

## Article

# A Preliminary Study Investigating the Impact of the COVID-19 Pandemic on Dental Education in the Caribbean: A Student's Perspective

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**Abstract:** Dental education was heavily impacted by the COVID-19 pandemic. The aim of this preliminary study was to begin to assessment of the effect of the pandemic on dental education in the Caribbean. An online self-administered questionnaire was emailed to undergraduate dental students. The survey was conducted at the end of the semester's online learning period. The survey assessed the experiences and attitudes of the students. Chi-square and Fisher exact test were tabulated to ascertain the relationship between questions asked with the year of study and gender. The response rate was 73% ( $n = 100$ ). The respondents comprised 53.4% ( $n = 24$ ) of preclinical and 72.7% ( $n = 40$ ) of clinical students who stated didactic and clinical training were affected. In total, 86.7% ( $n = 39$ ) of preclinical students felt that their lab experience was affected and 96.4% ( $n = 53$ ) of clinical students reported their clinical training was affected. Restorative dentistry was the sub-specialty students felt was mainly affected. Recorded lectures to review later was stated as the most significant advantage of online learning. A lack of hands-on experience as a result of no access to a preclinical lab was the most negative aspect of online learning for preclinical students. Clinical students reported that their clinical experience was affected by clinic closure and the move to online learning. Moreover, 66% ( $n = 66$ ) of respondents reported poor internet connection. There was no statistically significant correlation between gender and year of study with the questions asked. Students reported a positive attitude to online learning. However, they did not consider it a substitute for face-to-face laboratory and clinical teaching.

**Keywords:** COVID-19; dental education; online learning; Caribbean



**Citation:** Hoyte, T.; Ali, A.; Mahabir, A. A Preliminary Study Investigating the Impact of the COVID-19 Pandemic on Dental Education in the Caribbean: A Student's Perspective. *Oral* **2022**, *2*, 251–262. <https://doi.org/10.3390/oral2040024>

Academic Editor: Omar Kujan

Received: 18 August 2022

Accepted: 19 September 2022

Published: 22 September 2022

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## 1. Introduction

In April 2020, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) reported that 1.6 billion students were affected by the closure of schools in response to the COVID-19 pandemic [1]. Draconian measures were implemented that affected 98.5% of the world's student population [2]. These included the introduction of lockdowns and state of emergencies because social isolation was one of the critical elements in combating the spread of this virus [3,4].

Teaching preclinical dentistry depends a lot on laboratory work on phantom heads, and this provides procedural know how and motor skills in preparation for patient care in the clinics. Students practice these skills prior to working on patients in the dental clinics, which ensures safety to practice and the ability to perform clinical procedures [5].

Dentists have been classified by the Occupational Safety and Health Administration as very high risk because the aerosol-generating procedures performed by dentists can cause exposure to the coronavirus [6,7]. Contact transmission and respiratory droplets are also suggested methods of transmission of this virus [8,9]. Clinical students are at risk because of aerosols produced by these dental procedures. COVID-19 can remain aerosolized for up to 72 h on steel and 3 h on plastic objects [7,10]. Dental schools, therefore,

had to be closed. Because of this closure, dental education was heavily impacted by the COVID-19 pandemic.

There have been two coronavirus outbreaks prior to COVID-19; in 2002, severe acute respiratory syndrome (SARS) and, in 2015, Middle East respiratory syndrome (MERS). There is a paucity of information about these prior outbreaks and their effects on dental education. The effect of SARS on medical education has been documented [11]. Patil et al., 2003 documented the anxiety experienced by students in Hong Kong. Their clinical teaching was suspended, and universities in Hong Kong were closed. Four plans were developed and students were advised “make good use of the time to do revision”. This was the opportunity to initiate and incorporate information technology into education. Students were trained in wearing personal protective equipment in the wards [11]. MERS struck South Korea and fear of medical students becoming infected led to restricting student presence at the hospitals [12]. Like in the SARS outbreaks, clerkships and lectures were discontinued and students eventually switched to remote learning.

In the United States, in one school, faculty members reported it being a challenge to adapt evaluation methods and an entire curriculum in a short period. The online curriculum utilized file sharing platforms and teleconferencing to provide online lectures, student interactions, and group discussions. For the students who had children to care for or lived in different time zones, examinations and course attendance would have been difficult [13]. Simulation activities for preclinical students were discontinued at many schools. Rotations were moved to teledentistry consultations or cancelled. The clinical competency of the students came into question because patient care came to a halt [13]. Noteworthy, is that accreditation councils’ requirements did not change and schools wondered how they would make these requirements. Many licensure examination boards rescheduled their exams.

In Italy, graduate and postgraduate students were prevented from entering their schools. There was only online access for secretarial and administrative services. Graduation and summative examinations moved online. The start of the spring semester was postponed to allow lecturers time to record video lessons and familiarize themselves with and upload materials to the online platforms [14]. Dental clinics only treated emergencies. Students had to recuperate lost clinical rotations after they were trained in the new personal protective equipment. Clinical training included critical review of the literature, case reports, and interactive learning tutorials [14]. The summary of their experience was (a) online learning was effective in limiting the spread of COVID-19; (b) online examinations were not an ideal way to gauge clinical skills of dental students, but were adequate for theoretical knowledge; (c) online learning was welcomed by lecturers and students; and (d) clinical training cannot be substituted by remote activities and the lost training will have to be recovered in the next semester.

In Ukraine, lecturers had one day to adapt their disciplines to distance learning. Most of the lecturers were not familiar with online tools, lacked remote communication skills, or lacked information technology (IT) support for distance education [15]. Distance learning between different universities and departments was very diverse [16]. Lecturers in these universities were using different platforms and programs, conducted lectures with or without interactive methods or presentation materials, used video conferencing, or adapted their courses to a remote format. Some Ukraine universities had systematically organized the process, but for most, it was chaotic [15].

In Trinidad and Tobago, prior to the pandemic, teaching was mainly face-to-face. Online teaching was introduced using a combination of the my eLearning platform, and blackboard collaborate.

In March 2020, all universities including the dental school in Trinidad and Tobago were closed by the government because of the pandemic [17]. The school suspended face-to-face teaching and clinical experience and either improved or implemented distance learning [4,18] to ensure continuity of education.

All didactic and clinical sessions were suspended. E-learning then became the sole option to ensure the continuity of dental education. Online pedagogical methods had been

used for didactic teaching [19,20], but unfortunately, E-learning in its pure form cannot be applied to all sub-specialties.

This preliminary study aimed to assess the effect of the pandemic on dental education in the Caribbean.

## 2. Materials and Methods

This study is reported according to CHERRIES (Checklist For Reporting Results of Internet E-Surveys) guidelines [21].

### 2.1. Design

The study was conducted on a convenience sample. A self-administered questionnaire was used to conduct this cross-sectional survey. The survey had close-ended and open-ended questions.

### 2.2. Ethics

The study was approved by the University of the West Indies Ethics committee (Ref: CREC-SA.1111/08/2021). On the front page of the survey, all relevant information about the survey was given to participants. Information given included the purpose of the study and who was the principal investigator. The participants were told the survey was voluntary and students could withdraw their participation at any time. Filling out the survey implied consent, responses were anonymous, and it took only 8 min to complete the survey. They were also told no personal data would be stored. Student identification numbers and names were not required on the form. This was done to protect participants' identity.

### 2.3. Development and Pre-Testing

The questionnaire was developed after conducting a literature review and the survey was developed from previously used questionnaires that reflect the constructs of interest [22–24]. A pilot study was conducted on 15 students. These participants were not part of the final survey. The pilot study was conducted to ensure the face validity of the survey, and this ensured clarity and comprehension of the questions. After feedback from the pilot, changes were made to the survey.

### 2.4. Sample

The survey participants consisted of preclinical (years 2,  $n = 29$  and 3,  $n = 27$ ) and clinical students (years 4,  $n = 60$  and 5,  $n = 21$ ). The year 5 and 4 students were asked to repeat the year owing to the disruption of the pandemic. The year 4 group, therefore, consisted of two combined academic years. The survey was conducted at the end of the semester's online learning period, 16 months after the onset of the COVID-19 pandemic, entirely in an online system.

### 2.5. Survey Administration

The survey was emailed through the dental students' association to participants. An online survey platform (Survey Planet LLC, Marini Del Ray, CA, USA) was used. The questionnaire was open for 2 weeks. The questionnaire consisted of 22 questions with one question per page. There was no adaptive questioning or randomization of questions. The first part consisted of demographic information (age, nationality, sex, year of study). The second part collected data on the experiences and attitudes of preclinical and clinical students using a five-point Likert scale; they could agree or disagree with regarding online learning. There were no review steps or back button.

### 2.6. Response Rates

A unique visitor ID was assigned to every visitor and multiple responses from the same device were not allowed. Therefore, duplicate responses were not allowed. All relevant questions were answered, hence there was no management of incomplete answers.

### 2.7. Setting and Participants

The study was conducted at The University of The West Indies dental school, the only dental school in Trinidad and Tobago [25,26]. The school offers a 5-year dental programme. First to third years are considered preclinical and fourth and fifth years are clinical. The first-year students were not included in this study as they would have newly entered the programme and would not be able to draw the comparisons required for this study. The total number of students surveyed in preclinical and clinical years was 137. The fifth year and fourth year students were delayed one year in the system because of the pandemic. This left two year groups in the fourth year.

### 2.8. Statistical Analysis

Data were collected from 17 August to 31 August 2021. The data were analyzed using SPSS 28 (IBM SPSS Statistics for Windows Corp., Atlanta, GA, USA). Descriptive statistics were tabulated. Chi-square tests and the Fisher exact test were performed to ascertain the relationship between questions asked and any relationship with year of study and gender. When  $p < 0.5$ , the test results were considered significant.

Responses “worse” and “much worse” were regarded as thinking the statement was worse and “improved” and “somewhat improved” as an agreement on improvement. No weighting of items or propensity scores were used.

## 3. Results

### 3.1. Demographics

The study comprised a total of 100 respondents. This represented a response rate of 73%. The study sample consisted of 78 (78%) females and 22 (22%) males. Preclinical students comprised 45% (19 % second year 26% third year) of the sample and clinical students comprised 55% (38% year 4 and 17% year 5) of the sample. Most of the sample, 48%, ( $n = 48$ ) were aged 21–23 years, and 79% ( $n = 79$ ) were national students.

### 3.2. Preclinical Students' Attitudes

A little more than half (53.4%,  $n = 24$ ) of preclinical students agreed that their didactic and preclinical training was affected by transitioning to remote learning; Table 1. Most of these students (86.7%,  $n = 39$ ) felt that their lab experience was affected and 31.1% ( $n = 14$ ) felt that remote learning affected regular lectures, while 24.4% ( $n = 11$ ) felt that summative assessments were affected by transitioning to online assessments; Table 3.

**Table 1.** Answers to questions by preclinical students.

Questions	Much Worse	Somewhat Worse	Stayed the Same	Somewhat Improved	Much Improved
How have your didactic and preclinical learning changed since the transition to remote learning because of the COVID-19 pandemic (year 2 and year 3 ONLY)	8 (17.8%)	16 (35.6%)	4 (8.9%)	14 (31.1%)	3 (6.7%)

### 3.3. Clinical Students

Of the clinical students, most (72.7%,  $n = 40$ ) stated that didactic and clinical learning had been affected by the transition to remote learning; Table 2. Almost all respondents (96.4%,  $n = 53$ ) felt their clinical training mainly was affected by transitioning online. More

than half (56.4%,  $n = 31$ ) stated their lab experience was affected, while 32.7% ( $n = 18$ ) reported that summative assessments were affected; Table 3.

**Table 2.** Answers to questions by clinical students.

Questions	Much Worse	Somewhat Worse	Stayed the Same	Somewhat Improved	Much Improved
How have your didactic and clinical learning changed since the transition to remote learning because of the COVID-19 pandemic (year 4 and year 5 ONLY)	18 (32.7%)	22 (40%)	6 (10.9)	9 (16.4)	0

**Table 3.** Responses to questions.

	True
<b>Preclinical Students</b>	
<b>What was the experience mostly affected by transitioning to remote learning?</b>	
Regular Lectures	14 (31.1%)
Case Presentation	5 (11.1%)
Small Group Seminars/Tutorials	10 (22.2%)
Lab Experience	39 (86.7%)
Summative Assessments	11 (24.4%)
<b>Clinical Students</b>	
<b>What was the experience mostly affected by transitioning to remote learning?</b>	
Clinical Training	53 (96.4%)
Regular Lectures	14 (25.5%)
Small Group Seminars/Tutorials	10 (18.2%)
Lab Experience	31 (56.4%)
Summative Assessments	18 (32.7%)
Other	2 (3.6%)
<b>Sub-Specialty Experience</b>	
<b>Which sub-specialty experience do you think has been negatively affected by the COVID-19 pandemic?</b>	
Restorative Dentistry	64 (64%)
Prosthodontics	55 (55%)
Paediatric Dentistry	36 (36%)
Oral Surgery	41 (41%)
Periodontics	35 (35%)
Orthodontics	38 (38%)
Oral Medicine and Oral Pathology	32 (32%)
None	17 (17%)
Other	12 (12%)
<b>Advantages of Online Learning</b>	
Recorded lectures to review later	99 (99%)
No travelling	87(87%)
Open book summative assessments	50 (50%)
Time saving/convenient	83 (83%)

Table 3. Cont.

	True
Ability to disseminate continuing education courses online	47 (47%)
Other advantages of online learning?	4 (4%)
<b>Negative Aspects of Online Learning</b>	
Difficult to retain, visualize, or understand materials with the current teaching methods	40 (40%)
Fatigue from online learning/difficulty focusing	64 (64%)
Lack of hands-on practice/access to preclinical labs	83 (83%)
Lack of clinical experience	72 (72%)
Online summative assessments	14 (14%)
Poor internet connection	66 (66%)
Virtual case presentations teach critical thinking, but cannot replace hands-on experiences	46 (46%)
Less student/teacher interaction	37 (37%)
Accessibility to internet capable devices	19 (19%)
Other negative aspects of online learning	7 (7%)
<b>How can the transition to remote learning be improved</b>	
Videos of dental procedures	80 (80%)
Recorded lectures	77 (77%)
Exercises/activities to improve technical hand skills at home	70 (70%)
Virtual case discussions	54 (54%)
Unsure	12 (12%)
Other	6 (6%)

The majority of students (64%,  $n = 64$ ) reported that their experience in restorative dentistry had been negatively affected by the COVID-19 pandemic. This was followed by prosthodontics (55%,  $n = 55$ ) and oral surgery (41%,  $n = 41$ ), while periodontics (35%,  $n = 35$ ) and oral medicine and oral pathology (32%,  $n = 32$ ) were the two least affected; Table 3.

Some of the reported advantages of online learning were recorded lectures to review later by almost all respondents (99%,  $n = 99$ ), no travelling was reported by 87% ( $n = 87$ ) of respondents to be an advantage, and online learning being time saving and convenient was reported by 83% ( $n = 83$ ) of respondents. Conversely, relating to negative aspects of online learning, most of the respondents, 83% ( $n = 83$ ), reported a lack of hands-on practice as a negative aspect of online learning. Lack of clinical experience was reported by 72% ( $n = 72$ ), 66% ( $n = 66$ ) reported having internet connection problems, and fatigue and difficulty focusing was reported by 64% ( $n = 64$ ) of respondents.

When asked how the transition to remote learning can be improved, 80% ( $n = 80$ ) of respondents reported videos of dental procedures, 77% ( $n = 77$ ) stated recorded lectures, 70% ( $n = 70$ ) reported exercises or activities to improve hand skills at home, and 54% ( $n = 54$ ) reported virtual case discussions.

Overall, more participants (67%,  $n = 67$ ) preferred online lectures compared with face-to-face, irrespective of their year of study; Table 4. Similarly, most participants (74%,  $n = 74$ ) agreed that online summative assessments are a suitable method of evaluation. Most respondents (81%,  $n = 81$ ) also agreed that group discussion posted on E-learning positively impacted their education. However, almost half of respondents neither agree nor disagree with feeling more engaged and motivated in following E-learning (46%,  $n = 46$ ); Table 4.

**Table 4.** Frequency, distribution, and test of independence by year of study.

Year of Study	Year 2 and 3	Year 4 and 5	Total	<i>p</i> -value
Do you prefer online lectures compared with face-to-face lectures?				
No	13 (39.4)	20 (60.6)	33	0.429
Yes	32 (47.8)	35 (52.2)	67	
Total	45	55	100	
Do you think online summative assessments is a good method for evaluation?				
No	10 (38.5)	16 (61.5)	26	0.436
Yes	35 (47.3)	39 (52.7)	74	
Total	45	55	100	
Do you think group discussions posted on E-learning such as clinical cases and scenarios had a positive value on your education?				
No	7 (36.8)	12 (63.2)	19	0.427
Yes	38 (46.9)	43 (53.1)	81	
Total	45	55	100	
Did you feel more engaged and motivated in following up with E-learning?				
Disagree	10 (38.5)	16 (61.5)	26	0.617
Neither disagree nor agree	23 (50.0)	23 (50.0)	46	
Agree	12 (42.9)	16 (57.1)	28	
Total	45	55	100	
How would you rate the quality of online teaching and summative assessments?				
Unsatisfactory	9 (45.0)	11 (55.0)	20	0.877
Satisfactory	31 (43.1)	41 (56.9)	72	
Total	40 (43.5)	52 (56.2)	92	
Do you feel comfortable with all this technology-based education?				
Disagree	7 (53.8)	6 (46.2)	13	0.612
Neither agree nor disagree	9 (37.5)	15 (62.5)	24	
Agree	29 (46.0)	34 (54.0)	63	
Total	45	55	100	

Table 4 shows that no statistically significant association was found between the listed questions and the year of study, as all *p*-values were greater than 0.05.

Table 5 shows that most participants who agreed that online assessment was a suitable method for evaluation were females (77%, *n* = 57). Most participants who agreed that group discussions posted on E-learning contributed positive value to their education were also female (76.5%, *n* = 62). However, most participants neither agree nor disagree with feeling more engaged and motivated in following up with online learning (46%, *n* = 46), while the majority were females (80.4%, *n* = 37). The majority of participants (85%, *n* = 17) who were unsatisfied with the quality of online teaching and summative assessments were female. Table 5 also shows the results from a Chi-square analysis and a Fisher exact test for cases where the expected count was less than 5. No statistically significant association was found between the listed questions and gender as all *p*-values were greater than 0.05.

**Table 5.** Frequency, distribution, and test for independence by gender.

	Gender			<i>p</i> -Value
	Female	Male	Total	
Do you think online summative assessment is a good method of evaluation?				
No	21 (80.8)	5 (19.2)	26	0.692
Yes	57 (77.0)	17 (23.0)	74	
Total	78	22	100	
Do you think group discussion posted on E-learning such as clinical cases and scenarios had a positive value on your education?				
No	16 (84.2)	3 (15.8)	19	0.555 *
Yes	62 (76.5)	19 (23.5)	81	
Total	78	22	100	
Did you feel more engaged and motivated in following up with E-learning				
Disagree	20 (76.9)	6 (23.1)	26	0.851
Neither agree nor disagree	37 (80.4)	9 (19.6)	46	
Agree	21 (75.0)	7 (25.0)	28	
Total	78	22	100	
How would you rate the quality of online teaching and summative assessments?				
Unsatisfied	17 (85%)	3 (15.0)	20	0.753 *
Satisfied	57 (79.2)	15 (20.8)	72	
Total	74 (80.4)	18 (19.6)	92	

\* Fisher exact test as 1 cell (25%) has counts less than 5.

#### 4. Discussion

The success of online teaching is contingent on the rate at which it addresses the concerns and meets the needs of stakeholders like dental students [27]. This preliminary study evaluated Caribbean dental students' perspectives on the impact of the COVID-19 pandemic on their dental education. The sudden transfer from face-to-face to online learning accelerated the digitization process in dental education because of the pandemic [28,29]. Lecturers and students adapted quickly to online learning. However, this new teaching medium presents barriers and is not suitable for all dental courses. Students had a generally positive perception of online learning, but several points of concern need to be addressed.

In total, 53.4% ( $n = 24$ ) of preclinical students and 72.7% ( $n = 40$ ) of clinical students reported that their didactic and clinical learning had changed for the worse since transitioning to remote learning. Hattar et al. (2021) reported similar findings in Jordanian dental students [22]. In a comparative study, Hung et al. (2020) reported not only that clinical education suffered, but also that they experienced increased levels of stress [30]. Noteworthy, this cohort of dental students also reported increased stress levels during the COVID-19 pandemic [25].

The experience reported by preclinical students to be most affected was their lab experience. Their lack of hands-on practice in the lab as a point of concern is in agreement with Hatter et al. and Iosif et al. [22,31] and other authors in the literature [32,33]. Preclinical students' lab training on manikins is essential for developing their manual skills.

Clinical students stated that their clinical training, which would have included multi-disciplinary clinics, was the experience most affected by transitioning to remote learning. This would lead to trepidations on the quality assurance of the education of these dental students [34].

The majority of participants stated that they preferred online learning for didactic lectures to face-to-face lectures, irrespective of year of study. This was similar to findings



by Schlenz et al. [24]. Another study also reported a positive effect of the pandemic on students' performance [35]. The authors cited that students' learning strategies were more productive and efficient, and there were higher levels of engagement.

Online learning has barriers and is not suitable for all sub-specialities. Participants stated that restorative dentistry was the most affected sub-speciality. Most students' clinical training would require using a handpiece and generating aerosol. Because of public health ordinances, this was not allowed, and their training would have been negatively affected. During the final year, restorative dentistry forms the bulk of clinical exposure. This was similar to findings by other authors [22]. Students' clinical exposure has been shown to be the main factor in students feeling confident at graduation [36]. Oral medicine and oral pathology and periodontics were the least affected sub-specialities. This may be because of good clinical exposure in previous years, leading to competence and a sense of confidence in these disciplines [22].

One way of measuring teaching efficiency is by student evaluation of teaching efficacy [37]. The literature has reported that online learning is as effective as conventional methods [24]. Regmi and Jones (2020), in their systematic review, stated that, because of its flexibility and accessibility, e-learning can enhance learning and performance [38].

While being flexible during this pandemic, dental schools need to ensure the competency of their graduates. Students generally thought online learning was a good alternative to face-to-face education during the pandemic. Some studies have reported higher satisfaction with e-learning pedagogy on medical students [14,20,39]. Bernardo et al. [14], in a study in Italy, also reported higher satisfaction as a result of student interactions. Most participants in this study preferred online lectures, summative assessments, and group discussions and felt comfortable with technology-based education. Participants felt online examinations can only verify theoretical knowledge and, therefore probably were not ideal for dental education [14].

Another challenge reported by students was a poor internet connection, which has been echoed by other authors [24,38]. In total, 66% ( $n = 66$ ) of students encountered internet problems, which implies most could not keep up with classes at times. Noteworthy, Schlenz et al. only reported that 5% of students in Germany reported this problem, while 37.5% of dental students from Croatia reported technical problems [40]. This highlights the disparity between developed and developing countries with the ability to offer this type of education.

Habashneh et al. (2020) stated that online learning is a significant addition to all components of teaching in medical sciences. He stated that online learning makes students more mindful and allows the formulation of new ideas and multidirectional thinking, which allows students to be more mindful [41].

E-learning has been welcomed by students and encourages student–teacher interaction [14]. Bennardo et al. (2020) also stated that dental students welcomed the innovative pedagogical development in this area, and it helped to create an interactive learning environment. Dental students reported a positive attitude towards this form of learning in the literature [42]. However, the impact on dental students' competencies is not clear, and whether it would affect the quality of care in the long term is unknown.

Virtual sessions cannot precisely duplicate the hands-on experience with patients [43]. These assets will have to be recovered in the upcoming semesters. There has been a worldwide change in educational systems. E-learning was a useful tool in the pandemic, but for teachers, it involved a learning curve [33]. Teachers must be able to understand the complex relationship between technology, content, and pedagogy, and how they can be amalgamated into delivery of the curriculum. Badovinac et al., 2021 reported that the quality of classes differed among lecturers. They pointed out that this demonstrated the need for teachers to be further trained to use online tools. Further training of lecturers is needed so that E-learning can be more effectively used by teachers, and thereby improve the quality of the student experience. Schools need to assist teachers to improve pedagogical

content online if all schools are to be successful at online education. Nevertheless, E-learning has proven to effectively control the spread of COVID-19 infection at our university.

One strength of this study is that the data coming from this study can be used to improve the educational experience of these dental students. Moreover, these results can be used to minimize the impact of future pandemics on the teaching of dentistry. The dental school would be better prepared in the future for similar disruptions.

This study has some limitations. It only covers one point in time during the pandemic. The students were already 16 months into the pandemic, and their thoughts at different points may change. Therefore, future studies are required. The questionnaire was only assessed for face validity and, therefore, there are no data on its psychometric properties, which should be borne in mind when interpreting the results of this study.

## 5. Conclusions

Participants felt the main advantage of online learning was recorded lectures to review later. No traveling and the fact that online learning was time saving and convenient were other advantages stated. They also felt the main disadvantages were a lack of hands-on practice or access to preclinical labs, lack of clinical experience, and poor internet connection. Videos of dental procedures and recorded lectures were the two most popular solutions stated to improve online learning.

This preliminary information will serve as baseline data in the expectation of follow-up so that it can be used to monitor this pandemic-influenced cohort, and interventions can be recommended to (a) assist this cohort in their future careers and (b) improve further delivery of the DDS programme in the future so that the graduating dentist will be and feel competent.

**Author Contributions:** Conceptualization, T.H. and A.A.; methodology, T.H., A.A. and A.M.; software, T.H. and A.M.; validation, T.H.; formal analysis, T.H.; investigation, T.H. and A.M.; resources, T.H. and A.M.; data curation, T.H.; writing—original draft preparation, T.H.; writing—review and editing, T.H.; visualization, T.H., A.A. and A.M.; supervision, T.H. and A.M.; project administration, T.H. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of The University of The West Indies (Ref: CREC-SA.1111/08/2021).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data are available from the corresponding author.

**Conflicts of Interest:** The authors declare no conflict of interest.

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