RESEARCH ARTICLE

Perceived usefulness of medical teachers towards online learning using technology acceptance model

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Abstract

Objective: To determine medical teachers' acceptance of and attitude towards online learning, and to gather their recommendations about how it can be incorporated in the educational system.

Method: The mixed method study was conducted at Gujranwala Medical College, Gujranwala, Pakistan, from August 2021 to January 2022, and comprised medical teachers involved in online teaching during the coronavirus disease-2019 pandemic. Quantitative data was gathered using an online questionnaire based on the technology acceptance model. The qualitative component was explored through 2 focussed group discussions. Data was analysed using SPSS 25.

Results: Of the 50 teachers, 31(62%) were males and 19(38%) were females. The overall mean age was 42.9±7.9 years, and the mean teaching experience was 10.9±7.9 years. Mean perceived usefulness score was 3.2±0.9 and the mean perceived ease of use score was 3.6±0.6. The mean scores were 3.3±0.9 for intention to use and 3.5±0.7 for attitude towards computer use. There was a strong positive correlation of perceived usefulness with intention to use and attitude towards computer use ($p<0.05$), while perceived ease of use and intention to use had a strong correlation with attitude towards computer use ($p<0.05$). There were total 12 participants in focussed group discussions; 2(16.7%) females and 10(83.3%) males with mean age 44.34±5.23 years. A total of 4 major themes were identified.

Conclusion: Majority of medical teachers strongly agreed with the acceptance of e-learning, and agreed with its perceived usefulness and perceived ease of use for online learning.

Keywords: Distance, Education, Learning, Faculty, Teachers, COVID-19. (JPMA 74: 519; 2024)

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Introduction

Teaching methods are undergoing dramatic transformation globally with the introduction of new technology. Traditional or face-to-face learning takes place in a classroom setting.[1] Online learning is a subset of e-learning which takes place over the internet.[2] Online learning is often confused with distance learning, but it is only a form of distance learning. Distance learning is any form of educational activity in which the teacher and the student are separated by location and time. Online learning is widely utilised all over the world, but this method was not generally used in Pakistan in the past. Also, there is no utilisation of different learning management systems by higher educational institutions of Pakistan.[3]

Online learning gained popularity in Pakistan during severe phase of coronavirus disease-2019 (COVID-19) pandemic that entailed lockdowns. Descriptive studies in the region, depicting perception and satisfaction of medical students with online learning, have shown that the students were not much satisfied with the new system.[4,5] Teachers in medical institutions need to achieve new competencies to keep up with modern technologies in education. Because of lack of any prior training about online learning, faculty members faced much problems initially. Lack of training related to new technology was also reported in China.[6]

The current study was planned to determine medical teachers' acceptance of and attitude towards online learning, and to gather their recommendations about how it can be incorporated in the educational system.

Subjects and Methods

The mixed method study was conducted at Gujranwala Medical College (GMC), Gujranwala, Pakistan, from August 2021 to January 2022. After approval from the ethics review boards of GMC and the University of Health Sciences (UHS), Lahore, the sample was raised using universal sampling technique. Those included were medical teachers of either gender teaching basic and applied sciences at the undergraduate level and who had experience of using online learning methods for teaching purposes during the COVID-19 pandemic. Medical teachers with no such experience were excluded. Teachers were enrolled from

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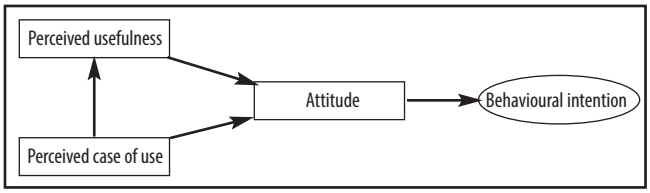

Figure: The Technology Acceptance Model (TAM).

Basic Sciences (Anatomy, Physiology, Biochemistry, Pharmacology, Pathology, Community Medicine and Forensic Medicine) and Clinical Sciences (Ear-Nose-Throat [ENT], Eye, Obstetrics and Gynaecology [OB-GYN], Surgery, Medicine and Paediatrics).Quantitative data was gathered using an online questionnaire based on the Technology Acceptance Model (TAM), which specifically assess user acceptance of information technology.[7] Perceived usefulness (PU) and perceived ease of use (PEU) are hypothesised by TAM to be the determinants attitude towards computer use (ATCU) and intention to use (IU) the new technology (Figure).

The items were modified to refer to online learning system as a technology. Several studies have provided support for the use of TAM for exploring online learning acceptance among teachers.[8,9]. The survey questionnaire was scored on Likert-type scale, with each items ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire was divided in to 4 constructs other than the demographic details of the participants. The constructs were PU (4 items), PEU (4 items), IU (2 items) and ATCU (4 items). Quantitative data was analysed using SPSS 25. Pearson's correlation analysis was done to assess the interaction of dependent variables IU and ATCU with independent variables PU and PEU. P≤0.05 was taken as statistically significant.

For the qualitative component of the study, 2 focussed group discussions (FGDs)[10] were conducted to explore the perspectives about research question and problems encountered while using the online learning method. The focus was on generating a set of recommendations for effective incorporation of online learning in the local educational system. FGD participants comprised head of departments (HODs) of the disciplines being taught at the undergraduate level. Two groups were recruited with participants having similar behavioural, demographic and psychographic characteristics. One group comprised HODs of Basic Sciences (BSs), while the other group comprised HODs of Clinical Sciences (CSs) subjects. The participants Signed informed consent before a 90-mnuted FGD session moderated by two researchers. The discussion was audio-recorded with the permission of the participants.

The proposed questions for FGD session were: What are your views about online teaching? What are the problems encountered while using online teaching? Are there any ways or recommendations to improve and overcome these problems? What is the practical model for incorporation of online teaching in undergraduate medical institutions?

Content analysis was performed for qualitative data analysis for which FGD transcriptions and notes were used. The derived ideas were reviewed and discussed by the team of researchers.

Results

Of the 50 teachers, 31(62%) were males and 19(38%) were females. The overall mean age was 42.9±7.9 years, and the mean teaching experience was 10.9±7.9 years (Table 1). Medical teachers' responses related to TAM components were noted (Table 2). Mean PU score was 3.2±0.9 and the mean PEU score was 3.6±0.6. The mean scores were 3.3±0.9 for IU and 3.5±0.7 for ATCU. The majority of responses under all the 4 categories was positive (Table 3). There was a strong positive correlation of PU with IU and ATCU, while PEU and IU had a strong correlation with ATCU (Table 4).

There were 12 participants in FGDs; 2(16.7%) females and 10(83.3%) males with mean age 44.34±5.23 years. A total of 4 major themes were identified (Table 5).

The first major theme was views about online learning, which had 3 subthemes. The participants believed that online learning was not an alternative to conventional learning in medical education. "*It can never be a replacement of class-room learning.*"

A participant said: "*It can be an add-on to what we are already doing*." Another participant said: "*It can serve as an additional tool of lectures, but cannot serve to replace labs and clinical, hospital-based education in medicine. It can serve when we have no other option, like as exercised during COVID-*

Table-1: Demographic and professional data.

Characteristics	n (%)
Gender	
Male	31 (62)
Female	19 (38)
Teaching Experience (years)	
0–5	1 (24)
6–10	19 (38)
11–15	8 (16)
16–20	6 (12)
21–25	5 (10)
Subjects	
Basic Sciences	17 (34)
Clinical Sciences	33 (66)
Designation	
Demonstrator	9 (18)
Senior Registrar	3 (6)
Assistant Professor	14 (28)
Associate Professor	11 (22)
Professor	13 (26)

Table-2: Medical teachers' responses related to components of the Technology Acceptance Model (TAM) [n (%)].

Perceived Usefulness of Medical Teachers towards Online using TAM Model Perceived Usefulness (PU)		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PU1	In your opinion can use of online learning improve your teaching work	2 (4)	14 (28)	12 (24)	18 (36)	4 (8)
PU2	Can use of online learning improve your effectiveness of teaching	2 (4)	19 (38)	11 (22)	14 (28)	4 (8)
PU3	Can use of online learning improve your productivity	1 (2)	14 (28)	13 (26)	20 (40)	2 (4)
PU4	Do you find online learning system a useful tool in your work	1 (2)	13 (26)	9 (18)	23 (46)	4 (8)
Perceived Ease of Use (PEU)						
PEU1	While using internet for e-learning my interaction with computer is clear and understandable	1 (2)	3 (6)	7 (14)	33 (66)	6 (12)
PEU2	I find it easy to get e-learning software on computer to do what I want it to do	1 (2)	8 (16)	9 (18)	27 (54)	5 (10)
PEU3	Interacting with internet does not require a lot of mental effort	0 (0)	14 (28)	9 (18)	22 (44)	5 (10)
PEU4	I Find internet/ computer easy to use for online learning	0 (0)	4 (8)	10 (20)	31 (62)	5 (10)
Intention to use (IU)						
IU1	I will like to use online learning system for teaching purpose in future	2 (4)	12 (24)	12 (24)	21 (42)	3 (6)
IU2	I plan to use online learning system for myself (Webinar's, distant learning)	0 (0)	12 (24)	6 (12)	30 (60)	2 (4)
Attitude towards computer use (ATCU)						
ATCU1	Use of new technology makes work more interesting	0 (0)	6 (12)	7 (14)	31 (62)	6 (12)
ATCU2	Working with new technology is fun	1 (2)	4 (8)	12 (24)	30 (60)	3 (6)
ACTU3	I like using online learning system	0 (0)	15 (30)	10 (20)	23 (46)	2 (4)
ACTU4	I look forward to use online learning system with my teaching job	1 (2)	14 (28)	5 (10)	28 (56)	2 (4)

Table-3: Medical teachers' attitude towards components of Technology Acceptance Model (TAM) [n (%)].

Perceived Usefulness of Medical Teachers towards Online using TAM Model	Positive response	Negative Response
Perceived Usefulness (PU)	43 (86)	7 (14)
Perceived Ease of Use (PEU)	49 (98)	1 (2)
Intention to Use (IU)	43 (86)	7 (14)
Attitude towards computer use (ATCU)	48 (96)	2 (4)

Table-4: Correlation of dependent variable with independent variables of Technology Acceptance Model (TAM).

Variable	Perceived Ease of Use (PEU)	Intention to Use (IU)	Attitude towards computer use (ATCU)
Perceived Usefulness (PU)			
r-value	0.155	0.725	0.765
p-value	0.283	<0.001*	<0.001*
Perceived Ease of Use (PEU)			
r-value	-	0.120	0.366
p-value	-	0.406	0.009*
Intention to Use (IU)			
r-value	-	-	0.771**
p-value	-	-	<0.001*

r: Correlation coefficient

19 pandemic when it was the only option available for teaching."

Most of the participants mentioned that the students who were taught by online learning during COVID-19 did not perform well in the final exam compared to the students of old batches who had been taught using the conventional learning method.

The second theme was problems encountered during online learning, and it had three subthemes. A major problem reported by almost all the participants was the

Table-5: : Themes and subthemes developed on the basis of focused group discussion (FGD).

Theme 1: Views about online learning
Subtheme 1a: Is online learning alternative to traditional learning?
Subtheme 1b: Role of online learning in our education system
Subtheme 1c: Exam performance of the students who were taught by online learning during COVID pandemic.
Theme 2: Problems Encountered
Subtheme 2a: Internet connectivity issues
Subtheme 2b: Lack of interaction
Subtheme 2c: Lack of assessment and evaluation
Theme 3: Recommendations
Subtheme 3a: Institutional IT departments
Subtheme 3b: Fast internet facility
Theme 4: Model For Incorporation:
Subtheme 4a: Hybrid/ Blended model
Subtheme 4b: Add on to conventional learning

lack of efficient internet facility for both teachers and students. This in turn led to connectivity issues, and technical disruptions. "*At times there was noise of microphone and background voices that disturbed the lecture and diverted the attention of the class.*"

Other issues included lack of familiarity with softwares and tools.

Another major issue was lack of interaction and teachers' monitoring of the class. This lead to problems with student's attendance. "*I was not able to ensure if the students were actually attending the class or not. I was not able to ask every student to switch on their videos because it could be difficult under certain situations, especially for female students.*"

The teachers also reported that there was lack of

interaction, question-answer (Q/A) session and teacher-centred engagement of students during the lectures.

The evaluation and assessment of students in online learning was also not comparable to conventional learning, the participants noted. This aspect, they thought, needed to be improved upon before implementation of online learning.

The third theme was recommendations, and it had 2 subthemes. "*There should be designated information technology (IT) departments designed for the purpose of regulating online learning in medical institutions. There should be provision of efficient internet facility both for the students and the teachers*."

The final theme was model for incorporation. "*We can never ignore the online method as it is the future and we need to devise strategies to incorporate it into our educational system*."

Discussion

The current study aimed at exploring the acceptance and usefulness of online learning among medical teachers involved at the undergraduate level in Pakistan. A questionnaire based on TAM was used. TAM model has been used widely to assess teachers' behaviour related to online education.[11] TAM is considered one of the most influential research models for determining IT acceptance in order to predict intention to use and acceptance of IT by individuals.[12] Several studies have provided support for the use of TAM for exploring online learning acceptancy among teachers.[8,9]

The study indicated a positive reception of online learning by the medical teachers. The results demonstrated an overall acceptant attitude and positive intention towards using new technology for teaching. Zalat et al. in Egypt reported similar findings.[13]

In India, around 48% of medical teachers were of the view that online teaching was suitable for the theory part of curriculum, while only 5% believed that online classes could also be conducted for dissection and practical sections of the curriculum.[14]

The current participants were mainly male teachers (68%). Regarding gender difference related to acceptance of new technology for the purpose of education different, varying results have been reported. Greater women preference for online-learning was reported by one study[15] while others have reported only a slight gender difference in this regard.[16]

The current study had teachers from BSs and CSs and heterogeneity was ensured with a sample aged 29-64 years.

PU and PEU are the key factors that influence the user's acceptance of new technology.[17] The current results indicated that the medical teachers perceived online teaching useful. The strong positive correlation of PU with IU and ATCU reflected PU to be the main determinant of intention and attitude of a teacher. Zalat et al. in Egypt concluded that the users of online learning assessed it by PEU.[13]

A study assessed the students stafisfaction with the learning management system (LMS) using TAM, and concluded that PEU and PU of the new technology were the key factors that determined whether or not the users would accept the new technology.[18]

For successful incorporation of online learning into the local education system, it is important to assess the competence of teachers who have not mastered the use of relevant technologies.[19] Low familiarity with the online learning medium, knowledge related to softwares and technical skills of the participants highlight the need for conducting training workshops to address these issues. This will strengthen online learning activities.

To our knowledge, the current study is the first to address the opinion of medical teachers regarding online learning, and the problems faced by them while using this technology.

The current study has limitations as it was done at a single public-sector institution. Since online learning method had not been used at the centre prior to COVID-19, the opinion of medical teachers in the qualitative part of the study might have been affected.

Conclusion

Majority of medical teachers strongly agreed with the perceived usefulness of online learning. The challenges that may affect the usefulness of online learning need to be addressed.

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Author Contribution:

IQM: Principal investigator, study design and approvals, qualitative part of a study, final drafting and approval.
UI: Literature review, writing, data acquisition, result analysis, and the qualitative part of the study.
MM: Supervision, revision, final approval.
SC: Proposed the study design, literature review and synopsis approval, and final review.