

Perceptions of dental faculty and students of E-learning and its application in a public sector Dental College in Karachi, Pakistan

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Abstract

Objective: To assess e-learning resources and its application in dentistry among students and faculty of a dental college.

Methods: The qualitative study was conducted at Dow International Dental College, Karachi, from April to July 2017, and comprised semi-structured one-to-one interviews of undergraduate and postgraduate dental students as well as faculty members. A questionnaire was used to collect data about the way learners were using computer or smart phones in addition to conventional learning. The data was analysed through analysis of themes that included familiarisation, identification of a theme framework, indexing, charting, followed by mapping and interpretation.

Results: There were 21 subjects in the study. The use of smart phones was still limited to communication majorly. Majority of students utilised online resources like e-books and online searches. Faculty members used computers for reading articles and research.

Conclusion: Blended asynchronous e-learning strategies were being practised by dental students and faculty.

Keywords: Dental education, E-learning, Learning management system, Blended learning, Teacher's portfolio. (JPMA 69: 1319; 2019)

Introduction

Teaching methodology in dental education is rapidly changing and integrating latest networked information technology (IT) in dental education as part of the Electronic (e) revolution that has become the prime focus of all stakeholders.

The e-learning is an intricate IT system that not only involves pedagogical approaches in teaching and learning but also includes assessment, logistics, feedback, administration, audit, quality assurance and communication. High and medium fidelity dental simulators supplemented with online learning resources have become a part of the revolution in dental education. Although e-learning has been established as an integral component of the mainstream in dental education in the developed countries, it is still facing teething problems in Pakistan. Worldwide e-learning and virtual learning environments have revolutionised the healthcare teaching

and learning environment. Lecture-based learning is being integrated and augmented with virtual learning environments (VLEs) of learning management systems (LMS) and resource-based learning methods.¹ This gives healthcare educators new challenges and opportunities to embrace themselves for advanced learning methods and resources.² Similarly, educational methodologies are also improvising according to the needs from hypothetical to more outcome- and competency-based learning.³ Therefore, e-learning has proved to be instrumental in incorporating different techniques, technologies amongst healthcare professionals in teaching and learning inter-professional and inter-disciplinary patient-centred education and is considered an essential component of the dental teacher's toolkit.⁴ The e-learning in simple terms is computer-assisted learning (CAL) that can be either entirely internet-based, or it can be blended or mixed with certain components of face-to-face e-learning sessions.⁵

In the current dental education system, a shift is being observed from instructor-centred teaching to learner-centred and self-directed lifelong learning in which the outcome is more controlled by students themselves.⁶ In

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this way, utilisation of newer technologies, flipped classroom blended learning concept, feedback from students and computer-mediated communication would add additional dimensions to their learning skills and cognitive interactivity, that the traditional teaching and learning strategies lacked.⁷

The e-learning not only develops interest in students by incorporating multimedia learning, but also standardises the course content and delivery by presenting online tutorial or videos and it also helps in adult learning by correlating more towards practical-based learning.⁸ Electronic learning motivates the learner to actively participate and get involved into the topic of interest because of the shift from passive teacher-centred approach to more active learner-centred approach. Evidence shows that e-learning provides more knowledge and skills that can be retained and remembered because of more engagement in the learning process, that improves performance.⁹

Since its inception, e-learning has evolved as a pedagogical approach that involves flexible easy-to-access self-directed learning that is time saving and one that encourages interaction and collaboration and even certification, such as in Massive Online Open Courses (MOOCs) as part of Open Courseware (OCW) movement with potential stop-gap arrangement.¹⁰

With the emergence of e-learning and the use of technologies and resources, a crucial issue has emerged for training institutions of low and middle income countries (LMICs), including Pakistan.¹¹ The current state of dental education in Pakistan can be portrayed by the fact that almost all of the dental colleges in Pakistan have a traditional discipline-based, lecture-based, non-integrated and non-outcome-based curriculum, and they are facing numerous challenges in adopting e-learning strategies as traditional technologies such as books, pens, papers, whiteboards and overhead projectors are still in the mainstream of dental education.¹² A notable difference is observed between public and private institutions in the adaptation of dental education methodologies within Pakistan. In this situation there is a need to assess both the learner and the educator about the access and utilisation of electronic learning in dental institutions. Based on existing theories and best evidence in health professional education, a needs-based assessment regarding availability and use of e-learning in dental colleges in Pakistan is required to pave the path for

switching from didactic teaching and learning practices to active learning.

The current study was planned to assess e-learning resources and its application in dentistry among students and faculty of a dental college.

Subjects and Methods

The qualitative study was conducted at the Dow International Dental College, Dow University of Health Sciences (DUHS), Karachi, from April to July 2017, and comprised semi-structured one-to-one interviews of undergraduate and postgraduate dental students as well as faculty members.

All interviews were conducted in accordance with the ethical standards of the institutional review board and the study was exempted from permission as it was conducted in commonly accepted educational settings on regular education instructional strategies. Informed consent was obtained from all the participants.

The first part of the questionnaire consisted of socio-demographics. The second part included questions regarding utilisation of e-learning in accordance with the requirement and application. The participants were encouraged to provide their own observations, reflections and thoughts related to the topic. The audio component of the interviews was recorded digitally through audio recorders from mobile phones and then their hand-written transcriptions were made. The digital data was subsequently analysed through analysis of themes using NVivo®. This includes five stages of framework analysis: Familiarization, Identification of a theme framework, Indexing, Charting, and, finally, Mapping and Interpretation.¹³

During the familiarisation stage, the transcribed data was grouped into different themes by identifying differences in responses of the participants. A thematic framework was then developed after identifying five main themes, namely: Smart Mobile Phone Versus Computers, Access to Computers and Usage, E-Learning Resources, Computer Usage for Dental Treatment Planning for Patients, and, lastly, Electronic Learning gained from computers in dentistry. Codes were assigned to these themes and Indexing was subsequently performed for numerical annotation of transcripts for identifying consistencies. Responses were categorised and coded through the process of charting through abstraction and discriminating the responses based on the codes. A revised thematic

framework was devised in the stage of mapping and interpretation, in which the themes were interrelated and correlated to understand the different themes and their association based on participants' responses to elucidate the impact and implications of E-learning in dentistry.

Results

Of the 35 individuals approached, 21 participants agreed to participate with a response rate of 60%. The first theme was Smart mobile phones Versus Computers. The use of smart cell phones was still limited to communication purposes. However, e-learning from smart-phones, commonly known as Mobile learning (M-learning), had its own utility:

"... if I have to use smart cell-phone I would prefer to do small tasks like Google search any term or search some scenario-based Short Essay Question (SEQ) topic on Facebook dental pages but not big chapter readings." (F3S, Female 3rd Year; Smart Mobile Phone versus Computers).

Majority of undergraduates still utilised laptops or desktop computers at home and college for e-learning resources apart from contemporary books and notes. They also found smart phones an easy and handy tool while writing lecture notes.

"... it is far easier to take pictures of the lectures rather than writing quickly the entire slide and then make a folder of that topic to read at the end ... many times the hardcopy of that lecture is not provided so we take pictures ... it helps in correlating and reading the topic in books." (M3S, Male 3rd Year; Smart Phone versus Computers).

The second theme was Access to Computers and Usage. Under graduate students were mostly digital natives and belonged to the YouTube generation as they were native speakers of computer, online games and the internet language since childhood.¹⁴ However, many postgraduate students and faculty members were digital immigrants and some were digital nomads as they belonged to the less tech-savvy generation since they had access to computers in their second decade of life and currently own a desktop or laptop for their use.¹⁵ All undergraduate and postgraduate students used computers on a daily basis. Students utilised the college computer laboratory almost daily for their academic or co-curricular activities. However, faculty members showed a different range.

"... Yes, I do have a computer for daily use ... I use it frequently, but work related to dentistry is done rarely like maybe two or three times a week..." (MFA, Male Faculty; Access to Computers and Usage).

The third theme was E- Learning Resources. When the participants were asked to respond about what they do on computers for e-learning in dentistry, students reported online resource usage in different ways.

"It is good to read or download PowerPoint lectures from various topics from famous professors of other colleges or universities to get good marks in Viva (Oral Examination). However, these lectures are not that helpful in theory papers and Objective Structured Practical Examination (OPSE) which are cleared from books and notes only." (M4LR, Male 4th Year; e-Learning Resources).

Students looked for various resources that were cost-effective.

"I use Wikipedia and WebMD to search terms or Google on other online dictionaries. It is free, and we don't have to purchase expensive dictionaries from bookstores." (M2LR, Male 2nd Year; -e-Learning Resources).

"Sometimes it is difficult for me to look for a book in the library, so I try to download a free copy of e-book from which I either read or make assignments." (M4LR, Male 4th Year; e-Learning Resources).

On the other hand, utilisation of computers by postgraduate students and faculty members was totally different.

"I read research articles majorly from online dental journals to explore and improvise current knowledge and to prepare lecturers ... Office computers are also used for literature writing and data entry and analysis" (FFLR, Female Faculty; e-Learning Resources).

The concept of evidence-based dentistry was still not familiar for undergraduate students compared to postgraduate students and faculty.

"We follow treatment procedures that are taught to us from books and lectures and we apply them. We are not sure about the research evidence." (M3LR, Male 3rd Year; e- Learning Resources).

The fourth theme was Computer Usage for Dental Research and Dental Treatment Planning of Patients. Majority of the undergraduate students had never used any software for research-based activity except helping the seniors in data collection. However, postgraduate

dental students responded differently:

"... for research I use Microsoft Office© for writing literature, and for data analysis I use SPSS in my thesis." (MPgRTP, Male Postgraduate; Research & Treatment Plan).

"I have used STATA for Data analysis." (MPgRTP, Male Postgraduate; Research & Treatment Plan).

Most followed search engines for research articles were Google© and PubMed©. Along with research, faculty also utilised computer software for patient treatment plan and assistance.

"Sometimes I use AMIRA© for assistance in my dental implants cases." (MFRTP, Male Faculty; Research & Treatment).

"I have tried to use Dolphin© in orthodontic dental treatments and Carestream© as dental imaging software for many of my clinical cases." (MFRTP, Male Faculty; Research & Treatment Plan).

The fifth theme identified was e-Learning gained from Computers in Dentistry. The subjects were asked to conclude their response in percentage terms to reflect learning they gained from computers in the field of dentistry. As a result, different ranges were obtained.

"I mainly study from books and lectures but also use computers for even less than 10 per cent of the total time." (F4LG, Female 4th Year; Learning).

The e-Learning system complemented the traditional education system during assessments.

"We generally use less computers or cell-phones for learning but when exams are near, we spend more time on study along with my mobile phone or laptop for communicating and discussing topics." (M3LG, Male 3rd Year; Learning).

Discussion

The qualitative study assessed student's perceptions on asynchronous blended e-learning practices in dentistry from devices involving computers and smart-phones. The use of qualitative study design enabled in-depth simultaneous exploration of students and faculty perceptions of using e-learning and their potential applications in their professional life. Unlike the quantitative research, a qualitative study highlights wide range of issues¹⁵ like the current one that focussed on e-learning.¹⁶ It is one of the very few studies focusing on Electronic learning in Dental schools of Pakistan. The

interviews were based on self-assessment. Subjective assessment is a key indicator in many surveys, but this could lead to emergence of potential bias on the objective utilisation.¹⁷ This potential bias is based on the fact that undergraduate students are digital natives, while their seniors and faculty members are digital immigrants and some are even digital nomads and digital aliens in terms of using technology for teaching and learning purposes.¹⁸ Objective assessment of e-learning practices in dental education is still not possible as most of the dental colleges in Pakistan are not using LMS and even VLEs, and digital blackboards are still not an integral component of the mainstream dental education in Pakistan.

The domain of e-learning has a large body of evidence with consistent positive outcomes in terms of teaching and learning in health professional education compared to other conventional methods of teaching.¹⁹

While taking into account the emergence of e-learning and resource development in various dental institutions in Pakistan, it is important to consider appropriateness and to avoid any hype of over or under usage of technology.²⁰ This may be seen in many dental institutions where simulations and technologies are either not available or, if present, they are partly functional or of low fidelity.

Mobile phones are frequently used and are accessible to every medical or dental student.²¹ The current study found that students collected academic information on mobile phones rather than on a conventional hardcopy or notebook, which is a manifestation of subjective acuity in self-management. Most e-learning activities noted were limited to reading lecture notes, PowerPoint presentations and data search for research purposes while faculty was involved in e-learning to research patient-related problems and to conduct literature search.

Formative and summative assessment of dental students, commonly known as e-assessment including e-portfolios within e-learning management software, are currently not practised in Pakistan.

In this context, certain mobile learning applications, such as audio and video podcasting incorporated within free online LMS software like Modular Object-Oriented Dynamic Learning Environment (MOODLE), Digital Blackboard (DB) and others, are being offered by only a handful of Pakistani universities and those institutions that are currently not utilising e-learning, M-learning and e-assessment are bound to face issues and challenges

from their digital native learners.^{22,23}

In developing countries like Pakistan, certain features like LMS and VLEs should be incorporated in developing an institutional web portal for students and faculty with adequate IT resources and support staff. Further studies are needed to assess the difference on easiness of portability with communication and its impact on adult learning.

In any education system, faculty is the key driving force facilitating the students in adopting useful ways to enhance their skills and expertise in any discipline. In-house faculty development or promotion on new technologies is scarce and a very little focus is placed on capacity-building.²⁴ In the current study, faculty showed utilisation of e-learning methods. However, frequent faculty development programmes can be designed by medical education departments.

Hindrances in reforms in dental education and lack of implementation of e-learning practices can be attributed to lack of trained faculty in dental education, absence of faculty development programmes and parochialism in dental education.^{25,26} The educational environment and organisational culture can only be modified through provision of faculty development related not only to teaching and learning strategies but to the provision of concrete steps to revise and revamp the dental curriculum.

Faculty development programmes should be tailor-made to the needs of the dental faculty coupled with performance-based appraisal. There is a dire need to develop and implement dental faculty development programmes in Pakistan to address contextually the academic and learning needs of the dental learners in general and the dental society specifically.

Conclusion

Blended asynchronous e-learning practices were being adopted by undergraduate and postgraduate dental students even in the absence of LMS and VLE. Incorporation of e-information through devices has augmented dental student's learning practices even in resource-constrained settings of dental colleges in Pakistan. Faculty has also showed a shift towards modern e-learning methods. Implementation of e-learning in Pakistan would supplement dental education in achieving a shift towards competency-based self-directed lifelong adult learning.

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