

# ASSESSMENT OF LEARNING STYLES FOR MEDICAL STUDENTS USING VARK QUESTIONNAIRE

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**Abstract**— Students learn in several ways and instructors have to design and outline their courses to meet the needs of those students. It is a vital issue to specify the learning styles of students in order to reach the goal of learning. In this study the learning style for a representative sample of Inaya Medical College (IMC) Students has been reported. A VARK questionnaire (Version 7.0) has been administrated to the students who were enrolled in foundation year (FY) and graduation year (GY) have been determined and compared. The research sample consisted of 110 medical students of Inaya Medical College. The representative sample consists of 55 students of FY and 55 students from GY. Based on the assessment of the research data the students have been classified into five groups according to their favorite style of learning has been performed. In FY group, the largest group of students consisted of those are multimodal learning style and most of them considered bimodal learner styles one of them is kinestatic learning style. In GY group, the largest group of students consisted of those are preferred the aural. The classification of the students into the other four learning styles was more or less even. Assessment of student learning style is a vital part in teaching/learning process. Thus medical educators should accommodate their classes to meet all learning styles of the students through using different teaching strategies and aids.

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**Keywords**— VARK; Medical Students; Learning Styles; Academic Achievements.

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## I. INTRODUCTION

Medical education is a continuous process which requires that both students and instructors always update themselves. There are several challenge that facing medical education such as informing a large amount of knowledge within a limited time period in a manner it is effectively retained, interpreted and remembered by a student. This has resulted in important changes in the field of medical education, with a shift from conventional teaching to the use of problem-based, student-centered learning and interactive. Most medical curricula have implemented creative methods of teaching and learning to changeable degrees [1]. It has been argued that facts of learning styles can be helpful for both instructors and students, in that instructors can chose a proper teaching style to associate with the learning styles of students [2] alike, students with knowledge of their learning styles could be empowered to identify and use the techniques of learning best right to their individual styles, resulting in better educational satisfaction [3].

The learner in most cases does not realize his or her learning styles; he or she does not analyses them systematically or improve them coherently [4]. This is because a correct and effective learning style can really help students to gain achievement in their learning. For the determination of students c learning styles, a VARK questionnaire will be used [5] According to Rahmat and Samsudin (2005), students be supposed to be given the chance to study in exclusive situations and presentation methods until

they are competent to identify the most appropriate technique and their own individual learning style. [6] The survey prepared to investigate on four physiological fundamentals in each popular typology, namely VARK learning style.

### A. Visual

Students convince with this style are likely to be provide with demonstration and can learn through explanation. These students have a preference to use record to maintain their progress rate in learning as well as arranging their thoughts and mind. separately from that, visual students are simple to be disturbed or change in center of attention by movements or events, whereas, noise, usually do not trouble them [7][8].

Miller (2001) Explained that as to a great extent as 29 percent of the students are more tending to visual learning style where they hold cleverness in using pictures, optical vision and models in three dimensional form. They also are capable to clarify a thought to others by illustration [9].

### B. Aural

Aural students preferred learning by listening [7]. These students provide more consideration to the words delivered by instructors and easily sporadic noise [7] . They wish to pay attention than writing lecture notes. After lectures end, they prefer to converse topics which were taught with classmates, as a method to clarify their understanding [8] According to Miller (2001), this type of learners can remember information through loud reading or mouthing when reading. Students can strengthen their

memory by listening again to audio recordings, by teaching other people and discussing with instructors. Aural students usually read easily, learn different foreign language fast, have good vocabulary with correct spelling, like to write letters and own strong ability in remembering names or facts [9].

### C. Read / Write

Students with the affinity of reading like better printed word and text as a method to gain knowledge. They like list, word list, textbooks, lecture notes, or passage. These students like to arrange lecture notes into sketch form, paraphrase classroom notes, and study multiple alternative exam questions [8] Besides that, according to [7] these students are note takers. They study superior through note taken from lecture or from hard reading materials.

### D. Kinesthetic

Learning through kinesthetic is an extent mode, regarded to the combination of various sense functions. Kinesthetic referring to learning achieved using perform and experience. In other words, kinesthetic students should go through experience to learn something [8] [7] describes the characteristics of kinesthetic learners as those who emphasize more in experience in learning something and usually, they have high energy and prefer to apply touch.

The aim of this study was to describe learning styles of medical students in Inaya Medical College, Riyadh, Saudi Arabia.

## II. METHODS

This study was performed at Inaya Medical College, female section Riyadh, Saudi Arabia. The research sample consisted of 110 female students of Inaya Medical College, Riyadh, KSA. The sample composed of two groups' foundation and graduation year groups, each group 55 students.

**Tool:** The VARK questionnaire English version 7.0 developed by Fleming (1992) was used in this study to identify one aspect of student learning styles: the sensory modality by which they prefer to take in information. It consisted of 16-item, self-reported, multiple choice questionnaire that can be completed in 10–15 min. In addition to the personal data such as age and academic level were collected. It was administered at the beginning of the second semester to medical students to determine their preferred mode(s) of learning. The purpose of the study was explained to the students, and written informed consent was obtained before the VARK questionnaire was distributed [10].

Participants were asked to describe their learning style(s) by choosing from the following options: 1) visual (learning from graphs, charts, flow diagrams, and demos); 2) aural (learning from speech, lectures, and discussions); 3) reading/writing (learning from reading and writing); and 4) kinesthetic (learning

from performing an activity, touch, hearing, smell, taste, and sight). The student may mark even more choices in case that more answers describe her reactions. Before students complete the questionnaire, they have been advised to choose the answer that best explained their preference and circle the letter(s) next to it, but if necessary they may omit a question or choose two or three options. Questionnaires were evaluated on the basis of previously validated scoring instructions and a chart.

Scoring system steps: first find the learner total score by summing the responses of V, A, R, and K and listing descending. Second look at the difference between each of the scores through compare this to the cut-off points for the "mode" or type of preference the student corresponds to from the VARK resource pack. This ranges from strong preference cut-off points, to weak preference cut-off points. A score for a mode that stands out from the others will indicate a strong or very strong preference as shown in table (1).

**Table (1) Determining Learning Preferences of Students**

Total No. of responses	Very Strong	Strong	Mild
Up to 16	4+	3	2
17-22	5+	4	3
23-30	6+	5	4
31+	7+	6	5

*Statistical analysis has been done using SPSS version 20*

## III. RESULTS

The resulted data from each learner are shown in Appendix (1).

**Table (2) The representative sample details**

	Student's Number	Percentage	Age
FY	55	50%	18-21
GY	55	50%	21-29

**Table (3) Distribution of FY and GY medical students according to their learning style preferences**

	FY		GY	
	Preference of style			
	No.	%	No.	%
VISUAL "V"	3	5%	6	10%
AURAL "A"	7	12%	21	38%
READ/WRITE "R"	6	10%	4	7.2%
KINESTETIC "K"	15	27%	5	9%
Multimodal "MM"	23	41%	12	21.8%
<b>Total</b>	55	100%	55	100%

As shown in table (3) the distribution of individual groups of students according to their learning style preferences via VARK classification is truly surprising. Within this context, interesting facts

should be highlighted. For the FY group, it was found that the most valued style is kinesthetic learning style, preferred by more than 27% of FY students although the highest value was 41% for multinodular learning style but even those who specified as multimodal most of them choose two styles one of them is kinesthetic. The representation of the other three learning styles is more or less similar. For GY group, the obtained were different as the most valued style is aural learning style, preferred by more than 38% of GY students. It resulted from the questionnaire that the representation of both FY and GY as far as their learning style preferences are concerned is the same in each group and corresponds to the total proportion of FY and GY in the sample. These results can be visualized for the purpose of clarity by Figure 1. shown below.

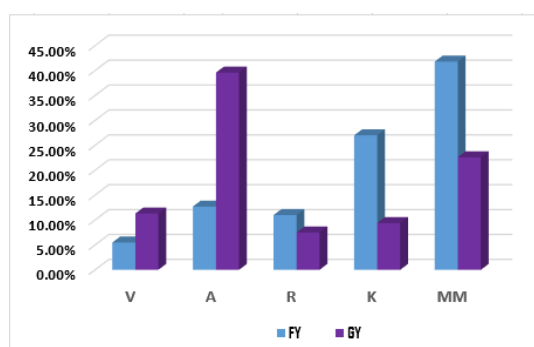


Figure (1) Proportional representation of Inaya medical college students

As shown in figure (2) Almost 26.4% of the total students have aural preference, about 20.9% of students have the multimodal (MM) which include the kinesthetic preference (K) associated with visual or read write preference. The students which preferred kinesthetic style is 19% of the total learners. The least preferable style was the read/write and visual style as its total percentage was 9.1%, 8.20% respectively.

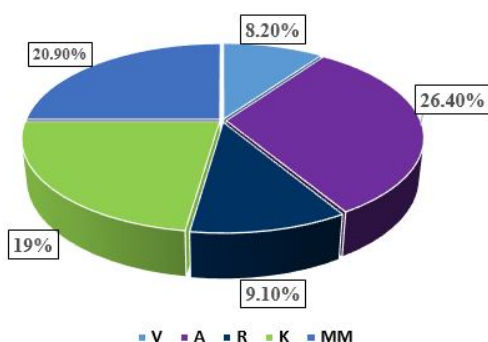


Figure (2) Percentage distribution of learning style among medical students

AS shown in the above mentioned results the students are classified into unimodal (52.7% for FY students and 70.9% for GY students) and the rest students are classified as multimodal learners. to the multimodal learners which are students use more than one

specified learning styles, it was noticed they are classified as bimodal with 36.3% for FY students and 23.6% for GY students, trimodal which are 5.5% for FY students and 3.6% for GY and quadmodal styles 1.8.6% for GY as shown in figure (3). Also the students which are specified as unimodal has been shown. These findings have significant teaching and research implications.

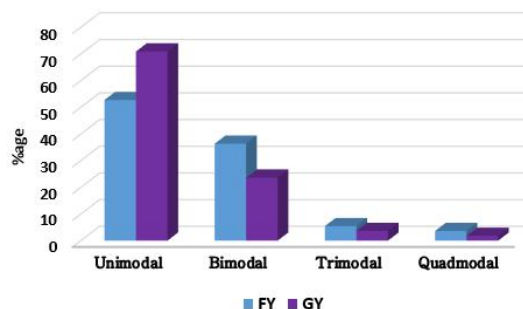


Figure (3) Percentages of medical students who preferred to use unimodal, bimodal, trimodal and quadmodal sensory modalities

#### IV. DISCUSSION

Assessment of students' learning style is a valuable skill in education. Knowledge of learning styles may help educators identify and solve learning problems among students, thus helping their students to become more effective learners [11].

The present study revealed several main differences between FY and GY medical students with regards to learning styles and approaches. Our results showed that the majority of FY students had multimodal learning styles while GY students has a majority in aural style (39.6%). In a similar study conducted in USA, the majority (63.8%) had multimodal learning styles with only 36.1% having a unimodal learning preference; however auditory learners were only a small minority (4.8%) [12].In addition, Slater et al. (2007) reported that the majority of male and female first-year medical students utilize multiple sensory modalities over unimodal learning.(1A) Another study in Turkey showed similar results with the multimodal approach being the predominant style (63.9%), with only 3.2% being auditory learners [13]. Both these studies demonstrated a clear predominance of kinesthetic learners (18.1% and 23.3% respectively) among unimodal learners. A similar study conducted in Australia among first year nursing students demonstrated a predominance of the kinesthetic style of learning [14]. The differences observed in our students may be attributable to the pre-university education system in the country, where students traditionally follow didactic lectures in schools.

In contrast, Samarakoon et al. (2013) reported that despite the majority of medical students remaining multimodal learners, a shift is seen to occur from mainly auditory to mainly kinesthetic learning from first to final years. [15]

This could be attributed to most of the perfect students are multimodal, using all their senses to take in information at any given time. Moreover, it is possible that multimodal learners have stronger learning outcomes that better qualify them for admission to medical college. It is important to emphasize that students will only remember 20% of what they read 30 % of what they hear, 40% of what they see, 50% of what they say, and 60% of what they do. This average increases to 90% for information they say, hear, see, and do [11]. This result also may be related to the use of which means those active learning strategies have to be applied to a greater extent in the foundation year.

While the majority of GY students (39.6%) preferred aural style. This may be related to the most study plan of graduation year had extensive theoretical part that required using group discussion, oral presentation and multimedia applications to match the courses learning objectives.

In addition, the results of this study showed that almost of the total medical students had aural learning style followed by Kinesthetic whereas the least preferable style was visual. This finding is supported by Urval et al. (2014) who found that the highest percentage of preferred learning style was auditory and the lowest was visual of undergraduate medical students. [16] However, Murphy et al (2004) reported that dental students had highest mean score for visual learning style and the lowest was Kinesthetic. [8]

This result may be attributed to teaching in Inaya Medical College mostly consists of lecture classes using PowerPoint presentations and to some extent, whiteboard teaching. Practical and clinical teaching is predominantly small-group teaching/demonstrations. Those who mainly are kinesthetic learners are least targeted in our current teaching methods. Furthermore, important is the fact that kinesthetic learning was an important component in the majority of the multimodal learners. Moreover, simple presentation of a PowerPoint slide might not stimulate the visual learners unless the slide content is organized in a manner that it can be read and understood during the limited time it is projected even if the student was not listening to the lecture.[16]

The present study results also identified that most of foundation and graduation year medical students were perceived unimodal and bimodal. Similar results have been reported by Urval et al. (2014) in India. This highlights the self-utility of the VARK questionnaire. Students can understand their own learning preferences that will help them to actively engage in a learning environment that they would have otherwise perceived to be unsuitable. [16]

Finally, instructors could administer the VARK questionnaire to students to raise students' awareness level of their preferred learning modality, to give students and instructors a common language for discussing learning, and to help empower students to

adjust their learning behaviors to take advantage of their strengths and preferences. This type of knowledge may increase students' ability to actively cope with the rigorous

## CONCLUSION

Based on the assessment of the acquired research data, a classification of students into four groups according to their favorite style of learning given by VARK classification in addition to multimodal style have been performed. The largest group of students being composed of those who prefer motion (kinesthetic) learning style, the other three learning styles are represented rather equally. It would be advisable to respect this fact within the teaching preparation, which should thus involve and be enriched by more elements or educational materials that would enable a particular group of students to learn more effectively. The proportional representation of FY and GY according to their favorite learning style in each group is different. It has been noted that the kinesthetic learning style is a majority for the foundation year students, where the proportion of GY preferred aural learning style. This finding is to be taken into account especially in preparing the course syllabus for Inaya Medical college the students.

Instructors should accommodate their classes to meet the learning needs and styles of students. Multimodal learners can be more flexible about how they exchange information than those with a single preference. However, multimodal learners need to have at least two, three or four modes involved in learning before they are satisfied. Instructors at nursing program should use more than one teaching modality to be able to make their students satisfied with their learning experience.

## ACKNOWLEDGMENT

We are grateful thanks to Inaya Medical College for its guidance assistance suggestions and facilities is gratefully acknowledged. Last but not least we all would like to thank Prof Dr. Abdullah Al Bekairi Dean Inaya Medical College for his support.

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**Appendix (1)**

**FY questionnaire**

#	V	A	R	K	Tot
1	5	2	5	4	16
2	1	4	4	7	16
3	4	6	4	2	16
4	2	5	4	5	16
5	1	11	3	4	19
6	4	7	5	0	16
7	1	1	7	7	16
8	7	4	4	2	17
9	6	5	2	6	19
10	0	3	9	4	16
11	4	4	5	8	21
12	6	4	3	7	20
13	1	4	2	9	16
14	3	4	5	4	16
15	8	7	4	8	27
16	6	8	6	8	28
17	6	9	3	6	24
18	5	6	5	6	22
19	2	9	3	2	16
20	4	7	4	6	21
21	1	5	2	8	16
22	4	6	3	10	23
23	4	3	5	3	15
24	6	2	3	5	16
25	4	4	5	4	17
26	2	3	3	8	16
27	4	4	4	8	20
29	3	3	3	7	16
30	2	6	5	3	16
31	7	6	0	3	16
32	2	7	1	6	16
33	2	6	5	3	16
35	3	5	2	7	17
36	2	5	5	3	15
37	1	5	3	7	16
38	4	5	6	3	18
39	2	2	7	5	16
40	2	3	3	8	16
41	5	3	5	3	16
42	3	2	5	8	18
43	3	2	4	8	17
44	8	7	11	9	35
45	2	4	7	3	16
46	7	5	7	3	22
47	4	4	5	5	18
48	4	6	1	5	16
49	1	3	7	5	16
50	6	5	4	3	18
51	4	5	4	3	16
52	2	6	2	7	17
53	2	6	7	3	18
54	2	5	4	5	16
55	8	3	3	2	16

**GY questionnaire**

#	V	A	R	K	Tot
1	1	8	3	4	16
2	2	7	8	2	19
3	4	6	4	2	16
4	2	5	2	6	15
5	3	4	3	5	15
6	3	3	5	7	18
7	2	5	6	3	16
8	8	10	5	6	29
9	9	4	1	6	20
10	0	13	1	2	16
11	2	8	4	2	16
12	3	6	1	7	17
13	0	7	2	6	15
14	7	2	7	1	17
15	3	3	4	6	16
16	6	5	3	1	15
17	9	10	4	8	31
18	9	10	3	5	27
19	4	11	5	2	22
20	10	5	3	7	25
21	6	6	4	6	22
22	10	9	10	11	40
23	1	9	1	4	15
24	5	8	3	6	22
25	4	5	5	2	16
26	9	5	8	9	31
27	3	5	6	2	16
28	9	6	6	2	23
29	6	8	7	10	31
30	10	7	3	8	28
31	8	4	3	0	15
32	5	10	2	8	25
33	7	15	9	14	45
34	2	7	6	4	19
35	3	8	4	3	18
36	3	8	3	4	18
37	9	1	5	1	16
38	4	8	3	1	16
39	3	6	6	3	18
40	9	6	4	8	27
41	6	0	7	3	16
42	4	10	7	6	27
43	6	2	2	6	16
44	5	3	5	5	18
45	4	6	1	3	14
46	7	7	2	0	16
47	2	3	6	5	16
48	5	6	3	1	15
49	3	8	4	1	16
50	3	6	4	5	18
51	3	3	5	6	17
52	4	7	2	2	15
53	4	6	4	5	19
54	3	7	4	5	19
55	2	7	5	9	23

