ORIGINAL ARTICLE

Perceptions of First- and Second-Years Medical Students about E-Learning versus Face-to- Face Learning in Human Anatomy Integrated Course.

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ABSTRACT

Background: The Coronavirus Disease (COVID-19) pandemic has forced all educational institutes to stop direct educational methods in order to control the rapid spread of the virus. Medical institutes in Egypt were the first to apply these measures. The aim of this study was to detect the perception and opinions of 1st and 2nd years Egyptian MBBCh medical students about E-learning versus Face-to- Face learning in human anatomy integrated course.

Methods: A cross sectional study was directed in the Human Anatomy and Embryology department, faculty of medicine, Zagazig University for the academic year 2019-2020. Two hundred sixty-four 1st and 2nd year MBBCh students were explained the study and appealed to participate in it. Data was collected through an online survey using online Form Sheets. Two objectively structured questionnaires were designed; each one included a total of 15 items regarding the opinion of students, as well as their satisfaction for E-learning.

Results: About half of the participants were males (49.6%). Just over a quarter of the responding students (25.5%) were in the 1st academic year. Regarding the overall students' perception towards traditional versus e-learning methods, 31.06% of students felt positive (replying for the questionnaires by agree and strongly agree) towards traditional versus 24.6% towards e-learning.

Conclusions: It is concluded that students are still more inclined to use traditional learning methods rather than E-learning.

Keywords: E-learning; traditional learning; face-to-face learning; medical students.

INTRODUCTION

Online educational approaches are rising in popularity and are components of medical college programs in the United States in the last decade (1) Although the traditional didactic lecture is efficient for presenting information and providing explanations, it usually does not provide adequate time for deeper learning activities, which is why traditional lectures are one of the most widely, criticized educational methods (2). E-learning is a special method of education with digital skills defined as "the use of new multimedia technologies and the internet to improve the quality of learning, by facilitating access to resources and services, as well as remote exchange and collaboration (3).E-learning resources provide easy access to information and are being widely used for self-directed learning by medical students.

Computers and e-resources have made the process of learning simple, easier, exciting and efficient, thus enabling students and teachers to overcome the few limitations of traditional classroom teaching (4).

Medical educators have used the term e-learning with the term's web-based learning, online learning or education, computer-assisted or -aided instruction, computer-based instruction, internet-based learning, multimedia learning, technology-enhanced learning and virtual learning (5, 6). Such nomenclature has led to confusion as to whether e-learning is part of the medium (e.g., computer-assisted instruction) or the delivery mechanism (e.g., online learning) (7).The Covid-19 pandemic has produced global devastation, resulting in the abandonment of face-to-face (F2F) education and the implementation of a computer-generated teaching method, which affected the educational

system, particularly those enrolled in hands-on programs and courses such as anatomy (8,9). Stockley defines it as "the delivery of a learning, training, or education program by electronic means" (10). Teaching the subject of Anatomy may be an exceptional challenge when turned into an online based curriculum, devoid of the learning enhancement provided by in person tools such as cadaver dissection. Great numbers of anatomy curricula use a variety of face-to-face physical-based actions (11–15) that are not easy to familiarize to a group of individuals via technologies such as, Microsoft Teams, Blackboard Collaborate, or Zoom.

There is currently a lack of studies exploring comparisons between traditional teaching methods and E-learning in the Middle East and Africa. In the faculty of medicine of Zagazig University Egypt, the Human Anatomy course is educated to first- and second-year undergraduate students divided into large groups (600-800) for didactic lectures, and again into 55 person groups for prospection practical sessions and small group teaching (SGS).

METHODS

Ethical Consideration

In May 2020, this study was approved by Institutional Review Board (IRB), Faculty of medicine, Zagazig University numbered (6420-16-5-2020). The participants were informed of the rationale and objectives of the study and were reassured that their personal information and responses were confidential. The research team stated in the first page of the questionnaire that the submission of the online response form was considered to be the consent for involvement in the research. The participation of the respondents was fully consensual, anonymous, and voluntary.

Study Design, Sampling and participants

In pre-Covid 19 time, our institute used to implement the traditional face to face teaching methods in the newly established competency based integrated program in 2018-2019 academic year, in which flipped classrooms, team-based learning (TBL) and small group sessions (SGS) were used as a basic teaching approach. A cross sectional study was conducted in the Department of Human Anatomy and embryology, faculty of medicine, Zagazig University for the academic year 2019-2020. According to previous records, the total number of first- and second-year students was 2800 (1652 1st, and 1148 2nd year). A sample size of 258 was calculated using online open epi program (16), based on prevalence of medical students with positive perceptions towards E-learning 75.6% (17), with a 95% confidence

interval, 5% confidence limit, and design effect of 1. In this study 264 students (68 1st year, and 196 2nd year) volunteered to participate in this study. Anatomy lectures were sent using e-learning approaches such as recordings of *narrated lecture slides using* PowerPoint presentation, as well as Zoom video conferencing platform for conducting interactive large and small group classes.

Data Collection

Data were collected through an online survey using online Form Sheets. Access to the survey was made available to students by sharing it via social networks. The first page of the online form contained clear information on the rationale and objectives of the study, as well as ensuring the complete confidentiality of all the data and opinions provided. The survey gateway was closed at the end of the 8th day, as the number of respondents exceeded the calculated sample.

A predesigned questionnaire was used for data collection based on a study in Iran (18). It consisted of 15 items, which sought the opinion of students regarding their satisfaction for E-learning (used during the pandemic), and the traditional lectures, including; (1) whether all educational aims were clearly demarcated at the beginning of each session, (2) whether the worksheet specified prior to the sitting was very beneficial to recognize the subject, (3) did the sources given in the worksheet such as references and web sources spark any attention to the reader, (4) whether or not this method of e-learning was more engaging and interesting in contrast to traditional class, (5) time fixed for the cases was satisfactory, and (6) whether this technique made the students participate actively with the topic.

Opinions were also sought on their preference in whether the team-based activity qualified them to go through the subject prior to the module. The students were further asked to grade their overall feelings towards E-learning and traditional learning. The participants were asked to answer the items using a 5 - point Likert's scale (strongly disagree, disagree, neutral, agree, and strongly agree). Only one answer was permitted.

The reliability of the questionnaire was assessed by measuring its internal consistency. It demonstrated a good level of reliability (Cronbach's alpha = 0.88) (19). The questionnaire was checked and validated for content and relevance by the authors, and two external Human Anatomy and Embryology professors. The questionnaire was submitted to the students in the form of two separate online sheets written in the English language consisting of different titles but exactly

the same content; one for traditional learning and the other for E-learning.

A pilot study was conducted on 10 students to detect any difficulties, as well as to test the content validity of the questionnaire. The sample included in the pilot study was excluded from the main sample because of the changes that were done to the final version of the questionnaire.

Statistical study

Data were studied using the Statistical Package for Social sciences (SPSS) software (Statistical Package for the Sociable Sciences, version 20, SPSS Inc. Chicago, IL, USA). Descriptive statistical approaches were used to review socio-demographic features and replies to questions. Data were presented as numbers and percentages.

RESULTS

Two hundred and sixty-four students filled in the questionnaire and responded to all of the questions, resulting in a 100% response rate. Regarding the socio-demographic characteristics of the students, almost half of the participants were males (49.6%) and 25.5% of the responding students were in the 1st academic year **(Table 1).**

It was observed that 36.4% of the students agreed that educational objectives were clearly defined at the beginning of each session in traditional learning, while for E-learning 22.35% agreed. The usefulness of the worksheet given prior to the session was reported to be 27.6% for traditional learning, and 29.9% for E-learning. In traditional learning, the given sources in the worksheet kindled interest to read in 31.8% of students, while for E-learning, it was 25.7%. The engagement and interesting criteria of traditional learning was 29.54% and 24.2% for E-learning. For the time

allotted to the case suitability in traditional learning, there was a 28.4% agreeability, and for E-learning it was 27.3%. The active participation in the subject during traditional learning was 42% and 26.1% for E-learning. The traditional learning description as an enjoyable way of learning and its role in improving oral communication was 33% versus 23.5% for E- learning. Concerning the team-based activity which qualified students to go through the subject prior to the module, traditional learning showed a 40.53% agreeability, while for E-learning, it was 27.2%.

In terms of the teaching method that decreased the time needed to revise subjects, traditional learning had an agreeability of 33.71% versus 23.5% for E-learning. The preference to use continuous evaluations instead of being evaluated only with exams was 38.63% agreeability for traditional teaching methods and 34.1% for E-learning. In terms of reinforcement of self-confidence by education, 42.05% and 25.8% of students agreed towards traditional and E-learning respectively. For the chance to establish good teacher-student relationship, 39.77% and 29.9% of students agreed towards traditional and E-learning respectively. About 44.7% and 22.3% agreed that education with the meant method can enhance learning experience as well as communication skills, towards the traditional and E-learning respectively. About 29.17% and 25% agreed regarding the interesting feeling of traditional and E-learning courses respectively. Regarding the overall students' perception towards both teaching methods, 31.06% of students felt positive towards traditional versus 24.6% towards e-learning **(Table 1 & Figure 1)**.

Table (1): Undergraduate Medical Students Perception of E-learning versus Traditional learning (n=264).

no	Content and Structure		Response					Mean ± S/E
			Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
	All educational objectives were clearly defined at the beginning of each session	Traditional	20 (7.6%)	45 (17.2%)	84 (31.7%)	96 (36.4%)	19 (7.1%)	2.82 ±0.086
		E-learning	40 (15.15%)	66 (25%)	92 (34.85%)	59 (22.35%)	7 (2.65%)	2.72 ±0.088
	The worksheet given prior to the session was very useful to understand the topic	Traditional	29 (11%)	65 (24.6%)	84 (31.8%)	73 (27.6%)	13 (5%)	3.096 ±0.089
		E-learning	46 (17.4%)	67 (25.4%)	57 (21.6%)	79 (29.9%)	15 (5.7%)	2.80 ±0.10
	The sources given in the worksheet such	Traditional	53 (20%)	84 (31.8%)	71 (26.9%)	49 (18.6%)	7 (2.7%)	3.47 ±0.09

no	Content and Structure		Response					Mean ± S/E
			Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
	as- references and web sources kindled interest to read	E-learning	49 (18.6%)	68 (25.7%)	84 (31.8%)	51 (19.3%)	12 (4.6%)	2.64 ±0.09
	This method was more engaging and interesting in comparison to others	Traditional	34 (12.9%)	36 (13.64%)	71 (26.9%)	78 (29.54%)	45 (17.02%)	2.77 ±0.10
		E-learning	60 (22.7%)	59 (22.4%)	60 (22.7%)	64 (24.2%)	21 (8%)	2.71 ±0.10
	Time allotted for the cases were adequate	Traditional	40 (15.15%)	56 (21.2%)	69 (26.15%)	75 (28.4%)	24 (9.1%)	3.05 ±0.10
		E-learning	38 (14.4%)	53 (20.1%)	79 (29.9%)	72 (27.3%)	22 (8.3%)	2.94 ±0.09
	This method made me participate actively with the subject	Traditional	20 (7.6%)	38 (14.4%)	73 (27.7%)	111 (42%)	22 (8.3%)	2.71 ±0.08
		E-learning	53 (20.1%)	59 (22.4%)	62 (23.5%)	69 26.1%)	21 7.9%)	2.79 ±0.10
	Enjoyable way of learning and improve my oral communication ability	Traditional	24 (9.1%)	53 (20%)	51 (19.3%)	87 (33%)	49 (18.6%)	2.67 ±0.10
		E-learning	60 (22.7%)	72 (27.3%)	55 (20.8%)	62 (23.5%)	15 (5.7%)	2.61 ±0.10
	The team-based activity enabled me to go through the topic prior to the module	Traditional	18 (6.82%)	33 (12.5%)	80 (30.3%)	107 (40.53%)	26 (9.85%)	2.66 ±0.08
		E-learning	42 (16%)	62 (23.5%)	66 (25%)	72 (27.2%)	22 (8.3%)	2.88 ±0.10
	Enable me to decrease time required to revise the subjects	Traditional	40 (15.15%)	55 (20.83%)	71 (26.9%)	89 (33.71%)	9 (3.41%)	3.10 ±0.094
		E-learning	59 (22.3%)	62 (23.5%)	44 (16.7%)	62 (23.5%)	37 14%)	2.83 ±0.11
	Let me to prefer continuous evaluation instead of being evaluated only with exams.	Traditional	29 (11%)	40 (15.15%)	62 (23.48%)	102 (38.63%)	31 (11.74%)	2.75 ±0.098
		E-learning	35 (13.3%)	51 (19.3%)	62 (23.5%)	90 34.1%)	26 (9.8%)	3.07 ±0.10
	Education in this system reinforces my self-confidence.	Traditional	31 (11.74%)	40 (15.15%)	60 (22.72%)	111 (42.05%)	22 (8.34%)	2.8 ±0.096
		E-learning	46 (17.4%)	51 (19.3%)	81 (30.7%)	68 (25.8%)	18 (6.8%)	2.85 ±0.09
	Small groups give the chance to establish	Traditional	26 (9.85%)	24 (9.09%)	62 (23.49%)	105 (39.77%)	47 (17.8%)	2.52 ±0.097

| no	Content and Structure		Response					Mean ± S/E
			Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
	good teacher-student relationship.	E-learning	40 (15.15%)	59 (22.35%)	53 (20.1%)	79 (29.9%)	33 (12.5%)	3.02 ±0.10
	Education with this method can enhance my learning experience as well as communication skills	Traditional	18 (6.82%)	31 (11.74%)	60 (22.73%)	118 (44.7%)	37 (14.01%)	2.53 ±0.090
		E-learning	55 (21%)	50 (18.9%)	80 (30.3%)	59 (22.3%)	20 (7.5%)	2.76 ±0.10
	I would be interested in studying courses that use this method	Traditional	26 (9.84%)	29 (10.98%)	89 (33.71%)	77 (29.17%)	43 (16.3%)	2.68 ±0.096
		E-learning	53 (20.1%)	43 (16.3%)	71 (26.9%)	66 (25%)	31 (11.7%)	2.92 ±0.10
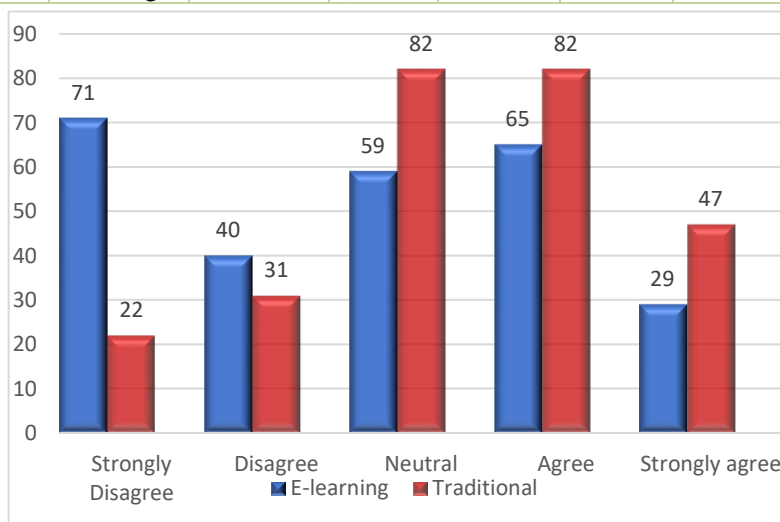
Figure (1): A Bar chart shows brief comparison to the overall positive feeling towards E-learning and traditional learning between participants

DISCUSSION

The COVID-19 pandemic has enforced medical institutes to establish distant education to avoid virus spread, including all medical institutes in Egypt, which have been officially locked down. In these circumstances, e-learning has replaced traditional learning as an alternative that affords an online communicating learning atmosphere for students without compromising social distancing and lockdown orders. Hugenholtz et al. documented that e-learning is just as effective in enhancing information as lecture-based education (20).

Our results revealed that, of the overall students' perception towards both methods, 31.06% of 264 participating students felt positive towards traditional learning, versus 24.6% towards E-learning. This means that most of the students favored traditional learning more than E-learning.

They felt that E-learning is less interesting due to its limits with respect to practical characteristics of learning. This is consistent with the students' performances in many other countries including China, Malaysia, and Singapore (21, 22, 23).In the current study, 85% of students preferred the traditional face-to-face rather than e-learning. This agrees with other studies that showed that students favored face to face education over online education (24, 25).

However, in a study by Singh A, Min AK which aimed to determine the usefulness of carrying out digital lectures on gross anatomy and student levels of satisfaction, it was found that, most of them felt positive towards digital learning (26). Mamattah also recognized that, in contrast to traditional learning, students were pleased with e-learning (27) There are many studies on the assessment of e-learning with face-to-face education (28,29)

research presented in a conference on mobile learning in Singapore, documented that there is no significant difference between the presentation of students' skills by e-learning and face to face learning. In our study it was reported that e-learning is perceived to have little impact compared to traditional learning, as indicated by about 66% of the students. Additionally, the Singaporean study highlighted that E-teaching methodology restricts student-teacher communication ((28), which goes in accordance with our findings, where about 57% of the students rated that E-teaching has limited the student-teacher interaction.

In the current study, a majority of students agreed that the traditional methods of studying had the following benefits; (1) the objectives and goals were clearly defined at the beginning of the session, (2) the worksheets containing resources on the studied topic kindled more interest, and (3) the classroom engagement was more interesting, whereas in e-learning, most students agreed that usefulness of the worksheets given during the teaching session were better than those provided during traditional classroom sessions. This data goes in accordance with other literatures, which have concluded that poor communication between students and instructors, and an absence of clearly outlined aims and goals of the learning can obstruct the educational process (30,31)

The results of the current study revealed that, 33% of the students agreed that the traditional learning methods were a more   enjoyable way of learning and improved oral communication, versus 23.5% for E- learning. Concerning the team-based activities, which enabled students to review the subject previous to the module, traditional learning had a 40.53% agreeability, while for E-learning, it was27.2%. About 44.7% and 22.3% of the students agreed that, education with the meant method can enhance learning experience as well as communication skills, towards the traditional and E-learning respectively. The authors believe that these results reflect the important core role of face-to-face learning as a basic teaching method that guarantees the deep students' learning with its great benefits as well engaged student, physical communication skills that can't be gained by the remote learning methods.E-learning approaches that are less interactive are observed less favorably (32). There are many methods to boost the interactivity of online learning. One new and hopeful way is gamification, in which "game design elements are used in non-game contexts" (33).Though some published systemic reviews on e-learning have provided some promises that e-learning would be equally as effective as traditional methods of learning or teaching, still there is very limited evidence demonstrating when and how best e-learning enhances education and learning, and the factors associated with it (34, 35). As Kim (36) argues, most of the published evidences, including the systematic reviews on e-learning, appear to have three major limitations: (a) they are mostly descriptive; (b) they have clearly failed to demonstrate the outcome measures; and (c) the majority has faults due to weakness or inappropriateness in study designs.

CONCLUSIONS

It is determined that, even with acquisition and immense popularity today, digital technology has still not been accepted by the medical undergraduates for its use in the education system. Students are still more inclined towards traditional learning methods over e-learning. Administration and faculty members should take important actions to improve e-learning quality for better engagement of undergraduates in the educational process, especially during lock down and onwards.

|RECOMMENDATIONS

It is recommended to further discover the possibility of using a combination of traditional anatomy lectures with online learning, and evaluation of changes in students' study behavior, as well as perceptions of their learning outcomes, which should be examined by future studies.

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