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Research Article

# ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS E-LEARNING AMONG UNDERGRADUATE MEDICAL STUDENTS IN GAUHATI MEDICAL COLLEGE, GUWAHATI, ASSAM – A PILOT STUDY

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**ABSTRACT**

**Objectives**: The objective is to conduct a pilot study to assess the knowledge, attitude, and practice (KAP) of e-learning among undergraduate medical students.

**Methods:** An observational, questionnaire-based, and cross-sectional pilot study was carried out for 1 month among undergraduate medical students of Gauhati Medical College and Hospital (13 from each phase of MBBS). We compared the responses of KAP among the participants of each phase of MBBS.

**Results:** A total of 52 undergraduate medical students participated in the study. 43 (82.69%) were male and 9 (17.31%) were female with a mean age of 21.63±1.63. 18 (34.62%) owned a personal laptop or computer and 45 (86.54%) of them had access to Internet facility. Majority of them i.e. 48 (92.31%) used only smartphones and were competent in using software applications. Most of them agreed that e-learning should be supplemented in regular teaching curriculum (76.92%). Statistical analysis was done by using one-way analysis of variance and *post hoc* test (Tukey), to know the mean KAP score of e-learning among the participants of three phases of MBBS and also the significance of KAP towards e-learning. It showed that p value was significant in case of knowledge and practice but not in case of attitude.

**Conclusion:** The results that were found in each category of KAP toward e-learning were almost comparable to other studies which were conducted using a structured and validated questionnaire. Thus e-learning can be a useful tool in enhancing the learning experience among students.

**Keywords:** Knowledge, Attitude, Practice, E-learning, Questionnaire, MBBS.

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## INTRODUCTION

E-learning or computer-assisted learning is a method of teaching and learning using electronic media [1]. E-learning is most often used as a complementary tool to traditional education learning. Thus e-learning has become part of the mainstream health professions' education because of increased emphasis to incorporate active learning and self-directed learning in education programs [2]. Studies have shown that multimedia e-learning enhances the experience of both teaching and learning and has become the easiest method for updating oneself and use at ease [3]. The horizon of medical education is widening day by day and to keep the upcoming doctors and established physicians on par with the competitive world e-learning has become a necessary tool and the platform most commonly used is learning management system (LMS) [3,4]. LMS helps in assessment, evaluation, and supervision of the content delivered via e-learning [3]. Thus, the introduction of e-learning into academics had made learning system more active and teachers as facilitators and mentors [5].

E-learning is also known as web-based learning, online learning, or Internet-based learning. The media in e-learning involves text, images, animation, live streaming of videos and audios which are made for easy understanding. The advantage of e-learning is easy accessibility to information, updating content, personalized instruction, ease of distribution, standardization of content, and accountability. This allows the learners to have control over the content, learning sequence, pace of learning and to meet personal learning objectives [6,7].

"E-learning" has become a platform to address the contemporary instructional interests and enhancing the self-responsibility to learn and promote lifelong learning among students [8]. The use of computer- and Internet-based learning is growing in the developing countries compared to their usage in the last decade [9]. Hesitation in acquiring the software skills in computer in both rural and urban areas and to accommodate newer methods in learning impose a setback in adapting e-learning [10].

Knowledge, attitude, and practice (KAP) survey is performed to study the human behavior related to certain topics. It surveys what people know (knowledge), how they feel (attitude), and what they do (practice) [11]. KAP survey is usually done to document the existing prevalence and willingness for newer changes as a betterment of current occurrences [11]. It is implemented for diagnostic purposes, to increase insights in the present situation and help design appropriate specific interventions, and used as an evaluation tool to evaluate the effectiveness of interventions [11].

The objective of this study is to conduct a pilot study to assess KAP of e-learning among undergraduate medical students.

## METHODS

This pilot study was conducted among 52 MBBS students studying at Gauhati Medical College and Hospital, Guwahati. We enrolled 13 students from each phase of MBBS i.e., 1st, 2nd, and 3rd phase (Part I and II) using simple random technique. The study was approved by

the institutional ethics committee, GMCH and all enrolled students gave consent to participate in this study. It was an observational, questionnaire-based, and cross-sectional study conducted in January 2023. A structured questionnaire was administered to each of the participating students after an initial brief description and motive of the study. For easy understanding and unbiased reciprocation, the questionnaire was prepared in easy English. The questionnaire was administered to obtain the details regarding demographic data, infrastructure used by the students for the purpose of e-learning, students' knowledge regarding software applications, attitude towards e-learning and practice of Internet browsing for the purpose of e-learning. Each positive response was given a score of 1 whereas the negative response was given a score of 0 for analysis of knowledge. The attitude was analyzed using a 5-point Likert scale from 1=strongly disagree to 5=strongly agree and practical use of different modes of e-learning and questions regarding the duration of using the e-learning were scored from 4= daily usage to 0= never. A questionnaire was in multiple choice questions format and students were asked to select their preferred option. Likert scale was used to minimize the mixed options and to score the questions [3] in comparing the attitude of students towards e-learning. Data entry was done in Microsoft Excel 2010 and analysis was done using SPSS-software version 20. Results were displayed in the form of frequencies and percentages. One-way analysis of variance (ANOVA) and Tukey's test was used as the *post hoc* test for pair-wise comparisons between the different e-learning usage groups. $p<0.5$ was considered statistically significant.

## RESULTS

A total of 52 undergraduate medical students participated in the study. Out of them, 43 (82.69%) were males and 9 (17.31%) were females of which 11 (21.15%) of them were ≤20 years of age and 41 (78.85%) were >20 years of age. The mean age of the participants was 21.63±1.63. Out of the total participants, 49 (94.23%) were hostel residents, 1 (1.92%) was staying as paying guest and 2 (3.85%) were residing at home as shown in Table 1.

Regarding the availability of computers and Internet facility for the purpose of e-learning, 18 (34.62%) owned a personal laptop or computer; majority 45 (86.54%) of them had own personal access to Internet facility as shown in Table 2.

Coming to the devices commonly used, 48 (92.31%) said that they use only smartphones, 3 (5.77%) use both i.e. laptops/computers and smartphones and 1 (1.92%) use only laptops or computers for e-learning as shown in Fig. 1. This indicates increase in the utilization of smartphones for the purpose of e-learning.

While understanding the students' knowledge in software applications and Internet usage, it was observed that 39 (75%) were competent in operating Microsoft Word, 43 (82.69%) were competent in preparing PowerPoint slides, 31 (59.62%) were competent in using Microsoft Excel, 39 (75%) were competent in drawing using paint, 48 (92.31%) were competent in sending email attachments, 14 (26.92%) were competent in creating a blog/web page, 47 (90.38%) were competent in performing an online search, 51 (98.08%) were competent in downloading health information from Internet and 41 (78.85%) were aware about the various academic sites as shown in Table 3.

While understanding the attitude toward e-learning on adding the students' responses (agree and strongly agree), 43 (82.69%) agreed that e-learning is method of learning and teaching using electronic media, 21 (40.38%) agreed that e-learning should be a method of learning and teaching in medical education, 38 (73.08%) agreed that e-learning is useful in improving their overall academic performance, 38 (73.08%) agreed that e-learning helps in preparing better notes, 36 (69.23%) find e-learning helpful in their self-assessment, 44 (84.62%) find e-learning useful in exam preparation, 43 (82.69%) agreed that e-learning helps in topic understanding, 38 (73.08%) agreed for recommending institutional e-learning portal, 31 (59.62%) agreed that proper training program should be held for e-learning, 40 (76.92%) recommend traditional teaching should be supplemented with e-learning, 40 (76.92%) think that the respective teacher should guide regarding ideal e-learning material to be used for clearing concepts, 28 (53.85%) think that online exams not only test knowledge of the subject, but IT skill as well, 15 (28.85%) think that online assessment is just as secure as paper-based assessment, 27 (51.92%) think that online marking is more accurate, as computers do not suffer from human error, 8 (15.38%) think that e-learning should be discouraged for the undergraduate teaching and learning as it would cause Internet or mobile addiction problems as shown in Table 4.

**Table 1: Demographic characteristics of study participants (n=52)**

| Variable | Frequency | Percentage |
|---|---|---|
| Age (in years) | | |
| ≤20 | 11 | 21.15 |
| >20 | 41 | 78.85 |
| Gender | | |
| Males | 43 | 82.69 |
| Females | 9 | 17.31 |
| Residence | | |
| Hostel resident | 49 | 94.23 |
| Paying guest | 1 | 1.92 |
| Home | 2 | 3.85 |

**Table 2: Infrastructure used by undergraduate medical students (n=52)**

| Variable | Frequency | Percentage |
|---|---|---|
| Availability of laptops/computer | | |
| Own personal laptop/computers | 18 | 34.62 |
| Colleagues | 5 | 9.61 |
| Institutional | 0 | 0 |
| None | 29 | 55.77 |
| Internet access | | |
| Own personal | 45 | 86.54 |
| Institutional | 0 | 0 |
| Both | 3 | 5.77 |
| None | 4 | 7.69 |
| Devices most commonly used by participants for the purpose of e-learning | | |
| Laptop/computer | 1 | 1.92 |
| Smartphone | 48 | 92.31 |
| Both | 3 | 5.77 |

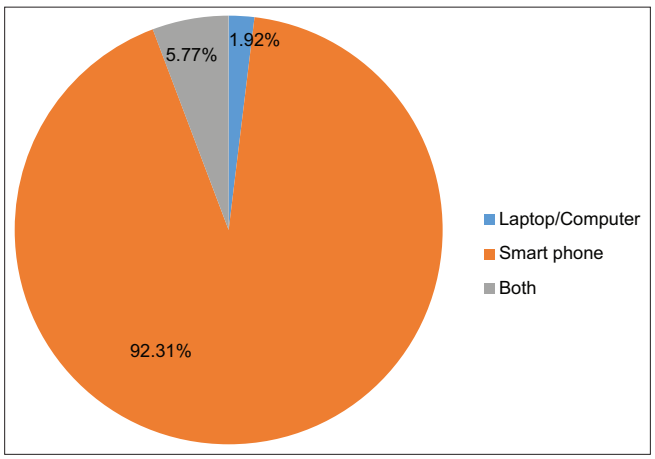


**Fig. 1: Devices most commonly used by respondents for purpose of e-learning**

**Table 3: Knowledge of e-learning among study participants (n=52)**

| S. No. | Question | Overall frequency, n (%) |
|---|---|---|
| 1 | Do you know to operate Microsoft word? | |
| | (a) Yes | 39 (75) |
| | (b) No | 13 (25) |
| 2 | Do you know to prepare PPT slides? | |
| | (a) Yes | 43 (82.69) |
| | (b) No | 9 (17.31) |
| 3 | Do you know to use Excel sheet? | |
| | (a) Yes | 31 (59.62) |
| | (b) No | 21 (40.38) |
| 4 | Do you know to draw using paint? | |
| | (a) Yes | 39 (75) |
| | (b) No | 13 (25) |
| 5 | Do you know to send email attachments? | |
| | (a) Yes | 48 (92.31) |
| | (b) No | 4 (7.69) |
| 6 | Do you know to create a blog/web page? | |
| | (a) Yes | 14 (26.92) |
| | (b) No | 38 (73.08) |
| 7 | Do you know to write a computer program? | |
| | (a) Yes | 7 (13.46) |
| | (b) No | 45 (86.54) |
| 8 | Do you know to analyze data with statistical package? | |
| | (a) Yes | 10 (19.23) |
| | (b) No | 42 (80.77) |
| 9 | Do you know to perform an online search? | |
| | (a) Yes | 47 (90.38) |
| | (b) No | 5 (9.62) |
| 10 | Do you know to download health information from Internet? | |
| | (a) Yes | 51 (98.08) |
| | (b) No | 1 (1.92) |
| 11 | Do you know about the various academic websites? | |
| | (a) Yes | 41 (78.85) |
| | (b) No | 11 (21.15) |

Students use Internet, computers/laptops and other similar devices for the purpose of e-learning. It is seen that 34 (65.38%) searched for online information daily, 34 (65.38%) performed general browsing daily, 3 (5.77%) used email for communication daily, 26 (50%) spend time on social networking sites daily, 7 (13.46%) spend time on searching therapeutic guidelines daily, 6 (11.54%) spend time on searching recent advances daily, 15 (28.85%) searched for videos and animations for better understanding of the subject daily and 2 (3.85%) took e-learning tests for self-assessment daily. Table 5 shows the practice of e-learning among study participants.

On statistical analysis by using one-way ANOVA and *post hoc* test (Tukey), the mean KAP score of e-learning among the study participants of three phases of MBBS was done to know the significance of KAP towards e-learning. Table 6 shows that p-value was significant in case of knowledge and practice but not significant in case of attitude when the mean KAP score was calculated for all the study participants of three phases of MBBS.

## DISCUSSION

In the present study, among 52 undergraduate medical students, 43 (82.69%) were males and 9 (17.31%) were females. About 18 (34.62%) of medical students had access to their own laptops and 45 (86.54%) had access to their own Internet facility. In the studies done by Vadlamani *et al*., Yapa *et al*., Silva *et al*., Jawaid and Ashraf regarding KAP towards e-learning among medical students, majority of the students had access to their own laptops and had better Internet facilities compared to the students in this study [5,12-14]. The study showed that a few of the students had access to the institutional Internet service, but majority of them i.e. 45 (86.54%) use their own personal Internet for e-learning. This identifies the need to build up infrastructure to increase Internet accessibility and availability for the purpose of e-learning.

**Table 4: Attitude toward e-learning among study participants (n=52)**

| Attitude | Response | Overall frequency, n (%) |
|---|---|---|
| E-learning is defined as method of learning and teaching using electronic media | Agree and strongly agree | 43 (82.69) |
| | Other response | 9 (17.31) |
| Do you think e-learning should be a method of learning and teaching in medical education? | Agree and strongly agree | 21 (40.38) |
| | Other response | 31 (59.62) |
| Do you think e-learning can be useful in your academic performance? | Agree and strongly agree | 38 (73.08) |
| | Other response | 14 (26.92) |
| Do you think e-learning helps in preparing better notes? | Agree and strongly agree | 38 (73.08) |
| | Other response | 14 (26.92) |
| Do you find e-learning useful in your self-assessment? | Agree and strongly agree | 36 (69.23) |
| | Other response | 16 (30.77) |
| Do you find e-learning useful in exam preparation? | Agree and strongly agree | 44 (84.62) |
| | Other response | 8 (15.38) |
| Do you think e-learning improves topic understanding? | Agree and strongly agree | 43 (82.69) |
| | Other response | 9 (17.31) |
| Do you recommend institutional e-learning portal? | Agree and strongly agree | 38 (73.08) |
| | Other response | 14 (26.92) |
| Do you require training program for e-learning? | Agree and strongly agree | 31 (59.62) |
| | Other response | 21 (40.38) |
| Do you recommend traditional teaching supplemented with e-learning? | Agree and strongly agree | 40 (76.92) |
| | Other response | 12 (23.08) |
| Do you think that the respective teacher should guide you regarding ideal e-learning material to be used for clearing concepts? | Agree and strongly agree | 40 (76.92) |
| | Other response | 12 (23.08) |
| Do you think online exams don't just test knowledge of the subject, but IT skills as well | Agree and strongly agree | 28 (53.85) |
| | Other response | 24 (46.15) |
| Do you think online assessment is just as secure as paper-based assessment? | Agree and strongly agree | 15 (28.85) |
| | Other response | 37 (71.15) |
| Do you think marking is more accurate, because computers don't suffer from human error? | Agree and strongly agree | 27 (51.92) |
| | Other response | 25 (48.08) |
| Do you think E-learning should be discouraged for the undergraduate teaching and learning as it would cause Internet or mobile addiction problem? | Agree and strongly agree | 8 (15.38) |
| | Other response | 44 (84.62) |

**Table 5: Practice of e-learning among study participants (n=52)**

| S. No. | Question | Overall frequency, n (%) |
|---|---|---|
| 1 | How often you search for online information? | |
| | Daily | 34 (65.38) |
| | Other response | 18 (34.62) |
| 2 | How often you perform general browsing? | |
| | Daily | 34 (65.38) |
| | Other response | 18 (34.62) |
| 3 | How often you use email for communication? | |
| | Daily | 3 (5.77) |
| | Other response | 49 (94.23) |
| 4 | How often you spend time on social networking? | |
| | Daily | 26 (50) |
| | Other response | 26 (50) |
| 5 | How often you spend time on searching therapeutic guidelines? | |
| | Daily | 7 (13.46) |
| | Other response | 45 (86.54) |
| 6 | How often you spend time on searching recent advances? | |
| | Daily | 6 (11.54) |
| | Other response | 46 (88.46) |
| 7 | Do you search for videos and animations for better understanding of your subject? | |
| | Daily | 15 (28.85) |
| | Other response | 37 (71.15) |
| 8 | How often you take e-learning tests for self-assessment? | |
| | Daily | 2 (3.85) |
| | Other response | 50 (96.15) |

**Table 6: Mean KAP score of e-learning among the study participants (n=52)**

| Professional qualification | Mean (±SD) score | | |
|---|---|---|---|
| | Knowledge | Attitude | Practice |
| 1st phase | 5.62±2.63 | 56.00±5.48 | 16.00±7.14 |
| 2nd phase | 7.77±1.69 | 53.08±3.64 | 20.31±4.46 |
| 3rd phase (part-I) | 7.23±1.79 | 54.62±3.91 | 21.08±4.33 |
| 3rd phase (part-II) | 7.85±1.63 | 53.31±3.82 | 21.53±5.41 |
| p-value | p<0.05 | p>0.05 | p<0.05 |

KAP: Knowledge, attitude, and practice

48 (92.31%) students in this study preferred smartphones for the purpose of e-learning when compared to laptops or computers which is only 1 (1.92%). This represents an increase in the role of smartphones in Internet-based learning which contradicts the study done by Vadlamani *et al*. where only 44.8% preferred smartphones over 8.5% preferring laptops/computers [12]. The study showed that 47 (90.38%) know to perform an online search similar to studies done by Vadlamani *et al*., Chowdhury *et al*. among Bangladeshi medical students and Chudasama *et al*. [12,15,16]. In the present study majority of the participants had knowledge regarding Microsoft Word, PowerPoint and Excel contrast to the studies were done by Vadlamani *et al*., Visalam *et al*., Yapa *et al*. [5,12,17]. But there were also students who had minimum knowledge regarding creating blog page, writing computer program and analyzing data with statistical package.

Regarding attitude toward e-learning, majority of participants i.e. 43 (82.69%) agreed that it is method of learning and teaching using electronic media and 40 (76.92%) recommend traditional teaching should be supplemented by e-learning. Similarly in a study done by Visalam *et al*. 76% strongly agreed that e-learning is a method of learning and teaching using electronic media and 71% think that it should be used as a supplementary tool in teaching curriculum [17]. These findings were similar to the studies done by Yapa *et al*., Silva *et al*., Varghese *et al*., Kumar *et al*. in medical students in Tamil Nadu, India [5,13,18,19]. In our study 43 (82.69%) think e-learning improves topic understanding and 44 (84.62%) find e-learning useful in exam preparation which is similar to Varghese *et al*. study, where 86% of students both understood the subject better and also their ability to answer questions in assessments had improved as a result of using e-learning [18]. 36 (69.23%) agreed that e-learning is useful in self-assessment which is similar to Visalam *et al*. study where 68% prefer e-learning for self-assessment. 38 (73.08%) recommend institutional e-learning portal and 93.64% of participants in Hiwarkar and Taywade study also prefer the same [20]. 31 (59.62%) agreed that proper training program is required for e-learning which is similar to Rana *et al*. study (72%) [21]. In the same study, there was unanimous opinion with the majority 85% suggesting that the provision of free Internet at institutes and provision of dedicated e-learning portals will help to improve e-learning [21]. Availability of Internet is considered a major limitation for e-learning by 76% of students as in India the accessibility and the speed of Internet is still under the developing arena according to Visalam *et al*.'s study [17].

In this study, 34 (65.38%) and 26 (50%) of students use Internet daily for online information and social networking respectively. In Jones's study found that 42% of undergraduate students use Internet for their social communication [22]. Again a very low percentage of students were using Internet for searching therapeutic guidelines (13.46% daily) and also spend less time on searching recent advances (11.54% daily) like that of Jones's study (14.1% daily) [22].

## CONCLUSION

The present study showed that e-learning can be a useful tool in enhancing the learning experience among students as they are more accustomed to using their own smartphones for searching any online information. Students also had a positive attitude towards supplementation of e-learning in regular traditional teaching methods. However, lack of proper training regarding optimal usage of e-learning in academics along with poor technological infrastructure and resources at the institution could be a challenge for the implementation of e-learning.

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## AUTHORS CONTRIBUTION

Conception/design: Dr. Mitra Bhattacharyya, Dr. Pran Pratim Saikia, Dr S Renuka Singh, Dr. Dwipen Khanikar, Dr. Lakhimi Borah, Dr. Diptimayee Devi Provision of study material: Dr. Mitra Bhattacharyya, Dr. Pran Pratim Saikia, Dr. S Renuka Singh Dr. Dwipen Khanikar, Dr. Lakhimi Borah, Dr. Diptimayee Devi Collection of data: Dr. Mitra Bhattacharyya, Dr. Pran Pratim Saikia, Dr. S Renuka Singh, Dr. Dwipen Khanikar, Dr. Lakhimi Borah, Dr. Diptimayee Devi Data analysis and interpretation: Dr. Mitra Bhattacharyya, Dr. Pran Pratim Saikia, Dr. S Renuka Singh Dr. Dwipen Khanikar, Dr. Lakhimi Borah, Dr. Diptimayee Devi Manuscript writing: Dr. Mitra Bhattacharyya, Dr. Pran Pratim Saikia, Dr. S Renuka Singh Dr. Dwipen Khanikar, Dr. Lakhimi Borah, Dr. Diptimayee Devi Final approval of manuscript: Dr. Mitra Bhattacharyya, Dr. Pran Pratim Saikia, Dr. S Renuka Singh, Dr. Dwipen Khanikar, Dr. Lakhimi Borah, Dr. Diptimayee Devi.

## CONFLICT OF INTEREST

None.

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