Digital teaching methodology among the dental students a questionnaire based survey

Running Title: Digital teaching methodology

Abstract

Background : The implementation of digital technologies in dental curricula has started globally and reached varying levels of penetration counting on local resources and demands. One of the biggest challenges in digital education is the need to continuously adapt and adjust to the developments in technology and apply these to dental practice in communicating with dental professionals, medical doctors, dental technicians, and insurance providers, dental students need to be prepared to manage digitized data, ensure patient safety, and understand the advantages and limitations of conventional and digital processes. **Aim** : To create awareness about digital teaching methodology among the dental students. **Materials and Methods** :A cross-sectional survey was conducted among the adolescent population with a sample size of 120. A self administered structured questionnaire was prepared based on digital teaching methodology and consisted of 13 questions. It was circulated to participants through an online platform (google form). The statistics were done using SPSS software, chi-square test was used to check the association and P value of 0.05 was said to be statistically significant.The pros of the survey is that the adolescents of different lifestyles and cultures were surveyed. Children and adults were excluded from the survey. Simple random sampling method was the sampling method used to minimise the sampling bias. **Result** : The results showed that the dental students are aware about the digital teaching methodology. **Conclusion** : The people are aware of the digital teaching methodology. But more awareness needs to be spread so that digital handling can be improvised in the near future.

Keywords: insurance providers; dental students; digital technologies

Introduction

Digital Technology has reached various levels of interest in the dental field and curriculum depending on the local resources and demands. The biggest challenge in digital education is the need for continuous adaptation and adjustment to the developments in digital technology and to apply such methods in the dental curriculum (1). Variety of digital technologies are now available to dentists and it is impressive and evolving. Starting from CBCD and 3-D printers and digital radiography and intra-oral scanners, the implementation of such digital technology in the everyday practices of dentists is becoming more common. So consequently as technology improves and continues to transform in the field of dental practice to remain updated and relevant, both the current and future practitioners are away from being able to correlate the art of digital technology into the practises (2). Introduction of intra oral optical scanning helps the present anatomical situation to be digitised by enabling laboratory fabrication of restorations and to plan for oral rehabilitation with a set up (2,3), to superimpose the situation with a 3-D radiography (2–4).The penetration of the scanners are still in limitations in dental clinics (5). Dental technicians used 3-D model files from iOS by the dentists or they took it from dusk and conventional castes to fill or facilitate the fabrications of restoration . Compared to the waxing method, the digital design offers various advantages for the quality control like providing the data about the material thickness and values of connector cross sections. But the main shortcomings of lost wax casting were shrinkage cavities, with the digital workflow deliberately being benefited when the industrially manufactured products can be used with additive printing from improved material properties (3).

3-D education programs have been introduced to enhance the students' critical thinking, interactivity. Clinical correlations with integration of multiple dental disciplines. 3D visualisation allows the insights in the tooth morphology and it also helps to facilitate treatment planning with removable partial denture programs brackets (RPD) (3,6). The digital technology includes 3-D printing of teeth (virtual) which has been mostly suggested to enhance the transparency for all the dental students due to identical setups (3,6,7).

A recent review on application of augmented reality (AR) and virtual reality (VR) in dental medicine showed that the use of AR or VR technologies for motor skill training and the clinical testing of maxillofacial surgical protocols has been increasing (3,6–8) . Finally it concluded that these various digital technologies are highly valuable in dental undergraduate education and postgraduate education also. The overall offering interactive learning concepts with 24 seven axis and the objective evaluation. Recent review analyzed the application of VR in pre-clinical education and it identified four education themes (validation, realism of simulation hardware)Which started highlighting the need for better evidence for the utility of VR in dental

education (3,6–9). After conversation with medical doctors, dental professionals, insurance providers, dental technicians, the dental students will have to be prepared to manage and handle digitised data, understand the limitations and benefits of conventional and digital processes and ensure patient safety.

It looks like digitalisation has a major effect or impact on dental education, after addressing various aspects like, 3-D imaging, digital radiography, dental simulator motor skills including iOS with 3-D printing. Digital applications can improve dental education and implement evidence-based service related to acceptance of digital education.

Aim of this questionnaire approach was to investigate the knowledge and awareness of digital education in dental students and to create awareness of digital education among dental students Our team has extensive knowledge and research experience that has translate into high quality publications(10–12)(13–18),(19)(20),(21)(22),(23)(24)(25–29)

Materials and Methods

The sample size used for the study is 120. Self structured questionnaire was prepared and uploaded in Google forms. This standard questionnaire in Google forms has been circulated among the sample study population and at the end of the survey, all the data were collected and the data was analysed using chi-square analysis. The chi-square analysis was done using a software SPSS IBM.

Results

Among these people 78.33% think that digital teaching is a boon and 21.61% think that it's been (Figure 1) . 64.17% support and consider digital teaching the best teaching methodology, 24.17% do not consider and 11.67% on both sides (Figure 2). 48.33% students consider smart learning, 27.50% consider online education and 24.17% students consider traditional black board teaching (Figure 3). 70.00% of students concentrate and study during digital methodology like smart learning and 20.83% can't concentrate and 19.17% or on either (Figure 4). 40% of the females considered digital teaching as a boon (Figure 5).

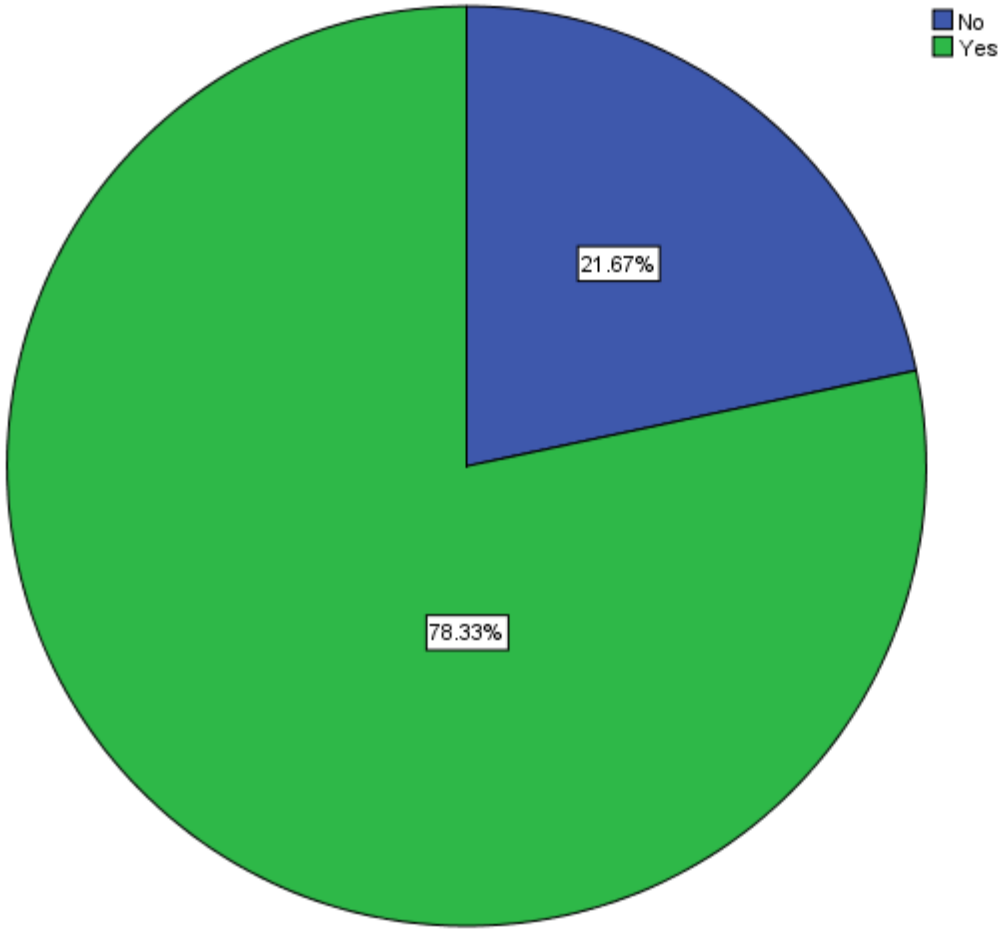

Figure 1. Pie chart showing the percentage distribution of whether digital teaching is a boon or a bane among dental students. Whereas, green represents Yes (78.33%) and blue colour represents No (21.67%).

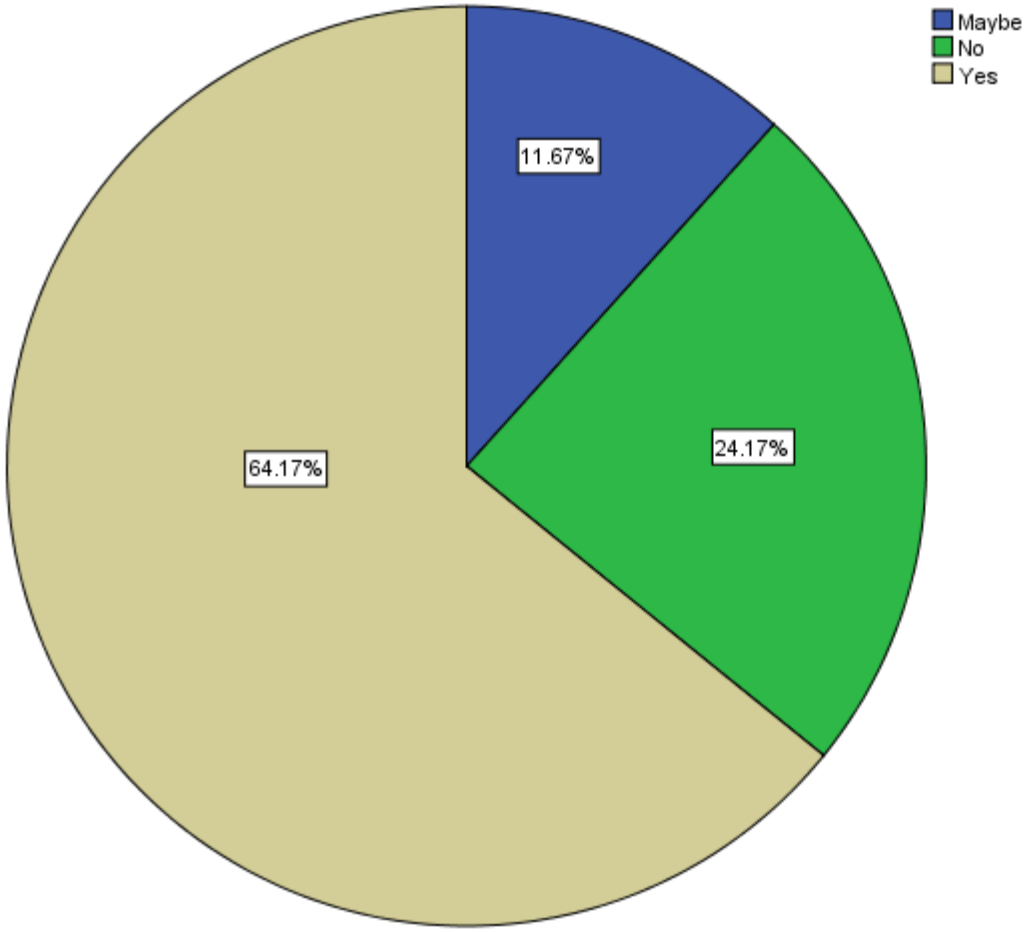

Figure 2 : Pie chart showing the percentage distribution of the best teaching methodology among the dental students. Whereas, beige colour represents Yes (64.17%), green colour represents No (24.17%), blue colour represents maybe (11.67%).

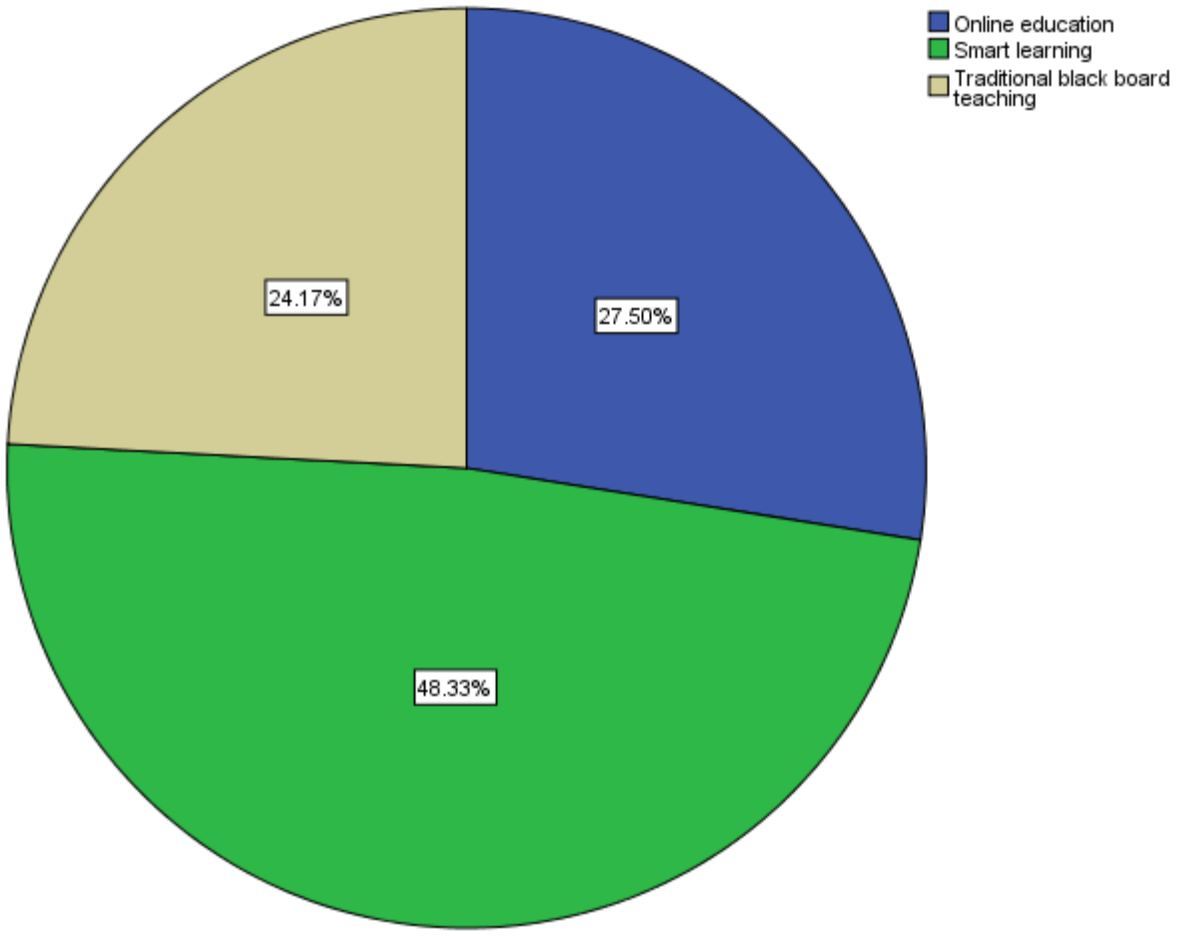

Figure 3 : Pie chart showing the percentage distribution of benefits of digital technology among the dental students. Whereas, green colour represents smart learning (48.33%), blue colour represents online education (27.50%), beige colour represents (24.17%).

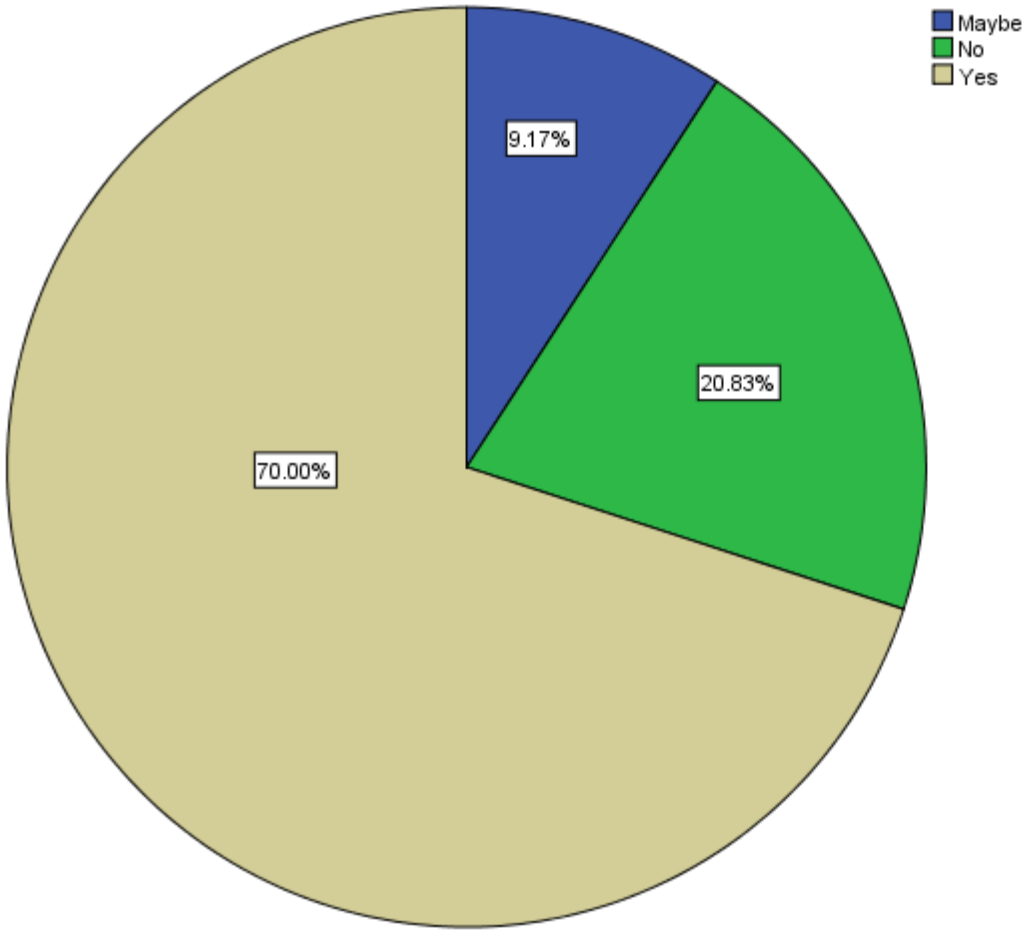

Figure 4 : Pie chart representing the percentage distribution of study concentration in digital teaching methods among the dental students. Whereas, beige colour represents Yes (70.00%), green colour represents No (20.83%), blue colour represents maybe (9.17%).

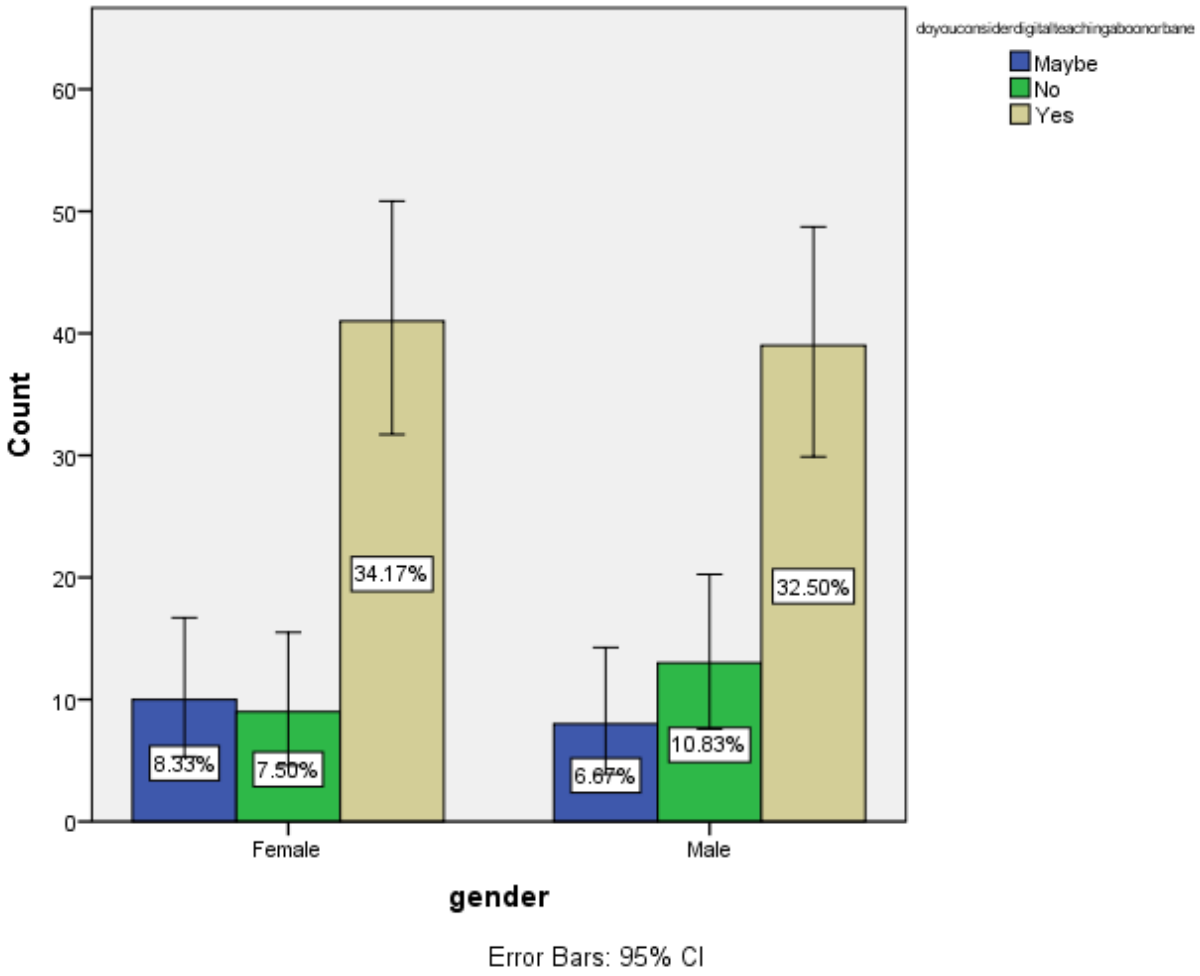

Figure 5 : Bar graph showing association between gender and whether digital teaching is a boon or a bane among the dental students. The X-axis represents gender and the Y -axis represents the number of responses. Green colour represents Yes, and blue colour represents No. The females were more in support towards digital teaching as a boon than males. Pearson's chi square test showed P value was 0.19 (<0.05), hence insignificant.

Discussion

From the survey conducted among dental undergraduates 29.17% males prefer smart learning and 19.17% females prefer smart learning. 11.67% males prefer online education and 15.8% females prefer online education. 9.17% males prefer traditional blackboard teaching and 15.00% females prefer traditional blackboard teaching. There are 50% females and 50% male dental undergraduates that participated in the survey. 26.61% of first years 32% second year is 27.50% 30 or 13.33% fourth years. Figure 1 : Among these people 78.33% think that digital teaching is a boon and 21.61% think that it's been. Figure 2 : 64.17% support and consider digital teaching the best teaching methodology, 24.17% do not consider and 11.67% on both sides. Figure 3 :

48.33% students consider smart learning, 27.50% consider online education and 24.17% students consider traditional black board teaching. Figure 4 : The 70.00% students concentrate and study during digital methodology like smart learning and 20.83% can't concentrate and 19.17% or on either side of it.

Association of gender with digital teaching considering it as a boon or a bane, Association of gender with best teaching methodology. In recent years the requirements of modern education have changed.(30) described that 83.5% of the dental students at the University of Tennessee USA expected to be taught using CAL approaches (31) .(32) Recommended that in the current era of digital technology, modern teaching methods such as simulation trainers should be integrated into dental education as is the standard in other businesses such as aviation or automobile traffic (4). However, (33) (30,31,34)advised against a radical shift from conventional teaching methods to digital technologies, as demanded by (35,36)

The concept for implementation of digital dentistry into our preclinical curriculum consisted of two training modules that enabled the CAL systems to be integrated into the prevailing curriculum without completely replacing the conventional teaching methods. This approach allows a step-by-step implementation as recommended by (30) (30,31)

After the training modules most of the students stated that they felt confident of using the digital preparation analysis by themselves or of manufacturing a chair side restoration using the CAD or CAM workflow. These results show that the structure of the curriculum consisting of lectures, demonstrations and training of practical skills in small groups, seems to be comprehensible for the students. However such a curriculum involves high staff which is consistent with the experiences of all the authors(35,37) (35,37,38).

Conclusion:

The people are aware of the digital teaching methodology. But more awareness needs to be spread so that digital handling can be improvised in the near future.

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