



# Evaluation of dentistry professors before and during the COVID-19 pandemic

## Evaluación de profesores de odontología antes y durante la pandemia por COVID-19

## Avaliação de professores de odontologia antes e durante a pandemia de COVID-19

### ABSTRACT

**Introduction:** Student evaluations of professors through surveys are valuable instruments for adjusting to higher education. During the COVID-19 pandemic, face-to-face education was suspended to comply with health guidelines. **Objective:** To determine the effect of technology-mediated learning on professors' evaluations of students in the Dentistry academic program at *Universidad del Valle* for theoretical subjects before and during the pandemic. **Materials and methods:** A descriptive and retrospective study was conducted. The quantitative phase utilized the faculty evaluation system database. The periods 2018 (n = 218), 2019 (n = 296), 2020 (n = 68), and 2021 (n = 347) were reviewed, and the years 2018-2019 and 2020-2021 were compared. The qualitative phase employed the focus group technique. **Results:** The median faculty evaluation 2018 was 4.84/5.0, in 2019: 4.94/5.0, in 2020: 4.87/5.0, and in 2021: 4.75/5.0. Significant differences between 2018 and 2019 ( $p = 0.047$ ) and 2019 and 2021 ( $p = 0.00$ ) were found. The content analysis of the two focus groups generated four categories: student study methodologies, discipline and routines, professor teaching methodologies, and emotions and socialization. **Conclusions:** For students, face-to-face learning remains crucial in the educational process.

**Keywords:** Evaluation study; dentistry; COVID-19. (Source: DeCS, Bireme).

**Sustainable development goals:** Good health and well-being; quality education. (Source: SDG, WHO).

### RESUMEN

**Introducción:** La evaluación de profesores por los estudiantes, a través de encuestas, es un instrumento útil para realizar ajustes en la educación superior. Durante la pandemia por COVID-19 se cerró la educación presencial para cumplir con los lineamientos de salud. **Objetivo:** Determinar el efecto del aprendizaje, mediado por tecnologías, en la evaluación de profesores del programa académico de Odontología de la *Universidad del Valle*, realizada por estudiantes en las asignaturas teóricas, antes y durante la pandemia. **Materiales y métodos:** Estudio descriptivo y retrospectivo, donde la fase cuantitativa utilizó la base del sistema de evaluación docente. Se revisaron los periodos 2018 (n = 218), 2019 (n = 296), 2020 (n = 68) y 2021 (n = 347), y se compararon los años 2018-2019 y 2020-2021. La fase cualitativa utilizó la técnica de grupos focales. **Resultados:** La mediana de la evaluación docente en 2018 fue: 4,84/5,0, en 2019: 4,94/5,0, en 2020: 4,87/5,0 y en 2021: 4,75/5,0; las diferencias fueron estadísticamente significativas entre los años 2018 y 2019 ( $p = 0,047$ ) y 2019 y 2021 ( $p = 0,00$ ). El análisis de contenido de los dos grupos focales generó cuatro categorías: metodologías de estudio de los estudiantes, disciplina y rutinas, metodologías de enseñanza de los profesores, emociones y socialización. **Conclusiones:** Para los estudiantes, la presencialidad sigue siendo trascendental en el proceso formativo.

**Palabras clave:** Estudio de evaluación; odontología; COVID-19. (Fuente: DeCS, Bireme).

**Objetivos de desarrollo sostenible:** Salud y bienestar; educación de calidad. (Fuente: ODS, ONU).

Judy Villavicencio



Lina María García-Zapata



I. Universidad del Valle  
Cali, Colombia.

#### Citation:

Villavicencio J, García-Zapata LM. Evaluation of dentistry professors before and during the COVID-19 pandemic. Univ Salud [Internet]. 2025; 27(2):e8404. DOI: 10.22267/rus.252702.343

Received: January 15 - 2024

Revised: October 08 - 2024

Accepted: February 18 - 2025

Published: May 01 - 2025



ISSN: 0124-7107 - ISSN (Online): 2389-7066  
Univ. Salud 2025 Vol 27 No 2  
<https://doi.org/10.22267/rus>

<https://revistas.udenar.edu.co/index.php/usalud>

**Authorship contribution:**

Judy Villavicencio: Conceptualization, investigation, methodology, Project administration, visualization, writing - original draft and writing - review & editing. Lina García: Conceptualization, investigation, methodology, Project administration, visualization, writing - original draft and writing - review & editing. (Source: CRediT, NISO).

**Ethics approval and consent to participate:** Approval Code E 036-023 issued on August 18, 2023, by the Health Research Ethics Committee of the Faculty of Health at *Universidad del Valle*.

**Data and materials availability:** The data analyzed during this study are available from the corresponding author upon reasonable request.

The data used for analysis in this project have been consolidated by the team at the School of Dentistry Directorate, including interview transcripts and generated analysis files. These comply with *Universidad del Valle's* ethics policy, which ensures respective anonymity.

**Conflict of interest:** The authors declare no conflicts of interest.

**Disclaimer:** The views expressed in this article are the sole responsibility of the authors.

**Consent for publication:** The authors authorize the publication of this document.

**RESUMO**

**Introdução:** A avaliação dos professores pelos alunos por meio de pesquisas é uma ferramenta útil para fazer ajustes no ensino superior. Durante a pandemia da COVID-19, o ensino presencial foi encerrado para cumprir as diretrizes de saúde. **Objetivo:** Determinar o efeito da aprendizagem mediada por tecnologia na avaliação dos docentes do programa acadêmico de Odontologia da *Universidad del Valle*, realizada pelos alunos das disciplinas teóricas, antes e durante a pandemia. **Materiais e métodos:** Estudo descritivo e retrospectivo, onde a fase quantitativa utilizou como base o sistema de avaliação docente. Foram revisados os períodos de 2018 (n = 218), 2019 (n = 296), 2020 (n = 68) e 2021 (n = 347), e comparados os anos de 2018-2019 e 2020-2021. A fase qualitativa utilizou a técnica de grupo focal. **Resultados:** A mediana da avaliação dos professores em 2018 foi: 4,84/5,0, em 2019: 4,94/5,0, em 2020: 4,87/5,0 e em 2021: 4,75/5,0; as diferenças foram estatisticamente significativas entre os anos de 2018 e 2019 ( $p = 0,047$ ) e 2019 e 2021 ( $p = 0,00$ ). A análise de conteúdo dos dois grupos focais gerou quatro categorias: metodologias de estudo dos alunos, disciplina e rotinas, metodologias de ensino dos professores, emoções e socialização. **Conclusão:** Para os alunos, o aprendizado presencial continua sendo crucial no processo de aprendizagem.

**Palavras-chave:** Estudo de Avaliação; odontologia; COVID-19. (Fonte: DeCS, Bireme).

**Metas de desenvolvimento sustentável:** Saúde e bem-estar; educação de qualidade. (Fonte: MDS, OMS).

## INTRODUCTION

Evaluating teaching performance is a fundamental process for higher education institutions, aiming to achieve excellence and improve the quality of educational processes<sup>(1,2)</sup>. Student evaluations of professors through surveys can be a valid and helpful instrument for adjusting in higher education institutions; however, these must be taken with caution, considering the context and personal perspectives of the students<sup>(3)</sup>.

Students' opinions about the educational process within higher education can contribute to aspects such as the incorporation of favorable pedagogical practices and evaluation methods, verification of the quality of proposals put forward by institutions, students' self-evaluation of their commitment to learning, and the student's free and viewpoint<sup>(4)</sup>.

In March 2020, the COVID-19 pandemic required the immediate closure of face-to-face dental education to comply with social and health guidelines<sup>(4)</sup>. Dental schools faced the challenge of engaging students in virtual learning platforms and digital content to develop academic programs<sup>(5,6)</sup>. This distance education process was accelerated, established as an emergency, and therefore was not structured<sup>(7)</sup>; however, digital learning became a good alternative, which depended mainly on the mindset and interactive teaching styles of professors, as well as the attitudes and knowledge towards digital technologies on the part of students<sup>(8)</sup>.

Educational activities that occur exclusively through a device connected to the network are divided into synchronous and asynchronous learning formats. Synchronous learning includes conferences via Zoom®, Google Meet®, and Microsoft Teams®, and live broadcasts where conferences are transmitted in real-time to the student's digital device. Thus, asynchronous learning is based on autonomous learning and includes any recording of teaching content that is not broadcast live to students' digital devices. An example is pre-recorded PowerPoint® presentations with audio explanations, screenshots, and videos<sup>(9)</sup>. Both digital teaching media (synchronous and asynchronous) were

used in dental education during the COVID-19 pandemic.

Understanding student perceptions of online dental education during the COVID-19 pandemic has been studied, including advantages and disadvantages<sup>(10)</sup>. The advantages were the availability of classes when required, the willingness to accept new evaluation techniques and the review of additional notes. Among the disadvantages were burnout, technology failures, lack of peer interaction, and lack of practical training<sup>(11,12)</sup>.

There was controversy regarding student anxiety levels, with some reviews citing high levels as a disadvantage<sup>(12)</sup>. In contrast, others found it an advantage due to low levels<sup>(11)</sup>. The same occurred with time management, where some reviews found that it worsened with online dental education<sup>(11)</sup>, and others saw the opposite<sup>(12)</sup>. The studies conducted used quantitative and qualitative analyses.

In dental education during the COVID-19 pandemic, a significant increase in psychological disorders has been identified<sup>(13)</sup> due to increased workload and isolation from classmates<sup>(14)</sup>, necessitating psychological counseling and interventions for student well-being<sup>(15)</sup>.

The professors of the Dentistry academic program at the School of Dentistry of *Universidad del Valle* evaluated theoretical subjects. They mostly had specialized studies, followed by master's degrees and, to a lesser extent, doctoral degrees. Their dedication to the program ranged from the second to the tenth semester. Professors of the first semester of the Dentistry academic program belonged to the School of Basic Sciences and the School of Public Health.

To understand the phenomenon that occurred, it was proposed to review the evaluations made by students of the Dentistry academic program at *Universidad del Valle* before the COVID-19 pandemic (2018 and 2019) and compare them with the assessment in the two years of the pandemic (2020 and 2021), to determine the effect of technology-mediated learning.

## MATERIALS AND METHODS

A descriptive and retrospective study was conducted in two stages. The first quantitative stage was based on secondary information sources from the faculty evaluation system of *Universidad del Valle*. The years 2018 (n = 218), 2019 (n = 296), 2020 (n = 68), and 2021 (n = 347) were reviewed. From each period, the professor evaluated forms completed by students of the Dentistry program in theoretical subjects were selected. The rating scale was from 1.0 to 5.0, where 1.0 was the lowest possible score, and 5.0 was the highest. These data were included in an Excel® database for analysis in the SPSS-26 program, where medians were analyzed because the data did not meet normality criteria. Differences between summary measures were analyzed with the Shapiro-Wilk test.

The variables considered in the quantitative evaluation of professors included aspects such as presentation and explanation of the course syllabus, course planning by the professor, adherence to the schedule, validation of whether the methodology used promoted reflection and appropriation of knowledge and skills, clarity of the professor's explanations, fulfillment of the objectives set at the beginning of the course, availability of the professor for consultations and advising during the scheduled time, explicit agreement on evaluation at the start of the course, timely delivery of evaluation results, use of assessments to improve student training, facilitation of skill acquisition for the development of techniques and procedures by the teacher's support, and respectful treatment of students by the professor.

Once the evaluation system issued the semiannual grade report, professors were informed of their performance quantitatively and qualitatively; if they obtained a score below 3.8/5.0, they had to carry out an improvement plan that described the improvement opportunities agreed upon with the head of the academic unit. This was followed up in the next academic period.

In the second stage, which was qualitative, two focus groups were established with eighth and tenth-semester students, selected by convenience, who, during the pandemic period, were related to the contents of theoretical subjects of the curriculum, with an emphasis on the professional component of the career; with them, aspects about virtual methodologies as a means of learning in times of pandemic were explored in depth. This information was transcribed, and the content was systematically analyzed, extracting significant ideas and patterns from the data, which generated four categories.

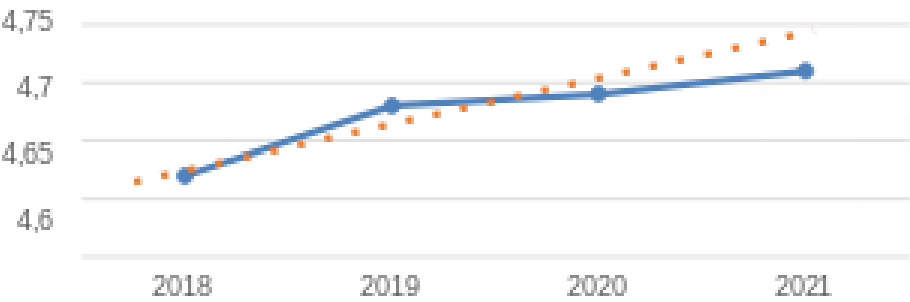
## Ethical considerations

According to Resolution 8430 1993 of the Ministry of Health and Social Protection of Colombia, this research was classified as having no risk. The researchers followed Law 1581 of 2012, which was related to protecting personal data. Finally, *Universidad del Valle's* Health Research Ethics Committee reviewed and approved the research, assigning it code E-036-023.

## RESULTS

### Quantitative component

The average evaluations of professors in theoretical subjects between 2018-2021 showed an upward trend, indicating that the change in the methodology used in theoretical classes favored the quantitative review of professors' performance, as shown in Figure 1. The average assessments considered in this research were those corresponding to the final evaluations of the subjects, where the topics best rated by students were: a. the professor's treatment was respectful to the students and b. the professor explained the program and presented it promptly; the lowest rating had to do with the methodology used and whether it fostered reflection and appropriation of knowledge.



**Figure 1.**  
Teacher grade point averages 2018-2021

**Source:** Faculty Evaluation System, Universidad del Valle, 2022. Grade point averages for professors in the theoretical subjects of the Dentistry academic program during the 2018-2021 period.

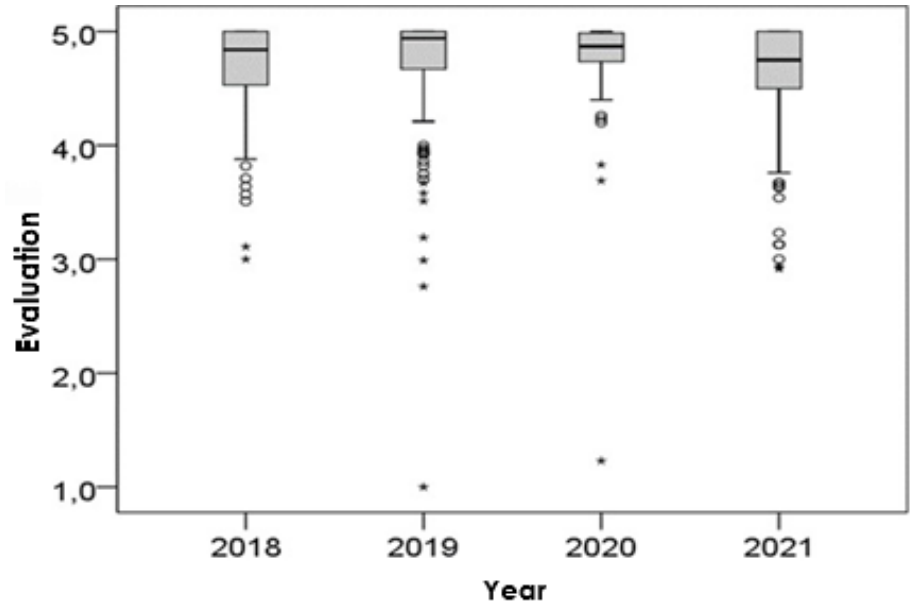
Nevertheless, upon performing the normality test with the Kolmogorov-Smirnov test, it was identified that none of the semesters presented normality in the distribution of the obtained grades. Therefore, the medians of the grades reported from 2018 to 2021 were used, as shown in Table 1.

Year	n	Mean	SD	Median	Q1	Q3	Minimum	Maximum
2018	218	4.7	0.4	4.84	4.5	5.0	3.0	5.0
2019	296	4.8	0.4	4.94	4.7	5.0	1.0	5.0
2020	68	4.8	0.5	4.87	4.7	5.0	1.2	5.0
2021	347	4.7	0.4	4.75	4.5	5.0	2.9	5.0

**Table 1.**  
Medians of Grades from 2018 to 2021

**SD:** Standard deviation  
**Q1:** 25th percentile  
**Q3:** 75th percentile

The medians were plotted in a box-and-whisker diagram; 2019 had the best performance, and 2021 had the most significant variation in the reported data (Figure 2).



**Figure 2.**  
Box and whisker diagram of the evaluation behavior from 2018 to 2021

The medians were compared using the Kruskal-Wallis test, which identified significant differences between 2018 and 2019 ( $p = 0.047$ ) and 2019-2021 ( $p = 0.00$ ), as described in Table 2.

The qualitative component was developed to understand the quantitative evaluation results further, revealing the following results.

**Table 2.**  
Comparative Analysis of Medians to Establish  
Differences in Evaluations Conducted by  
Students from 2018 to 2021

Explanatory note: Each row tests the null hypothesis that the distributions of samples 1 and 2 are the same. Asymptotic significances (two-tailed tests) are shown. The *p* level is 0.05, and significance values have been adjusted with Bonferroni correction for multiple tests.

Sample 1 - Sample 2	Test Statistic	Standard Error	Test Statistic Deviation	<i>p</i>	Adjusted <i>p</i> value
2021-2018	32.746	22.875	1.432	0.152	0.914
2021-2020	68.794	35.103	1.960	0.050	0.300
2021-2019	95.541	20.943	4.562	0.000	0.000
2018-2020	-36.047	36.765	-0.980	0.327	1.000
2018-2019	-62.795	23.624	-2.658	0.008	0.047
2020-2019	26.748	35.595	0.751	0.452	1.000

Qualitative Component

From the analysis conducted in the two focus groups, the first with five eighth-semester students and the second with seven tenth-semester students, four categories of aspects experienced during the pandemic, with technology-assisted remote classes, were identified:

- 1. Student study methodologies, discipline, and routines.
- 2. Professor teaching methodologies.
- 3. Emotions.
- 4. Socialization and interaction with others.

The literature corroborated these four categories.

**Student study methodologies, discipline, and routines.** The change from face-to-face to virtual modality was unsatisfactory for all students interviewed in the focus groups, except for one student. The process was complicated and required an adaptation of academic life to daily life at the residence, increasing responsibilities for the care of other family members. Students had to reorganize their schedules for this form of learning, developing self-discipline, which was not always achieved due to multiple distractions in their places of residence.

Another point the students referred to concerned the need for students to meet teachers' demands for face-to-face activities for academic tasks. Class viewing was also postponed. This situation was supported by the recordings generated through the platforms, which facilitated study for workshops, partial exams, finals, and other exercises proposed by professors. Students preferred asynchronous PowerPoint® presentations over synchronous ones due to flexibility in time and place and fewer technical problems.

**Professor teaching methodologies.** A greater demand was identified in the number of activities assigned by professors to students. The management of some teachers favored the experience of virtual learning environments. However, when this was not the case, it was very complex for students to understand the topics presented at the beginning of the courses and adhere to them. In some subjects, professors incorporated innovative elements that reinforced the subject content, including elements such as the creation of concept maps, videos, presentations, workshops, diagrams, drawings, readings, and topic reviews; these exercises were considered for the evaluation of subjects, a favorable aspect for students. The changes in the professors' evaluation processes and the demand in the delivery times of theoretical exams, workshops, and short evaluations of some professors were sometimes stressful for students because the submission time was different from the reception time, as this was mediated by the internet network, which could vary for multiple reasons.

Despite the students' support of recorded classes, books, articles, and class notes for evaluating the learning outcomes of the courses, some mentioned that learning was better achieved when they had contact with professors in university spaces in person.

**Emotions.** Some aspects were referred to in this category, from anguish and anxiety to tranquility and comfort, which were associated with the uncertainty of the pandemic. Others were linked to the way of relating to teachers and remote technologies (which, in many cases, were unknown to teachers). However, over time, they were consolidated well for the well-being of students.



**Socialization and interaction with others.** One of the situations identified in the focus groups reported by students was the need for face-to-face interaction to exchange with classmates and professors; they expressed missing contact with their peers and professors as a mechanism for socialization, but also for personal demand with the routines of face-to-face attendance at the university.

## DISCUSSION

Dental education was affected by the COVID-19 pandemic, especially in the teaching and learning methodologies that had to be modified, resulting in a migration to virtual education platforms, with the significant challenges this represented<sup>(16)</sup>. Students conducted evaluations of professors, as was customary; however, since closed surveys did not provide additional information to measure the impact of the pandemic, it was necessary to conduct focus groups that allowed for a deeper exploration of unnoticed aspects before and during the COVID-19 pandemic.

No reports were found in the literature of evaluations with numerical scales conducted by dental students regarding professors' performance during the COVID-19 pandemic; therefore, what was found in this research is revealing for dental education. The improvement processes at *Universidad del Valle* can justify the significant differences in medians between 2018 and 2019 (4.84 and 4.94) before the pandemic. The statistically significant differences between the years 2019 and 2021 in the evaluation of professors by students can be explained by the changes that occurred when transitioning from traditional university dental education (which involved the physical presence of students and professors) to virtual dental education (which involved the use of digital platforms, something with which the system was not sufficiently familiarized), with professors obtaining lower ratings in virtuality<sup>(17)</sup>.

### Student study methodologies, discipline, and routines

During the pandemic, students had to modify their study methodologies<sup>(10,16)</sup>, as was found in this article, where a low degree of satisfaction and a negative attitude towards distance

education and online exams were found. At the University of Indonesia, first, second, and third-year dental students expressed 55.8% that they did not like distance learning, preferring face-to-face learning in a classroom; of these, 47.8% studied less efficiently with distance learning<sup>(18)</sup>. However, there are contrary reports from dental and orthodontic specialty students at Roseman University in the United States, where 87.6% showed a high degree of adaptability to distance education, 12.4% indicated neutral adaptability to the subject, and no student expressed discomfort with virtuality; however, a third of the studied population was concerned about the quality of the courses, and nearly half of them found it challenging to focus on academic work and motivation to study<sup>(19)</sup>. In that study<sup>(19)</sup>, advantages of online education were also mentioned, such as better accessibility, as it allowed for viewing asynchronous PowerPoint® presentations and a greater willingness to accept new evaluation techniques<sup>(11)</sup>.

Barriers to online dental education included technological problems, interruptions or loss of internet connection, lack of devices for some students, and inadequate environmental conditions attributable to economic disparities<sup>(20)</sup>. Difficulty concentrating on long academic sessions, time management, and the absence of practical training were also barriers<sup>(11)</sup>.

### Professor teaching methodologies

For professors, the rapid transition from teaching on the university campus to online learning was challenging, as many of them had never taught in a virtual environment; therefore, it was necessary to provide training in online course teaching and evaluation skills in a limited period<sup>(17)</sup>. With this migration forced by the circumstances of the COVID-19 pandemic, dental professors gained experience and confidence in virtual teaching media, which accelerated the adoption and innovation of electronic learning<sup>(4)</sup>.

### Emotions

Students were affected in different ways by the global COVID-19 pandemic<sup>(14)</sup>. The emotions expressed by students at *Universidad del Valle* and other institutions during the pandemic were anguish, anxiety, depression, and uncertainty<sup>(22)</sup>.

Other emotions expressed by dental students were increased stress related to high workload, loneliness<sup>(21)</sup>, concern for physical health, mental and emotional health, being bad-tempered due to feeling that the COVID-19 situation was out of control, and also concern about not being able to secure housing and about the post-pandemic financial crisis<sup>(19)</sup>.

**Socialization and Interaction with Others**

Dental students from *Universidad del Valle* and *Universidad de los Andes* in Chile mentioned, among the changes in learning processes due to the COVID-19 pandemic, impacts on personal life, increased time spent with family if living with them, and adapting a place to study at their residence<sup>(21)</sup>. Additionally, the virtual learning method brought about isolation from classmates, preventing group communication<sup>(14)</sup>. Social isolation and loneliness were other stressful factors among dental students, as well as limited social interaction and more difficulty maintaining contact with professors<sup>(22)</sup>. Due to these situations, more students felt less satisfaction with learning and more complex communication, whether with instructors or classmates, when engaging in distance learning<sup>(23)</sup>.

**CONCLUSIONS**

The analyses performed on the quantitative information of this study allowed us to identify

that the measure of central tendency that enabled the comparative analysis in the periods analyzed was the median and not the arithmetic mean due to the lack of normality in the data. The behavior of the grades showed that the quantitative evaluations of dentistry professors, through a survey conducted by students before and during the COVID-19 pandemic, showed significant differences in the medians in the years 2018-2019, which could be attributed to the improvement policies implemented by the university institution for professors with deficient evaluations. Between 2019 and 2021, significant differences also occurred, attributable to the change from face-to-face education to virtual education, an adaptive process that both professors and students had to carry out.

The focus groups conducted provided information that allowed for a deeper exploration of complementary aspects regarding elements of faculty evaluation, which had to do with study methodologies, disciplines, routines, teaching methodology, emotions, and socialization and interaction with others, as essential points for the learning process that went beyond the tools used to overcome the difficulties experienced during the pandemic, in which computer-assisted technologies became the center of the pedagogical process; however, for students, face-to-face attendance in the classroom continues to be transcendent and more satisfactory for the educational process.



## REFERENCES

1. Gómez-López LF, Valdés MG. The evaluation of teacher performance in higher education. *Propos Represent*. Propós Represent [Internet]. 2019; 7(2):499-515. DOI: 10.20511/pyr2019.v7n2.255
2. Mohammad M. Dimensions of teacher performance evaluation by students in higher education. *Shanlax Int J Educ* [Internet]. 2021; 9(2):18-25. DOI: 10.34293/education.v9i2.3673
3. Sivena S, Nikolaidis Y. Improving the quality of Higher Education teaching through the exploitation of student evaluations and the use of control charts. *Commun Stat Simul Comput* [Internet]. 2019; 51(3):1289-1312. DOI: 10.1080/03610918.2019.1667390
4. Chen E, Kaczmarek K, Ohyama H. Student perceptions of distance learning strategies during COVID-19. *J Dent Educ* [Internet]. 2021; 85(Suppl 1):1190-1191. DOI: 10.1002/jdd.12339
5. Iyer P, Aziz K, Ojcius DM. Impact of COVID-19 on dental education in the United States. *J Dent Educ* [Internet]. 2020; 84(6):718-722. DOI: 10.1002/jdd.12163
6. Desai BK. Clinical implications of the COVID-19 pandemic on dental education. *J Dent Educ* [Internet]. 2020; 84(5):512. DOI: 10.1002/jdd.12162
7. Oliveira G, Grenha Teixeira J, Torres A, Morais C. An exploratory study on the emergency remote education experience of higher education students and teachers during the COVID 19 pandemic. *Br J Educ Technol* [Internet]. 2021; 52(4):1357-1376. DOI: 10.1111/bjet.13112
8. Al-Azzam N, Elsalem L, Gombedza F. A cross-sectional study to determine factors affecting dental and medical students' preference for virtual learning during the COVID-19 outbreak. *Heliyon* [Internet]. 2020; 6(12):e05704. DOI: 10.1016/j.heliyon.2020.e05704
9. Amiri F. Synchronous and asynchronous E-learning. *Eur J Open Educ E-Learn Stud* [Internet]. 2020; 5(2):60-70. DOI: 10.46827/ejoe.v5i2.3313
10. Coughlan J, Timu D, Crnic T, Srdo D, Halton C, Dragan IF. Impact of COVID 19 on dental education in Europe: The students' perspective. *Eur J Dent Educ* [Internet]. 2022; 26(3):599-607. DOI: 10.1111/eje.12736
11. Kerkstra RL, Rustagi KA, Grimshaw AA, Minges KE. Dental education practices during COVID 19: A scoping review. *J Dent Educ* [Internet]. 2022; 86(5):546-573. DOI: 10.1002/jdd.12849
12. Di Carvalho-Melo L, Bastos-Silveira B, Amorim-Dos Santos J, Alves-de Cena J, Damé-Teixeira N, Domingues-Martins M, et al. Dental education profile in COVID-19 pandemic: A scoping review. *Eur J Dent Educ* [Internet]. 2023; 27(2):252-261. DOI: 10.1111/eje.12798
13. Tonkaboni A, Razi Avarzamani A, Sadrzadeh Afshar MS. Effects of COVID 19 epidemic on mental health of dental students of Tehran University of Medical Sciences in 2020. *J Dent Educ* [Internet]. 2023; 87(1):43-49. DOI: 10.1002/jdd.13095
14. Hill CM, Moore E, Randall CL, Chi DL. Dental trainees' mental health changes, sources of stress, coping strategies, and suggestions for mental health improvement 1 year into the pandemic. *J Dent Educ* [Internet]. 2023; 87(1):101-109. DOI: 10.1002/jdd.13099
15. Tonkaboni A, Razi-Avarzamani A, Sadrzadeh-Afshar MS. Effects of COVID-19 epidemic on mental health of dental students of Tehran University of Medical Sciences in 2020. *J Dent Educ* [Internet]. 2023; 87(1):43-49. DOI: 10.1002/jdd.13095

16. Goob J, Erdelt K, Güth JF, Liebermann A. Dental education during the pandemic: Cross sectional evaluation of four different teaching concepts. *J Dent Educ [Internet]*. 2021; 85(10): 1574-1587. DOI: 10.1002/jdd.12653
17. Iosif L, Tâncu AMC, Didilescu AC, Imre M, Pituru SM, Ionescu E, et al. Perceptions and expectations of academic staff in bucharest towards the covid-19 pandemic impact on dental education. *Int J Environ Res Public Health [Internet]*. 2023; 20(3):1782:1782-1799. DOI: 10.3390/ijerph20031782
18. Amir LR, Tanti I, Maharani DA, Wimardhani YS, Julia V, Sulijaya B, et al. Student perspective of classroom and distance learning during COVID-19 pandemic in the undergraduate dental study program Universitas Indonesia. *BMC Med Educ [Internet]*. 2020; 20(1):392-400. DOI: 10.1186/s12909-020-02312-0
19. Hung M, Licari FW, Hon ES, Lauren E, Su S, Birmingham WC, et al. In an era of uncertainty: Impact of COVID 19 on dental education. *J Dent Educ [Internet]*. 2021; 85(2):148-156. DOI: 10.1002/jdd.12404
20. Goh CE, Lim LZ, Müller AM, Wong ML, Gao X. When e-learning takes centre stage amid COVID-19: Dental educators' perspectives and their future impacts. *Eur J Dent Educ [Internet]*. 2022; 26(3):506-515. DOI: 10.1111/eje.12727
21. Prieto D, Tricio J, Cáceres F, Param F, Meléndez C, Vásquez P, et al. Academics' and students' experiences in a chilean dental school during the COVID-19 pandemic: A qualitative study. *Eur J Dent Educ [Internet]*. 2021; 25(4):689-697. DOI: 10.1111/eje.12647
22. Ramachandran S, Shayanfar M, Brondani M. Stressors and mental health impacts of COVID 19 in dental students: A scoping review. *J Dent Educ [Internet]*. 2023; 87(3):326-342. DOI: 10.1002/jdd.13122
23. Di Giacomo P, Di Paolo C. COVID-19 and dental distance-based education: students' perceptions in an Italian University. *BMC Med Educ [Internet]*. 2021; 21(1):414. DOI: 10.1186/s12909-021-02840-3