

## Research Article

## The Perception of Undergraduate Students in a Malaysian Dental School on use of just in Time Videos before a Clinical Procedure

Vinayak Kalyan Chakravarthy Pishipati<sup>1\*</sup>, Jayashri Tamanna Nerali<sup>2</sup>, Rennie Doh Li Ryn<sup>3</sup>, Alicia Wong Pui Lai<sup>3</sup>, Goh Wei Horng<sup>3</sup>, Khor Wei Kent<sup>3</sup>

<sup>1</sup>Department of Conservative Dentistry and Endodontics, Penang International Dental College, Penang, Malaysia

<sup>2</sup>Department of General Dentistry, Penang International Dental College, Penang, Malaysia

<sup>3</sup>Penang International Dental College, Penang, Malaysia

**\*Corresponding Author:** Vinayak Kalyan Chakravarthy Pishipati, Department of Conservative Dentistry and Endodontics, Master of Dental Surgery, Penang International Dental College, Penang, Malaysia, E-mail: [kalyanendo@gmail.com](mailto:kalyanendo@gmail.com)

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### Abstract

The undergraduate dental students who enter clinical session after completion of preclinical exercises on simulated patients usually encounter difficulties in adjusting to real life patient encounter. This study seeks to evaluate the perception of undergraduate dental students on the use of JIT videos before a clinical procedure as an aid to overcome these difficulties. Inside this Interventional study student watch JIT videos of three simple procedures like rubber dam application, fluoride application, restoration of carious teeth (International Caries Detection and Assessment System ICDAS 03) before the clinical procedure starts. 90 randomly selected Penang International Dental College

undergraduates were included in this study. Questionnaire based on 5-Level Likert Scale at the extremes, with “strongly disagree,” to “strongly agree,” and open-ended questions at the end was distributed to them after watching the JIT video and performing the clinical procedure. The mean scores for the 21 individual questions range from 3 to 4 for Fluoride Application, Restoration of Carious Tooth (ICDAS 03), Rubber Dam Application JIT videos and the overall Cronbach's Alpha showed a very strong reliability. In summary, the student perceptions were generally positive. Even though there were some disagreements among the items evaluated, the majority of students

agreed that JIT videos have helped them during the clinical procedure. All three JIT videos were able to reduce the students' anxiety level, improve students' knowledge, skills and professionalism, provided good video structures, enhanced interaction of students with and useful enough to be recommended to other students in the clinical practice.

**Keywords:** Perception; Dental students; Just in Time Videos (JIT); Clinical procedure

## 1. Introduction

The undergraduate dental students who enter clinical session after completion of preclinical exercises on simulated patients usually encounter difficulties in adjusting to real life patient encounter. Difficulties like increased stress factor, lack of confidence, and inability to apply knowledge and skills were reported [1]. Teaching, learning strategies like Just In Time (JIT) videos can be employed to overcome these difficulties. A Student can access this video just before the patient encounter and access relevant information about the procedure. The use of just-in-time learning strategies allows students to choose the timing, location and amount of learning before patient encounter. As technology has advanced, portable handheld devices are now available that allow an individual the ability to review information at the point of need [2]. According to the research "The effectiveness of video support in the teaching of manual skills related to initial periodontal therapy tested on phantoms" that investigated the effectiveness of the video support system during practical training, video support can be an effective aid in the teaching of manual skills related to oral health care [3]. Educational methods must be dynamic and continuously adapt to an ever-changing social environment. Information and communication technology (ICT) has been a critical component of teaching and learning in higher education over the last

few decades. One particularly important trend we have recently witnessed with regard to the use of ICT is the increasing reliance on mobile-connected devices not only in daily tasks, but also within professional and educational environments [4]. Numerous surveys carried out at different levels of education reveal the extended and promising use of videos in education. However, the limited number of researches was carried out in the past about JIT videos in the education system, especially in a dental setting. Omar et al. [5] in his study describes the development and implementation of a student-generated video activity as part of a knowledge, observation, simulation, and experience (KOSE) program at the School of Dentistry, International Medical University, Kuala Lumpur, Malaysia. The study reports on the perception of an activity intended to improve professional behavior and communication skills of first year students through exposure to clinical scenarios involving the patient and a dental team. Overall, the dental students perceived that the student-generated video activity was a positive experience and enabled them to play the major role in driving their learning process [5]. This study offered several insights that led to our research entitled "The Perception of Undergraduate Students In A Malaysian Dental School On Use Of Just In Time Videos Before A Clinical Procedure".

### 1.1 Aim

This study seeks to evaluate the perception of undergraduate dental students on the use of JIT videos before a clinical procedure.

### 1.2 Objectives

1. To determine whether watching the JIT videos before a clinical procedure reduces the students' anxiety level.

2. To evaluate the role of JIT videos in improving the students' knowledge, skills and professionalism.
3. To evaluate whether students feel JIT videos are useful, relevant and of good multimedia quality.
4. To determine if JIT video does improve the students' ability to interact with other fellow students, instructors and patients.
5. To Evaluate if students find the JIT videos useful enough to recommend them to other students during their clinical practice.

## 2. Material & Methods

This is an intervention study that seeks to evaluate the perception of undergraduate dental students on the use of JIT videos before a clinical procedure. Study population consisted of 90 randomly selected Penang International Dental College (PIDC) undergraduates who have entered the clinical session after completion of preclinical exercises on simulated patients. Groups of thirty students were allocated to Fluoride Application, Restoration of Carious Tooth (ICDAS 03 (International Caries Detection and Assessment System)), and Rubber Dam Application JIT videos each, respectively. The Fluoride Application JIT video is a demonstration video along with captions and background instrumental music incorporated which lasted for 4minutes 17seconds. The second Rubber Dam Application JIT videos are also a demonstration video along with captions and background instrumental music incorporated which lasted for 4 minutes 15seconds. The third Restoration of Carious Tooth (ICDAS 03) JIT video is a picture slideshow video along with captions and background instrumental music incorporated which lasted for 1minute 27seconds. All eligible subjects were given an explanation about the study by the investigators to obtain consent and allowed to watch the JIT video through an iPad before starting the clinical procedures.

Using a survey methodology, questionnaire was answered on that day after the procedure. The questionnaire consisted of 5-Level Likert Scale at the extremes, with "strongly disagree," to "strongly agree," and open-ended questions at the end. All five aspects of perception, namely, the psychological aspect, knowledge, skills, and professionalism; video structure; interaction; satisfaction and future outlook were included into the questionnaire. The data were collected, organized accordingly by SPSS software, and subjected to data analysis. Cronbach's Alpha was used to test the reliability of all 3 JIT videos and calculated the mean score of the 5 aspects of perception of students.

## 3. Results

The mean score for overall 21 individual questions pertaining to students' perception towards Fluoride Application JIT video was 4.1 (Table 2). Mean scores for the individual questions ranged from 3.50 to 4.53 (Table 1). The Cronbach's Alpha shows 0.807 which has a good internal consistency (Table 3) [15]. The mean score for overall 21 individual questions which pertain to students' perceptions towards the Restoration of Carious Tooth (ICDAS 03) JIT video was 3.8 (Table 2). Mean scores for the individual questions ranged from 3.30 to 4.17(Table 1). The Cronbach's Alpha shows 0.937 which has an excellent internal consistency (Table 3) [15]. The mean for overall 21 individual questions which pertain to students' perceptions towards Rubber Dam Application JIT video was 3.7 (Table 2). Mean scores for the individual questions ranged from 3.37 to 4.10 (Table 1). The Cronbach's Alpha shows 0.893 which has a good internal consistency (Table 3) [15]. Watching the JIT videos before procedure helped students to reduce the anxiety level and also boost their confidence level. The mean score concerning the psychological aspect of the fluoride application JIT video was high (4.467) compared to Rubber dam application JIT video (3.783) and restoration of carious

tooth ICDAS 03 JIT video (3.767). The JIT video improved the dental students' knowledge, skills and professionalism as the mean score in this study for Fluoride Application JIT video was high (4.033), followed by the Restoration of Carious Tooth (ICDAS 03) JIT video (3.739) and then Rubber Dam Application JIT video (3.694). Apart from this, the students also found the structure of the video to be useful, relevant and of good multimedia quality. The mean score for the student responses concerning the video structure aspect for the Restoration of Carious Tooth (ICDAS 03) JIT video was (3.913), Fluoride Application JIT video (3.893) and Rubber Dam Application JIT video (3.840).

JIT video does improve the students' ability to interact with the patients. The mean score for the student responses concerning the interaction aspect for Fluoride Application JIT video was high (4.067), followed by Rubber Dam Application JIT video (3.575) and then Restoration of Carious Tooth (ICDAS 03) JIT video (3.533). The students found JIT video useful to recommend others to watch before their clinical procedure. The mean score of the student responses concerning the satisfaction and future outlook aspect for Fluoride Application JIT video was (4.400) followed by the Restoration of Carious Tooth (ICDAS 03) JIT video (4.075) and Rubber Dam Application JIT video (3.850).

Questions	Fluoride Application		Restoration of Carious Tooth (ICDAS 03)		Rubber Dam Application	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Watching just in time video before the procedure on patient reduced my anxiety level.	4.47	.629	3.77	.817	3.63	.765
I was able to approach patient with more confidence.	4.47	.571	3.77	.858	3.93	.521
I was able to recall and apply my previous knowledge.	4.23	.504	4.13	.730	4.10	.712
I was able to transfer the skills learned during pre-clinical	4.07	.868	3.90	.885	3.77	.679
The just in time video helped me to identify the strong and weak points of my procedure	4.10	.607	3.63	.964	3.53	.973
The just in time video gave me an insight of how to approach my patient	4.20	.714	3.63	.850	3.87	.900
I found that this video stimulate my interest in reading more on this topic	3.53	.860	3.43	.858	3.40	.675
The video improved my professional development in the dental clinic	4.07	.740	3.70	.837	3.50	.861

The just in time video consisted of useful and relevant information	4.10	.607	4.10	.845	4.10	.548
The Video was closely linked theoretically and practically	3.97	.765	3.87	.860	4.10	.662
The audio and visual effects combined well	3.50	.974	3.73	1.015	3.40	1.192
The duration of Just in time video was adequate	3.70	1.088	4.10	.712	3.73	.868
The video explained important concepts/ ideas in ways that I can understand	4.20	.610	3.77	.817	3.87	.937
I felt comfortable to explain the details of procedure to patient	4.33	.661	3.77	.679	3.70	.651
I felt comfortable sharing my opinions, questions, and ideas with other students	4.17	.531	3.57	.817	3.73	.691
The video increased my interaction with other students	3.90	.759	3.30	.750	3.37	.850
The video increased my interaction with the instructors	3.87	.730	3.50	.731	3.50	.777
I am satisfied with the just in time video	4.27	.691	4.03	.765	3.97	.765
Learning with this learning method was fun	4.37	.669	3.97	.890	3.63	.964
I will recommend this learning method to others	4.43	.568	4.13	.776	3.87	.819
I will recommend using just in time video in clinical practice	4.53	.571	4.17	.699	3.93	.691

**Table 1:** Descriptive statistics of individual 21 items of the questionnaire for 3 JIT Videos.

JIT Video	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Fluoride Application	4.117	3.500	4.533	1.033	1.295	.086	21
Restoration of Carious Tooth (ICDAS 03)	3.808	3.300	4.167	.867	1.263	.062	21
Rubber Dam Application	3.744	3.367	4.100	.733	1.218	.056	21

**Table 2:** Descriptive statistics for overall 3 JIT Videos.

JIT Video	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Fluoride Application	.807	.822	21
Restoration of Carious Tooth (ICDAS 03)	.937	.938	21
Rubber Dam Application	.893	.895	21

**Table 3:** Reliability statistics of 21 items of the questionnaire for 3 JIT Videos.

#### 4. Discussion

The student perceptions were generally positive. Even though there were some disagreements among the items evaluated, the majority of students agreed that JIT videos helped them during their clinical procedure. All the 3 JIT videos was able to reduce the students' anxiety level, improve students' knowledge, skills and professionalism, provide good video structures, allow students to interact with the patients, and useful enough to be recommended to other students in the clinical practice. McGarr argued that the level of processing required to deconstruct and understand information presented in a video podcast limits viewing effectiveness on a mobile platform [6], hence, we have decided to display our JIT videos through iPad which enhances the viewing effectiveness. Two studies noted that viewing video podcasts helped reduce student anxiety, presumably before a testing situation [7, 8]. Therefore, the psychological aspect of the students has to be evaluated after watching the JIT video. This not only includes the anxiety level, but also the confidence level. Similarly, in our study, the students had positive feedback that their anxiety level did reduce and they felt more confident in carrying out the procedure as they were more mentally prepared especially after watching Fluoride Application and Rubber Dam Application JIT videos. Students felt that it took shorter time to recall the previous learnt knowledge. The Fluoride Application JIT video managed to point out common mistakes done by the students and hence enhanced their clinical skills directly. As mentioned by Zhang D, et al.

[9] when an e-learning environment provides interactive video, the higher degree of process control can positively influence the effectiveness of knowledge transfer [9]. We sought to find out if students are able to transfer the learned information, be it knowledge or skills and improve their professionalism after watching the JIT video. All in all, student better performed professionally in terms of confronting the patient with the knowledge and skills they gained from watching the JIT videos. Personal and professional development (PPD) is an integral part of dental education that aims to prepare those graduates for a life of continuous learning [10].

Several researchers observed that students believed video podcasts helped to build connections with the instructor [11] and other students [12]. This suggests students are more engaged to interact with their surroundings after watching the JIT video. Our results also support the literature that students interact more with their patients after watching the JIT videos as they will obtain more information to educate their patients. Klineberg I, et al. [10] also stated that dental education aims to prepare graduates to treat the patient holistically. Hence, the interaction with patients is of utmost importance [10]. According to Brame, C.J., in order for video to serve as a productive part of a learning experience, it is important to consider the elements for video design [13] The video structure of the JIT videos which consists of the relevance of information, the audio and visual effects, the duration,

the explanation of concepts or ideas are critical when evaluating the students' perception towards JIT video. Even in our study, the majority of the students preferred shorter JIT videos. The Restoration of Carious Tooth (ICDAS 03) JIT video was the shortest video among all, which lasted for 1 minute 27 seconds and it consisted of picture slideshow video. M. Khalifa and R. Lam stated that interactive e-learning environments provide more exploration and interactive capabilities which can lead to higher degrees of learner satisfaction. They give learners more control over both learning content and process to meet their individual learning needs [14]. Students felt encouraged to share with others the information about JIT videos as they find them useful in the clinical practice. Nevertheless, the correlation of satisfaction and future outlook of the JIT video with other aspects of perception should be further investigated. Further directions for this research involves evaluating the perception of dental students after watching the JIT video for the second time and making a comparison with the eligible participants who did not watch the JIT videos. As this is just a preliminary study, future research can also include evaluating the performance of the students after watching the JIT videos.

### Limitations

1. Few students were not able to focus entirely while watching the JIT video due to the reduced time available for student to perform their clinical treatment.
2. The JIT videos only show the basic steps of the procedure and students cannot apply instantly when there are modifications to the procedure that require stimulation of specific clinical skills of the students.

### Recommendations

1. Video speed can be increased to deliver the JIT video more efficiently with audio voice at the background to boost students' focus.
2. Certain modifications to the procedure can be mentioned in the JIT video.
3. References can be given at the end of the video for students to seek for more knowledge and clinical skills related to the procedure.
4. JIT videos can be extended to other topics.
5. Students can be interviewed to seek more in depth information about this instructional methodology.

### 5. Conclusion

Overall, the dental students in this study perceived the JIT videos as a good learning experience. Thus, JIT video support can be an effective teaching aid in the clinical setting for oral health care.

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### Conflicts of Interest

The authors declare that they have no Conflicts of interest.

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