

Artigo Original

Use of Information and Communication Technologies in Dental Education During the Covid-19 Pandemic Lockdown

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Abstract

Dental courses used to be mainly designed by traditional learning previously from the Covid-19 pandemic. To face in-person closure, one of the biggest challenges was adapt the dental course design to an on-line model, which guarantees the development of skills needed by future professionals. In this context, this paper aimed to present a report about the usage of information and communication technologies by a public university in XXX from April to December 2020. Procedures about the methodology applied and reflections about the implementation of Moodle and Whereby were described. A checklist for monitoring undergraduate units showed that before the pandemic the Moodle system was little used in the dental course. However, during the pandemic, the number of units that started using the platform rose from 09 to 32 (64%). Among the possibilities offered, some teachers used the Moodle platform only as a repository. Others also used tools available on Moodle such as forums, questionnaires, external links, and files. Therefore, the results from the checklist showed that the platforms worked positively during online learning in dental faculty. However, some policies and training remain necessary to ensure better educational outcomes.

Keywords: Distance learning. Dentistry. Information and communication technologies. Technology enhanced learning. Covid-19.

I. Introdução

The pandemic originated by Coronavirus (Covid-19), which started in Wuhan, China, in 2020, has become a great challenge for countries around the world due to the speed of contamination and mutation of the virus (SMITH *et al.*, 2020). With the intention of prioritizing social isolation in an attempt to reduce the spread of the virus and prevent the collapse of global health systems, the World Health Organization (WHO) recommended, among other actions, that the in-person classes be suspended (CRITICAL..., 2020).

Thus, the Brazilian Ministry of Education authorized the replacement of on-site courses by remote classes in undergraduate courses using Information and Communication Technologies (ICTs) as a tool and resource for professional training (SPANEMBERG; SIMÕES; CARDOSO, 2020). In order to maintain the study routine and enable a Virtual Learning Environment (AVA), aiming at the least possible harm to the teaching plan of the subjects and the academic calendar, federal and state higher education institutions have adopted these strategies in their pedagogical programs (BRASIL, 2020).

Institutions that had institutional VLE faced, however, the lack of experience of teachers in the use of these technologies (OLIVEIRA, 2008). In fact, the lack of ability to use ICTs in teaching was not only due to the technological domain; it was also due to the lack of training in the use of these technologies. As an example, the Bachelor of Information Systems course presented difficulties in this transition of teaching models (SILVEIRA *et al.*, 2021).

In the case of the School of Dentistry of the State University of Rio de Janeiro (UERJ), the focus of this study, due to the difficulties of the global and educational scenario, the work of teachers has become a great challenge, especially in clinical-laboratory disciplines. Even with the support of a Teledentistry Nucleus along with undergraduate teaching, some professors chose not to develop activities in their disciplines, waiting for the return of in-person activities. Other teachers used class time and technological support to discuss cases and videos of techniques, in addition to exploring the potential of online teaching.

The objective of this work was to present the strategies for the use of ICTs in education in Dentistry in the Covid-19 pandemic, highlighting the resources used, in order to highlight the possibilities of their use in this field of education.

2. Transferring face-to-face teaching to remote learning

2.1. The Covid-19 Pandemic and Education in Dentistry

In March 2020, WHO announced that the new Coronavirus outbreaks constituted a public health emergency of global concern. Since then, many countries have continued to demonstrate that transmission of the SARS-CoV-2 virus can be controlled through strategic actions that include physical distance, use of facial coverings and hand hygiene. In addition to preventive measures, rapid testing, contact tracking and vaccination campaigns are being essential to control transmission and assist in reporting the prevalence and incidence of the disease. WHO has been advocating these measures and recommends that countries should continue to take all necessary measures to further slow the spread, in order to prevent their health systems from becoming overwhelmed, as well as to prevent infections.

In Brazil, the Opinion of the Ministry of Education, of the National Council of Education (CNE) No. 11/2020, which provides for "Educational guidelines for the realization of in-person and non-face-to-face classes and pedagogical activities in the context of the pandemic", advocated during the context of Covid-19, the establishment of a pedagogical methodology favorable to practical activities, in which the learning objects should correspond to the construction of competences and facilitate the interdisciplinary application of the curriculum. Thus, in-person classes were suspended and remote teaching was installed in several public undergraduate courses, including those in Dentistry (BRASIL, 2020).

Given the new reality exposed, the work of teachers has become a great challenge, especially in the disciplines of theoretical-practical

activities. Among the challenges faced were the low engagement of students in certain subjects, the lack of infrastructure, the redefinition of the teacher's role in the educational process and the difficulty of using technologies (QUINN *et al.*, 2020). Digital tools aimed at teaching are currently experiencing a constant growth in the world, as different reports have been published exemplifying the different conducts of Faculties of Dentistry during this period of social distancing, in order to highlight the strengths and weaknesses of each implementation (DAMIEN; CHAPPELL; HOEVEN, 2020; PERES *et al.*, 2020; UMEIZUDIKE *et al.*, 2020).

It is also incumbent to reflect on other aspects related to the pandemic that directly affect the educational process. How did the courses handle student management and their general anxiety about reshaping teaching, either in relation to patient care, or inability to meet clinical requirements for graduation and concerns about safety? Being in an environment that changes by the minute, it is common for undergraduate courses to make appropriate and timely changes in their teaching and learning methods to ensure the continuity of education, as well as program policies and provisional protocols to protect staff, students, teachers and patients. Therefore, in addition to pedagogical and technological issues, it was necessary to draw up recommendations for educators and dental administrators to adapt the issues imposed by Covid-19, in order to prepare them for similar interruptions in the future (IYER; AZIZ; OJCIUS, 2020).

2.2. Remote Learning Strategies

With the development of society and generational changes, new active teaching methodologies have been increasingly proposed. In 2017, the European Board of Dental Education published a consensus on new approaches to teaching dentistry, emphasizing technology as a fundamental pillar. A potential use of technology in the educational process is the ability to create collaborative knowledge that allows the exchange of information on a large scale, by stimulating greater engagement and strengthening the institution's brand (MITRE *et al.*, 2008).

However, in the transition period between the face-to-face and remote systems, it was observed that one of the main difficulties faced by the institutions was the lack of experience of teachers in the use and application of ICTs in teaching (OLIVEIRA, 2008). To mitigate the impact on the quality of dental education, the remote teaching process at the Faculty of Dentistry at UERJ was carried out in partnership with the Department of Teleodontology at the same institution. In this context, the following strategies were carried out: 1. tutorials on dental education and technology; 2. videos and e-books about the Moodle platform and Whereby; 3. full support via email and WhatsApp; 4. academic management in partnership with professors of each discipline of the undergraduate course with experienced professionals in educational design. Although with effective support, the transition period faced an increase in urgent tasks and responsibilities, as pointed out by other universities, emphasizing the need for human and technological resources for the effectiveness of the system (MOORE *et al.*, 2020).

The online mode included asynchronous learning supported by the Moodle platform and synchronous learning from Whereby. The activities and tests were also carried out on the Moodle platform in a questionnaire format. All online tests followed the pattern of randomized questions, in a single page format, with no possibility of returning to the previous question. The exam time and the number of questions were stipulated by each teacher. Some teachers preferred to take oral exams through Whereby.

The inclusion of technology in dental education is not something recent. Many systematic review works point to the blended learning modality, known in Portuguese as blended learning.

3. Methodology

This article is a retrospective, descriptive observational study carried out from April to December 2020. For its elaboration, 32 mandatory undergraduate courses taught at a Faculty of Dentistry and hosted on the virtual environment platform Moodle were selected.

For this, two methodologies were used: the survey of undergraduate courses on the ICTs used; and the report of our experiences as a facilitating department of Teledentistry.

3.1. Survey on the use of ICTs

The first qualitative method consisted of using a checklist proposed for monitoring the virtual environment on the activities and resources used by teachers in the online teaching model (ROCHA, 2015). The instrument consists of eight criteria that, together, aim to establish an effective pedagogical proposal. The choice of this checklist was based on other works already published in the literature with the same objective, taking into account the experience of the author of the instrument with the use of VLEs in graduation.

Data were collected through the survey and exploration of undergraduate courses registered in the virtual environment of the Faculty of Dentistry studied. The 32 subjects included followed these criteria: (a) being a mandatory subject offered by the degree program; (b) have used at least one resource from the virtual environment; (c) teacher with active registration in the system. Subjects that used online resources other than the institution's AVA were excluded.

3.2. Experience report of the Department of Teleodontology

The inclusion of Teledentistry in care and education has gained more notoriety during the Covid-19 pandemic (ROSE, 2020). It is a field established since 1989, defined as the use of information and communication technologies in the dental field, with the objective of facilitating the provision of services and education (ALABDULLAH; DANIEL, 2018). In fact, with the intention of using all the benefits of Teledentistry, some centers within universities were developed.

The first Teledentistry Nucleus created was that of the School of Dentistry of the University of São Paulo (FOUSP) in 2007. At UERJ, the Teledentistry Nucleus was developed in 2014 with the objective of

providing technological and innovative support to undergraduate and postgraduate courses. University graduate. As products, the institutional Moodle platform, health applications and scientific publications were developed. However, with the pandemic event, the department became a key ally in the rapid transformation from face-to-face to remote learning. The multi-professional team at the center, composed of: dentist, design, programmer and students from the Academic Teledentistry League of the institution, prepared illustrative material for the professors, in order to include an e-book and video tutorials explaining each feature of the platform, in addition to suggestions for use.

Thus, the situation allowed the teacher to have full autonomy over his discipline and support throughout the entire semester. It is understood that support during this period was essential so that teachers and students could, in such a short time, adapt to the new teaching reality. In view of the great change in the educational system with no prospect of going back to how it used to be, the use of online resources in institutional virtual environments in the professional training of students is proposed.

4. Results and discussions

Students and teachers were offered access to the AVA Moodle and the Whereby virtual classroom platform, with technical and pedagogical support from the institution's Teleodontology Center and the Academic Teledentistry League (LATELE). The use of digital tools and teaching methodologies were left to the teachers' discretion. However, the application of a hybrid teaching methodology (blended learning) was recommended for practical subjects consisting of theoretical content taught in the online system and a practical module in person, following the biosafety precepts recommended by the Federal Council of Dentistry (CFO). To train students and teachers on the new biosafety rules, an asynchronous course was made available on the institution's Moodle platform, with free access between April and December 2020.

The UERJ Dentistry curriculum has a total of 50 (fifty) mandatory curricular subjects. Until February 2020, of the total of these subjects, only 9 (18%) used, in some way, the institutional VLE. With the onset of the pandemic, as of March 2020, the number of mandatory courses that started using the system increased by 46%, from 9 to 32 courses taught online.

The choice of teaching methodologies and resources for the VLE was the autonomy of the teachers, with a variation in their use. Among the 32 subjects, 7 used the VLE only as a repository for the recorded video lessons; for not having any active methodology objective, it was not possible to apply the checklist in these disciplines. Among the remaining 25 subjects, it was observed that they used scripts, activities and evaluation instruments (general activity) as the most frequent resources, according to the checklist (Table 1). Only 5 subjects used the assessment resource (subject or student) and none allowed the students' autonomy through motivation in the search for research resources of their own interest or on the web.

Activity	No. of subjects
Does each class have a student orientation script?	18
In addition to the content offered, is there an indication of links to further studies?	14
Can students undertake studies or research of their own interest?	0
Is there an activity that students must do in each class?	17
Are there groups for studies and/or tasks?	11
Are there research proposals on the web?	0
Is there a general activity – synthesis of the contents and domains of the discipline?	16
Is there a discipline assessment and self-assessment instrument?	5

Table 1 – Number of subjects that had any checklist item for monitoring

Source: prepared by the authors.

With regard to AVA resources, Table 1 shows which were most used, with the inclusion of videos being the main resource. Some reasons for the variation in the use of resources have been published in the literature (IYER; AZIZ; OJCIUS, 2020). According to the authors, these variations depend on the political-institutional philosophies of each unit, the recommendations of local agencies, the extent of the spread of the infection and the availability and training of teachers.

In a study carried out in Germany on the implementation of online

learning in dentistry, students and teachers showed a predominantly positive perspective, providing the opportunity to use online learning even beyond Covid-19 in the future curriculum. Many students, however, reported still not feeling prepared for practical online courses, in order to learn independently (SCHLENZ *et al.*, 2020).

Tutorial-oriented AVA resource	Number of subjects that used the resource
news forum	10
File	22
Quiz	19
Link (URL)	12
Attach video	27

Table 2 – VLE resources used in the analyzed subjects

Source: prepared by the authors.

Literature studies reveal that new concepts for modern education highlight the importance of the teacher as a guiding agent in this process to help students build their personal and professional identities, in addition to developing their skills and competences through their experiences and profiles, in order for them to find their spaces as they become fulfilled and productive citizens (ROCHA, 2015).

In addition to the differentiated format for the construction of content in VLEs, another fundamental point is equivalent to the interaction relationships in online learning: student-student, student-teacher, student-content, teacher-teacher, teacher-content and content-content (ANDERSON, 2008). In our institution, in addition to the tutorials produced, the professors had the help of students from the Academic League of Teleodontology for monitoring in the classroom. Teachers also sought other strategies to involve students, considering that their theoretical classes were only taught online, such as the use of forums, chats, social networks (such as WhatsApp) and discussions in a synchronous format.

Based on the applied checklist, it was found that the use of VLE worked positively during remote teaching in Dentistry at the institution. It is necessary, however, to improve the quality of student-centered online

education and strengthen measures to relieve students of psychological stress. Higher education in the health sciences increasingly demands the implementation of flexible pedagogical tools, such as VLEs, to enable the shared construction of knowledge in plural and integrative spaces, as this circumstance is characterized by the presence of different subjects (teacher, student and patient) (PALACIO, 2016).

In this context, to incorporate new technologies, such as VLEs, it is prudent to reassess the theoretical bases that conform a pedagogical model, as well as clarify the new roles of teachers and students in new teaching-learning scenarios, since the traditional model of teaching does not meet the new educational demands (SALVADOR *et al.*, 2017).

For the academic unit to develop an effective policy using technology-mediated education, a discussion is essential to identify the purpose of information and communication technologies (in administrative or instructional scope) and identify the necessary demands within each space. The path to reconciling face-to-face and distance learning must follow the clarification of the academic community to overcome prejudices, pedagogical training, definition of priority areas and planning.

5. Final considerations

Through the measurements taken, it was noted that the institution's VLE was positive during remote teaching in Dentistry, taking into account the analysis of the monitoring items. It is suggested, however, that educators in the field of Dentistry dedicate themselves to: learning how to apply contemporary methodologies in the online environment; training on the tools of the AVA; promote online social engagement; and add technology to their Dentistry courses. It is also necessary for dental institutions to develop policies to assist educators in the online education modality.

For this, it will be essential to seek to involve students as actors in their learning processes, developing skills that culminate in technical-scientific training to encompass the gain of social capital. It is essential to associate face-to-face learning with the online modality and overcome some prejudices.

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