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Response of undergraduate medical students to contemporary teaching aids

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The medical teachers are currently employing new teaching aids to make lectures more interesting and interactive to enhance the learning capabilities of the students and to help them develop the ability to understand the topic better as compared to traditional methods of teaching. The objective of the study was to determine the medical students' perception and preferences about the use of different teaching aids including visual aids like whiteboard, overhead projector, multimedia/PowerPoint presentations, audio-visual aid and case based learning in order to recommend ways for their optimal utilization. A cross sectional questionnaire based study was conducted on a stratified random sample of 200 undergraduate medical students during the month of October 2021 at Hail University, Hail, Saudi Arabia. Majority of the students chose Multimedia/ PowerPoint presentations to be a reliable mode of teaching and favored it as interesting and interactive teaching aid. They believe that it provides a better learning experience as compared to case based learning, audio visual aid or white board teaching. Use of Overhead projectors was totally rejected by the students. The article serves as a source of valuable information for the faculty members. Teachers will be able to develop better understanding of the subject matter in students by considering their learning style preferences. It will also facilitate them in developing interest and active participation of students in the classroom.

Keywords: contemporary Teaching aid, Medical Education, Academic Curriculum

INTRODUCTION

There has been a growing interest over the past decade for a paradigm shift from teacher-centered mode of delivery to student-centered. It has been emphasized that such a shift can help for providing a contextually meaningful framework so that core knowledge is delivered with sound concepts of the subject (Ramnanan CJ et al. 2017). A number of variations, which exist between the learning capabilities and learning styles of students, were documented. The later can be improved by providing contextual opportunities to the students (Tainter CR etal.2016).

Active participation of the learners' can be attracted by designing different learning strategies of their preference; an adopted example is of models and video demonstrations for the visual learners, active discussion for auditory learners, models and role-playing for kinesthetic and tactile learners. Presentation of the material in a variety of ways and format attracts the active participation of the students, which enhance their understanding and learning of the subject (Rao et al. 2012, Rose et al.2016) . Nowadays, electronic learning technologies have facilitated this process and have increased the range of aids available to assist the academics in their teaching.

The effectiveness of various learning strategies has

little documentary evidence, which appears to be the hindrance for adopting these strategies. The faculty members must have thorough knowledge of the subject matter along with awareness of the learners' characteristics and learning styles preferences to be effective. Most of the faculty members have an up to date knowledge of their subject of specialization. However, understanding the differences in learning style preferences of the learner is very important but an underutilized approach to improve understanding of the learners'.

Learning style describes the manner and environment of information delivery, which enables the learner to perceive, process, store and recall the information efficiently and effectively (Tennyson et al. 2012). More than 70 different learning styles have been identified which emphasize the various characteristics of the learner's preference. It includes style of processing the information and cognitive personality style. Learning can be through cognitive, affective and psychomotor domains. Students have shown to grasp new knowledge by the help of visual, auditory and tactile sensory modalities (Fleming et al. 1995).

The mode of delivery and transfer of information in a lecture appeals particularly to those with strong verbal/linguistic skills. In addition, drawing figures on the whiteboard or presenting through PowerPoint presentation tend to accommodate those with strong visual/spatial intelligence also. Multimedia and audiovisual-based demonstration broadens the scope of a lecture. Teachers are able to show a variety of tables, colored pictures, diagrammatic illustrations and flow charts with the help of PowerPoint presentations whereas animations can help understand the dynamics of complex bodily mechanisms and pathogenesis.

The study was designed to determine the perception and preferences of the undergraduate medical students' about the use of contemporary teaching aids.

MATERIALS AND METHODS

A cross sectional survey was conducted in month of October 2021 at Hail University,. A stratified random sample of 200 undergraduate medical students was taken. After explaining the purpose of the study and taking informed consent, the students were asked to fill a questionnaire during their leisure time while they are sitting in canteen and library.

The study questionnaire was designed carefully after literature review and some of the questions were adapted from similar studies conducted previously. It was pre-tested on a sample of 25 participants. Any ambiguities in the questions or responses were removed before its implementation. The questionnaire had three sections. The first section assessed the demographics of the students. The second one assessed the preference of the students among different teaching aids in terms of developing interest and interaction, increasing understandability and provision of a better learning experience, while the last section dealt with the attitude of the students towards the use of the contemporary teaching aids utilized in undergraduate medical teaching.

Statistical Package for the Social Sciences (SPSS version 22.0) was used to analyze the data using descriptive statistics that involves the use of frequency distribution and percentages. An informed consent was obtained from every student and confidentiality was assured.

RESULTS

Table 1: Demographic of MBBS students

Parameters Studied	Classification	Number	Percentages (%)
Age in years	19 years	40	20
	20 years	50	25
	21 years	40	20
	22 years	70	35
Year of studying	1st year MBBS	50	25
	2nd year MBBS	40	20
	3rd year MBBS	60	30
	4th year MBBS	50	25

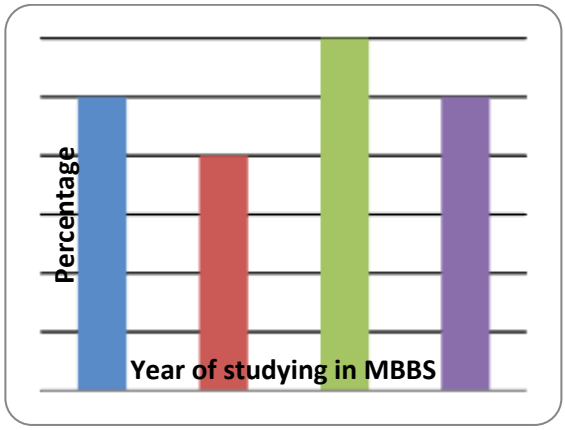

Figure 1: Percentages of the students studying in different years of their undergraduate medical education

A stratified random sample of 200 undergraduate medical students was taken out of which 100 were males and 100 were females. At the time of study, 25% students were studying in first year, 20% in second year, 30% in third year and 25% were in final year of their medical education. 20% students were 19 years old, 25% were 20 years old, 20% were 21 years old whereas 25% were 22 years old.

Table-2: Perception and preferences of the undergraduate medical students' towards different teaching aids

	Frequency of responses obtained from the students				
Questions asked	**WB***	**OHP§**	**MM/PP¤**	**AVA‡**	**CBLϕ**
Which tool is reliable type?					
Boys	18	0	39	18	24
Girls	16	2	35	20	28
Total	34	2	74	38	52
Which mode develops the ability to understand the topic better?					
Boys	11	0	44	14	31
Girls	9	0	40	18	33
Total	20	0	84	32	64
Which mode provides better learning experience?					
Boys	12	0	43	16	29
Girls	10	2	45	16	27
Total	22	2	88	32	56
I prefer…					
Boys	14	2	31	26	27
Girls	18	0	35	22	25
Total	32	2	66	48	52
Which is more interesting and interactive teaching aid?					
Boys	14	0	46	21	30
Girls	10	0	42	27	34
Total	24	0	88	48	64

*White Board, § Over Head Projector, ¤ Multimedia / PowerPoint presentations, ‡ Audio visual Aid, ϕ Case based Learning

Table 2 represents the generalized attitude of the students towards different teaching aids. 37% students favored multimedia/PowerPoint presentations whereas 26% and 17% considered WB and CBL respectively as a reliable teaching tool. 42% students considered that PowerPoint presentations develop the ability to understand the topic better while 32% and 16% students think that case based learning and audio visual aids respectively can help them develop the ability to understand better. 44% students agreed that PowerPoint presentations provides a better learning experience as compared to case based learning (28%) and audio visual aids (21%) and white board teaching (11%). 33% students gave overall preference to Multimedia / PowerPoint presentations. 26% preferred CBL, 24% preferred audio visual aids and 16% students preferred white board teaching. Multimedia / PowerPoint presentations teaching were also preferred as an interesting, interactive type of teaching aid by 44% students. 32% students thought CBL to be more interesting and interactive while 24% opted for audio visual aids and 12 % for WB teaching. Students totally rejected the teaching by means of Overhead projector. Only one student favored OHP as the preferred mode of teaching and considered that it as a reliable teaching aid that provides a better learning experience.

Table-3 shows number and percentage of students who agreed to the questions asked about different teaching aids. 75% students preferred teaching using combination of PowerPoint presentations with the AVA or WB. 83% students did not feel any difficulty in switching from one mode of teaching to other during the delivery of lecture. 87% students did not feel any difficulty when two or more teaching aids were used simultaneously. 89% students agreed that lectures by foreign scholars can be used a teaching tool in future. 71% wanted a handout to be provided after a lecture and 56% considered that provision of the handouts reduces the need of getting detailed knowledge from the textbook. 79% students agreed that busy schedule in the semester system is responsible for students to rely on review books. 65% students considered e-books to be helpful and 84% denied the possibility that e-books could replace printed books in future.

Table-3: Percentage of students agreed with questions asked in survey

Questions	% of Students (n)
Integration of multimedia/PowerPoint presentations teaching with AVA/ WB	75
Difficulties in switching from one visual aid to other in short duration	17
Difficulties in using two or more methods simultaneously by the teacher	13
Student-centered interactive sessions are more helpful in understanding the concepts of physiology	81
Lectures by local/foreign scholars by video conferencing as a future teaching tool	89
Handouts of topic/lecture be provided	71
Provision of the handouts reducing the need of getting detailed knowledge from book	56
Tight/busy schedule of the semester system behind relying more on short notes and review books	79
E-books as a helpful tool in studying	65
Replacement of printed books by e-books in future	16

DISCUSSION

Although students need to memorize a number of facts but developing concepts is fundamental to the understanding of medical sciences. The process of understanding involves the ability to assimilate and recall the thoughts, ideas and knowledge about a particular subject matter. It also includes predicting the behavior of body systems and able to explain responses to specific stimuli [11]. Students develop concepts and acquire facts through lectures and textbooks. Several different teaching methodologies can be employed; each has its advantages and disadvantages (Reese AC et al. 1998) . Lecture is used to deliver information to larger masses but it is usually a one-way communication and involves minimal engagement of the students (Chaudhary R et al.2009). It takes active involvement of the student with the subject matter to develop understanding that is mostly not achieved in the lecture halls (Hunt et al. 1998) .

Blackboard was the choice of the past as it was simple to use with minimal requirements. White board has now largely replaced Blackboard and is very similar except that an erasable marker is used in place of chalk. Chaudhary, Dullo, and Gupta et al in 2009 have mentioned in their study that students favored BB teaching as a better visual teaching aid instead of transparencies on OHP. The biggest disadvantage in BB teaching is that the complex diagrams are difficult to draw and time consuming and requires a lot of drawing skills on part of teacher. It is note worthy that while drawing a diagram; teacher's eye contact is also broken with students. Similar problems are encountered with the Whiteboard as well. In our study too, only few students favored WB teaching.

PowerPoint presentations have become an important component of traditional face-to-face lectures and have largely replaced Blackboard and Whiteboard. Use of well-prepared presentations can help promote active learning process It can increase the efficiency and scope of classroom lectures many folds. It also helps clarify the important but difficult concepts making it easier for students to understand (Sammons et al.1997). Rocklin proposed that PowerPoint can facilitate teachers to "help their students learn" while Creed counter-argues that PowerPoint is teacher-focused and can be a "bad pedagogical tool" (Tainter et al.2016). (However, understanding the merits and demerits of using PowerPoint as a teaching aid is important academically as well as practically. Our study, favors the findings of Rocklin as students have preferred PowerPoint presentation as the most reliable teaching tool, which is also interactive and provides best learning opportunity.

Several studies have shown that students consider video based demonstrations as an effective learning tool (Kumar et al.2003, Hecht et al.1998). Video conferencing and video streaming have proved its effectiveness in delivering lectures to off campus students. Those who have missed their lectures can also stream the video online to get maximum benefit from this technology. Similar results were found in our study. 89% students agreed that online lectures through video conferencing could play a promising role in medical education.

The modern teaching is shifting from teacher centered to students centered education, which has led to a shift in the role of the teachers as well. The primary objective of the teachers' is to involve students in an active learning process. The role of Problem/Case Based Learning in actively involving the students in learning process is identified in several studies (Kumar et al.2003). Case Based Learning (CBL) has largely replaced formal teaching aids and has become a popular approach to learning in medical curricula worldwide. It is an active learning process, which uses hypothetical medical case scenarios as the basis for learning. Small groups of 5 to 9 students participate in the discussion facilitated by a faculty member who leads the group in the right direction. Discussion helps students identify the learning issues necessary to understand the case scenarios and leads them to seek information through individual, self-directed study.

Studies show that students have achieved higher scores in undergraduate courses when teaching style was

designed according to their learning style preferences. Rochford(Ochoa, T et al.2005) found significantly higher achievement when instruction material was prepared in response to learning style at an urban community college. Miller observed a significant improvement in examination scores as well as in students' attitude towards learning when information delivery style matched students' learning styles (Miller et al.1998). The present study suggests that students prefer integration of the multimedia or presentation with AVA or WB teaching. Demonstrators and lecturers must keep these preferences in mind to increase the effectiveness of the lectures. Our findings do not correlate with the findings of Slater and Lujan who found gender specific learning style preferences among undergraduate students. There was no significant difference in learning style preference of male and female students (Slater et al.2007).

An opposing viewpoint shows that an intentional mismatch in teaching style and in learning preferences of the learners' can produce better results. Grasha argued that matching would bore the learner causing disengagement whereas a premeditated mismatch would not only prevent disinterest and would ensure active learning of the students. Studies supporting this theory have shown that even students who have dominant patterns of learning styles have also chosen diverse methods of information delivery to prevent monotony. Kelly and Tangney showed that students who have demonstrated least learning process have demonstrated good learning ability when information was presented in their least preferred method.

However, some studies disapproved the use of mismatching as a primary strategy as it did not prove efficient for improving student-learning outcomes. Mismatching, therefore, is not a replacement for matching but can be employed occasionally to enhance and stimulate the learning process (Kelly D et al. 2007).

CONCLUSION

To date, the early student response to FC applications in undergraduate medical education is largely positive. The studies characterized thus far have demonstrated strong student satisfaction with pre-class learning resources that have been designed based on sound technology-assisted learning theory.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

FK and TA wrote first draft of the manuscript. SH, SA and FA,RF,RA,EA.collected data and literature. ZB,RM,AK,,AE,TA,SHMA,FS,MA and AB reviewed the manuscript. FK contributed in literature search and finalized the manuscript. All authors read and approved the final version of the manuscript.

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