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Fahad AlFhaid[1*]

Waqas Sami[2]

Mansour K Alzahrani[1]

Mohammed Zaid Aljulifi[1]

Yahya Ahmed Almufarrih [3]

Ahmed Khalid Ibrahim Alaqil[4]

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[1]Department of Family Medicine, College of Medicine, Majmaah University, Majmaah 11952, Saudi Arabia
[2]Department of Community Medicine and Public Health, College of Medicine, Majmaah University, Majmaah 11952, Saudi Arabia
[3]Service Resident, Huraymila General Hospital, Riyadh, Saudi Arabia
[4]General surgery resident, King Saud hospital, 'Unayzah, Saudi Arabia

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The Study of Learning Styles among Medical Students at Majmaah University, Saudi Arabia

Fahad AlFhaid[1*], Waqas Sami[2], Mansour K Alzahrani[1], Mohammed Zaid Aljulifi[1], Yahya Ahmed Almufarrih [3], Ahmed Khalid Ibrahim Alaqil[4]

[1]Department of Family Medicine, College of Medicine, Majmaah University, Majmaah 11952, Saudi Arabia
[2]Department of Community Medicine and Public Health, College of Medicine, Majmaah University, Majmaah 11952, Saudi Arabia
[3]Service Resident, Huraymila General Hospital, Riyadh, Saudi Arabia
[4]General surgery resident, King Saud hospital, 'Unayzah, Saudi Arabia
*Corresponding author
Email: f.alfhaid@mu.edu.sa

ABSTRACT

The main objectives of this research were to detect types of learning styles (LS), time spending in studying, to know the relation with GPA, and to determine which LS is suitable with teaching style used in the College of Medicine at Majmaah University.

The study was cross-sectional self-survey conducted among male and female medical students at College of Medicine at Majmaah city over 6 months. Cluster sampling was used and total participants were 194 students from College of Medicine (males & females). The data was collected using a designed questionnaire and analysis of data was performed by SPSS (V26).This study showed that majority of participants preferred the Visual learning (VL) style (27.79%), the second most used type was Kinesthetic (24.79%), and the least used type was Auditory (24.53%). It also showed that students who prefer VL style score more than students who prefer other learning styles. It was observed that the student who prefers kinesthetic style spent more time in the studying the more use of this type. In Conclusion, The study concluded that the majority of participants were preferred the VL style. It is also showed that student who prefers visual learning style score more than students who prefer other learning styles. It is important to increase awareness of students regarding types of their learning styles and teaching strategies in college during admission.

Keywords: Learning Style, Medical Student, Saudi Arabia, Survey, Majmaah University, Visual learning.

INTRODUCTION

Learning styles (LS) can be identified, categorized, and define in different shapes. In general, they are designs that provide teaching and learning with direction (Vaishnav and Chirayu, 2013). Learning styles can be also defined as a set of attitudes that direct learning in a given moment (Griffiths and İnceçay, 2016). Learning styles impact how teachers teach, and how the learners learn, and how to communicate. Each individual is born with some tendencies to a particular style, but these inherited or biological features are influenced by maturity level, culture, and personal experiences (Vaishnav and Chirayu, 2013).

There are different learning methods such as the Visual learning (VL), Aural, Kolb's learning, and models of learning were developed. Awareness of student LS could provide a basis to optimize teaching method. There is a strong relationship between the LS preferences and academic achievements. Most of higher education students continually improved or changed the LS for getting good performance in their academics (Bhagat and Singh, 2015).

Each student has a consistent and distinct way of organization and perception. These learning styles are features of affective, cognitive, and physiological attitudes that render as a good indicator of the way the learners respond, interact with, and perceive the learning surroundings (Bhagat and Singh, 2015; Zhou, 2011) . As a result, these differences impact the effectiveness of the lesson. As the learning style is linked to personal preferences and characteristics, LS reflects the learner's preferences on how they interact (Wierstra and Kanselaar, 2003). When the person's LS is determined, both the teaching environment and the way to accurately define the issues to be learned in and out of the class may be raised (Felder and Brent, 2005). When the LS is taking into consideration, the student's success increases considerably (Reid, 1987).

We have different models of LS; viz; Visual/Verbal LS, Kinesthetic LS, and Auditory LS. VL likes to gain knowledge by visual facilities like pictures and diagrams. In comparison, Verbal learners understand more with spoken materials (Awla, 2014). Kinesthetic learners will learn better when they involve in experiments, role plays, and trips (Tyas and Safitri, 2017). Auditory LS is the ability to memorize songs through being sensitive to sound and music (Kayalar and Kayalar, 2017).
This is the first study conducted in the College of Medicine at Majmaah University, Saudi Arabia to determine time spent by medical students (males and females) in studying; to know the relation between grade point average (GPA) and types of LS; and to know which learning style is suitable with the teaching style used.

METHODOLOGY

Study design and setting

This is cross-sectional research done among male and female medical students of College of Medicine at Majmaah city for 6 months started 1 December, 2017 till 30 April, 2018. Cluster sampling was used and the total participants were 194 out of 350 students from the College of Medicine (males and females). The tool used was LS Questionnaire (reproduced here is by O'Brien).

Data collection and procedure

The data was collected by using a questionnaire in two forms paper-based and online (Google Form). The paper forms were distributed among the students during lecture and practical sessions. Every step of data collection, study participants was briefed, and confidentiality of participants' information was ensured by maintaining the anonymity of responders. It consists of 16 questions with 3 choices, each of which corresponds to a modality preference. Students were free to select one or more than one option, thus varying combinations of multiple modalities could be obtained. The preferred modality was the one that received the highest marks. The questions describe circumstances of everyday occurrence; thereby connecting to a person's learning experience. The letter was to be encircled next to the choice that best expressed the student's preference. They may choose more than one option or leave any question blank if they didn't think it applied to them.

Ethical consideration

Informed consent was obtained from students, and all data is used for the purpose of this study. Ethical approval was taken from Majmaah University Research Ethical Committee (MUREC-Jan03/COM-2018/1).

Statistical analysis

Study participants' responses were scored which is present in the questionnaire, then identify the preferred learning approach and then identify the model of learning according to sub-scale scores. The data was analyzed using Statistical Package for Social Sciences (SPSS 26; IBM Corp., New York, NY, USA). Statistical Student's T-test was used for statistical comparisons. P-value < 0.05 was considered statistically significant.

RESULTS

The study highlighted that out of 194 participants (Table 1), a sizable population of 63.4% was male (123 only) whereas females attributed to about 36.4% (71 in number).

Table 1. The number of participants by gender.

Gender	Participants	Percent (%)
Male	123	63.4
Female	71	36.6
Total	194	100

The study showed that the dominant type of learning tool used by the students was the VL style (27.79 ± 5.22), followed by kinesthetic (24.79 ± 5.53). The least learning tool used was auditory (24.53 ± 5.76) (Table 2).

Table 2. Type of learning style used by the students.

Type of Learning style	Mean ± S.D.
Visual	27.79 ± 5.22
Kinesthetic	24.79 ± 5.53
Auditory	24.53 ± 5.76

When the relation between each type and the other was thoroughly studied, a significant association was observed between Visual and Kinesthetic (27.79 ± 5.22 vs. 24.79 ± 5.53, p = 0.027; i.e. p < 0.05) which implied

that students who use visual type were more than the students who use kinesthetic type. Also, a significant association was observed between Auditory and Kinesthetic (24.53 ± 5.76 vs. 24.79 ± 5.53, p = 0.002; i.e. p < 0.05) which indicated that students who use auditory type were more than students who use the Kinesthetic type of learning style (Table 3).

Table 3. Relation between each type of learning style and the other.

Type of learning style	Visual	Auditory	Kinesthetic
Visual	-	0.792	0.027
Auditory	0.792	-	0.002
Kinesthetic	0.027	0.002	-

When the relationship between each type and GPA of the students were studied, a significant association was observed in visual type between (4.5 – 5) and (3.5 – 4.4) groups (30.34 ± 5.582 vs. 27.14 ± 5.040, p = 0.019; i.e. p < 0.05), it was seen that group which has GPA of (3.5 – 4.4) was less as compared to the group who have GPA of (4.5 – 5). While exploring the association in auditory type between (4.5 – 5) and (3.5 – 4.4) groups (28.14 ± 3.583 vs. 23.51 ± 6.187, p = 0.001; i.e. p < 0.05), it showed that the group which has GPA of (3.5 – 4.4) was less as compared to the group who have GPA of (4.5 – 5). Also, (4.5 – 5) group and (2.5 - 3.4) group differs (30.34 ± 5.582 vs. 24.06 ± 5.310, p = 0.007; i.e. p < 0.05), in kinesthetic type, there was no significance (Table 4).

Table 4. The relation between each type of learning style and the GPA of the students.

GPA	Visual (%)	Auditory (%)	Kinesthetic (%)
4.5 – 5	30.34	28.14	26.69
3.5 – 4.4	27.14	23.51	23.94
2.5 – 3.4	27.45	24.06	25.45
< 2.5	30.00	29.20	22.40

The relationship between each type of learning style with time spending in studying was analyzed. A significant association was observed in kinesthetic type between (< 1 hr) and (1 – 2 hrs groups) (27.89 ± 5.242 vs. 27.06 ± 4.905, p = 0.007; i.e. p < 0.05) which showed that the group studied (< 1 hr) was less as compared to the group where studied (1 – 2 hrs). Also, (< 1 hr group) and (> 4 hrs group) differs (27.89 ± 5.242 vs. 25.50 ± 4.613, p = 0.048; i.e. p < 0.05), in auditory and visual type, there was no significance (Table 5).

Table 5. The relation between each type of learning style with time spent in studying.

Time (hr)	Visual (%)	Auditory (%)	Kinesthetic (%)
< 1	27.89	24.51	22.23
1 - 2	27.06	25.22	25.97
3 - 4	27.64	25.02	24.55
> 4	29.10	22.75	25.50

The questionnaire (Table 6) revealed the practices, logic, and personality of students, individual personification, and work execution through three parameters (often, sometimes, and rarely) which eventually influenced the academic excellence.

From the designed questionnaire, it was predominantly observed that when the individuals were asked about liking in taking notes for visual review, the best way to remember a picture, retrieving information through relevant materials reading, presentation & remembering sound-oriented information, preference of listening over reading, application friendliness with tools, best remembering by multiple writing things, playing with coins and keys, gripping objects in hand during learning, and inter-personal relationships; the majority of the respondents (38.7% - 60.8%) were extremely confident to mention as a quite regular approach and termed them under "often" parameter.

It was evidenced that when it comes to understanding written directions, use of maps, published news articles, solving mazes & puzzles, remembering better through listening, explanations of visual graphics, listening tapes & its implications in academics, listening to a good lecture about the same material, and writing experiences; a majority of the respondents (42.3% - 49%) were quite unsure in answering the asked questions and they ambiguously referred them under the "sometimes" parameter.

It was substantiated that when asked for enthusiasm levels in making charts, spell better by repeating the letters, intake consumption of recreational items, and finger-spelling approach in learning spellings; the majority of the respondents (40.2% - 59.3%) stated them as a rarely applied approach and expressed them under "rarely" parameter.

Table 6. Questionnaire.

QUESTIONS	Often (%)	Sometimes (%)	Rarely (%)
Follow written directions better than oral directions?	40.2	**47.4**	12.4
Like to write things down or take notes for visual review?	**49.5**	36.1	14.4
Am skillful and enjoy developing and making graphs and charts?	20.6	37.1	**42.3**
Can better understand and follow directions using maps?	38.7	**46.9**	14.4
Can better understand a news article by reading about it in the paper then the radio?	38.1	**47.9**	13.9
Feel the best way to remember a picture is in my head?	**49**	45.4	5.7
Am good at working and solving jigsaw puzzles and mazes?	38.1	**46.4**	15.5
Obtain information on an interesting subject by reading relevant materials?	**49.5**	35.1	15.5
Can remember more about a subject through listening than reading?	28.4	**46.9**	24.7
Require explanations of diagrams, graphs or visual directions?	42.3	**44.8**	12.9
Can tell if sounds match when presented with pairs of sounds?	**47.4**	40.7	11.9
Do better at academic subjects by listening to lectures and tapes?	23.2	**49**	27.8
Learn to spell better by repeating the letters than by writing the word on paper?	30.4	29.4	**40.2**
Would rather listen to a good lecture or speech than read about the same material?	17.5	**42.3**	40.2
Prefer listening to the news on the radio than reading about it in a newspaper?	**35.1**	33.5	31.4
Follow oral directions better than written ones?	22.7	**45.9**	31.4
Bear down extremely hard with pen or pencil when writing?	22.2	**42.3**	35.6
Enjoy working with tools?	**52.1**	34.0	13.9
Remember best by writing things down several times?	**60.8**	33.0	6.2
Play with coins and keys in pockets?	**38.7**	27.3	34.0
Chew gum, smoke or snack during studies?	27.3	23.2	**49.5**
Learn spelling by 'finger spelling' the words?	9.8	30.9	**59.3**
Grip objects in my hand during learning periods?	**36.1**	33.5	30.4
Feel very comfortable touching others, hugging, handshaking, etc?	**41.2**	39.2	19.6

DISCUSSION

We find out that the most used learning style was the Visual learning style (27.79%) and when we compare it to GPA the Visual learning style also has the highest GPA (30.34%). Also in time spending the Visual learning style was the most effective LS, students who prefer the Visual learning style spend less time compared to others. And when we compare our findings with other studies we found that there are similarities with other studies (Buşan, 2014; Jamulia, 2018). Another study was done in 2012, it is in agreement with the findings that the majority of participants achieved more if they study through pictures and charts (Gilakjani and Ahmadi, 2011). The findings of the present study are similar to the results of Dobson (2009), while results of the research done among Saudi preparatory schools found that the students preferred learning by visual aids (Saadi, 2012). Furthermore, Carbo (1983) found that excellent students like to learn through their visual senses.

We also found other studies with similar results to our study, the first one found that 80.8% of the students use the visual learning style (Hernández-Torrano et al., 2017). As a comparison, they found that big numbers of

students who participated in their study progress more when they use all VARK modalities (43.5%) (Almigbal, 2015). In a similar study, they found that the most dominant unimodal style is the aural (auditory) type it's used by 55.9% of the students (Rezigalla and Ahmed, 2019). In contrast to our study, some studies showed that most of the students preferred multiple learning styles (Nuzhat et al., 2011).

When we compared our results of GPA to the types of LS to another study done in 2015 that shows Visual learners having higher GPAs which is similar to our study results (Bertsch and Saeed, 2015). Also, we compared our results of time spent studying to the type of LS to one study done in 2015 which was also similar to our results shows the students who prefer visual learning style spend less time in the study (Farkas et al., 2015). The differences between these studies and our study results might be attributed to the teaching style used in each college.

Our study closely complied with the study done in 2019 in Pakistan which suggested a positive transition toward strategic learning in medical students by highlighting the importance of VL in 21% students (Bokhari & Zafar, 2019). The study done in 2020 by Hernandez et al. (2020) abide by our study in terms of the suggested VARK (visual, auditory, read/write, kinesthetic) models in undergraduate and postgraduate students, this results is a beneficial movement toward deeper and strategic learning. Similar study done in India in the year 2017 by Soundariya et al. (2017) as well as Kharb et al. (2013) indicated the dominance of VL among undergraduate medical students, which awfully complied with our study outcomes. Analogous study concerning the prevalence of VL over the other approaches among undergraduate medical students in Malaysia has been observed with our result (Rahim et al., 2019). The study pertaining to the prevalence of VL in medical students in Gambia demonstrated quite similar findings as that of our study (Mederos et al., 2019). The study on learning patterns conducted by a group of Iranian researchers demonstrated moreover similar compliance with our study with dominance over VL, however, the results included paramedical samplings apart from medical students (Pour et al., 2017).

CONCLUSION

The majority of participants in the survey chose the Visual learning technique. Students who favor a visual learning style score higher (based on GPA data) than students who prefer other learning styles. In terms of learning style and time spent studying, there was a strong correlation. During the admissions process, it is critical to raise student understanding of the many kinds of learning styles and teaching methodologies.

Study strength

- This is the first time for Majmaah University to discuss the LS of medical students,
- This study will improve the knowledge about the LS among the students
- It will show the difference in LS between the medical students
- It will be a baseline sample for research aimed at potential changes in the types of learning or their relation to the preferred teaching strategies or evaluation. Since its newly formed college, this study offers a starting point form to improve activities in our college.

Study limitation

The limitation of this study includes only a few numbers of male students from the medical background, the learning style is unknown in high school students.

Recommendations

To assess the association between learning style and teaching strategies and methods, more research work will be needed.

Conflict of interest

No conflict of interest is declared.

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