Original Research

Evaluation of information and communication technology skills of dental teachers in the dental schools of India: A questionnaire study

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ABSTRACT

Background: The information and communication technology (ICT) has evolved into an essential part of our lives. The ICT is increasingly used in various ways in higher education especially dental and medical education. **Aim:** To provide a valid and reliable assessment of the level and nature of ICT knowledge and skills among the dental teachers. **Materials and Methods:** The questionnaire study was designed to assess the competencies of the dental teachers toward ICT. The 320 questionnaires received were analyzed to assess the level of skills and knowledge. **Results:** The majority of respondents were confident in managing computer files and doing routine activities like word processing, PowerPoint presentations and use of internet, while felt the need of further training on the aspects like video and audio recording, projectors and use of online course materials. **Conclusion:** The results of the study indicated the need to refine the ICT skills among the dental faculties for its optimum use in teaching–learning procedures in the dental schools.

INTRODUCTION

Today the Information and communication technology (ICTs) have transformed all the aspect of our lives from business, governance to education. In past few years, the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavors in our world. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student-centered learning settings and often this creates some tensions for some teachers and students. However with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century.

Use of ICT is rapidly increasing in medical and dental education. The rapid development of computer technology and the access to personal computers and smartphones, together with the Internet, e-mail, and various medical literature retrieval applications have changed both the study and practice environments in dentistry, as in other disciplines [1]. The International Medical Informatics Association has agreed on

recommendations for professionals to acquire knowledge and skills in information processing and ICT. Use of new technology and media has become very popular, especially among younger people, where the use of personal computers, portable laptops, mobile phones, etc., has reached one of the highest levels in the world [2].

Hence, this study was planned to provide a valid and reliable assessment of the level and nature of ICT knowledge and skills among dental teachers and to establish to what extent teachers are integrating their ICT knowledge and skills in classrooms.

MATERIALS AND METHODS

A questionnaire was designed aiming to assess quickly the competence of dental teachers with ICT in a structured way. This questionnaire was designed in an attempt to investigate ICT knowledge and skills among the dental teachers. The questionnaire was first given to three experts from the field of medical education and three respondents. This was then validated using Anastasi concurrent validity and the validity was found to be 89.3%. The 500 questionnaires were then distributed to the teaching faculties in eight dental colleges in various parts of the country. The questionnaire was collected from the respondents and analyzed.

The questionnaire was divided into 10 sections depending on the different ICT skills and knowledge. The respondents were given five closed-ended options ranging from the awareness regarding the skill to the competence in the field on respective skills.

The 10 sections covered the questions related to respective skills and knowledge. They are as follows:
1. Using the computer and managing files
2. Word processing
3. Spreadsheets
4. Presentations
5. Using the internet
6. E-mail
7. Cameras and scanning
8. Video and audio recording
9. Projectors and other display techniques
10. Using online course material.

The last section of the questionnaire had the closed-ended questions regarding the ICT facilities at their workplace.

The questionnaire also had two open-ended questions for their opinion on provision of ICT generally in their college and their ability to use it, and whether they have any particular training needs in ICT or information and learning technology.

RESULTS

A total of 343 respondents returned the questionnaires, which where crosschecked for completeness. The 320 questionnaires were found to be complete and were included for final analysis.

Out of 320, 178 (55.65%) were females and 142 (44.38%) were males. All the respondents were dental teachers with master's qualification in dental sciences in their respective discipline. All were working as full-time faculty in the teaching institutes and were involved in undergraduate as well as postgraduate teaching.

The results were analyzed using percentage analysis for each of the skills as mentioned above.

Using the Computer and Managing Files

The respondents were very positive in computer usage and managing files as 53.1% had confidence to do it and 28.4% were fully competent in the said skills and were ready to assist others in it. Only 3.1% felt that they had no experience and need training [Table 1].

Word Processing

About 130 respondents (40.6%) were confident in managing and processing word files while 89 respondents (27.8%) felt that they have some knowledge but do need training for the same. Only 51 respondents were fully competent and were ready to explain the word processing skills to others [Table 1].

Spreadsheets

The analysis of the questionnaire revealed that the majority of the respondents required the training in the skills of managing and using spreadsheets, as 110 respondents (34.3%) said that they do not have the experience of using spreadsheets and 98 respondents (30.62%) felt that they have some knowledge but require training [Table 1].

Presentations

Most of the dental teachers were well versed with the use of PowerPoint presentation as 44% were confident in doing it and 28.4% were fully competent in doing it [Table 1].

Using the Internet

Most of the respondents were using the Internet at their workplace or home and hence 44.3% were confident in its use while 25% were fully competent in these skills [Table 1].

E-mail

Emails being the most important mode of communication, most of the dental teachers were using it with confidence. Only the 50 respondents (15.6%) were not having experience of this skill and needed the training [Table 1].

Cameras and Scanning

About 132 respondents (41.2%) were confident in using cameras and scanners while 76 (23.7%) were fully confident in this skill.

Table 1: Results of the questionnaire survey

Question	Overall response				
	Not aware and don't think to know about it (%)	Don't have experience and need training (%)	Have some knowledge but need practice/training (%)	Have confident to do (%)	Fully competent and can explain it to others (%)
Using the computer and managing files	0 (0)	10 (3.1)	49 (15.3)	170 (53.2)	91 (28.4)
Word processing	0 (0)	50 (15.6)	89 (27.8)	130 (40.6)	51 (16.0)
Spreadsheets	12 (3.7)	110 (34.3)	98 (30.6)	58 (18.2)	42 (13.2)
Presentations	0 (0)	18 (5.6)	70 (21.8)	141 (44.2)	91 (28.4)
Using the internet	0 (0)	37 (11.5)	61 (19.1)	142 (44.4)	80 (25)
E-mail	0 (0)	50 (15.6)	80 (25)	141 (44.1)	49 (15.3)
Cameras and scanning	0 (0)	22 (6.8)	90 (28.2)	132 (41.2)	76 (23.8)
Video and audio recording	9 (3.1)	120 (37.5)	72 (25)	70 (21.9)	49 (12.5)
Projectors and other display techniques	19 (5.9)	168 (52.6)	80 (25)	53 (16.5)	0 (0)
Using online course material	30 (9.3)	151 (47.2)	90 (28.2)	49 (15.3)	0 (0)

Only 22 teachers (6.8%) were not having any experience of this skill and required training [Table 1].

Video and Audio Recording

About 37.5% of the respondents felt that they do not have experience of video and audio recording while 25% of respondents had some knowledge, but required training. Only 7 respondents (21.9%) were confident of this skill while 4 (12.5) were fully competent in the same [Table 1].

Projectors and Other Display Techniques

Most of the dental teachers from the sample studies were not having any experience of using projectors and other display techniques (53.1%) [Table 1].

Using Online Course Material

About 47.1% of the respondents had no experience of using online course material and felt the need for training, while 28.1% were having some knowledge but needed training. Only 49 respondents (15.3%) were confident of using it [Table 1].

Access to Technology in Work Place

About 68.7% of the dental teachers form the study population felt that they have insufficient availability or access to technology at their workplace [Table 2].

DISCUSSION

The results of this study demonstrate that most of the dental teachers are well versed with the skills and knowledge regarding the routine and basic ICT skills such as word processing, PowerPoint, using internet and e-mails. However, they failed to possess the necessary skills for using ICT applications such as video and audio recording, using projectors. Very few teachers had an experience of using online course materials. The results of this study are in concurrence with the previous studies demonstrating the variable response among the dental teachers

Table 2: Access technologies in work place

Overall response	Number of respondents (%)
Available for use	80 (25.0)
Not available for use	220 (68.7)
Don't know	20 (6.3)
Total	320 (100.0)

regarding the ICT skills. With the advancements in the field of communication technology, the dental teachers have to keep pace with it, to make best use of the ICT for imparting the holistic education to the students [3,4].

Most of the dental teachers used computers and smartphones regularly for various personal as well as professional tasks [5]. The teachers possessed the better knowledge and skills of the tasks used more routinely. However, this has little impact on their skills and knowledge of ICT in dental educational setup. There seems to be a wide gap observed in their own perceived ICT skills and actual skills for specific tasks evaluated through this questionnaire.

The results of this study can be considered as representative of Indian scenario as the respondents were from different colleges across the country. The teachers included were from the different specialties and academic levels. Hence, the sample was diverse and representative.

The questionnaire designed covered varied skills and competencies and was predictive of current status as well as future needs to upgrade/refine ICT skills and knowledge. The outcome of this study is in concurrence with the views expressed by Mattheos *et al.* that the positive attitude toward computer literary was observed among the dental teachers with varied competence levels [6]. The role of ICT in dental education is well understood by all the dental faculties despite different levels of skills and knowledge and different academic positions.

The results of the demonstrate that the dental teachers appear to be strong in using computers and managing files, word processing, spreadsheets, presentations, using cameras and scanning. They felt a need for further training in the areas of

video and audio recording and use of projectors. The training for the optimum use of online course materials was also sensed to be required.

The exponential advancements taking place in ICT pose the challenge for the dental teachers and students. The present technology oriented teaching–learning environment requires a good deal of attention, which is lacking in today's dental and medical schools. More efforts and investments are needed so that the best out of the technology is taped and can be employed to improve the quality of oral health education [6,7].

The shift from conventional teaching and curricula to the competency and performance-based curricula are well supported and encouraged by emerging instructional technologies. For the same, the dental teachers need access to a variety of information sources, forms, and types. The learning settings need to be student-centered with access to information. The ICT based instructional modules and an online course provides learner freedom to learn at any time and wherever they want [8,9]. The learning should be problem and inquiry based. In such environment, teachers can be coaches and mentors rather than content experts.

CONCLUSIONS

This study was planed to explore the ICT skills among the dental teachers at various dental teaching institutes in India. The analysis of the ICT skills and knowledge through this questionnaire reflects the current state of integration of technology in teaching–learning. The results of the study are the predictor of the future and if the constructive interventions are undertaken, ICT can well be amalgamated with the future dental curricula in India.

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