Rol del docente en el aprendizaje virtual de emergencia por covid-19 en una facultad de odontología chilena

Teacher's role in emergency e-learning by covid-19 in a chilean dental school

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Resumen: El confinamiento debido a la pandemia por COVID-19 obligó a instituciones educativas de todo el mundo a adaptarse rápidamente a la enseñanza remota de emergencia (ERE). Este cambio abrupto planteó desafíos significativos en la Educación Superior. En este contexto, resulta crucial comprender cómo se perciben la adaptación de los roles docentes en el proceso de virtualización. De esta manera, la pregunta de investigación es ¿Cómo perciben los estudiantes, los docentes y los directivos el rol del docente en la virtualización de emergencia de la carrera de odontología de una universidad privada? El objetivo de esta investigación es describir e interpretar las percepciones de una comunidad educativa respecto del rol del docente en el período ERE. Para ello nos basamos en la perspectiva del buen docente de salud según Harden y Crosby. El estudio se enmarca dentro de una investigación cualitativa con un enfoque interpretativo fenomenológico y un diseño teórico-metodológico microetnográfico, mediante la aplicación de entrevistas semiestructuradas y semiestandarizadas. Los datos fueron analizados mediante codificación y triangulación, generando matrices abiertas, axiales y una matriz selectiva final, y contrastados con las seis categorías de roles del docente. Se reveló que, aunque se mantuvo la continuidad educativa, el formato remoto de emergencia afectó y comprometió de manera significativa todos los roles docentes. Se destacó la necesidad de presencialidad para los contenidos procedimentales, siendo el subrol de *modelo a seguir en el trabajo* el más afectado. Se sugieren futuras investigaciones sobre la educación virtual en el contexto de la ERE, para ampliar la comprensión del fenómeno y estar mejor preparados para contingencias similares o avanzar hacia una modalidad híbrida en la carrera de Odontología.

Palabras clave: covid-19; enseñanza remota de emergencia; educación odontológica; rol del docente; metodologías de enseñanza

Abstract: Confinement due to the COVID-19 pandemic forced educational institutions around the world to quickly adapt to emergency remote teaching (ERE). This abrupt change posed significant challenges in Higher Education. In this context, it is crucial to understand how teaching roles are perceived to adapt in the process of virtualization. Thus, the research question is: How do students, teachers and academic administrators perceive the role of the teacher in the emergency virtualization of the dental career at a private university? The objective of this research is to describe and interpret the perceptions of an educational community regarding the role of the teacher in the ERE period. To do so, we based ourselves on the perspective of the good health teacher, according to Harden and Crosby. The study is framed within qualitative research with a phenomenological interpretative approach and a micro ethnographic theoretical-methodological design through the application of semi-structured and semi-standardized interviews. The data were analyzed by coding and triangulation, generating open and axial matrices and a final selective matrix, and contrasted with the six categories of teacher roles. It was revealed that,

although educational continuity was maintained, the remote emergency format significantly affected and compromised all teaching roles. The need for face-to-face presence for procedural content was highlighted, with the role *model* sub role being the most affected. Future research on virtual education in the context of ERE is suggested in order to broaden the understanding of the phenomenon and prepare better for similar contingencies or move towards a hybrid modality in the dental career.

Keywords: covid-19; emergency remote teaching; dental education; role of the teacher; teaching methodologies

1. Introduction

By the end of 2019, the global spread of COVID-19 triggered a public health crisis that, by April 2020, confined more than 3.4 billion people, profoundly affecting education worldwide. Educational institutions were forced to rapidly adopt the online modality, especially for teaching theoretical content, which presented numerous challenges in adapting the formative process (1). The urgency of this transition and the lack of time for adequate planning affected the quality of learning (2) and evidenced inequalities in access to the Internet and technological equipment, which exacerbated inequity in educational opportunities (3). The impact was particularly disruptive in the health professions, especially in undergraduate and graduate medical and dental programs, which traditionally require direct contact for hands-on learning (4). While distance education facilitated the teaching of theoretical knowledge and the development of clinical reasoning, it was insufficient for clinical skills training.

Dental education, which requires constant integration of theory and practice in clinical settings, faces significant difficulties in this context. The need for adequate digital tools limited practical training, forcing faculties to quickly adapt theoretical and practical content to a virtual format, challenging the traditional role of the teacher. This temporary adaptation, known as Emergency Remote Teaching (ERE), implied an abrupt change to new learning environments and methodologies that would remain until the return to face-to-face education (5) and meant a change and adaptation to a new culture and learning environments (6). In this context, the need arises to study how a dental school faced the virtualization of its theoretical and practical content and how this transition redefined the role of teachers. According to Harden and Crosby (7), teachers in health careers fulfil 12 roles grouped into six categories, including information provider, professional model, facilitator, evaluator, planner and resource developer, all of which are fundamental in this process.
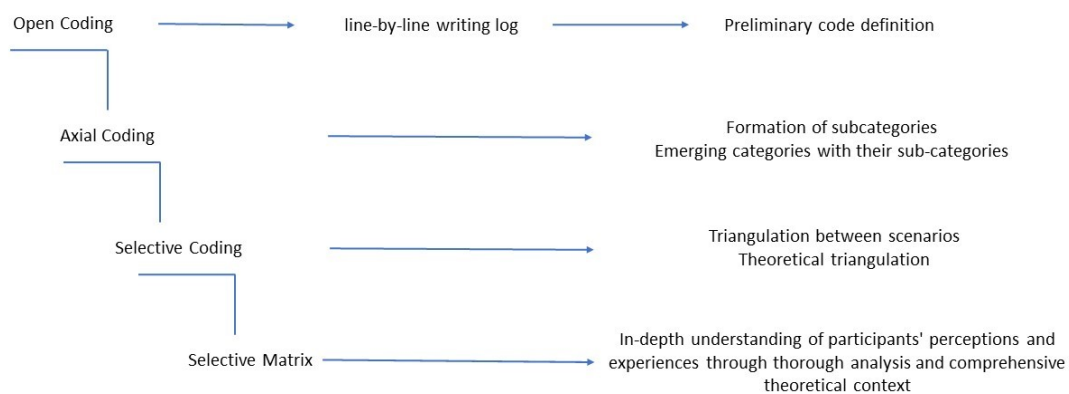
Documenting these experiences is key to optimizing pedagogical strategies and ensuring comprehensive training. Therefore, this study focuses on describing and interpreting the perceptions of students, teachers, and academic administrators about the teaching role in the emergency virtualization of a dentistry program at a private Chilean university during the COVID-19 pandemic.

2. Methods

This interpretative qualitative study, based on a hermeneutic phenomenological approach and with a micro ethnographic design, included purposive maximum variability sampling, a technique that selects participants with diverse characteristics to capture the heterogeneity of the phenomenon, allowing the identification of key experiences and shared dimensions in a small sample. The sample consisted of two students from the preclinical cycle, two from the clinical cycle, three teachers, and three managers, who were selected until data saturation was reached. The face-to-face semi-structured interviews, lasting approximately 50 minutes, were conducted at the

faculty, were audio-recorded and explored perceptions of virtual teaching. The study had the approval of the Universidad Central Ethics Committee, and informed consent was obtained from all participants.

Data analysis followed an iterative process based on the established paradigm and design, employing the open, axial and selective coding phases described by Strauss and Corbin (8). This procedure included the identification and organization of significant categories, the generation of empirical categories, the analysis of frequencies and relationships, and constant triangulation to ensure the reliability of the analysis. Open coding made it possible to decompose and classify the data, axial coding established relationships between categories and subcategories, and selective coding integrated and refined the categories to construct a dense description of the phenomenon. In addition, triangulations with actors, researchers and scenarios were applied to corroborate the validity and interpretative depth of the results. Finally, the categories and subcategories obtained from the selective coding were exhaustively analyzed using a dense interpretation based on Geertz's (9) method. A synthesis of the analytical treatment of the information can be seen in figure 1.

| Open Coding | → | line-by-line writing log | → | Preliminary code definition |

Axial Coding → Formation of subcategories / Emerging categories with their sub-categories

Selective Coding → Triangulation between scenarios / Theoretical triangulation

Selective Matrix → In-depth understanding of participants' perceptions and experiences through thorough analysis and comprehensive theoretical context

Figure 1. Analytical processing of information

3. Results

Five emergent categories emerged from the data: Learning Challenges, Student Context, Instructional Strategies, Instructional Design, and Graduation Profile. These categories were constructed following two main criteria: first, the frequencies of appearance in the participants' responses, which made it possible to identify recurrent patterns in their perceptions, and second, the depth and richness of the content associated with each category, which positioned them as key elements for understanding the phenomenon studied, regardless of their relative frequency.

Table 1 presents the frequencies of the emerging categories and subcategories obtained during the axial coding process to provide an overview of the data and facilitate understanding of the analytical structure. In contrast, Table 2 summarizes the frequencies integrated and refined in the selective coding. These tables show the analyzed dimensions' recurrent patterns and interpretative relevance. While the categories "Learning Challenges", "Student Context", and "Educational Strategies" were chosen because of their high frequency of occurrence and their ability to capture central aspects of the phenomenon studied, the categories "Instructional Design" and "Graduation Profile", although initially derived as subcategories with lower frequencies, were included because of their importance in addressing critical dimensions that could not be explained exclusively from the most frequent categories. This decision is based on a key principle of qualitative methods: priority is not only given to numerical trends but also to the ability of the categories to provide meaningful and deep insights. By privileging their interpretative richness, the analysis made it possible to capture more accurately the complexity and scope of the phenomenon under study. This

approach is aligned with methodological approaches such as those proposed by Strauss and Corbin (2015), who emphasize the importance of integrating key categories, regardless of their frequency, as long as they contribute to the overall understanding of the object of study.

Table 1. Frequency analysis of Axial Coding textualities

Category	Subcategory	Scenario 1			Scenario 2			Total
		Students	Teachers	Admins	Students	Teachers	Admins	
Learning Challenges	Barriers	1	0	0	1	0	1	3
	Weaknesses of Remote Educ.	3	6	5	9	6	9	38
	Regulatory Framework	0	0	2	0	1	0	3
	Planning	0	1	0	1	1	0	3
Student Context	Conditions	2	5	0	0	1	7	15
	Student-specific factors	5	1	1	1	0	3	11
Educational Strategies	Evaluation strategies	6	5	2	1	2	4	20
	Teaching-Learning Methodologies	8	9	6	13	9	21	66
Innovations in Distance Education in Dentistry	Instructional Design	0	0	0	0	0	6	6
	Modernization of dental education	0	0	3	0	5	0	8
	Positive impact of remote education	3	4	3	0	0	7	17
Competencies and Values of the Dental Professional	Academic Integrity	3	0	0	2	0	0	5
	Graduate Profile	1	2	2	1	3	2	11

Table 2. Frequency analysis of Selective Coding textualities.

Category	Subcategory	Scenario 1	Scenario 2	Total
Learning Challenges	Weaknesses of Remote Education	19	19	38
Student Context	Conditions	1	3	4
	Student-specific factors	7	4	11
Educational Strategies	Evaluation strategies	12	6	18
	Teaching-Learning Methodologies	33	38	71
Innovations in Distance Education in Dentistry	Positive impact of remote education	7	7	14
	Instructional Design	0	6	6
Competencies and Values of the Dental Professional	Academic Integrity	3	2	5
	Graduate profile	5	5	10

Learning Challenges

The adoption of emergency remote teaching (ERE) in dentistry during the COVID-19 pandemic evidenced the limitations of the virtual format in a practical discipline, where theory-practice integration requires face-to-face experiences. Teachers and students agreed that the lack of clinical practices affected the quality of training since, although theoretical concepts could be addressed virtually, learning procedural techniques would only be consolidated through face-to-face activities essential for professional competence. A student said:

"(they cannot be done remotely) ...in my opinion, more than anything else, because effectively transmitting is more physical, practical... rather than through a screen. By watching the video, you can see the possibility. Still, in the end, you will end up understanding the concept in person, in a real class, so to speak". But the procedural aspects, as such, and I am talking about all the health professions, cannot be transmitted through a platform like this".

In addition, the transition to emergency remote teaching (ERE) was affected by the lack of preparation and adequate digital resources, resulting in an improvised migration that replicated face-to-face methodologies without adapting them to the virtual environment. Teachers and academic administrators pointed out that the speed of the change increased their workload, as they did not have enough time or resources to transform content effectively, which affected educational quality and led them to improvise strategies in a medium for which they were not fully trained.

"(We suffered) the lack of time for digital transformation (...) the way of doing things was strained, and we ended up replicating what was done in the face-to-face modality remotely".

In addition to the above, the need for more specific digital tools and methodologies and the limited teacher training to dynamize and adapt classes to the virtual environment hindered online teaching during the ERE. This deficiency negatively impacted the teaching role and the student's ability to assimilate complex content, highlighting the need for training in digital competencies:

"And the lack of digital teaching strategies or skills to be able to capture attention or to be able to alleviate classes and to be able to generate resources."

Student Context

This category had two subcategories: conditions and student factors. The subcategory "Conditions" analyzes the technological, environmental and physical resources necessary for students to cope with ERE. Factors such as access to one's own devices, the quality of the Internet connection and an adequate study space were determinants of academic performance. Limitations in these aspects generated frustration and anxiety, making participation in virtual classes difficult.

"that all students had a place to study (...) a computer, that is, there were classmates who had (only) one computer at home, and that was a problem".

Teachers also identified connectivity as an essential element for the effective participation of students, highlighting that the intermittent connection made it difficult to develop the activities. One teacher commented in this regard:

"Let us think first of the students, that for me connectivity is very important for them; what I was telling you, one sees when students are connecting and disconnecting".

On the other hand, the directors' perspective highlighted the importance of students and teachers' stable equipment connections and knowledge in digital platforms. One academic administrator highlighted:

"The digital resource is fundamental, both from the student and the teacher. That is, having good equipment, a good connection (...) there must be knowledge in the use of the platforms".

The scarcity of resources and the lack of experience with digital tools became additional obstacles that negatively impacted students' motivation and performance during ERE, hindering their integration and participation in online teaching.

The subcategory "Student's own factors" addresses the students' individual characteristics that influenced how they coped with the ERE. Intrinsic motivation, understood as the student's internal and spontaneous drive to learn and achieve their academic goals without relying on external stimuli, allowed some students to maintain interest and overcome challenges, while those who lacked it showed difficulties and resorted to practices that compromised academic integrity.

Also, self-management (the ability of students to direct their own learning without constant supervision) was key to adapting to ERE, as students needed to organize their time and plan tasks. academic administrators noted that students with greater self-management managed to maintain good performance, while lack of this ability contributed to behaviours that compromised academic ethics.

"We struggled a bit at the beginning because it is a format in which learning is student-centred, not so much in the role of the teacher or in a unidirectional transfer of knowledge, but in the student, himself taking responsibility for his learning."

while another academic administrator added that

"And that it is self-directed, for example, that it has some asynchronous procedures, that allows it to be visible on all types of equipment, for example, on tablets, cell phones, computers, that helped a lot in the adaptation."

On the contrary, when their drive and commitment to learning do not arise naturally and spontaneously, the lack of intrinsic motivation leads some students to become unmotivated and adopt unethical behaviours. Without a real interest in learning, these students prioritized the minimum effort to pass, relying on peers or resorting to copying on exams rather than demonstrating their own knowledge. Less face-to-face supervision and accompaniment in the ERE intensified these practices.

"I think the kids at 17 and 18 are unprepared to self-direct their studies. They have not been trained since high school, perhaps without sufficient training (...) It has nothing to do with age, but rather (that) it is the previous training. I do not think so, they have to be guided a lot. Yes, they are still very young, very childish... they are not prepared. No, they are not ready".

Pedagogical strategies

This category is divided into two subcategories: Teaching-Learning Methodologies and Evaluation Strategies. The Teaching-Learning Methodologies subcategory addresses educational practices in dentistry during ERE and is constructed from the concepts and codes of the interviewees. These include the transmission of experiences, didactic techniques and methods, digital resources and tools used, interaction and feedback strategies between teachers and students, and methodological adaptations required for the remote modality.

In careers such as dentistry, which involve a high degree of clinical-theoretical integration, the ability of teachers to transmit this experience and apply it in clinical situations is essential for the

training of dentists. Participants emphasized the importance of having teachers who use their experience in instruction, as one student mentioned:

"For me, it is good that they occupy clinical cases, cool that they show you what they have done or that they explain how certain things can be treated, it is cool because that way you vay (sic) seeing things".

Likewise, a professor complimented:
"I took the time to make a transfer of experiences to the students because we spent the whole class hour talking about motivational aspects, why they were here, and the aspects of work expectations and achievable or unachievable performance. We took the time to talk about employability goals and life goals".

The transfer of experiences influences the delivery of content, the resolution of clinical cases and the development of transversal competencies, motivation and academic and work expectations, being key for the integral formation of the student; as a teacher pointed out:

"Through motivation with real-life examples (...) You must overcome prejudices, modesty, laziness, and many other things. That is why it is important that in each of the things that you needed the students to really know as objectives to be achieved in class, they always had to be qualified with examples from everyday life."

Modelling is strongly linked to the transfer of experiences. The interviewees emphasized the importance of modelling in the training of dentists, stressing that this practice allows students to learn by observing and imitating their teachers. By imitating behaviours, future dentists acquire technical skills, values, attitudes and transversal competencies necessary for their professional development. This type of learning is essential, as it facilitates the mastery of specific procedures and the learning of *"the way of doing things"* in a professional context that requires both technical and relational skills. Participants paid particular attention to this dimension of learning.

Modelling, closely related to the transfer of experiences, is crucial in the training of dentists, as it allows students to learn by observing and imitating their teachers. This process provides them with the technical skills, values, attitudes, and transversal competencies necessary for professional development. One academic administrator pointed out that despite existing limitations, it is possible to develop procedural and relational aspects:

"I believe that synchronous remote activities also allow for modelling, not with the impact of a face-to-face activity (...), but some clinical or simulation actions can be recreated (...) and another aspect that can be modelled in a greater way in a remote, synchronous space, is the issue of relational skills or that has to do with the misnamed soft skills, etc. Because the teacher, as in the skill of some clinical action, can demonstrate how to do it, and there is direct modelling."

In ERE, using audiovisual media such as telesimulation, pre-recorded capsules, and live transmissions was critical to transferring experiences and modelling in dental education. It facilitated the demonstration of techniques and resolved doubts in real-time, improving students' practical understanding. However, the lack of equitable access to the technology and the need for specific skills for its implementation presented challenges, potentially widening learning gaps and affecting educational quality.

"For example, when it was time for isolation, I was showing everyone through the camera how to make torulas, pediatric dentistry belts; I was also showing them step by step; it was like I was making a video, but I was doing it live and answering their questions."
"Perhaps there could have been a live transmission of a procedure, consider that it is difficult to understand clinical skills if they are only mentioned to you (...) the most practical thing is to be taught with

the patient or, finally, with a live transmission if they are going to be synchronous, it was still entertaining, they managed to make it entertaining and show you beyond a definition or an explanation with a lot of text (...) what helped the most, I think, were the videos, because it was like being able to execute a technique in the most real way".

In the research, active methodologies were key in ERE, promoting student-centred learning through interactive applications such as Kahoot, Socrative and Genially, which encouraged student participation. Although valued by academic administrators and teachers for their ability to motivate, their implementation needed more institutional support, which generated unequal experiences among students, depending on the preparation and approach of teachers. Despite the effort to adopt participatory dynamics, teaching maintained traditional structures, hindering a complete transition to an active model.

"The methodology I used was participatory. Since I did not (want) ... although we were behind a computer, it was not a monologue of mine. I asked questions, interactions or mini activities, trying to have questions and answers to keep them active (...) We often used Socrative to ask for opinions and generate word clouds. We also use Socrative often to do online tests, generally in the formative test. We also use Genially (in general) the methodologies best received by the students were those more active".

In the same line, another academic administrator stated:

"I think what got the most attention or captured the attention of the students remotely was the activities that posed some challenges. That posed a challenge in terms of evaluation or in terms of achieving a product (...) using inverted classrooms, that is, the previous study of knowledge, was one of the methodologies that increased the students' motivation".

As part of active methodologies, gamification enriched online learning by integrating game elements that made it more attractive and motivating. It was well accepted by all educational stakeholders, who highlighted its usefulness in developing skills and knowledge in a playful way. Although both methodologies improved the learning experience during ERE, their implementation depended on the individual efforts of teachers, evidencing the need for institutional support for a more uniform adoption in the future.

"We are talking about resources like Kahoot and gamification. Kahoot is the one that worked best for us (...) the students really liked it. In fact, now that the classes are face-to-face, I continue to apply it because participation is outstanding; it shows who is winning, with the scores and everything, so I really like it; it works very well because it is also very easy to use. After all, I put the code in the ppt, everyone enters from their phone, and it is very entertaining to use".

The subcategory "Assessment Strategies" exposes the challenges of virtual assessments during the pandemic. Although the need for adaptations was recognized, traditional methods were resorted to, generating academic irregularities and inauthentic results. Teachers and academic administrators stressed the importance of adequate tools to assess cognitive and cross-cutting skills, highlighting the need for greater control and supervision to prevent the misuse of external resources.

"There was no special strategy in evaluations, but from the teachers' point of view, they were always focused on test evaluation. And from traditional formats."

"We try to make it more of application than of knowledge (...), but that they do not use material either, that they are not with the subject reading and that in the background they cheat, if not that you really

evaluate how they understand (...) That (the evaluation instruments) allow to verify that it is individual, that it is authentic, that it does not have academic vices"

The Faculty's experience during the pandemic evidenced limitations in implementing student-centred evaluation strategies due to the need for more infrastructure and the urgency of the context. This underscores the need to strengthen institutional and Faculty competencies to develop tailored assessments and highlights the importance of conceiving assessment not only as a means of testing knowledge but as a comprehensive and formative process that fosters student autonomy and engagement in hybrid and emergent models.

"The main conflict was thinking this is a problem because of the in-person attendance (sic). Teachers do not know instances of different instruments to measure different levels of potentiality. To measure different taxonomic levels".

Academic integrity emerged as a relevant theme in the participants' responses, evidencing the difficulties in controlling fraud during ERE evaluations. The absence of physical supervision facilitated collusion and copying, affecting the quality of learning and generating concern among teachers and students about the effectiveness of online assessments. This prompted reflections on the need to design assessment methods that measure authentic and individual understanding, promoting meaningful learning and preventing access to materials or undue collaboration from distorting the results. The findings are consistent with the literature, which highlights the challenges of authenticity and oversight in virtual environments.

"The copying was wild."

"Making it more about application than knowledge because they end up being group work and you do not want that, but you also do not want them to use material, to be with the subject matter reading and in the background cheating, if not that you really evaluate how they understand."

While a student complements:

"I know that there were groups doing tests, so the merits of whether you know or do not know or what kind of people are coming out if you had a solemn exam online in group, I do not know what level of learning you will have (sic). Because the test itself is supposed to be what you are learning, a face-to-face test, the teacher sees if you are copying or if you learned. You do not measure one hundred percent knowledge".

Instructional Design

The testimonies of the participants reinforce the idea that during the ERE period, there was no premeditated or adequate instructional design for the online modality. Both academic administrators and teachers recognized the need for a solid instructional design to offer quality dental education alternatives in digital environments. This implies a conception and definition at the institutional level of how to approach this modality, having a good technological platform and specific materials and content for remote teaching, as stated by a faculty director:

"First, a conception and definition at the institutional level (...) a good institutional design and a good platform (...) and here I am going to make a comment, but it is that it made much sense to me, that I think the instructional design part is key, that area has to be developed first to offer the alternative. Otherwise, it will continue to adapt to what is traditionally done."

Graduation Profile

The analysis of the graduate profile in dentistry during the ERE revealed concerns about the sufficiency of the competencies acquired. The lack of essential clinical practices and the separation

between theory and clinic critically affected the correct taxation of the graduate profile and compromised the comprehensive training and preparation for professional practice.

"That area was left deficient because after (the ERE period) we went directly to the clinic, but nobody really cared about evaluating what we learned online, and in the end, we had to face clinical work with incomplete or partial learning (...) that is why the graduate profile is not going to be 100%, mostly because of the clinical activities. It has a lot to do with the career; you can know a lot, but if you do not have the clinical and practical competencies, it is useless to (achieve) the graduate profile. It is not enough just theoretical... so, in my opinion, these remote activities were left to the task".

Although the institutional strategy was first to teach the theoretical contents and then defer the practices until the return to face-to-face teaching, some teachers questioned whether this was enough to guarantee the quality of the training. The findings reflect a consensus in the academic community on the ethical importance of graduates possessing solid competencies to meet the health demands of the population, underscoring the need for students to maintain an authentic commitment to their learning beyond simply obtaining a degree.

"We are very far from having a critical mass, and I am not even going to question the students; I am going to make a general questioning, a critical mass interested in learning itself, learning as an end in itself. It has left us to demonstrate that the primary motivation is to pass a subject. That is all the same with inflated averages because the copying was wild, then we lack the culture, the culture to be able to understand that reaching a graduation profile is related to a learning phenomenon, not to answer well for a test in order to pass the course."

4. Discussion

The educational community perceived the teaching role during emergency virtualization as a process of gradual adaptation, highlighting the effort to maintain academic quality while becoming familiar with new digital tools.

Teachers' Adaptation to ERE

Teachers' adaptation to emergency remote teaching (ERE) has varied, with positive and contrasting perceptions among students and teachers. Students valued the teaching effort to integrate new technologies and methodologies, highlighting active methodologies such as audiovisual media and gamification, which improved motivation, participation and information retention (24, 26). The positive perception of the teacher's facilitator role contrasted with the evaluation of his or her sub-roles. The learning *facilitator* sub-role was well valued, possibly due to teachers' adaptation to new platforms (REDs and LMS), which balanced their role as a guide in self-training and the online lecturer role. In contrast, the *remote conditions limited the mentor sub-role*, as students had little opportunity to interact with lecturers outside of scheduled classes, resulting in little or no mentoring or tutoring. From the teaching perspective, using active methodologies was also crucial for adaptation, allowing minimal demonstrations and maintaining some interaction with students. This point was also supported by management. The specialized literature reflects this uneven adaptation, with studies such as those of Gómez-Hurtado et al. (10), which highlight the effort of teachers to overcome initial scepticism and face uncertainties, and others such as those of Crous et al. (11), which indicate that, although active methodologies had a positive impact, they also presented difficulties, such as the need to improve the quality of classes and the effectiveness of adapting face-to-face methods to the virtual environment.

Challenges of digital teacher preparation

Teachers' lack of digital preparation was a significant challenge, especially in the role of resource developer, since adapting methodologies and resources required both creativity and

mastery of the learning objectives. Although some teachers managed to create effective materials, others faced difficulties due to a lack of experience and training in educational technologies. The digital transformation was abrupt, and more resources and time were needed to adapt traditional classes adequately to the remote format, where the lack of digital tools and methodologies may have been an important factor. There was consensus that teachers lacked the necessary knowledge and experience for virtual education. As noted by the participants, these aspects are also linked to the absence of instructional design. This impacted the role of the teacher planner. Indeed, both the *curriculum planner* and *course planner* sub-roles were limited to educational and evaluative strategies, teaching methods and the educational environment, where solutions were based more on improvised adaptations through a continuation of the face-to-face format to the digital medium(26, 28, 29). However, it is important to remember that, by definition, ERE is a format without a prior instructional design or developed learning ecosystem, unlike traditional online education (5). This phenomenon amplified the difficulties of the ERE period, which was also observed in other countries, such as the United Kingdom, Italy, Ecuador and Spain, where students criticized the lack of adequate instructional design for effective learning (12, 28, 27). The literature supports this perception by highlighting several of the challenges evidenced in our research. The rapid, non-voluntary and overwhelming nature of the digital transition during the ERE period has been remarked on (5), leaving teachers vulnerable to the urgency of providing academic continuity. Moreover, this abrupt change has been described as disruptive and marked by the urgency of a catastrophic global event without a natural evolution (13).

Indispensable In-Person Attendance

The three consulted estates agree that dentistry teaching requires face-to-face practical and procedural activities, especially in surgical and restorative procedures, where the integration of theoretical knowledge and practical skills is essential. The transition to remote teaching negatively affected the role of the information provider. The *lecturer's* sub-role faced difficulties adapting theoretical content to the virtual format, improvisation, and a lack of teacher preparation, which deteriorated the quality of the classes. The clinical/practical teaching sub-role was further compromised, as practical dental skills cannot be adequately taught online. The clinical setting remains essential for skills transfer, where clinical teacher quality and interaction are the most important factors for learning procedures and relational skills (12). The literature supports this view, highlighting the difficulties in teaching practical skills at a distance and the importance of face-to-face attendance to ensure quality education in dentistry (14). In addition, students recognize that practical training is key to their comprehensive career development (15, 25).

Perception of the role model and the transmission of experiences.

Students value the model role of teachers, especially in transmitting practical and professional experiences, since they provide deep and applicable knowledge, where they learn how to perform clinical procedures and interact with patients. However, the suspension of practical activities during ERE severely limited this role, especially the role *model* sub-role at work, being the most affected role in ERE due to the lack of personal interaction in the remote format. On the other hand, the continuity of theoretical classes partially mitigated the impact on *the teacher's role as a model*. Teachers and academic administrators stress the importance of modelling clinical behaviour, which represents a key challenge in the training of future dentists. Radford (16) argues that deep learning and theoretical-practical integration occur through shared experiences with teachers. Thus, students continue cognitive processes that lead them to acquire technical competencies, integrating knowledge structures that allow them to face clinical situations with greater breadth, enriching their experience (16).

Likewise, clinical learning, described as "chains of practice and networks of understanding" (17), is based on the practical steps given by the teacher, allowing for deeper and more integrated knowledge (18). Clinical modelling is crucial to transmitting cognitive skills, relational

competencies and clinical behaviours. Harden and Crosby (7) reinforce that students learn by observing clinical teachers they respect, not only by verbal teaching but also through their actions, knowledge, skills, and attitudes. In addition, insufficient integration of theoretical and clinical content affected students' preparation for dental practice, compromising their graduation profile. Studies on the knowledge gap between students trained remotely and those trained face-to-face would be useful (19).

Evaluation strategies

Assessment strategies in the remote educational context generated significant debate during the ERE period, focusing on the lack of innovation and the repetition of exams similar to face-to-face ones. Given the above, the assessment role faced significant challenges adapting to ERE. Students perceived that this compromised the effectiveness of the assessments, along with issues of academic integrity and technical difficulties. The need for adapted instruments that reflect the true level of understanding was highlighted, emphasizing avoiding fraud and promoting academic integrity (20, 21). Despite the literary recommendations on adapting assessments, the findings of this research show a significant gap between recommendations and actual practices during ERE.

Students preferred written assessments, such as essays or open-ended questions, to measure their knowledge in the virtual environment, aligning with previous studies advocating for student-centred instruments that promote skills such as autonomy and problem-solving (13). However, the assessments' lack of integration of theoretical and clinical content was criticized. Teachers expressed diverse opinions, some promoting student-centred evaluations, while others emphasized that they should be aligned with the learning objectives, regardless of the application format. The management team emphasized the importance of maintaining assessment principles such as validity and authenticity, using rubrics and rubrics. They also pointed out that assessments should focus on measuring the degree of learning by the learning objectives. The literature suggests that the instruments consider the psychosocial context of the student and their data protection (21), which implies highly adapted instruments and recommendations that, according to the testimonies, were implemented in a very limited way.

Our research findings show that attempts to implement assessment strategies adapted to the remote environment were insufficient and did not align with international recommendations, compromising the quality of learning and the fulfilment of the student's graduation profile. The perception that assessments in remote environments favour fraud and copying was also widespread, as shown in international experience (22). Silva et al. (13) argue that assessment in the remote format should contemplate a deep reflection on the collaborative teaching-learning process and the facilitating role of the teacher, which goes far beyond the mere application of instruments. The literature suggests the need to rethink evaluation strategies and use non-traditional methodologies to reduce academic fraud (23). The misalignment between international recommendations and the findings of this research highlights implementation gaps and the need to rethink the paradigms governing evaluative strategies. Despite institutional efforts, the challenges that arose in the evaluations in the ERE period were not overcome.

Our results highlighted the need to develop digital competencies in teachers and students. This could be done through continuous training programs that include innovative pedagogical strategies using technological tools. For institutions, we suggest implementing new instructional designs adapted to the virtual modality, which consider creating specific materials for online practical and theoretical teaching, such as clinical simulations, interactive capsules and live transmissions of procedures. Complemented by strong institutional support, these and other innovative actions could significantly improve the quality of virtual dental teaching and prepare faculties for future hybrid or emergency scenarios.

The findings of this study highlight the need to develop digital competencies in teachers and students through continuing education programs that include the use of technological tools and innovative pedagogical strategies. Likewise, it is recommended that an instructional design be adapted to the virtual modality, which contemplates the creation of specific materials for practical online teaching, such as clinical simulations, interactive capsules, and live transmissions of procedures. These actions, complemented by strong institutional support, could significantly improve the quality of virtual education and prepare faculties for future hybrid or emergency scenarios.

This research was conducted exclusively at a single institution, which could represent a limitation in the generalizability of the results. While the qualitative design allowed for an in-depth understanding of participants' perceptions and experiences, they reflect the particularities of a specific institutional context. Therefore, they may not reflect the reality of other dental schools, even within the same country. One possibility to overcome this limitation is to replicate the research in other institutions or to include several institutions with different organizational characteristics and educational contexts. This would allow a broader evaluation of different strategies and outcomes, enrich knowledge about ERE, increase the validity of the findings, and offer more robust solutions to emerging problems.

Although the methodology used a questionnaire of semi-structured questions, which carries risks of self-reporting due to the subjectivity of responses, scientific rigour was safeguarded through a series of triangulations, including triangulation of data with sources, triangulation of open coding with peer researchers and a theoretical triangulation, which allowed the construction of robust categories, ensuring a solid and reliable analysis. These measures reinforce the credibility and validity of the results, minimizing the impact of possible biases inherent in the design. Nevertheless, the use of mixed methodologies could be considered for future research, incorporating quantitative data to complement and contrast the findings.

5. Conclusions

- This micro ethnographic study analyzes the transformation of teaching roles in a Chilean dental school during Emergency Remote Teaching (ERT). The findings show that virtualization significantly affected all teaching roles, forcing a permanent adaptation. Although teachers tried to maintain educational continuity, the practical nature of dentistry presented challenges, especially in teaching practical and relational skills. Despite some efforts in resources and assessment, these needed more innovation, mostly replicating face-to-face methods in virtual environments.
- The triangulation of perceptions among academic administrators, teachers, and students revealed concerns about the quality of learning, especially in clinical areas. It pointed to obstacles such as technical limitations, academic integrity issues, and a lack of digital teacher preparation. The study contributes to understanding the transformation of teaching roles in dentistry during ERE, highlighting the need for specific pedagogical strategies that integrate technologies and interactive methods for online practice teaching.
- The study's limitations include its focus on a single institution and possible self-report biases. Future research should extend these findings to other dental schools, use larger samples, and evaluate the impact of ERE on the graduate profile to validate the results and develop effective strategies to improve dental education in future scenarios of virtualization or curricular hybridization.

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