

ORIGINAL RESEARCH



Perception of Students on Online Self-Assessment Tool in Anatomy During COVID-19 Crisis

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Authors' Contribution:
A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
G – Funds collection

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Background and Aim of Study:

Abstract

As anatomy subject is the basis of the MBBS curriculum, it's clear understanding and knowledge is needed. Syllabus of anatomy is vast and also volatile, to summarise large amounts of facts and train students for acquisition of the skills, we believe that students learn by practice. Due to COVID-19 crisis on educational system online learning and assessment of students has become a preferable replacement of conventional in person teaching and learning.

The aim of the study: to determine the perception of first year MBBS students on online self-assessment tool in anatomy, to evaluate their academic achievements during COVID-19 crisis.

Material and Methods:

The present study included 50 students of first year MBBS of Saveetha Medical College. Steps to conduct the aim for divided in two google forms, one contains challenging questions on the topic Lungs and Heart and other was a questionnaire to know the students' perception on this online assessment tool.

Results:

It was observed that majority of the students have attempted the first google form and have also performed really well in it. 80% of the students were successful in giving the right answer for the questions given. In the second google form, which was a questionnaire, 85% of the students have found this online self-assessment to be really useful, interesting and easy way of learning. They found the questions to be challenging and help them to remember the topic in a long run. 91% of the students have liked the way of learning.

Conclusions:

Online self-assessment tool definitely proved to be a student friendly method of learning. This method gave them a way to learn and practice their subject topics as well as helped them in improving their perception and memory.

Keywords:

education, students, perception, memory, anatomy, COVID-19

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Introduction

Anatomy is one of the fascinating subject in MBBS curriculum which involves a lot of understanding of basics and knowledge of the clinical part. It is the study of the internal structure and structural design of the living things.

In the vast curriculum of MBBS, anatomy is one of the challenging subjects among the students. As 1st year MBBS students, anatomy doesn't prove to be cake walk as students are newly exposed to the unfamiliar environment of the curriculum. They are exposed to totally new scenario of teaching and learning process (Jaiswal, Sathe, Gajbhiye, & Sathe, 2015).

The learning characteristics of students have been extensively studied and numerous theories have been proposed. For example, in the widely read theory of andragogy, Knowles (1984) described adult students as self-directed learners whose knowledge acquisition occurs best when it is exploratory and task-oriented, rather than via rote memorization. Learning involves the reorganization and transfer of new information from the limited confines of working memory to the limitless repository of the long term memory. Working memory, or what we can consider at conscious memory, is characterized by storage durations as well as content capacities that both are very limited. Long term memory encompasses our repository of accumulated knowledge and therefore has a capacity that is theoretically boundless. The challenge facing each learner is to organize new information, as it is added to this repository, so that it can be successively retrieved and applied in a timely fashion when needed. With that in mind a challenge facing anatomy educators is to effectively guide learning so as to maximize the efficiency with the new knowledge is encoded in long term memory (Kirschner, Sweller, & Clark, 2006).

With the recent crisis and disruption of education system due to COVID-19 crisis it's the need of the hour to develop and strengthen the online mode of teaching and learning and online assessment of students through development of technology. The paper (O'Byrne, Patry, & Carnegie, 2008) describes the development and implementation of program based online anatomy learning and self-directed tools for undergraduate faculty of health science students enrolled in first year combined anatomy and physiology courses at the university of Ottawa.

Generally, students find it difficult in understanding of concepts and learning of the subject. Eventually students get frustrated and lose their hopes over the subject as a result, there is a loss of self-confidence among the students. Among this confusion in the students, anatomy professors play an important role (Nagar et al., 2012). They act as helping hands for the students struggling with the subject. The role of the faculty members in the medical education is to influence the learning process. The introduction of multiple techniques of learning is necessary to create an easy learning among the students. Students feedback is a useful basis for modifying and improving medical education (Bandyopadhyay & Biswas, 2017). Therefore, in developing the teaching and assessment method it is necessary to get the feedback from students that will later be useful for the

faculty to modify their teaching and assessment methods (S. Rafique & H. Rafique, 2013).

A systemic process of collecting, analyzing and interpreting data in order to validate or judge students is assessment (Shamkuwar & Mokhasi, 2018). Nowadays different innovative teaching techniques which bring about an interest in the students are introduced. There are many techniques like anatomical books, cadavers, prosection anatomy 3D views, audio and visual learning. Among all this is online self assessment. Nowadays students have become more familiar and expert in operating the electronic devices like smart phones, laptop, etc. The correlation of these devices with anatomy study can create a better combination in learning and practicing of the subjects (Davis & Dargusch, 2015). Online self assessment is equally important as online teaching and learning thus without a proper comprehensive online assessment tool the teaching or learning does not fulfil the purpose and cannot motivate the students so there was a need of immediate development of variety of online assessment tools, programs with the prevailing COVID-19 crisis. MCQ are reliable, valid and most easily assessable form. Online assessment method can be accessible anywhere without any obstruction. Nevertheless, online assessment tool can be of utmost help to the students (Obad et al., 2016). Keeping this technique in mind, the present study is conducted on perception of 1st year MBBS students towards an online assessment tool especially in the year when the world had to face the COVID-19 crisis of the century.

The aim of the study. To determine the perception of first year MBBS students on online self-assessment tool in anatomy, to evaluate their academic achievements during COVID-19 crisis.

Materials and Methods

A cross-sectional, descriptive study was conducted on 50 students of first year MBBS who are currently into the course of first year in Saveetha Medical College and Research Institute Chennai after receiving Institutional Review Board clearance. Two online Google forms were prepared which gives a brief description and response about the study.

Google form 1: This Google form contains challenging and interest provoking questions on the topics of anatomy of heart and lungs. There are 20 questions framed for the students to answer. The students were asked to respond to the questions after the topics were completed. As this was a first hand experience for the students the questions were kept simple and straight forward. This form even consists of students details like name and email-id so that we can assess each particular student's knowledge about the topic though confidentiality was maintained throughout the study. The performance of students was analysed in detail.

Google form 2: This anonymous Google form consists of questions about the students' perception on the online assessment tool in anatomy, basically a questionnaire about the students' experience with the online assessment tool. This questionnaire involved questions like whether the students found it easy, whether it was a

preferable mode of learning, whether it was interesting, challenging and thought provoking and other related questions. Students were informed that the information provided by them is for the research and evaluation purpose only and will be kept confidential. The analysis of the perception of students were done.

Table 1. Questions asked on the topic heart and lungs.

No.	Questions	Answer options			
		A	B	C	D
1.	The base of the lung separates the left lung from	Left lobe of the liver	Oesophagus	Fundus of the stomach	Inferior vena cava (IVC)
2.	The apex of the lung is covered by	Suprapleural membrane	Parietal pleura	Costal surface	Mediastinal pleura
3.	Right lung is divided into	3 lobes	2 lobes	1 lobe	4 lobes
4.	The projection of the left lung below the cardiac notch is	Middle lobe	Lingula	Alveoli	Bronchus
5.	Which lung is shorter and broader	Right	Left		
6.	Blood supply to the lungs predominantly from	Bronchial artery	Musculophrenic	Intercostal artery	Internal thoracic
7.	Sympathetic supply of lungs is from	T6-T10	C3-C5	2-5 Sympathetic ganglia	T2-T5
8.	Trachea divides at the level of	T1	T5	T4	T3
9.	Inhaled particles of foreign body tend to pass more frequently	Right lung	Left lung	Right principal bronchus	Left principal bronchus
10.	Which are the surgical sector of lungs	Root of lungs	Hilum of lungs	Bronchopulmonary segment	Bronchus
11.	The area where the trachea bifurcates	Carina	Hilum	Lingula	Visceral pleura
12.	The pericardium is a	Fibrous sac	Fibroserous sac	Muscular sac	Serous sac
13.	Breakdown of dorsal mesogastrum forms	Oblique sinus	Costodiaphragmatic recess	Costomediastinal recess	Transverse sinus
14.	Nerve supply to pericardium	Phrenic	Vagus	Intercostal nerve	Cardiac plexus
15.	Apex of the heart is formed by	Left ventricle	Left atrium	Right ventricle	Left auricle
16.	The inferior border of the heart extends from	Apex to left auricle	SVC to IVC	Apex to IVC	Apex to right atrium
17.	The opening of coronary sinus is guarded by	Eustachian valve	Thebesian valve	Mitral valve	Tricuspid valve
18.	Narrowing of valve orifice due to fusion of cusps is	Stenosis	Pericarditis	Fistula	Block
19.	Blood supply to heart is by	Internal carotid artery	Coronary vessels	Musculophrenic artery	Descending aorta
20.	Sympathetic nerves of the heart are derived from	Superficial cardiac plexus	Deep cardiac plexus	T4-T5	T5-T6

Results

Responses were taken from the first year MBBS students at Saveetha Medical College and Research Centre on the first Google form which contains questions on heart and lungs (Table 1). Responses were collected for each and every question.

Figure 1 shows about the percent of correct responses obtained from the students on the online self-assessment tool. This figure gives us an idea that most of the students have found it really easy and helpful way of learning. Most of the students have given the right answers for all the questions. A very few students have answered the incorrect one and this proves that most of the students have found it to be a very easy way of learning.

Responses were collected from the students about the overall positive perception of them on this online self-assessment tool. Majority of students agreed on using this method of online assessment.

Table 2 shows the overall response of the students towards the online assessment tool in form of MCQ's in Google form.

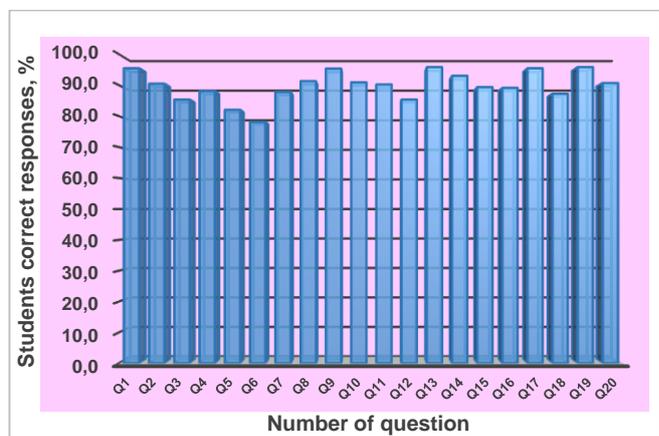


Figure 1. The percent of correct responses of the students on each question.

Table 2. The overall response of the students towards the online assessment tool.

Questions on perception of students on online assessment tool	Number of students' answers according to the scale, %					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Did this assessment tool help in improving your memory?	0.0	17.6	11.8	47.1	23.5	100.0
Was this assessment interesting?	0.0	0.0	17.6	29.4	53.0	100.0
Did this assessment kindle your interest in anatomy?	6.0	0.0	6.4	32.0	55.6	100.0
Was this assessment useful?	0.0	5.9	11.8	47.1	35.2	100.0
Were the questions in the assessment challenging?	0.0	16.7	25.0	50.0	8.3	100.0
Did you like this way of learning?	0.0	8.3	16.7	16.7	58.3	100.0
Were you able to attend the questions?	8.3	0.0	8.3	66.7	16.7	100.0
Was this assessment an easy way of learning?	15.4	0.0	15.4	53.8	15.4	100.0

A total of 23.5% of students has strongly agreed and 47.1% have agreed that this online assessment has proved to really useful to improve their memory. A total of 53.0% have strongly agreed and 29.4% have agreed that this online assessment tool is interesting. A total of 55.6% have strongly agreed and 32.0% have agreed that this online assessment was able to kindle their interest in anatomy. A total of 35.3% have strongly agreed and 47.1% have agreed that this assessment was useful to them. A total of 8.3% have strongly agreed and 50.0% have agreed that this assessment was challenging to them. A total of 58.3% have strongly agreed and 16.7% have agreed that they liked the method of learning. A total of 16.7% have strongly agreed and 66.7% have agreed that they were able to attend the questions given in the online assessment tool. A total of 15.4% have strongly agreed and 53.8% have agreed that this is an easy way of learning for them.

The overall positive response of the students for online method of assessment in 1st MBBS students which is comparatively new provided confidence to the educators and teachers at the time of COVID-19 crisis and thus opened a new approach which was to be adopted widely in the coming months.

Discussion

Anatomy is one of the challenging and basic subjects essential in the curriculum of MBBS (Gune et al., 2018). It involves more of learning and practicing of the topics. Extensive changes have taken place all around the world to improve the standards of education.

Learning and practicing methods are not just restricted to textbooks and lectures.

Nowadays access to internet, electronic gadgets, journals and educational videos are the newer concepts of learning (Jaiswal et al., 2015).

Social distancing during COVID-19 pandemic accelerated digitalization of education (Melnyk, Pypenko, & Maslov, 2020).

The COVID-19 pandemic forced almost all global higher education institutions to rapidly move to online instruction whether the institution, the faculty or the

students were ready for the move (Houlden & Veletsianos, 2020).

Online learning places emphasis on interactions between and among different channels and forms of interaction for students in the online environment to let learners be more engaged in the learning process (Riggs, 2020).

The COVID-19 pandemic required expansion of existing infrastructure and more demanding forms of technology-enhanced learning (Zimmerman, 2020).

Digitalization of education and the use of information technology are crucial for teaching students today (Melnyk & Pypenko, 2020).

Features of the perception of educational programs by students of medical universities were studied by Melnyk, Yekhalov, and Sedinkin (2020).

To make things easier for students, assessment methodologies have evolved. Assessment is an essential part of medical education. It is the central to the educational process. It shows how well students have learnt the subject (Shamkuwar & Mokhasi, 2018).

One of the assessment method is online assessment tool which easily accessible anywhere in providence of internet connection. Through feedback about this online assessment we can find whether this method has helped the students in coping with their learning and practicing process (Bandyopadhyay & Biswas, 2017).

Over the past decade, medical schools, postgraduate training programs, and licensing bodies have made new efforts to provide accurate, reliable, and timely assessments of the competence of trainees and practicing physicians (Epstein, 2007).

Such assessments have three main goals: to optimize capabilities of all learners and practitioners by providing motivation and direction for future learning, to protect the public by identifying incompetent physicians, and to provide a basis for choosing applicants for advanced training (Tabish, 2008).

In this study, we have just taken online assessment as a way of learning and practicing. There are many other methods and ways which has been used extensively by the students.



A study in Bhopal showed that 54.3% students preferred multimedia teaching methods as the best anatomy teaching methodology and it relies on scientific and does not cause lack of attention (Jaiswal et al., 2015).

As the teaching methodology majority of students feel that dissection hall teaching is the best method followed by slide projector/AV projection/Multimedia, conventional chalk and board methods (Hassanzadeh et al., 2012).

A study states that, 82.0% of the students agreed that the effectivity and reliability of the multimedia-supported anatomy teaching in both the theoretical and practical classes was useful as there was a notable increase in the academic performance of the students. In the present study, 35.3% have strongly agreed and 47.1% have agreed that the online assessment tool was really helpful to them (Al-Hayani, El-Aziz, Eldeek, & Hammad, 2008).

In a study, majority (75.0%) of the students felt that multiple modes of assessment improve their knowledge and skill. 32.7% of the students favoured MCQ's as a mode of assessment. In the present study, we have given MCQ's as a self-assessment tool in online mode and 47.1% of students have found that this MCQ based online assessment helps them in remembering the topics (S. Rafique & H. Rafique, 2013).

In the study conducted, 46.7% of students were aware of the internet as a tool to learning and judge it as an effective source of self learning. In the present study, 58.3% of students have agreed that the online self-assessment is an easy way of learning (Nagar et al., 2012).

From the experiences of the researchers in teaching undergraduate students, a study was conducted about collecting feedback on the assessment given to the students.

It was recognized that while considerable effort in recent years had been focused on improving the quality of lecturer feedback on student assessment, students reported that they were not consistently engaging with the feedback provided on assessment items.

In the present study students were given a feedback form on the assessment given to them and majority of them find it challenging and useful (Davis & Dargusch, 2015).

When we talk about topic in anatomy, majority of them have found neuroanatomy, pelvis, perineum to be the difficult topics in a study made.

In such cases we can help students by creating and introducing these online assessment tools as it creates confidence among the students when practiced using these online tools (Kramer & Soley, 2002).

As we have taken online assessment as our prime method of assessment to access the students, majority of the students have shown interest in it and found the learning and self-testing tool to be user-friendly, relevant and helpful.

However, approximately one third of the students did not find the online assessment tool useful.

One strategy that could be used to encourage students to develop a personal schedule of regular practice

application would be routinely assigned specific exercises that should be done when they are leaving at the end of the lecture.

Students can be encouraged by the faculty member to complete the given online assessment at the earliest as it shows a great impact when it comes to a long term plan.

A majority of the students have even found the questions in the online assessment to be challenging as it helped them to get a clear knowledge and made them remember the topic on a long run (O'Byrne et al., 2008).

A more important value of these online learning tools maybe their ability to appeal to learning styles that are often not addressed very strongly in the lecture room.

Undergraduate classrooms are composed of heterogenous populations of learners and these anatomy learning tools to address some of this heterogeneity. In a study, described four types of learning preferences: visual, aural, read/write and kinesthetic and developed a simple online questionnaire that students can use to recognize their primary learning style (Chapman et al., 2013; Densen, 2011).

What is the value of devoting so much time and energy to the development of these online self assessment tool when there already many offline interactive methods available to increase the knowledge and practicing way of the students?

The commercially available tools are indeed really helpful, but they often get difficult for the students to find such books and get them at an affordable cost.

The other tools might most of the times provide information that is more than required for the undergraduate level and makes it difficult for the students to read them and have a self assessment concerning those difficult topics.

But this online assessment tool is easily accessible anywhere and exactly provides the information and knowledge and assessment which can help them later in final exams too and make it a cake walk for the students. This is the need of the hour more due to COVID-19 crisis development of not only teaching online tools but equally important is the development of assessment tools which are student friendly and easy to operate.

In other studies, scholars have compared knowledge acquisition by students using an SDL approach versus other more traditional modes of content delivery (Kooloos, de Waal Malefijt, Ruiters, & Vorstenbosch, 2012; Leslie, 2017; Smythe, & Hughes, 2008).

Murad et al. (2010) conducted a systematic review of the effectiveness of SDL in the health professions. They found moderate quality evidence that SDL activities result in gains in the knowledge domain when compared to traditional teaching methods.

Similarly, in present study too the online assessment can promote self-directed learning and it's a motivation for students too for further learning.

In the present study, 53.0% of students felt the assessment tool was interesting, and 50.0% felt it was challenging, 58.3% preferred the tool, 53.8% felt it's an easy way of learning.

A clear comparison of the objective data of other studies and of present study are shown in Table 3.

Table 3. A clear comparison of the objective data.

Data of other studies	Data of present study
54.3% of the students have considered as multimedia to be the best method of learning	52.9% of the students have strongly agreed that online self-assessment tool is an interesting way of learning
82.0% of the students have considered that multimedia supported learning is helpful	82.4% of the students have found online assessment tool to be really helpful in learning
46.7% of the students were aware of internet as easy, effective and helpful way of studying	58.3% of the students have found that this online assessment is an easy way of learning
32.7% of the students found MCQ based online assessment to be best mood of assessment	47.1% have found this MCQ based online assessment to be the helpful in remembering the topics

Conclusions

An opinion regarding the online assessment tool in anatomy was taken in Saveetha Medical College concluded that majority of the students have found the online assessment to be really useful as a tool for practice and learning. This method has encouraged students in learning and practicing their topics in which they aren't confident and helps them to cope with the vast curriculum.

Our study shows that students have found the online assessment questions to be challenging and helps them to know their strong and weak topics in the subject. This online tool helps them in improving their perception and memory, and place a strong foundation about the topic in the students' mind. The students also found this method to be really easy and helpful way of learning.

As the learning and teaching has changed a lot over the years, both students and teachers can choose the best suited method to enrich and deliver the knowledge. In the end, the online assessment tool has been proved to be an innovative and student-friendly method of learning and practice in anatomy.

Despite the efforts made in making MBBS curriculum easy for the first year students, still many of them are struggling to cope up with the subject and efforts are still made to bring new methods to the students and help them in all possible way.

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Ethical Approval

Permission for this study was obtained from the ethic committee of institution and informed consent was obtained from students (Approval No. SMC/IRB/0052/020 from 26.03.2020).

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