

# Influence of Different Styles of Instructional Delivery on the Preference and Perception of Learner in Dental Education – A Survey

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## Abstract

**Purpose:** This study assesses the influence of four styles of instructional delivery on dental students' preference and perception of learning experience using lecture method in classroom setting. The association between gender, age, course level and the instructional method preference is also evaluated. **Materials and Methods:** A group of 98 undergraduate students belonging to the first three years of Bachelor of Dental Surgery (B.D.S) degree program participated in this study. Four instructional methods were used to deliver lectures on surgical techniques used in dental implantology: Chalk-talk method (CT), PowerPoint presentation with figures (PPTf), PowerPoint presentation with figures and dental models (PPTfm) and Videos-verbal elaboration (VT). Two structured questionnaires were used to record the response of the students towards the instructional method employed. Descriptive statistics and chi-square test were used. **Results:** Recorded students' response indicates that VT is an effective instructional delivery method to deliver subject content (99%), promote topic understanding (98%), promote future learning (99%), promote recollection (99%), promote integration of theoretical and practical knowledge (98%) and promote attentiveness (100%). The order of lecture methods preference is as follows: combination of instructional delivery methods (49%), VT (44.9%), PPTfm (5.1%), PPTf (1%) and CT (0%). As the course level increased, higher preference was given to combination of instructional delivery methods (PPTfm, PPTf, VT). There is statistically significant association between age and the method preferred ( $p=0.001$ ). **Conclusion:** The dental students preferred the VT method, followed by the PPTf and PPTfm methods.

**Keywords:** Instructional delivery, Dental implantology, Chalk-talk method, Videos, Presentations.

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## INTRODUCTION

Lectures facilitate acquisition of theoretical knowledge in a classroom and promote independent learning strategies. Traditional methods include chalk-talk, whiteboards and overhead projectors (OHP) [1].

Advances in science and technology and evidence-based clinical guidelines demand integration of instructional technology-based delivery systems to deliver knowledge in a classroom [1-4]. PowerPoint (PPT) software is commonly being used [5].

Incorporation of computer-assisted instruction into the curriculum has had a positive impact on the academic performance [6, 7]. However, negligible data is available on the response of dental students to this change.

This study assessed the influence of instructional methods on dental students' preference and perception using lecture method. The influence of gender, age and course level on their preference was also evaluated.

## METHODS

### Sample

This study was performed in the month of December 2017 at the Goa Dental College and Hospital, India. A purposive sampling technique was used to include all the students attending the first-year, second-year and third-year degree course of Bachelor of Dental Surgery (BDS) ( $n=120$ ). This non-random sampling technique was used since the inclusion criteria included participants who did not have prior knowledge of the topics discussed in the direct instruction. Thus, the sample group members were selected based on the

objective of the study, judgement of the researcher and accessibility for experimentation.

Inclusion criteria included students who were present in the class room on the day of the study, those who concurred that they did not have prior knowledge of the topic discussed in the lecture and those who gave informed consent. Exclusion criteria included students who were absent on the day of the experiment and who had prior knowledge about the topics. Ninety-eight undergraduate dental students out of 120 students fulfilled the inclusion criteria (82%) and were selected for the study.

### Lecture Topic and Strategy

Four different instructional delivery methods were used to deliver lectures on surgical techniques used in dental implantology. The Lecture methods included: Chalk-talk method (CT) (Maxillary Sinus floor Augmentation Procedures), PowerPoint presentation with figures (PPTf) (Suturing techniques in dental implantology), PowerPoint presentation with figures and dental models (PPTfm) (Direct sinus lift procedure) and Videos with subtitles and verbal elaboration (VT) (Indirect sinus lift procedure) by the same dental educator. The duration of each lecture was 10mins. All four lectures were delivered back-to-back, with a break of 5-8mins following each lecture to allow the students to fill the questionnaire forms.

### Study Instrument and Procedure

Two structured close-ended feedback questionnaires were pre-formed to allow data collection for this study [8]. Face validity of the questionnaires was conducted by three experts.

- A self-designed questionnaire (6 questions) was developed to record the students' response towards the lectures delivered, based on their perception of the quality of learning experience [9]. Responses to the items were made on a 5-point Likert scale anchored with 'strongly agree' and 'strongly disagree'.
- An additional questionnaire (4 questions) was developed to record the student's personal data such as gender, age, course level and the students' overall preference of the instructional delivery method.

The self-report scale was administered to the students at the end of every lecture and the personal data collection questionnaire was administered at the end of the instructional unit. The participants were verbally informed about the particulars in the questionnaire and the purpose of the study prior to the commencement of the instructional unit, following which Informed consent was obtained from every participant.

### Analysis

The data was analysed using the Statistical Package for Social Sciences (SPSS) software for Windows, Version 19.0 (IBM Corp, Armonk, NY). Descriptive statistics and chi square test were used.

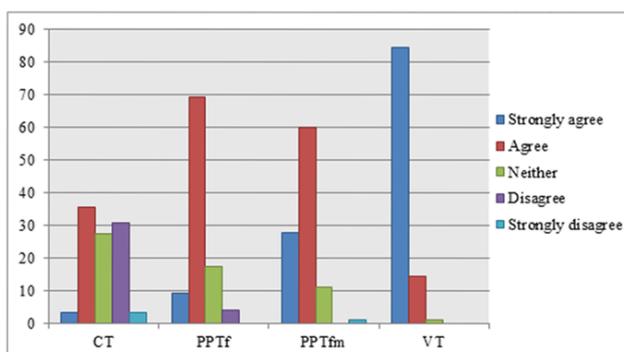
### RESULTS

A total of ninety-eight undergraduate students filled the questionnaires, out of which twenty-three (23.5%) were males and seventy-five (76.5%) were females. The study comprised of thirty-eight (38.8%) first BDS students, thirty-two (32.6%) second BDS students and twenty-eight (28.6%) third BDS students. The age group of study participants ranged from 18 to 21 years.

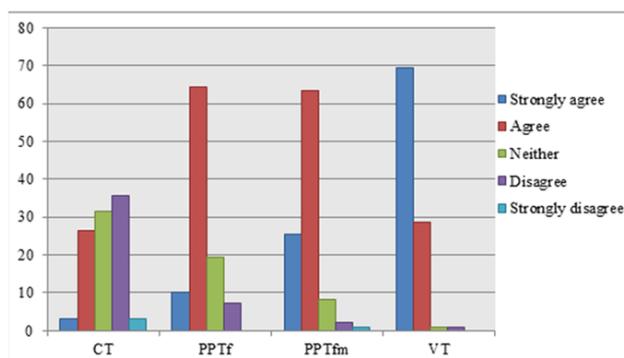
According to course level, 2.6% of first BDS students preferred PPT with figures (PPTf) whereas 65.8% of first BDS students preferred videos-talk (VT) and 18.4% preferred a combination of instructional delivery methods (students' preferred PPTf, PPTfm and VT). Among the second BDS students, 56.3% preferred VT whereas 43.8% preferred a combination of methods. Majority of the third BDS students (96.4%) preferred a combination of methods. This suggested that as the course level increased, the preference for an instructional delivery method varied and higher preference was given to combination of methods. There was statistically significant association between age and the method preferred ( $p=0.001$ ). However, there was no statistically significant association between gender and the method preferred ( $p=0.71$ ).

The responses to the items in the questionnaire were made on a 5-point Likert scale. 84.7% of students strongly agreed that VT method promoted a clear transmission of information, whereas, 30.6% of students disagreed that CT method promoted a clear transmission of information, as depicted in Fig-1. 69.4% of students strongly agreed that VT method promoted understanding of the general principles and concepts of the topic effectively, as depicted in Fig-2. In addition, 74.5% and 88.8% of students agreed or strongly agreed that PPTf and PPTfm methods were efficient in promoting understanding of the topic, in contrast to 35.7% of students who disagreed that CT method did the same. 99% of students agreed or strongly agreed that the VT method simulated their interest in the topic for future learning. Whereas, 49% of students disagreed or strongly disagreed that CT method simulated their interest. 83.7% and 69.4% of students agreed or strongly agreed with PPTfm and PPTf methods in this regard, as depicted in Fig-3. 99% of students agreed or strongly agreed that VT method helped them to recollect the subject matter at the end of the lecture and 58.2% of students disagreed or strongly disagreed that CT method helped them recollect subject matter, as depicted in Fig-4. Nonetheless, 84.7% of students agreed or strongly agreed that PPTfm method helped them in recollection. 57.2% of students

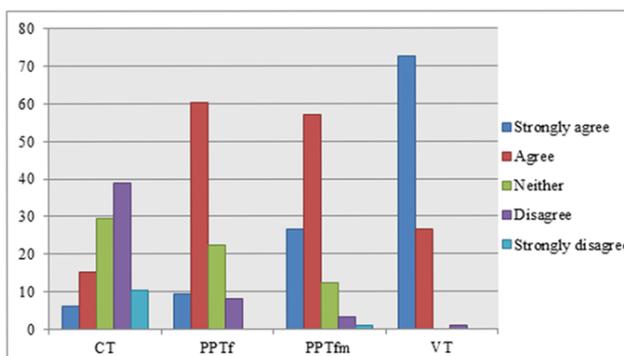
disagreed or strongly disagreed that CT method helped them in connecting the theoretical knowledge to the clinical task. Whereas, 98% of students agreed or strongly agreed that VT method was helpful. In addition, 91.8% of students agreed or strongly agreed that PPTfm method was also effective, as depicted in Fig-5. 66.4% of students agreed or strongly disagreed that CT method helped them focus in class, as depicted in Fig-6. Whereas, all the students said that VT method helped them focus in class.



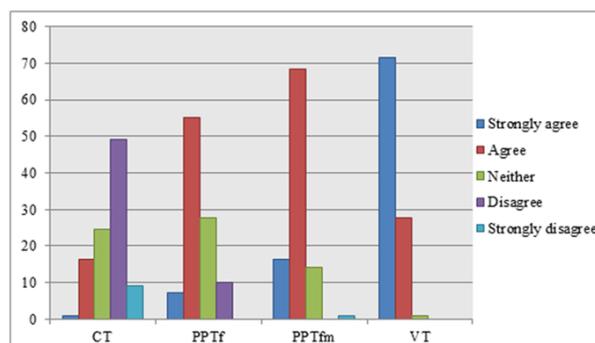
**Fig-1: Response of the students (in percentage) to "Does this teaching method promote a clear transmission of information?"**



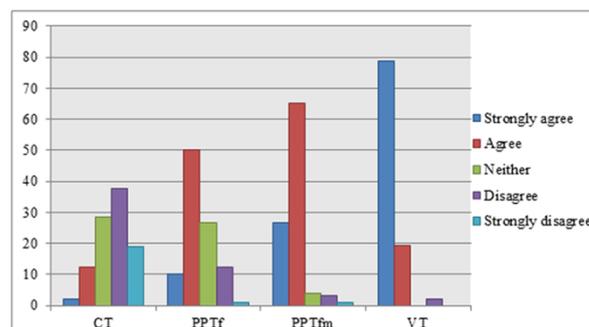
**Fig-2: Response of the students (in percentage) to "Does this teaching method promote understanding of the general principles and concepts efficiently?"**



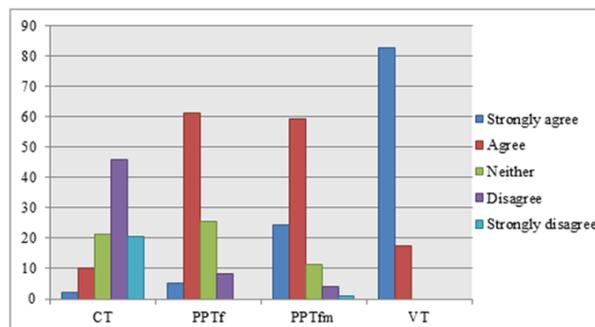
**Fig-3: Response of the students (in percentage) to "Does this teaching method stimulate your interest in the topic for future learning?"**



**Fig-4: Response of the students (in percentage) to "Is it easier to recollect information taught through this method of teaching?"**



**Fig-5: Response of the students (in percentage) to "Does this method of teaching promote a relationship between the theoretical knowledge and clinical application?"**



**Fig-6: Response of the students (in percentage) to "Does this method of teaching help you to focus on the subject matter?"**

## DISCUSSION

The results of this survey showed that implementation of different instructional delivery methods in the classroom can influence students' preference and perception of the quality of learning experience. It was also observed that there was an association between gender, age and course level of the students to their lecture method preference. The lecture methods applied in the study included the use of chalkboard (CT), MS PowerPoint presentations with illustrative figures and dental models (PPTf, PPTfm) and animated videos (VT).

It is noted that nearly all the students agreed that VT method is a better method to deliver subject content (99%), helped the students' to understand the topic better (98%), instigated them for future learning (99%), helped them to recollect subject matter (99%), helped them to understand the relationship between the theoretical knowledge and its clinical application (98%) and helped them to focus better in class (100%). This was in accordance with previous studies which concluded that the use of videos as a clinical skills instructional method can decrease cognitive load and increase acquisition of the skill [10, 11]. It was also reported that encompassing psychomotor skill principles as written instruction within a video demonstration provides an overview, demonstration and visualization of the skill [10, 12]. Moreover, the use of visual aid in classroom teaching can affect the students perception of the clinical relevance of the topic and can further promote students' interest in subject and their motivation for learning [13]. Another study concluded that animations in videos exhibit a three-dimensional presentation, which has been associated with increased interest, motivation and attention [14].

The students preferred the lecture methods in the following order: combination of instructional delivery methods (49%), VT (44.9%), PPTfm (5.1%), PPTf (1%) and CT (0%). It was also noted that as the course level increased, higher preference was given to a combination of instructional delivery methods (PPT with figures, dental model and videos-talk). This was in agreement with previous studies. It has been reported that medical students preferred combinations of teaching methods, such as blackboard and PowerPoint or blackboard with animations [14]. Parolia *et al.*, reported that most Indian dental students preferred lectures with the aid of PowerPoint, chalkboard and clinical demonstration [15]. Students reported that they enjoyed the one-to-one interaction between student and teacher allowed by the chalk-talk method, organized point-wise delivery of information presented by overhead projector and clinical details provided by a slide, thus, suggesting that "integrated lecture method" incorporating a combination of two or more teaching methods is a more suitable tool for teaching and learning [16, 17]. Pereira *et al.*, also suggested incorporation of new technologies for instruction since it was noted that blended methods of teaching (traditional and non-traditional methodologies) promoted better learning among medical students [18].

The application of inanimate models for simulation-based learning has been advocated by various authors in the medical field [19, 20]. Model-assisted teaching helps to present basic surgical knowledge in a simplified manner [20]. Also, plastic models enhance the students' ability to retain and transfer their learning to clinical application [19]. Nonetheless, they do not allow a through learning and

practice of surgical skills as compared to practice in live animals and human cadavers [21].

There was statistically significant association between age and the method preferred ( $p=0.001$ ). However, there was no statistically significant association between gender and the method preferred ( $p=0.71$ ). This was in agreement with a previously conducted study [13].

The students' perception about their learning experience provides a better understanding of the learning environment and thus, provides an opportunity for enhanced development of curriculum and teaching activities [22]. Student feedback questionnaire is one of the methods used for evaluation of teaching and learning experience [23]. In this survey, two close-ended structured questionnaires were developed using the guidelines provided by Student Evaluation of teaching (SET), which is part of a research conducted by Centre for Excellence in Learning and Teaching (CELT) [9]. One questionnaire was designed to evaluate each lecture method for the following: 1) clear transmission of information, 2) promotion of concept understanding, 3) promotion of future learning, 4) recollection of information, 5) correlation between theoretical knowledge and clinical application, and 6) promotion of attentiveness in class room [8]. The second questionnaire recorded the students' personal data and method preference. Face validity of the questionnaires was then conducted by three experts. Hence, the attitudes of the participants towards the quality of their learning experience were studied by means of these pre-formed questionnaires.

Advanced surgical procedures were chosen as lecture topics to reduce the possibility of undergraduate students knowing the objective of the lessons prior to the lecture. Different lecture topics were chosen to avoid bias from gaining prior knowledge about the topic before application of the specific teaching method since all four lectures were delivered back-to-back in the same session. Also, the same educator conducted all the lectures to avoid operator bias.

Extensive research in science and discovery has resulted in considerable amount of new knowledge and technologies that must be incorporated into the mainstream of dental education. Hence, there is a need for continued evolution of dental educational practices.<sup>[24]</sup> Selection of the appropriate teaching method is one of the most important responsibilities of the dental educator to ensure effective teaching of this didactic course in a class room setting. Instruction of the students in a classroom prior to entry into the clinical setting promotes knowledge and facilitates understanding of the required procedural skill. In addition, the teaching method enhances the power of communication of the dental educator by establishing a balance between the delivery of knowledge by the

sender and the understanding of the information by the receiver.

The routine evaluation of teaching effectiveness is important in improving student learning, faculty development and curriculum change. Various authors have concluded that the educators' behaviour and characteristics are significantly associated with quality instruction and effective learning [22, 25]. Nonetheless, effective lecture skills are considered very crucial for teaching in a classroom setting and the selection of the method of instruction greatly affects this outcome [26].

Previous literature reports various studies conducted to evaluate effectiveness of teaching methods used for direct instruction in various educational fields. Kumar *et al.*, reported that medical and dental students preferred chalk-talk method over PPT and OHP [23]. Another study reported that medical students preferred the CT methods for lecture delivery of non-clinical subjects [27]. This was attributed to the familiarity of the students to the CT method since it is the commonly used instructional method at the school level [23]. A study conducted in 2011 reported that 56% of the medical students had no previous exposure to audio-visual and multimedia teaching experience during their higher or higher secondary learning and chalk-talk method is their primary teaching method [14, 23]. It was also reported that traditional lecture method using CT promoted material understand-ability and effective teaching/learning process compared to PPT. This was attributed to the students' perception of educators being lax in their PowerPoint presentation preparation and PPT-based lecture delivery.<sup>[28]</sup> Various other demerits of PPT presentations have also been reported: a) educators need formal training in handling multimedia projector, preparing PPT presentations and presentation skills, b) a darkened room can result in a gloomy learning environment, c) educators misuse electronic slides by creating dull text-packed slides making the lecture boring, d) teachers may go fast, making it difficult for students to take down subject notes [14, 29].

On the other hand, a study conducted by Seth *et al.* concluded that medical students preferred the use of PPT presentations in lectures as compared to the chalk-talk and transparencies-overhead projector method. This was attributed to the incorporation of good quality pictures, animations, videos and charts in a PPT [29]. Jabeen and Ghani reported that 90.7% medical students preferred PPT presentations compared to chalk-talk method [30]. PPT lecture slides that were designed based on multimedia principles resulted in increase in short-term retention, transfer of learning and facilitated deep learning [5]. Moreover, it has been reported that the use of PPT promotes efficient learning and helps to organize and structure note taking [31].

Nevertheless, CT method presents with the following demerits: a) out-dated technique, b) unsuitable for large groups, c) squeaking of chalk can be annoying d) organization of matter is difficult, and d) it does not provide a medium to display complex diagrams or images.<sup>[14]</sup> Also, it has been reported that the effectiveness of CT declines as the number of students in the classroom increases and it is difficult to achieve pupil attention for a longer period of time [14].

Since there is an exponential increase in the application of PowerPoint technology, educator must be trained to attain effective skills in using this technology for teaching purpose. According to previous literature, the traditional chalk-talk method has been widely favoured among students. However, with introduction of considerable amount of health science and technological innovations, it is necessary to promote students to adapt to the use of PPT and computer-based learning applications for lecture delivery and clinical work training [4, 23].

The limitation of this study is that assessment of students' attitudes was done on a smaller sample size, since the study was conducted in the only dental college functioning within the state. Also, the lecture topics covered a clinical subject. It would have been useful to deliver lectures covering both, a clinical and a non-clinical subject to assess the preferences of the students.

## CONCLUSION

The findings of this study indicated that dental students preferred the video-talk method, followed by the PPTf and PPTfm methods. However, the chalk-talk method was the least preferred method. Moreover, most students preferred combination of lecture methods which included videos-talk and PPT with figures and dental models. Students' perception and preference of an instructional delivery method indicated that it must encompass the elements of comprehensive teaching which include recall, comprehension and application to clinical task.

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