

# Continuing professional development of dentists through distant learning: An Indira Gandhi National Open University-Dental Council of India experiment a report

Ruchika Kuba, Anil Kohli<sup>1</sup>

School of Health Sciences,  
Indira Gandhi National Open  
University, Maidan Garhi, <sup>1</sup>Dental  
Council of India, Dr. Soni's  
Dental Clinic, New Delhi, India

## ABSTRACT

To keep themselves updated with all the advancements in the field of dentistry, dentists should involve themselves in some kind of professional development. Distance learning is the most appropriate way to serve the growing demand due to technological advancements. Indira Gandhi National Open University in collaboration with Dental Council of India (DCI) developed and launched two continuing professional development programs in Endodontics (postgraduate certificate in endodontics) and postgraduate certificate in oral implantology and has trained over 400 and 280 BDS dentists respectively till date. The program package consists of self-instructional material, assignments, videos and practical training. The training is conducted in premiere dental colleges and institutions recognized by DCI. The certificate is awarded after a term end examination, both in theory and practical. The pass percentages of the theory courses ranged from around 63% to 98%, and 90% of the candidates cleared the practical exam.

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India is producing approximately 25,000 dentists per annum with a dentist to the population ratio of 1:9000. This is in contrast to the WHO recommended dentist to population ratio of 1:7500. Currently, 300 Dental Council of India (DCI) recognized/approved dental colleges exist as per state dental council records and hence the actual figures may be much more. The annual intake capacity of BDS is 25,000–30,000. There are approximately 5500 MBS seats only hence only one in 6–7 BDS doctors get a chance to do their postgraduation. This is a big bottleneck in the career prospective of a dentist.<sup>[1]</sup>

Dentistry is a branch that has advanced at a very rapid pace in the last few decades. Clinical techniques are progressing

at an exponential rate; thus there are more opportunities for meeting health, healthcare and quality of life<sup>[2]</sup> for example some branches of dentistry such as oral implantology were scarcely practiced 20 years ago, but today have become a routine in everyday practice.<sup>[3,4]</sup> Other upcoming branches are cosmetic dentistry, endodontics and application of lasers in dentistry. It is not possible for the dentists to keep themselves updated with all these advancements without actively involving themselves in some kind of continuous professional development (CPD). Definitions of CPD<sup>[5-9]</sup> draw attention to the career-long importance of CPD and its value for patient care. There are various methods by which one can keep abreast with the advances in one's field like seminars, conferences, lectures and short term courses to name a few.

A study was conducted to identify the extent to which qualified dental practitioners in the U.K. undertake the three distinct activities of continuing CPD - reading professional journals; conducting courses; and undertaking refresher courses. A high proportion of the sample reported regularly undertaking activity related to CPD. Approximately 87% read professional journals at least once a month, just over half had attended 5 or more days at professional meetings and courses in the last year. A small portion of the dentist had attended 5 or more days at professional meetings and courses in the last year.<sup>[10]</sup>

### Address for correspondence:

Dr. Ruchika Kuba  
E-mail: [ruchikakuba@yahoo.com](mailto:ruchikakuba@yahoo.com)

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The need to update clinical skills and integrate new developments into patient care is an accepted part of professional practice and increasingly related to continued registration.<sup>[11,12]</sup> There is evidence of a worldwide trend toward mandatory CPD.<sup>[13-18]</sup>

Distance learning (DL) has been increasingly used to impart education for a variety of subjects including professional and skill oriented ones. DL is also reported to be the most appropriate way to serve the growing demand of postgraduates and specialist education, a demand that cannot be accommodated by existing university structures.<sup>[19]</sup> In that sense, DL will be specially attractive to certain categories of professional who are practically excluded from access to traditional, social, professional, geographical and economic factors.<sup>[20]</sup> Studies have shown that students who self regulate their learning have higher levels of self-efficacy, are confident in their abilities (positive attributions) and are more internally motivated.<sup>[21,22]</sup> Studies have also found that dentist appeared to be more motivated when the distant course was leading to accreditation points.<sup>[23]</sup>

Indira Gandhi National Open University (IGNOU) has been offering various CME programs to MBBS, MD doctors and dentists through the distant mode since 1997. Some of the programs offered are Postgraduate Diploma in Maternal and Child Health, Postgraduate Diploma in Geriatric Medicines, Postgraduate Diploma in Clinical Cardiology, Postgraduate Diploma in Health and Hospital Management, Post Doctoral Program in Dialysis Medicine, Postgraduate Certificate in Endodontics (PGCE) and Postgraduate Certificate in Oral Implantology (PGCOI). In the last 20 years more than 10,000 doctors and dentists have been trained in the various medical programs. There are many success stories.

## METHODOLOGY

Indira Gandhi National Open University in collaboration with DCI developed and launched two PGCE and PGCOI through DL mode for BDS graduates in July 2008. These two programs were developed as a CPD programs with 30 credits each (one credit is equivalent to 30 h of learning) and were of 1-year duration. The syllabus was drawn by reputed experts in dentistry from different parts of the country and identified by DCI. Thereafter the course material consisting of booklets in the form of self-instructional material (SIM) was prepared with the help of course writers. These writers from various medical colleges (both private and government) were identified by DCI and oriented toward writing modules for a DL course. The material written by them were edited for content, language and format editing before it was composed and printed. These modules replaced the teacher, since the language was interactive, simple and full of examples, study guide and recapitulations and self-assessments build within the text. Videos specifically prepared for the program also form part of the program package. The course material was

also supplemented by questions in the form of assignments. These served the dual purpose of a continuous assessment as well as a reinforcement of the text content and helped provide a feedback to the students.

The admission to these two programs was done through a vigorous entrance examination. The students were allotted centers for skill training. These were called program study centers (PSC). These centers were allotted on the basis of their choice and as per the availability of a seat at their position in the merit list. To ensure quality of training, a maximum of 6 seats per center was allowed. The PSCs were postgraduate dental colleges which were identified and approved by DCI. Senior dentist teachers in these institutions were given an orientation to guide and train the students in the various skills related to the two subjects respectively. The programs being of a distant nature, the attachment in these centers were not continuous. In the intermediate period the students were expected to practice the skills taught in these PSCs, in their own clinics or hospitals to gain proficiency. The students were expected to be regular and were evaluated on a continuous basis. At the end of the 1-year period of their study, they were assessed for their proficiency through a term end examination conducted by a set of internal and external examiners. Only the successful candidates were awarded a certificate.

## RESULTS

Two DL program - PGCE and PGCOI were launched through DL Mode for BDS graduates in July 2008. The programs consisted of three theory and two practical courses in PGCE and two theory and two practical courses in PGCOI [Tables 1 and 2]. The theoretical component is imparted by 14 SIM or booklets called blocks in each program. These are supplemented by doubt clearing sessions during face to face contact programs, assignments and video lectures. The practical component or psychomotor learning is taken care of by actual hands on training under supervision of trainers in the best dental colleges of the

**Table 1: Program design of PGCE program**

Course code	Topics
MDT-001	Fundamentals of endodontics
MDT-002	Clinical endodontics I
MDT-003	Clinical endodontics II
MDTL-001	Practicals of endodontics
MDTL-002	Practicals of clinical endodontics

PGCE=Postgraduate certificate in endodontics

**Table 2: Program design of PGCOI program**

Course code	Topics
MDT-004	Fundamentals of implantology
MDT-005	Advanced surgical implantology
MDTL-004	Practicals of implantology
MDTL-005	Practicals of advanced surgical implantology

PGCOI=Postgraduate certificate in oral implantology

country identified and selected as PSC. There were 15 PSCs for endodontics and 12 PSCs for oral implantology having 120 and 80 seats for the two programs respectively. By 2012, the number of centers increased to 18 and 15 respectively. List of the PSCs for the two programs is provided in Table 3.

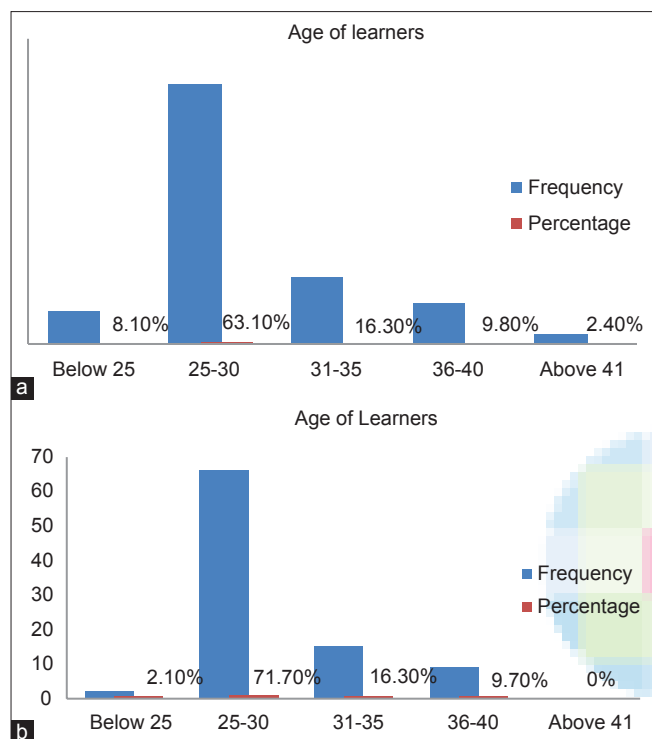
The learners had their contact session for a period of 6 days every alternate month. In the sessions, all the skills that were required to be taught were demonstrated by the counselors followed by ample opportunities for practice

under supervision. A list of skill taught in two programs is provided in the Tables 4 and 5.

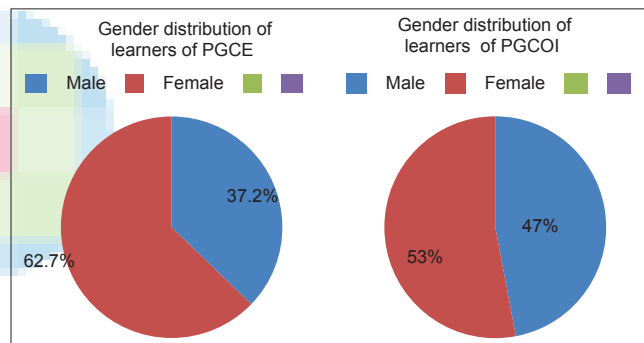
A total of 403 students has been enrolled in PGCE and 285 in PGCOI so far. The age distribution in two programs is placed in Figures 1a and b. The gender distribution in the two programs is placed in Figure 2. The figure shows a female predominance that is more pronounced in the PGCE program. The state wise distribution of learners of PGCE [Figure 3] and PGCOI [Figure 4] shows Delhi and Maharashtra as the predominating states.

The year wise enrolment of the learners and the number who have successfully cleared the program of PGCE and PGCOI are presented in Figures 5 and 6 respectively.

The course wise appearing and clearing all the various theory, and practical courses of the PGCE and PGCOI programs is also provided in the Tables 6 and 7 respectively. These figures reveal that the average pass percentage of the theory courses in PGCE ranges from 68 to 98.7 and of the PGCOI ranges from 63 to 98.4. The pass percentage of the practical courses of both the courses is in nineties.



**Figure 1:** (a) Age distribution of postgraduate certificate in endodontics learners, (b) age distribution of postgraduate certificate in oral implantology learners



**Figure 2:** Gender distribution of learners of postgraduate certificate in endodontics and postgraduate certificate in oral implantology

**Table 3: List of PSC of the PGCE and PGCOI program**

**Endodontics**

- Government Dental College and Hospital, Mumbai
- M.A. Rangoonwala College of Dental Sciences and Research Center, Pune
- Dr. R. Ahmed Dental College and Hospital, Kolkata
- SDM College of Dental Sciences and Hospital, Dharwad
- Government Dental College, Rohtak
- Maulana Azad Dental College and Hospital, New Delhi
- Punjab Government Dental College and Hospital, Amritsar
- V.S. Dental College and Hospital, Bangalore
- King George's University of Dental Sciences, Lucknow
- Bapuji Dental College and Hospital, Bangalore
- Rajah Muthiah Dental College and Hospital, Annamalai
- Meenakshi Ammal Dental College and Hospital, Chennai
- Modern Dental College and Research Centre, Indore
- Pacific Dental College, Udaipur
- Govt. Dental College and Hospital, Ahmedabad
- Sharad Pawar Dental College and Hospital, Wardha
- People's College of Dental Sciences and Research Center, Indore
- Regional Dental College, Guwahati, Guwahati

**Oral implantology**

- Dr. D.Y. Patil Dental College and Hospital, Pune
- Nair Hospital Dental College, Mumbai
- Sharad Pawar Dental College and Hospital, Wardha
- SDM College of Dental Sciences and Hospital, Dharwad
- D.A. Pandu Memorial R.V. Dental College, Bangalore
- Maulana Azad Dental College and Hospital, New Delhi
- I.T.S. Centre for Dental Studies and Research, Murad Nagar, Ghaziabad
- Subharati Dental College, Meerut
- King George's University of Dental Sciences, Lucknow
- Meenakshi Ammal Dental College and Hospital, Chennai
- Sri Sai College of Dental Surgery, Vikarabad
- Manipal College of Dental Sciences
- Government College of Dentistry, Indore
- Government Dental College, Rohtak
- Bhojia Dental College and Hospital, Solan

The centers presented in bold were added after the 1<sup>st</sup> year of launch of the program. PGCE=Postgraduate certificate in endodontics, PGCOI=Postgraduate certificate in oral implantology, PSC=Program study center

**Table 4: List of skills to be performed at PSC (endodontics)**

**Skill - endodontics**

- Section cutting (on extracted teeth)
- Access opening (on extracted teeth)
- Biomechanical preparation (on extracted teeth)
- Obturation (on extracted teeth)
- Post space preparation (on extracted teeth)
- Post and core anterior impression making (on extracted teeth)
- Post and core build up (on extracted teeth)
- Access opening (on anterior and posterior teeth)
- Rubber dam application and working length (on anterior and posterior teeth)
- Biomechanical preparation, step back and crown down (on anterior and posterior teeth)
- Obturation
- Lateral condensation and vertical condensation (on anterior and posterior teeth)
- Composite restoration (on anterior and posterior teeth)
- Bleaching (one anterior nonvital tooth)
- Post and core (prefabricated crown reduction (one anterior tooth))
- Post and core (direct technique) one anterior
- Crown delivery
- Endodontic surgery

PSC=Program study centre

**Table 5: List of skills to be performed at PSC (oral implantology)**

**Skills - oral implantology**

- Demonstration on implant equipment, instruments and implant kits
- Infection control guidelines and the operating room protocol
- Suturing techniques
- Work up - single tooth implant
- Hands on stage one surgery - preclinical on models
- Stage one surgery - single tooth implant
- Work up for edentulous mandible cases
- Stage one surgery-edentulous mandible
- Stage - 2 surgery single tooth implant
- Impression procedure - single tooth implant
- Case for bone grafting
- Case for sinus lift
- Facebow transfer
- Attachment of ball abutment to the implants and engagement of the attachment with the denture by direct technique
- Evaluation of the fabricated implant supported crowns received from the lab attachment of abutment and its torquing adjustment of the crown and its cementation

PSC=Program study centers

## DISCUSSION

Exemplar e modules developed by others are also structured to promote self-study by directing learners through their study, promoting interaction with the material, offering explanation, providing feedback, encouraging, supporting and motivating the reader.<sup>[24]</sup>

The curriculum developed for a distance program is learner centric with motivation, reinforcement and feedback inbuilt in every component, may it be SIM or practical contact sessions. Practical training is supplemented by videos. The practical contact session is a platform for a face to face interaction and is also an interface for peer group interaction which is an important component of DL program. The students are adult learners consisting of a heterogenous mix of students of different ages, coming from different parts of the country with a varied experience which adds to the richness of their interaction. Researchers have long pointed out the importance of student interactions in the teaching and learning process. Vygotsky states collaborative learning is necessary for building one's own cognitive process.<sup>[25]</sup> Among group opportunities if they cannot share their knowledge effectively, it can lead to poor learning outcome.<sup>[26]</sup> The programs are aimed at in service dentists. The greatest asset of the program is providing flexibility. Students enrolling in these programs can take their contact sessions within 3 years of enrolling in the program without extra payment. The entire expenditure of the stay and travel for these contact session is borne by the student. Besides the expenditure, the students are also required to take leave from their work place since attendance to these contact sessions is compulsory. The course material and face to face hands on training is supplemented by teleconferencing which is a one way video two way audio [Figure 7], radio conferencing, web counseling, video, broadcast, telecast and interactive classrooms which provide an essential components of the program.

**Table 6: Course wise passing of theory and practical courses of PGCE**

Course	2008			2009			2010			2011		
	Appeared	Passed	Pass %	Appeared	Passed	Pass %	Appeared	Passed	Pass %	Appeared	Passed	Pass %
MDT001	82	78	95.12	126	120	95.23	88	73	82.95	88	73	82.95
MDT002	82	77	93.90	125	121	96.8	87	72	82.76	87	72	82.76
MDT003	82	77	93.90	125	123	98.4	87	76	87.36	87	76	87.36
MDT 1 and 2	78	77	98.71	123	123	100	84	81	96.43	84	81	96.43

PGCE=Postgraduate certificate in endodontics

**Table 7: Course wise passing of theory and practical courses of PGCOI**

Course	2008			2009			2010			2011		
	Appeared	Passed	Pass %	Appeared	Passed	Pass %	Appeared	Passed	Pass %	Appeared	Passed	Pass %
MDT004	71	67	94.37	99	92	92.93	57	41	71.93	76	48	63.16
MDT005	71	68	95.77	99	82	82.83	56	42	75	76	49	64.471
MDTL4-5	66	65	98.48	95	93	97.89	44	43	97.73	33	33	100

PGCOI=Postgraduate certificate in oral implantology

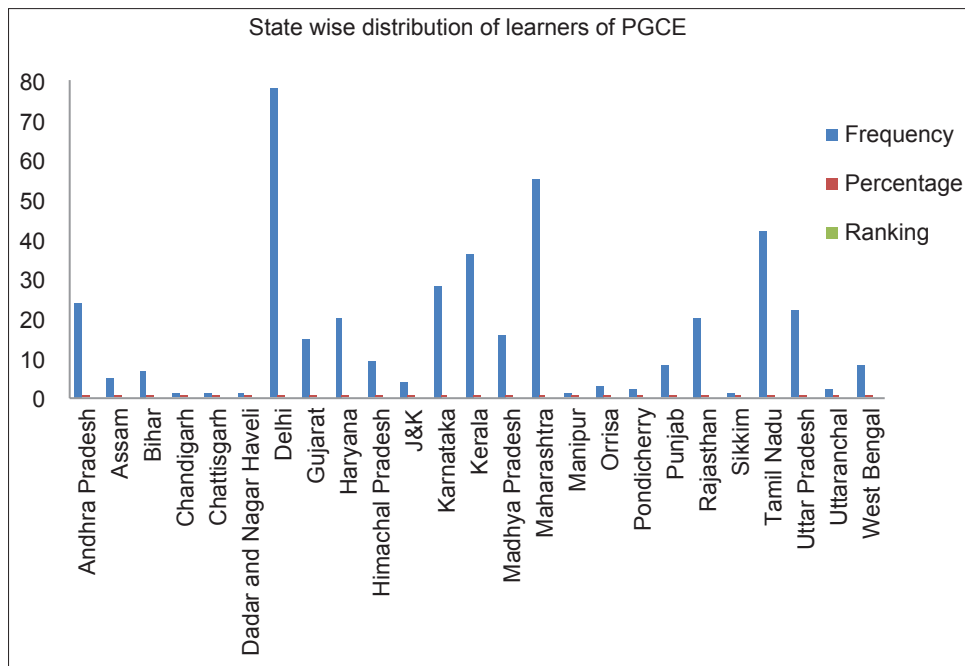


Figure 3: State wise distribution of learners of postgraduate certificate in endodontics

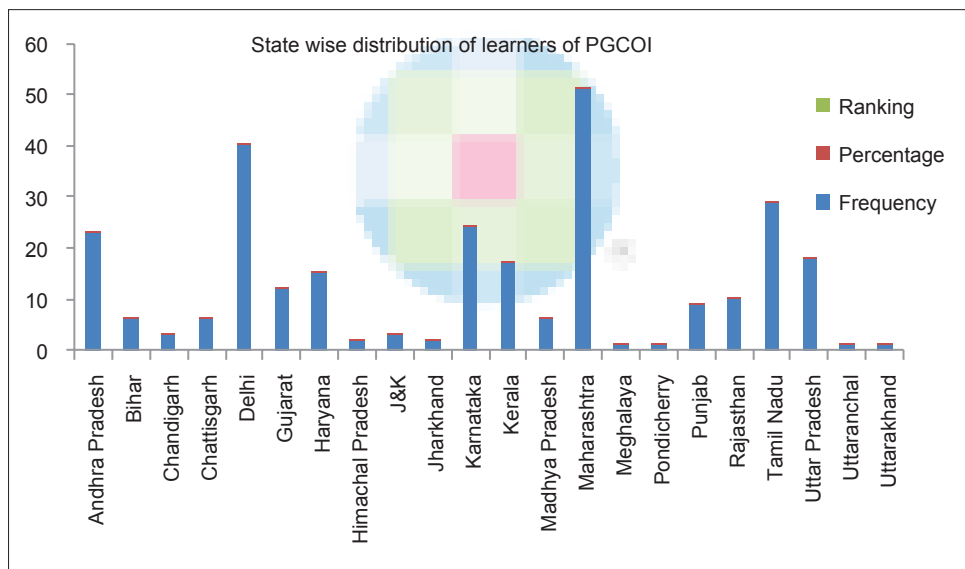


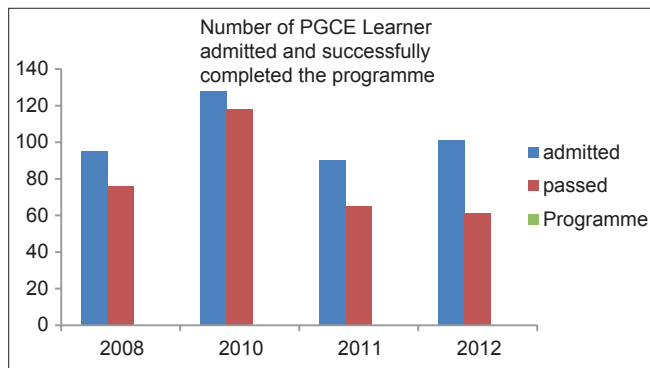
Figure 4: State wise distribution of learners of postgraduate certificate in oral implantology

The assignments serve to be an important two-way communication and providing feedback in addition to being an assessment tool. The types of feedback on assignments could be affective, cognitive and motivational. Emotional states are able to influence information processing during learning.<sup>[27,28]</sup> Worrying about the awarded grade may lead to rumination, low performance and failure to go ahead, on the opposite side positive emotions as curiosity and joy may lead to enhanced attention and better performance.<sup>[29]</sup> As stated by a distant learner feedback is really helpful to be sure about. I have got right and what I need work more.<sup>[30]</sup> In distant education feedback might also lead students to engage themselves with critical thinking and

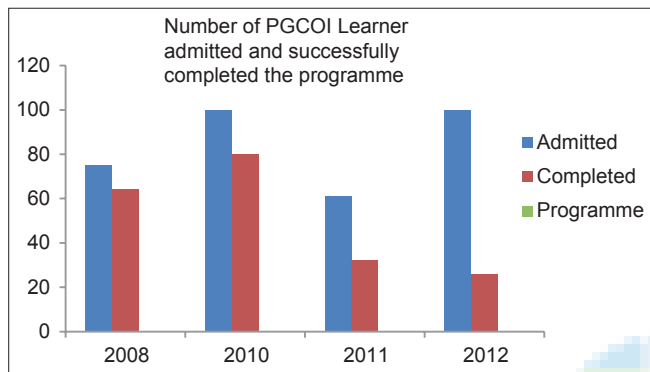
self-reflecting.<sup>[31]</sup> E-learning modules developed for the continuing professional development of European dentists also had self assessment provided throughout the module to increase interaction.<sup>[24]</sup>

The year wise enrolment of the learners and the number who have successfully cleared the program of PGCE and PGCOI is presented in Figures 5 and 6 respectively. The figures reflect that the majority of the students managed to successfully clear the program. The figures for the 2012 batch are lower than the rest of the batches, the reason being that the results of all the students for this batch have yet to be declared.

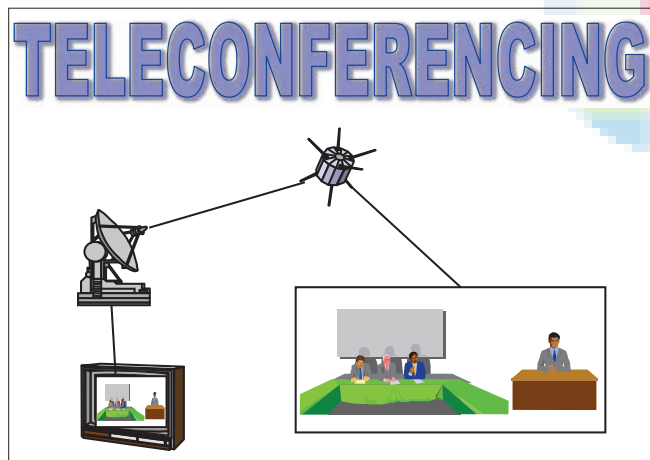




**Figure 5:** Year wise enrollment of PGCE learners and their pass percentages



**Figure 6:** Year wise enrollment of PGCOI learners and their pass percentages



**Figure 7:** Teleconferencing – a one way video two way audio facility

The course wise appearing and clearing all the various theory, and practical courses of the PGCE and PGCOI programs is also provided in the Tables 6 and 7 respectively. These figures reveal that the average pass percentage of the theory courses in PGCE ranges from 68 to 98.7 and of the PGCOI ranges from 63 to 98.4. The pass percentage of the practical courses of both the courses is in nineties. The results clearly indicate that the overall pass percentage of both theory and practical courses of the two programs are high. The good results reflect that the program has been effective in fulfilling its objectives of imparting skill training through distant learning mode.

## CONCLUSION

The two programs developed by IGNOU in collaboration with the DCI are very popular since they provide an opportunity to the dentists to update themselves and learn new skills. There is a vigorous evaluation system which ensures effective learning. The need of the hour is however to revise the given programs and offer them in a blended learning methodology. A blended learning method, combining face to face DL elements, presents many advantages<sup>[32,33]</sup> and could enable conversation and collaborative learning whilst using the e module.

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