


# Relationships Between Pedagogical Practices and Affective States for Effective Teaching During the COVID-19 Pandemic: Insights From University Professors


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## Abstract

**Objectives:** This study aimed to analyze how pedagogical practices and affective states during emergency remote teaching influence professors' perspectives on their capabilities and the professor-student relationship.

**Method:** We used a nonexperimental quantitative design, collecting data through an online survey during the first year of the pandemic. Participants were recruited using a non-probability sampling method. A total of 636 university professors from Chilean universities participated. We performed descriptive and correlation analyses between variables. Also, to gain a deeper understanding of the factors influencing perceptions of the professors' competence and the professor-student relationship, we conducted linear regression models.

**Results:** A higher perception of pedagogical competence was related to male professors reporting a high evaluation of teaching quality and a high diversification of assessment strategies. A better professor-student

relationship was related to female professors reporting a high level of tutoring activities and activities in which students work collaboratively. Additionally, unpleasant affective states were experienced at a higher rate by younger and female professors.

**Conclusions:** Variables that make up the perception of professor competence and the professor–student relationship were identified, relating to gender and pedagogical practices, such as diversification of assessment strategies, tutoring, and collaborative activities.

**Implications:** The results can guide future institutional actions to improve conditions and establish guidelines for quality virtual education in the post-pandemic scenario.

**Keywords:** *online learning, higher education, pedagogical practices, affective states*

**Date Submitted:** April 26, 2023 | **Date Accepted:** January 9, 2024 | **Date Published:** February 28, 2024

**Recommended Citation:**

Bruna, C., Villarroel, V., Sánchez, A., Cortes, J., Castro-Carrasco, P., & Conejeros-Solar, M. L. (2024). Relationships between pedagogical practices and affective states for effective teaching during the COVID-19 pandemic: Insights from university professors. *Higher Learning Research Communications*, (14)1, 33–50.  
<https://doi.org/10.18870/hlrc.v14i1.1436>

## Introduction

Higher education presents long-standing challenges in Latin America in terms of inclusion, quality, and equity (Jiménez & Quintana, 2020). Lack of vocation, economic factors, low academic performance, and demotivation are variables that mostly explain the dropout rate of students from low-income sectors (Cepeda et al., 2019; Organización para la Cooperación y el Desarrollo Económicos [OECD], 2017). In this context, the COVID-19 pandemic resulted in the closure of many universities and the urgent implementation of virtual education (Aristovnik et al., 2020; Benito et al., 2021). Emergency remote teaching (ERT) was the only viable solution to ensure pedagogical continuity. However, this solution involved technological, pedagogical, and financial challenges (Funk, 2021; Murphy, 2020; Pedró, 2020). This experience became an opportunity to reflect on and identify sustainable and effective practices for quality online education (Vlachopoulos, 2020).

Emergency remote teaching highlighted two issues. First, the educational process requires online teaching technologies and platforms (Popovici & Mironov, 2015). Second, this instruction did not constitute online education, because the courses were initially designed for face-to-face teaching (Babu & Srivedi, 2018), and the capabilities and resources that online education demanded were not fully developed (Pedró, 2020). Online education uses information, computational technologies, and systems to develop learning experiences and build knowledge through an instructional design that does not require face-to-face teaching and learning. It involves an organization of content and methodologies that guides students in the online learning process, requiring specialized knowledge and teaching skills to plan and implement (Aristovnik et al., 2020). It is appropriate to consider these differences from traditional education when assessing the experience of ERT during the pandemic since it was used to respond to a crisis that did not allow sufficient time to completely ensure quality remote education (Hodges et al., 2020; Xarles & Martinez, 2020).

Universities were challenged to solve problems of connectivity, equipment, and even the availability of electricity to guarantee access to remote education (Allen et al., 2020). Professors were greatly challenged, as they had to continue their classes remotely (Xarles & Martinez, 2020) without adequate training and with little experience and expertise in the use of technological tools (Coman et al., 2020; Herbert et al., 2022; Mseleku, 2020). In Chile, for example, higher education in 2019 was exclusively face to face for 95.6% of the enrolled students (Cea et al., 2020). For many professors, the shift required changes in the distribution of

time and involved additional stress due to the pressing need to adapt to the demands that challenged technology self-efficacy (Silas & Vasquez, 2020). Many professors and students were not prepared to take on the challenge, given that this modality had not been widely adopted and the instructional content was not designed for remote education (Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura—Instituto Internacional para la Educación Superior en América Latina y el Caribe [UNESCO—IALSC], 2020).

It has been reported that the lack of professor training and access to the necessary tools for transitioning to this new modality resulted in replicating the structure of a face-to-face class, for example, using rigid schedules, space-time synchronization, and a high amount of content with scarce feedback (Miguel, 2020; van der Spoel et al., 2020). Some authors argued that this tendency to replicate the face-to-face classroom experience might hinder student learning (Bryson & Andres, 2020).

## Literature Review

### Emergency Remote Teaching in the University Context

When the pandemic began, there was little information about how professors experienced being hastily trained and having to learn as they were teaching about platforms, technologies, and digital tools while simultaneously experiencing a state of emergency (Pedró, 2020). Special concern has been raised regarding how professor–student and student–student interactions developed in remote education and how these differ from the traditional face-to-face format (Mseleku, 2020). The assessment process has also been highlighted as an area to be examined, with professors reporting concerns about plagiarism and copying during assessment activities (Reedy et al., 2021).

Another matter of interest is related to the affective states of the professors during ERT. Even before COVID-19, university professors in Brazil, for example, experienced burnout and exhaustion; professor discomfort was linked to fatigue, annoyance with the lack of commitment and participation of students, and stress due to work overload (de Assis & Pacheco, 2017). This is consistent with the findings of Silas and Vasquez (2020) in Mexico, who reported an increase in the number of work hours per course and a decrease in the quality of interaction with their students for university professors. Likewise, Lemos et al. (2019) demonstrated that years of teaching, excessive ambiguous tasks, and having to work at home, along with family–work interference and vice versa, were psychosocial factors most correlated with professor stress.

The literature thus suggests that professors were already exhausted by normal educational processes, and the pandemic brought new challenges, such as uncertainty, fear, and anguish due to the high rates of COVID-19 virus transmission and mortality (Aristovnik et al., 2020; Cea et al., 2020). Not surprisingly, it has been reported that ERT negatively impacted professors' well-being, resulting in decreased positive emotions and motivation (Panadero et al., 2022). The role of professors is considered crucial for achieving inclusive, equitable, and high-quality remote education (Zhu & Liu, 2020). To achieve this goal, professors must possess the knowledge and skills to integrate technology and pedagogy into classroom management. Additionally, they must maintain professional ethics to guide students during times of adversity (Monroy et al., 2018).

In relation to skills, research carried out by Tejedor et al. (2020) analyzed the perceptions of students and professors from universities in Italy, Spain, and Ecuador during the pandemic. Despite professors' perceptions that they had the skills to carry out effective distance education, 50% of their students considered their professors lacking in adequate technical digital skills. In addition, 31.6% thought that their professors had not adapted satisfactorily to distance learning during this emergency.

One explanation for these differences in perception could be that, even though many professors possess digital skills and a positive disposition towards technology, during the pandemic, implementation may have been affected by limited peer collaboration and limited time to become familiar with virtual education (Aristovnik et al., 2020; van der Spoel et al., 2020). Another explanation, based on the results of the research conducted by García-Martín et al. (2023) with university professors from Spain and the United States, is that the integration of good practices not only depends on the professors' beliefs regarding the advantages of technology but also requires support and training. It is not enough to be able to use digital tools, they must be integrated into the teaching and learning process with a clear purpose.

Based on the experience of universities with a long history of online education, opportunities for improvement have been identified regarding planning, teaching, and assessment. It has been suggested that the implementation of remote education requires different planning practices than those employed for face-to-face classes (Mseleku, 2020). It is important to reduce class duration, focus on student learning, and select resources and asynchronous activities that promote self-inquiry, temporal flexibility, and interactive feedback (Gewin, 2020; Rapanta et al., 2020). These recommendations constituted a great challenge for the ERT experience since most professors primarily performed extensive synchronous classes (Quezada et al., 2020).

Regarding teaching practices, it has been reported that the effectiveness of online teaching depends on the design of the material, the professor's commitment to the virtual environment, and the quality of professor–student and student–student interactions (Aristovnik et al., 2020). Researchers have recommended that the virtual classroom should be organized to provide meaning, include collaborative and reflective activities, and offer clear criteria for assessment, with emphasis on interaction and commitment to learning (Kebritchi et al., 2017). Alonso-García et al. (2019) found that one of the main emphases was to prioritize collaborative work among students. Accordingly, Ho et al. (2023) highlight the impact of discussion on the effectiveness of online courses, suggesting that incorporating collaborative environments can promote engagement. Active learning implementation has also been shown to be relevant for engagement, motivation, and satisfaction (Nguyen et al., 2021). Consequently, students perceived that activities such as virtual games, interactive surveys or blackboards, and immediate response systems enhanced their learning during ERT (Lobos et al., 2023).

Concerning the use of digital technologies in Latin American higher education, García-Martín and García-Sánchez (2022) showed that the higher the students' socioeconomic level, the greater the access and use of these resources. Women tend to use technologies in a more academic way and less as a means of social communication, unlike men. It is important to take these results into account when planning teaching, due to the digital inequality that these countries face.

Assessment practices have been reported as one of the most challenging aspects of ERT (Abasli, et al., 2023; Almonacid-Fierro et al., 2021; Radu et al., 2020). The literature suggests focusing on promoting self-regulation through reflections and portfolios, designing flexible asynchronous activities (Rapanta et al., 2020), including authentic assessments (Villarroel et al., 2021), and providing discussion forums, which offer a novel approach to the assessment process (Butler-Henderson & Crawford, 2020). Furthermore, virtual education represents an opportunity to implement formative assessments through gamification (Khaldi et al., 2023). The use of technology and the experience of ERT are also expected to influence feedback processes that promote engagement and learning (Wood, 2021).

Copying and plagiarism in virtual education have been reported as a concern for professors. Students considered that online assessment was more flexible, saved time, and facilitated access to documents. They perceived that it is easier to cheat and receive assistance from third parties (Butler-Henderson & Crawford, 2020). For these reasons, it is necessary to ensure academic integrity, to have tools and strategies to detect copying (Dawson & Sutherland-Smith, 2018), and to establish protocols to prohibit such practices (Amigud & Dawson, 2020; Butler-Henderson & Crawford, 2020).

## Purpose of the Study and Hypothesis

In the post-pandemic era, many universities aim to maintain the use of technology occasioned by the pandemic and continue integrating it into the educational process (van der Spoel et al., 2020). Blended learning has emerged as an appropriate model to leverage the benefits of both face-to-face and online modalities (Almahasees et al., 2021; Cobo-Rendón et al., 2022). It is, therefore, crucial to examine ERT and the organization and quality of the instruction provided during it to draw meaningful lessons from those experiences (Chen et al., 2020; Díaz-Barriga, 2021; Goh & Sanders, 2020).

The purpose of the study was to construct explanatory models regarding two variables that are considered valuable for effective teaching: (a) teacher capabilities, as a global representation of pedagogical competencies and practices, and (b) the professor–student relationship since this relationship can be related to socio-affective aspects of the educational process. In addition, the relationship between professor perspectives regarding pedagogical practices and affective states during emergency remote teaching was studied, differentiating between male and female professors, as well as professors' ages, for each variable.

We asked this research question: How do pedagogical practices and affective states during emergency remote teaching influence professors' perspectives on their capabilities and the professor–student relationship? In this context, the following hypothesis was formulated and tested:

H1: A higher presence of quality pedagogical practices, both in teaching and assessment, leads to a better sense of competence in the professor, as well as a better perception of their relationship with students in remote education during the pandemic.

## Methods

We employed a nonexperimental quantitative design to analyze the remote education process, considering variables such as the professor–student relationship, the quality of teaching, and assessment strategies in remote education, as well as professors' affective states during the pandemic. The methodological approach we used for this study was a cross-sectional and exploratory survey.

## Participants

A nonprobabilistic design was used to select the sample of professors. A total of 636 university professors from 34 Chilean universities participated in the study; 64% ( $n = 407$ ) were women. A total of 73.1 % of professors ( $n = 465$ ) came from 23 private universities and 26.9% ( $n = 171$ ) from 11 public universities. Of the total number of universities, 21 are in regional areas, while the remaining 13 are located in the capital. A total of 43.2% ( $n = 275$ ) of professors taught at the initial level (first and second year), while 44.7 % ( $n = 284$ ) taught at the intermediate level (third and fourth year), and 12.1% ( $n = 77$ ) taught at the terminal level (fifth year or more). Professors belonged to undergraduate programs in the areas of social sciences, biological sciences, arts, engineering, education, and health.

## Measures and Instruments

Consistent with the theoretical framework analyzed regarding successful online education experiences, a questionnaire was designed to be used with professors. Four judges with experience in educational psychology and psychometric analysis evaluated the indicators derived from the literature review. The judges used an evaluation guideline to analyze the relationship between each indicator and the theoretical variable associated with effective practices in remote education. Additionally, they assessed comprehension, length, and formal

aspects of the instrument. For each indicator evaluated, the judges scored its relationship with the theoretical variable on a scale from 1 (low agreement) to 5 (high agreement). The judges' evaluations reached an intra-class correlation index of 0.86.

The instrument consisted of 56 items that evaluated different variables related to the remote teaching and learning process. In this article, 11 of them are presented, which were analyzed in relation to the study's hypothesis. The variables are as follows:

### **Teaching Capability**

This variable assessed aptitudes and skills required for effective and impactful online teaching. It included three items measured on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is, "I feel that I can properly develop an online course." Cronbach's alpha was 0.80.

### **Professor–Student Relationship**

This variable assessed mutual respect, clear communication, and a supportive environment to encourage student engagement and promote learning. It included three items measured on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is, "I have discussed with students how they are dealing with online education." Cronbach's alpha was 0.82.

### **Teaching Quality**

This variable assessed the effectiveness of instructional methods, pedagogical expertise, and the ability to engage and motivate students to impact student learning outcomes. It included four items measured on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is, "Online classes are well-organized, including before, during, and after phases." Cronbach's alpha was 0.70.

### **Tutoring**

This variable assessed personalized educational support for students to clarify concepts, address learning gaps, and enhance comprehension and skills acquisition, fostering a deeper understanding of the discipline and academic growth. It included three items measured on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is, "In addition to the class, I have had some individual online meetings with students to clarify doubts." Cronbach's alpha was 0.76.

### **Collaborative Student Work**

This variable involved students working together on academic tasks or projects, sharing their knowledge, skills, and perspectives to achieve improved results regarding a common goal. It included three items measured on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is, "In online classes, there are moments when I have organized group assignments using the platform." Cronbach's alpha was 0.77.

### **Diversification of Assessment Strategies**

This variable assessed the use of a variety of evaluation methods other than traditional tests, such as projects, presentations, or portfolios, for a comprehensive assessment of student learning. It included three items measured on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is, "There have been occasions when I have asked students to evaluate a peer's performance (co-evaluation) in online classes." Cronbach's alpha was 0.81.

### **Pleasant Affective States**

This variable addressed positive emotional experiences and feelings in the context of online education. It included six items measured on a dichotomous scale (yes/no). An example item is, "I have felt joy during the pandemic."

**Unpleasant Affective States**

This variable addressed negative emotional experiences and feelings in the context of online education. It included six items measured on a dichotomous scale (yes/no). An example item is, “I have felt sorrow during the pandemic.”

**Dialogical Activities.**

This variable involved the professor facilitating interactive discussions and the exchange of ideas among students to engage them in meaningful and reflective conversations, enhancing their understanding and participation in the learning process. It included four items measured on a dichotomous scale (yes/no). An example item is, “In online classes, I have invited my students to participate in discussion forums regarding issues in the discipline.”

**Collaborative Activities**

This variable involved the professor designing tasks that require students to work together in teams to achieve a common learning objective. They foster teamwork, problem-solving skills, and peer learning. This variable included three items measured on a dichotomous scale (yes/no). An example item is, “In online classes, I have assessed through group tasks that students must develop collaboratively.”

**Traditional Expository Activities**

This variable addressed content delivered through lectures, presentations, or textbook-based instruction. These emphasize a one-way flow of information from the professor to the students. This variable included three items measured on a dichotomous scale (yes/no). An example item is, “In online classes, I present content using PowerPoint presentations.”

**Procedures**

Data collection was conducted during the first pandemic year between August and October 2020, which corresponds to the beginning of the second academic semester in Latin America. Online distribution of the questionnaires was requested at the institutional level upon receiving the certificate of research approval from the Ethics Committee. Contact was established with 50% of Chilean universities, both public and private, located in 11 regions across the national territory. Each university distributed a link to the Google Forms survey to its professors. Participants who completed the survey then shared it with their peers in other universities, thereby expanding the survey’s reach to the largest possible number of practicing university professors.

**Data Analysis**

IBM SPSS V20.0 was used for all analyses (Field, 2019). Analyses included: (a) descriptive statistics, (b) *t*-test and Chi-squared, (c) Pearson bivariate correlation, and (d) multiple linear regression. Inferential statistical analyses were performed using a significance level ( $\alpha$ ) of .05.

**Ethical Safeguards**

This research was approved by the Ethics Committee of the Universidad del Desarrollo in June 2020. The approval certificate ensures compliance with all ethical safeguards of scientific research, such as confidentiality, anonymity, voluntary participation, the right to withdraw from the study or choose not to answer, the absence of risks associated with participation, and the competence of the research team. This certificate of ethical approval was provided to all the universities invited to participate in the study.

The questionnaire used in the study included informed consent, which explained the research objectives and the ethical safeguards involved. The ethical standards and codes of conduct followed those included in the American Psychological Association (APA, 2017), the Code of Ethics of the Chilean College of Psychologists

(Colegio de Psicólogos de Chile, 1999), the Chilean legislation on scientific research (laws 19.628 and 20.120), as well as the 1975 Declaration of Helsinki revised in 2000.

## Results

### Professors' Perception Scores on Pedagogical Practices and Affective States

Table 1 shows the averages and additional statistical descriptors. The findings highlight low collaborative student work, tutoring, and, especially, lack of diversity of assessment strategies during ERT in the pandemic. Also, dialogical, and, especially, collaborative pedagogical activities conducted online are less frequent. On a positive note, the prevalence of traditional expository activities was also low during this period. Additionally, both pleasant and unpleasant affective states are experienced by a high percentage of professors.

**Table 1.** Professors' Perception Scores on Scale Variables

Scales	<i>M</i>	<i>SD</i>	% presence
Teaching quality	4.5	0.5	-
Teaching capability	4.1	0.8	-
Professor–student relationship	4.1	0.9	-
Collaborative student work	3.6	1.0	-
Tutoring	3.2	1.3	-
Diversification of assessment strategies	2.4	1.1	-
Unpleasant affective states	-	-	78.9
Pleasant affective states	-	-	70.0
Dialogical activities	-	-	62.5
Traditional expository activities	-	-	48.8
Collaborative activities	-	-	35.5

The analyses indicate there are significant and positive correlations among teaching capability, teaching quality, professor–student relationship, collaborative student work, tutoring, and assessment strategies.

On the other hand, significant differences regarding gender and age are indicated by the following results: (a) Male professors feel more competent in remote teaching ( $t(637) = 3.66, p < 0.001$ ), reporting more collaborative student work ( $t(637) = 4.00, p < 0.001$ ), as well as more traditional expository activities, than female professors ( $\chi^2(1) = 9.12, p < 0.01$ ); (b) Female professors perceive themselves achieving a better professor–student relationship, higher quality of teaching, and diversity of assessment strategies ( $t(637) = 3.44, p < 0.001$ ), as well as performing more dialogical activities ( $\chi^2(1) = 8.27, p < 0.01$ ), but also report more negative emotions related to stress and anxiety compared to male professors ( $\chi^2(1) = 7.27, p < 0.01$ ); and (c) Regarding age, older professors display a high diversity of assessment strategies ( $t(637) = 2.66, p < 0.01$ ), while the highest level of negative emotions is reported by younger professors ( $t(637) = 6.15, p < 0.001$ ).

### Explanatory Models of Teaching Capability and Teacher-Student Relationship

Results indicate a significant and positive correlation between the variables of teaching capability, teaching quality, professor–student relationship, collaborative student work, tutoring, and assessment strategies, suggesting that effective teaching integrates the associated practices; see Table 2.



**Table 2.** Correlations for Pedagogical Practices and Affective States Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Teaching capability	1.00										
2. Prof-student relationship	0.16***	1.00									
3. Teaching quality	0.27***	0.27***	1.00								
4. Tutoring	0.11**	0.23***	0.17***	1.00							
5. Collaborative student work	0.21***	0.31***	0.26***	0.23***	1.00						
6. Diversification of assessment	0.15***	0.30***	0.18***	0.28***	0.43***	1.00					
7. Pleasant affective states	0.19***	0.08*	0.11***	0.11**	0.18***	0.09*	1.00				
8. Unpleasant affective states	-0.12**	-0.04	-0.05	-0.03	-0.00	0.04	-0.02	1.00			
9. Dialogical activities	-0.04	0.07	0.06	0.19***	0.03	0.07	0.02	0.03	1.00		
10. Collaborative activities	0.07	0.12**	0.00	0.14***	0.23***	0.22***	0.09*	-0.02	-0.03	1.00	
11. Traditional expository	-0.01	-0.03	-0.02	-0.00	-0.10*	-0.04	-0.02	0.05	-0.05	-0.05	1.00

Note. \* $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\* $p < 0.001$

To test the hypothesis that a higher presence of quality pedagogical practices, both in teaching and assessment, leads to a better sense of competence in the professor and their relationship with students, two linear regression models were constructed. Results of the first model, describing variables that make up the perception of professor competence in remote education, are shown in Table 3. Results of the second model, describing variables that make up a good professor-student relationship, are shown in Table 4.

**Table 3.** Linear Regression Model of Perceptions of Teaching Capability

	$\beta$	$b$	$SE$
Female	-0.183	-0.323***	0.067
Age	-0.046	-0.004	0.003
Teaching quality	0.265	0.474***	0.068
Diversification of assessment strategies	0.126	0.096**	0.030
Dialogical activities	-0.047	-0.082	0.066
Collaborative activities	0.047	0.082	0.068
Intercept		2.136***	0.332

Note. \*\* =  $p < 0.01$ ; \*\*\* =  $p < 0.001$

Table 3 shows that professors who exhibit a higher perception of pedagogical competence in ERT are male ( $b = -0.323$ ), with a high evaluation of the quality of their teaching ( $b = 0.474$ ) and a high diversification of assessment strategies ( $b = 0.09$ ). Overall explained variance is 11.5%.

Table 4 indicates that professors who reported a better professor–student relationship in emergency remote education were female professors ( $b = 0.176$ ) who reported a high level of tutoring activities ( $b = 0.230$ ) and engaged in activities in which students work collaboratively ( $b = 0.115$ ). Overall explained variance is 12.8%.

**Table 4.** Linear Regression Model of Perceptions of Professor–Student Relationship

	$\beta$	$b$	$SE$
Female	0.091	0.176*	0.073
Age	0.066	0.005	0.003
Tutoring	0.257	0.230***	0.035
Collaborative student work	0.162	0.115***	0.028
Dialogical activities	0.021	0.041	0.073
Pleasant affective states	0.013	0.025	0.076
Intercept		2.496***	0.207

Note. \* =  $p < 0.05$ ; \*\*\* =  $p < 0.001$

## Discussion

The quality and success of remote education, as in any teaching and learning process, are influenced by various social, contextual, professional, and student-related factors. This study explored university professors' perceptions of their participation in this process. A significant proportion of professors indicated that they feel competent and possess adequate skills for remote education, as reported by the high scores in teaching quality and capabilities; this was especially true for male professors. This is supported by the findings of Rodriguez-Jimenez et al. (2022). In general, professors reported using pedagogical practices that have been identified in the

literature as being successful in remote education. These results are consistent with those reported by Tejedor et al. (2020) and Lobos Peña et al. (2021) but differ from those reported by Van der Spoel et al. (2020), who observed a low perception of professors' readiness to integrate digital teaching techniques into the curriculum.

In this study, high scores regarding the perception of professor–student relationships were reported. Previously Sepulveda-Escobar and Morrison (2020) reported a lack of direct interaction with learners. Oliveira et al. (2021) had similar findings and described the lack of interaction and human contact. They also reported, however, that communication channels expanded, facilitating quicker and better feedback for student questions, with teachers showing greater availability. This suggests a broader conception of what can be considered as interaction in virtual settings.

The variable with the lowest score was diversification of assessment, which is consistent with previous reports that highlight assessment as a weakness during ERT (Almonacid-Fierro et al., 2021; Radu et al., 2021). The variable Collaborative activities was not considered in the regression model of Teaching Capability. This result might be attributed to the lack of skills and training, which were not guaranteed during the urgent response to the emergency (Aristovnik et al., 2020; Coman et al., 2020; Mseleku, 2020; Pedró, 2020). However, in post-pandemic scenarios, learning management systems for virtual education are acknowledged for their potential to facilitate the design and implementation of diverse collaborative activities (Lobos et al., 2023). These practices may require professors to learn more about how to use technology effectively (Van der Spoel et al., 2020). In addition to the low percentage reported for collaborative activities, there was also a low percentage for traditional expository activities, suggesting other practices were implemented. Additionally, a fair percentage for dialogical activities was found, which is relevant since some of the practices that focus on dialogue are precisely those associated with the effectiveness of online teaching (Aristovnik et al., 2020).

The findings show strong, positive links among teaching capability, quality, professor–student rapport, collaborative student work, tutoring, and assessment strategies. This suggests that effective teaching involves incorporating these related practices. Consistently positive student experience related to these practices in all dimensions of the virtual educational process has been reported (Lobos et al., 2023). Thus, it is relevant to address the necessary actions to promote those practices that are poorly displayed, in order to advance effective virtual education (Villarroel et al., 2021).

With regard to professors' affective states while practicing remote education during the pandemic, professors who reported a higher frequency of unpleasant feelings, a result also reported by Trotter et al. (2022), also reported a lower perception of their students' involvement, which is consistent with other studies (Silas & Vasquez, 2020; Garrido, 2020). In this study, both pleasant and unpleasant affective states were highly reported, the latter being higher for female professors and for younger professors. In this context, a lower level of happiness in women during the pandemic, related to higher household responsibilities and caretaking tasks, has been reported (Giurge et al., 2021). Regarding younger teachers, the result is consistent with the findings of Panadero et al. (2022), who reported more negative emotions in younger professors. This result could be due to their having had less experience with online teaching before the pandemic, as the level of experience has been associated with higher professor well-being (de Assis & Pacheco, 2017). Unpleasant affective states were found to be related only to the perception of teaching capabilities, while pleasant affective states were related to several positive pedagogical practices, including teaching capabilities, collaborative student work, quality of teaching, and tutoring, which suggests the importance of professors' well-being in developing effective teaching in this educational setting. Well-being has been reported to influence professors' satisfaction with distance teaching (Almhdawi et al., 2021), as well as being related to a positive perception of efficacy (Sánchez-Oñate et al., 2023).

Explanatory models reveal key traits of professors. Findings suggest:

1. Male professors who exhibit high pedagogical confidence in remote teaching reported higher teaching quality and diverse assessment methods.

2. Female professors foster better professor–student bonds through extensive tutoring and collaborative student work during ERT.

These findings, associating gender with certain weaknesses in remote teaching, such as online assessment or collaborative learning, offer opportunities for learning, deeper investigation, and guiding future policies for effective virtual education.

### **Limitations**

We acknowledge the limitations of this study. We used a cross-sectional design, which captures a specific moment in the implementation of emergency remote teaching. In addition, data are self-reported, which may introduce social desirability bias. Additionally, while the sample is diverse in terms of gender, age, teaching discipline, and national territory, random sampling was not used, so it may not necessarily be representative of the study population.

### **Implications for Research, Theory, and Practice**

This study provides important information about the educational process during the pandemic that can potentially guide teacher training efforts for remote teaching. The results of this study can be used to enhance professional practice by focusing on two key areas:

- addressing the weak aspects identified as being based in gender disparity, supporting younger educators, and recognizing the correlation between pedagogical methods and emotional states during remote education in the context of a pandemic
- emphasizing the factors that contribute to a professor’s sense of competence and rapport with students

These elements significantly influence the teaching and learning process. In terms of implications for future research, there is a need to delve deeper into the apparently gender-based disparities identified and their impact on remote teaching practices, especially in terms of online assessment and collaborative learning. Additionally, it is crucial to investigate how support systems and mentoring can better help younger teachers navigate the challenges of remote education in general. Furthermore, exploring the intricate relationship between pedagogical practices and the emotional well-being of both educators and students during remote education deserves further attention.

Considering these factors in future research endeavors can guide the development of strategies and policies in higher education institutions. Addressing these issues can help improve conditions and set forth guidelines for ensuring quality virtual education, especially in the post-pandemic landscape, as the educational landscape continues to evolve (Koruga et al., 2023; Covelli & Roy, 2021).

### **Conclusions**

Analysis of the relationships between the variables in this study suggests that pedagogical practices are related, emphasizing the holistic nature of the educational process and the need to strengthen weak aspects for effective virtual education. The crux of the study lies in the identification of key variables that influence the competence of teachers and their relationships with students in distance education. In emphasizing the interconnection of pedagogical practices and identifying the weakest facets, the study can guide educational policy and practice for effective virtual education. These findings have important implications for educational management in improving virtual education in the wake of the pandemic.

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