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Needs Assessment Among Students of Health Professions Education for the Introduction of E-learning in a South Indian Tertiary Care University

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Introduction

Medical education has been constantly evolving with the most significant milestones being system based education in 1950s, problem based learning (PBL) in 1970s and a new approach called 'e-learning' since 1990s. e-learning or Computer Assisted Learning (CAL) is a method of teaching and learning using electronic media (1). Blended learning is one of the emerging trends where traditional teaching is combined with e-learning (Eg. a lecture or demonstration is supplemented by an online tutorial). E-learning is usually used as a complementary tool to traditional education strategies, used more widely in basic sciences teaching. In the recent past, e-learning has become part of the mainstream health professions education because of an increase in emphasis to incorporate active learning and self-directed learning in education programs (2).

'E-learning' is potentially well suited as a platform to address the contemporary instructional interests as it enhances self-responsibility to learn and promotes lifelong learning among students (3). The inclusion of such interactive learning activity is viewed as a mandatory component of undergraduate education accreditation standards in many countries.

The growing influence of information technology on various aspects of life including education necessitates the developing countries like India to use e-learning for better distribution of teaching materials and interaction between students and teachers. E-learning represents a vital paradigm on higher education unconstrained by time and place, offering new opportunities for the development of the educational processes, making it more flexible and cost effective. Earlier studies have shown that e-learning not only enhances both teaching and learning experience but is also the easiest method available for regular revision of the curriculum.

Health science is constantly growing at a rapid speed and updating of curriculum is crucial to enable prospective health professionals to remain globally competent (4). Acceptance of computer and internet based learning is on the rise among developing countries compared to the previous decade. In India, evolution of technologies such as National Fiber Optic Network (NFON) & Teacher Management Information

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System (TMIS) have shown huge potential for e-learning (5).

Literature review showed that factors such as knowledge, attitude and practices in the context of e-learning among students, in addition to other factors such as Self-Directed Learning (SDL) gender, age, academic performance could be critical elements in determining the effectiveness of e-learning (6).

Needs assessment is aimed at guiding decision-making by investigators and hence the primary objective of this study was to assess Knowledge, Attitude and Practices (KAP) with regard to e-learning among undergraduate students of health professions education in a south Indian tertiary care medical centre and teaching hospital.

Methods

Participants and recruitment

The present study was based on the 'Curriculum Development for Medical Education: A Six Step Approach' model by David Kern (7). The study participants were students of Medical and Dental colleges at a south Indian tertiary care university cum teaching hospital in one of the metropolitan cities in India.

The students were recruited after obtaining written permission from the Deans of respective colleges and Dean of Education of the University. In total, 950 students (three batches of 250 medical students – 750; two batches of 100 dental students – 200) participated in the study. The participants comprised of 371 males and 579 females from varied educational backgrounds in the age range of 17 to 19 years. Institutional ethical clearance was obtained and written informed consent was taken from all the study participants.

Tool development

Prior to data collection, the authors of the study developed a standardized and validated KAP questionnaire containing open-ended and close-ended questions.

Extensive literature review was done to identify validated questionnaires that were administered in similar settings. Keeping the hypothesis and objectives of the present study in mind, the questions based on the variables of interest were structured. During the development of the questionnaire, the appropriateness of the content, level of sophistication of language, sequence and method of administration were taken into account. For easy understanding, the questionnaire was developed in simple English and divided into 10 parts - general information, availability of computers, internet connectivity, purpose of using internet, self-reported confidence levels, preferred resources used for studying, preferred components of e-module, reasons for preferring e-learning, limitations of e-learning, applications of e-learning in education etc. Open ended questions related to the advantages and challenges of e-learning were also added. The questions were scored on a Likert Scale (8). Face Validity was done by a group of five faculty who were not experts in the field. Content Validity was checked by nine Subject Matter Experts (SME) through Lawshe method (9).

Data collection

The data was collected over a period of three consecutive years for three different batches of students entering in to first year MBBS and two batches of students entering in to first year BDS (2014 to 2017). The hard copy of the questionnaire was administered to the students after getting informed consent. All students were given thirty minutes of protected time to answer the questionnaire. During the administration of the questionnaire researchers were present for any clarification. All students were asked to use black pen and answer in block letters to ensure anonymity. Additional questionnaires were made available for a week for those who were absent on the day of data collection. Boxes were kept on the lecture halls and students were requested to drop their responses in the box.

Data analysis

Using SPSSversion 17, the data was analysed and

the results of quantitative data were expressed in percentages (%). For qualitative data analysis, the authors transcribed the responses to open ended questions verbatim. The responses from four questionnaires were excluded due to illegible hand writing. During the process of data collection, the first round data analysis was initiated, from which the preliminary dominant emergent themes were identified (11).

After data collection, the researchers developed a coding manual containing twenty codes organized into seven coding categories, based on the preliminary emergent themes. Prior to the start of the individual coding process, three faculty who were trained in qualitative research were allowed to become familiar with the process by individually coding the same transcript and then reviewing the differences, if any. Once the faculty expressed comfort and confidence with the process of coding, one third of the transcripts were randomly allotted to each of the three faculty. Finally, the researchers reviewed all the transcripts and ensured that all of them were coded appropriately. Meanwhile, the authors also discussed the difficulties in assigning codes and worked towards reducing the errors of drift (12).

After entering codes into NVivo9 Qualitative Software, the authors reviewed the codes in each category to determine the final comprehensive list of dominant emergent themes not only within categories, but also across categories (13).

Results

The responses for various questions related to knowledge, attitude and practices of e-learning are shown in Tables I to V.

More than 69% of students were confident of practicing simple computer skills like using word documents, preparing PowerPoint presentations etc. Also, 89% of the students were familiar with various aspects of internet and e-mail. About 70% of the students were not confident of complex computer skills like creating a web page, data analysis etc.

TABLE I: Reasons quoted by students for preferring e-learning.

Reasons	*Strongly agree*	*Agree*	*No comments*	*Disagree*	*Strongly disagree*
Time saving	37.1	45.7	11.1	4.0	1.7
Available anywhere/anytime	45.1	42.4	8.1	3.3	1
Updated information	48	46.9	5	0.1	0
More interactive	38.9	33.8	21.3	4.4	1.1
Scope for self-assessment	30.9	48.9	18	2.1	0.1

(Data expressed as %)

TABLE II: Perceived limitations for e-learning.

Limitations	*Strongly agree*	*Agree*	*No comments*	*Disagree*	*Strongly disagree*
Requires computer skills	27.0	51.4	7.7	10.0	3.4
Availability of computers	38.1	44	7.4	6.9	3.6
Availability of internet connectivity	50.4	37	5.7	4.4	2.4
Absence of human element	18.6	35.7	33.4	6.9	4.6
Requires self-motivation	25.3	44	19.7	9.0	1.6
Time consuming	15.4	30.1	28	20.4	5.6
Excess of unwanted information	13.6	26.9	31.7	20.9	7
Distraction	28.6	44.6	16.1	8.1	2.6
Hard to focus on Computer screen for a long time	26.9	46.9	12.4	11.9	2
Authenticity of information	10.7	35.4	45.3	6.7	1.9
Not part of regular curriculum	8	29.9	43.4	14.9	3.4

(Data expressed as %)

TABLE III: Qualitative responses for 'major advantage of introducing e-learning in medical/dental education in India'.

Themes emerged	*Actual responses*
Better understanding Allows better and deeper understanding of topic Updated information available	*'availability to everything and updated information'* *'easier smarter' 'it helps in easy understanding'*
Easier access Easier access to information anywhere and anytime	*'we can gain information anywhere, any time'* *'more privacy, less time consuming'*
Presentation of information Interactive Attractive More volume of information presented	*'majority feel lazy to take up the books, internet usage is rapidly increasing, thus e-learning is a better advancement'* *'new learning experience'*

TABLE IV: Qualitative responses for 'major disadvantage of introducing e-learning in medical/dental education in India'.

Themes emerged	*Actual responses*
Distractions Browsing non academic stuff Wastage of time Unwanted information searched for	*'distractions due to other non academic activities' 'distractions i,e. students should not always use e-learning for studies but they must refer books too' 'more of unwanted things'*
Loss of human touch Reduced student teacher interaction Reduced student-student interaction Inability to clarify doubts then and there	*'feel lazy after sometime because there is no interaction' 'student teacher interaction is reduced' 'team work or class discussion. Could not be possible' 'lack of human touch'*
Computer related Availability of computers and internet facilities Skill with computers Side effects of prolonged screen based learning	*'focussing computer would result in headache and make me sick' 'long time usage of internet can cause eye problem and mobile data usage' 'it requires availability of internet connectivity' 'computer knowledge is necessary'*

TABLE V: Qualitative responses for 'the biggest challenge in introducing e-learning in medical/dental education in India'.

Themes emerged	*Actual responses*
Infrastructure Rural urban divide Affordability Acceptability	*'cannot be affordable by all colleges' 'not many students have access to the latest technology or the internet so they might be deprived of this facility'* *'acceptance of all groups of people such as rural people to use this method'*
Content creation Development of e-modules	*'establishing a e-document is time consuming' 'replacing lectures with e-learning becomes a big challenge' 'e-learning is no use if the content is not good enough'*
Computer knowledge Technical skills Change management	*'if people are not good in operating them, then they may face a serious problem'* *'those who are really handy in using a computer will be able to use most of it'* *'people who are comfortable with board learning will take time and it should be easy to understand'*

Further, 80% of the students used internet for the purpose of communication while 62% of the students used internet mainly for entertainment.

Most of the students preferred text books for studying (Females -92%; Males - 89%). About 95% of students wanted animations and multimedia to be incorporated while 94% of students preferred self-explanatory images along with audio and video to be integrated into regular teaching.

Majority of the students (95%) believed that e-learning could be used to provide updated information to all the students. Also, 88% of the students preferred e-learning because it allowed them to access learning materials anywhere and anytime (Table I).

Availability of computers and stable internet connectivity were perceived as the key limitations by 82% and 87% of student, respectively. Distractions from other activities like games,

entertainment, social networking etc was also quoted as a limitation by 73% of students (Table II).

Most of the students (84%) expressed that e-learning should be used as a supplementary tool. Further, 56% of students believed that e-learning was crucial for acquiring more competencies and 86% of students expressed that computer and internet use should be encouraged in all teaching institutions. Interestingly, 67% of students did not agree to replace all lectures with e-learning while 84% of students preferred e-learning as a supplementary tool in addition to regular lectures rather than replacement of lectures.

Students expressed many factors as major advantages, disadvantages and biggest challenges for introducing e-learning in medical/dental education in India. The prominent themes which emerged in the analysis are given in Tables III, IV & V).

Discussion

Targeted needs assessment is aimed at guiding decision-making by investigators thereby allowing them to plan interdisciplinary solutions for complex problems. It is a systematic process of asking questions, comparing answers and arriving at conclusions about how to proceed with a research question. Knowledge, Attitude and Practice (KAP) survey is conducted to investigate and document the existing knowledge (what people know), attitude (how they feel) and practice (what they do) about any given topic of interest (14). In KAP questionnaire, the 'needs' are translated in to measurable objectives, resources and criteria necessary for program planning and evaluation.

All the students who participated in the present study had access to computers and most of them had more than one technological gadget. Most of the students used internet and computer on a daily basis. Internet is a network of networks, connecting many computers together providing an infrastructure for the use of E-mail, bulletin boards, file archives, hypertext documents, databases etc (4, 15). The Internet has become the world's largest library, where retrieval of scientific resources can be done instantaneously. Internet has been shown to revolutionize medical education with the increasing use of e-learning, telemedicine and evidence based medicine, thereby encouraging the students to update their knowledge and become lifelong learners. Adequate computer skills in information seeking are the key elements in this process. Around two thirds of the students in the present study were confident in the basic computer skills like use of MicrosoftWord, Excel, PowerPoint etc. while more than 80% of them were confident of using the internet and email, as also shown by previous studies (1-3).

In our study 80% of students used internet mainly for non-academic purposes such as music, entertainment, games, chatting similar to earlier reports (16, 17).

Almost all female students preferred textbooks for learning academic content when compared to males who preferred more e-learning. The observed gender differences in attitudes towards use of computers and e-learning in the present study was concurrent with previous reports stating that female students were not directly opposed to e learning; however, they might be more pragmatic and focused on examinations, while some male students preferred the freedom of time and space offered by e-learning in their studies. These studies also showed that female students were at a disadvantage due to different attitude and patterns of computer usage (18).

Most of the students in the present study preferred animation and multimedia to be added to the regular teaching sessions probably they explain the phenomena that might otherwise be difficult to visualise and offer potential advantages for depicting dynamic information as shown by previous studies (19). Computer-assisted e-learning allows educators to incorporate elements such as multimedia, interactive images and animations to enhance the teaching – learning process (3).

Medical educators increasingly use animations as part of their teaching activities as evidenced by published studies employing animations and educational materials submitted to the digital repositories (20). However, designing and developing

computer animations are reported to be time-consuming and expensive (21). Furthermore, some studies also showed that animations might not be effective always. Also there was sparse evidence provided by studies in medical education about the effects of multimedia rich e-learning on learning outcomes (22). Conversely, when compared with many traditional instructional methods, interactive e-learning with multimedia and animation seemed to facilitate the learning process not only in the cognitive domain but also in the affective and psycho-motor domains (23).

In the current study, majority of the students quoted that availability of updated information and accessibility to learning resources anywhere and anytime as reasons for preferring e-learning. Consequently, many researchers have encouraged learning courses through the e-learning system as it saved time and energy of those students staying far away from the universities or colleges where they have enrolled (24, 25). Previous studies also have shown that many students wanted to learn online without the need to go anywhere else to get information (26).

While e-learning assures a lot of advantages, it is equally important to note that there are limitations. The availability of computers and stable internet connectivity were perceived as the key restricting factors in the present study. Also, distractions from other activities like games, entertainment, social networking etc were also quoted as limitations by many students. Previous studies have also emphasized similar views such as problems with the technology, little or no real time interaction with the faculty, feeling of isolation etc. In developing countries, funds to deploy new technology coupled with lack of adequate faculty training were also observed as limitations for e-learning. A high level of self-discipline or self-directed learning is required to pursue e-learning; learners with low motivation or bad study habits might fall behind (27).

The participants of the present study did not agree to replace all lectures with e-learning and instead preferred e-learning as a supplementary tool in addition to regular lectures. Concurrent findings were also identified where students agreed that e-learning could be adopted as an additional or supplementary tool along with traditional teaching but not as a replacement (28).

Analysis of targeted needs assessment through Knowledge, Attitude and Practice questionnaire showed that all the students had one or more electronic gadgets with internet connectivity. Availability of high speed internet with continuous connectivity was one of the major limitations as also shown by other studies (29). In many educational interventions including the present study, majority of students have expressed their acceptance and willingness for e-learning.

Conclusion

Our study suggests that, in developing country like India, where many students donot have access to quality education, e-learning can be viewed as a promising tool to improve the accessibility and availability of learning resources by employing cost-effective and user-friendly programs. We are aware that these findings are from a tertiary care university located in the middle of a city and planning to extend this study to rural Universities and Colleges to get the holistic data. Keeping in mind, the increased complexity of e-learning, it is also proposed that having a team of educationists, technical experts and administrators in each university may prove more beneficial.

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