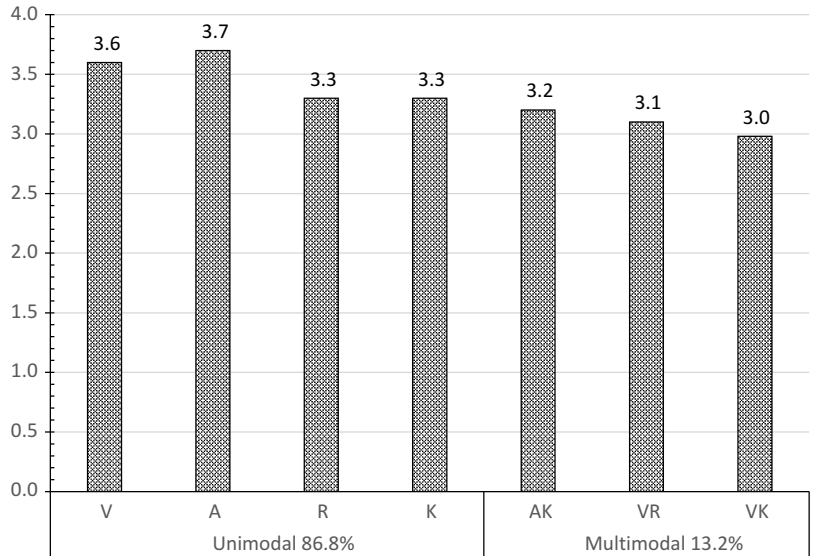

Figure 3 Learning styles and the GPA of medical students (n=136), College of Medicine, University of Bisha, Saudi Arabia, 2018.
Abbreviations: V, visual; A, aural; R, read/write; K, kinesthetic; Unimodal, unimodal pattern of learning style; Multimodal, multimodal pattern of learning style.

agreement with the domination of multimodal patter.[17] Many authors reported that the previous exposures to different teaching styles and the type and nature of the educational content could affect the learning styles[13,26,32] These reports can justify why many students preferred a unimodal pattern. The educational system in Saudi Arabia before university depends mostly on didactic lectures, with limited discussion and practical sessions.

The unimodal pattern represents 86.8% of the total participants in the study. This percentage is higher than the previous national studies. The previous studies described that unimodal pattern has a low percentage. Among unimodal pattern of learning styles in the current study, the most common learning style is aural (66.6%) followed by kinesthetic (38.3%), visual (8.7%), and Reading/writing (6.5%). The commonest learning style in Saudi literature is aural in males[13,17] and females[25,33] and studies with mixed-sex.[13–16] The second dominant was kinesthetic. Kinesthetic learning style in Saudi literature is either the dominant[25,33] or the second dominant[13,17,25,33] or dominant in combination with another style.[25]

In the current study, among multimodal, only the bimodal pattern was reported. The dominant bimodal pattern is AV (77.8%) and followed by VR and VK equally (11.1%). Commonly, the bimodal pattern is reported in studies as middle-ranked[14,17] or least presented.[34] May other studies reported trimodal[17] and quadmodal patterns.[14] It is described that students with multimodal pattern have a balanced set of learning preference and have the ability to process information in any variety of learning styles. They prefer concrete multisensory experience in their learning. Accordingly, multimodal students can adjust themselves to the different teaching styles during a given time or link a specific learning style to ascertain subject or activity.[6–11] Generally, students with a multimodal pattern of learning styles can get great benefits from active learning strategies.[6]

The distribution of learning styles within the academic levels shows that multimodal pattern is limited to students in level one generally. This result is supported by the work of Lujan and DiCarlo (2006).[34] They reported that students in the first year prefer multimodal pattern. It is not known, whether multimodal was their pattern of learning style in secondary school or they changed to it in the first year of the medical college. Although multimodal pattern (Quad, Tri, and Bi) was reported as the dominant in preparatory schools in Saudi Arabia.[35] Unimodal is present on all levels with different percentages. There is a gradual increase in the distribution of learning styles from K (in level one and two) to R (in level one to three) to A (in level one four) and V, which is dominant in level 5 (in level one to five). Also, the results suggest that, during progressing in the academic levels, students shift to unimodal, and within this pattern, they change from K to R and then A to V the dominant learning style in level 5.

If the type of training and both content and mode of teaching and learning can affect or change the preferred learning style, the situation in medical colleges and schools can justify this. As students progressing in medical curricula,

the curriculum contents gradually shift from recalling of basic knowledge to interpretation through critical thinking and acquiring clinical skills besides developing teamwork skills. Dependently, this change can shift students learning style from A to K as a unimodal pattern or multimodal such as AK or others. This probability is supported by the findings of Sayed et al,[33] Samarakoon et al,[36] and Naggar[25]. All of them reported that student during the student's progression; they tend to shift from multimodal to unimodal, and they like to use A and K.[13,25] Nuzhat et al[13] and Kumar et al[32] reported that both of the types of study and the nature of the studied material might affect or changes the learning style.

Although students with A learning style have the highest average GPA, there was no significant difference between the other styles. This finding is in agreement with the previous work, Liew et al (2015). They reported that there was no significant difference in learning styles and academic performances or superiority of learning style above the others.[26] However, these findings are controversial to some reports that claimed knowing persons learning style can support and enhance success.[26,37,38]

Study strength

This is the first study to discuss the learning styles in UBCOM. This work fills the gap of knowledge about the learning styles among students in UBCOM. It provides a better understanding of the difference in the learning styles between medical students in UBCOM other medical schools. Also, it forms baseline study for researches targeting possible changes in the learning styles or their link to the preferred method of instructional or assessment. This study provides starting point form adjusting activities in UBCOM since its newly established college.

Study limitation

Limitations of the study include the few numbers of students; there are no female students, and the learning styles of a student in the secondary school were unknown. The authors could not compare the teaching styles of faculties to student learning styles.

Conclusion

UBCOM students have different types and patterns of learning styles. Aural is the dominant unimodal learning style. The visual style is widely distributed among students of different levels. The multimodal pattern is limited to level one. Planning and implementation of educational activities that satisfy all learning styles will support the learning process. Further studies should target possible change in the learning styles due to a method of instruction and change of curriculum content or progressing in the academic levels.

Recommendations

More research work is needed to evaluate the possible association between learning style preferences and teaching and learning methods, and the teaching styles.

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Disclosure

The authors report no conflicts of interest in this work.

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