

Factors associated with satisfaction and difficulties in emergency remote teaching among Brazilian university professors

Maria Isabel Triches, Renata Gonçalves Mendes, Jaber Saud Alqahtani e Tatiana de Oliveira Sato

Maria Isabel Triches

Universidade Federal de São Carlos – São Carlos, SP, Brasil

E-mail: maria.isabel@estudante.ufscar.br

ORCID: <https://orcid.org/0000-0002-7606-8218>

Renata Gonçalves Mendes

Universidade Federal de São Carlos – São Carlos, SP, Brasil

E-mail: renatamendes@ufscar.br

ORCID: <https://orcid.org/0000-0003-4683-2657>

Jaber Saud Alqahtani

Prince Sultan Military College of Health Sciences – Dammam, Arábia Saudita

E-mail: alqahtani-jaber@hotmail.com

ORCID: <https://orcid.org/0000-0003-1795-5092>

Tatiana de Oliveira Sato

Universidade Federal de São Carlos – São Carlos, SP, Brasil

E-mail: tatisato@ufscar.br

ORCID: <https://orcid.org/0000-0001-8797-8981>

Abstract: This study identified factors associated with satisfaction and difficulties during emergency remote teaching among professors at Brazilian higher education institutions. Data were collected using a structured electronic questionnaire addressing perceptions of remote teaching during the COVID-19 pandemic. Logistic regression analyses were performed. A total of 428 professors participated in the study, of whom 57.5% reported dissatisfaction and 63.3% experienced difficulties transitioning to remote teaching. The study highlights that favorable attitudes, such as positive expectations (OR=7.14; 95%CI: 4.33-11.8) and willingness to change (OR=3.73; 95%CI: 2.17-6.43), were the main factors associated with satisfaction. Lack of technical skills (OR=3.78; 95%CI: 2.13-6.70), inability to track student engagement (OR=2.51; 95%CI: 1.58-3.99), and female gender (OR=1.82; 95%CI: 1.14-2.88) were the main factors associated with difficulties related to remote teaching. This paper may contribute to the development of public policies and the promotion of actions by educational institutions.

Keywords: Digital technology; occupational health; universities.

Artigo recebido em 09 de janeiro de 2025 e aprovado para publicação em 19 de maio de 2025

DOI: <https://doi.org/10.33871/nupem.2026.18.44.10166>

Fatores associados à satisfação e às dificuldades no ensino remoto emergencial entre professores universitários brasileiros

Resumo: Este estudo identificou fatores associados à satisfação e às dificuldades durante o ensino remoto emergencial entre professores de instituições brasileiras de Ensino Superior. As percepções dos docentes sobre o ensino remoto durante a pandemia de Covid-19 foram coletadas por meio de questionário eletrônico estruturado, e análises de regressão logística foram realizadas. Participaram do estudo 428 professores, dos quais 57,5% relataram insatisfação e 63,3% apresentaram dificuldades na transição para o ensino remoto. Atitudes favoráveis, como expectativas positivas (OR=7,14; IC95%: 4,33-11,8) e disposição para mudanças (OR=3,73; IC95%: 2,17-6,43), foram os principais fatores associados à satisfação. A falta de habilidade técnica (OR=3,78; IC95%: 2,13-6,70), a incapacidade de acompanhar o engajamento dos alunos (OR=2,51; IC95%: 1,58-3,99) e o gênero feminino (OR=1,82; IC95%: 1,14-2,88) foram os principais fatores associados às dificuldades relacionadas ao ensino remoto. Este trabalho pode contribuir para o estabelecimento de políticas públicas e para a promoção de ações por parte das instituições de ensino.

Palavras-chave: Tecnologias digitais; saúde ocupacional; universidades.

Factores asociados a la satisfacción y las dificultades en la enseñanza remota de emergencia entre profesores universitarios brasileños

Resumen: Este estudio identificó los factores asociados a la satisfacción y las dificultades durante la enseñanza remota de emergencia entre profesores de instituciones brasileñas de Educación Superior. Las percepciones de los docentes sobre la enseñanza remota durante la pandemia de Covid-19 se recopilaron mediante un cuestionario electrónico estructurado, y se realizaron análisis de regresión logística. Participaron 428 profesores, de los cuales el 57,5% manifestó insatisfacción y el 63,3% presentó dificultades en la transición hacia la enseñanza remota. Las actitudes favorables, como las expectativas positivas (OR=7,14; IC95%: 4,33-11,8) y la disposición al cambio (OR=3,73; IC95%: 2,17-6,43), fueron los principales factores asociados a la satisfacción. La falta de habilidades técnicas (OR=3,78; IC95%: 2,13-6,70), la incapacidad para monitorear el compromiso de los estudiantes (OR=2,51; IC95%: 1,58-3,99) y el género femenino (OR=1,82; IC95%: 1,14-2,88) fueron los principales factores asociados a las dificultades relacionadas con la enseñanza remota. Este trabajo puede contribuir al establecimiento de políticas públicas y a la promoción de acciones por parte de las instituciones educativas.

Palabras clave: Tecnologías digitales; salud ocupacional; universidades.

Introduction

The emergence of a new pneumonia in China in December of 2019 was the beginning of an outbreak that was later declared a pandemic by the World Health Organization (Pollard; Morran; Nestor-Kalinoski, 2020). COVID-19, acronym for coronavirus disease 2019, is a severe acute respiratory disease with a high contamination rate (Peeri et al., 2020).

The rapid spread of the coronavirus (SARS-CoV-2) put the entire population at risk. In response, many countries implemented measures to contain the virus as well as find solutions for the effective treatment and eradication of the disease. This critical situation caused the interruption of activities in educational institutions around the world and, as an alternative, most were forced to make quick decisions to comply with social distancing policies (Soni, 2020).

One of the most widely discussed solutions was the use of digital communication and information technologies. Globally, online education has forcibly surpassed traditional classroom education as the mode of interaction, generating unexpected challenges in the face of sudden training requirements for remote teaching (Cahyadi et al., 2022; Camargo et al., 2020). This change impacted work on all levels of education, especially higher education (Rossoni, 2020).

Universities suspended non-essential services, preventing the presence of individuals on campus with the adoption of classes in a remote format through virtual learning environments, although this was not a practice commonly adopted by professors before the COVID-19 pandemic (Toquero, 2020). Such technologically enhanced approaches require high levels of engagement among university students and faculty members (Fyllos et al., 2021).

The situation was even more challenging for teachers who were not accustomed to this learning environment and had to restructure their teaching plans for online format (Sengupta, 2022). As the educational system in many countries, including Brazil, was lagging in the use of virtual digital teaching-learning tools, it was difficult for many educators to develop digital skills (Kerres, 2020) and feel secure in making use of these digital technologies (Eachempati; Ramnarayan, 2020).

The difficulties inherent to online interactions have since surfaced, as a part of the population does not yet have access to the internet and technology. Therefore, in addition to restructuring the plans and skills developed for teaching in a virtual environment, teachers also had to provide emotional support for their students (Camargo et al., 2020) and work in their own homes, which generated a considerable emotional burden and work-family conflicts (Silva-Barbosa et al., 2022).

Thus, not only the competence of teachers, but also their resilience is important in emergency situations (Liu; Zhao; Su, 2022), due to the capacity to adapt positively during or after exposure to stressful life events (Aizpurua-Perez et al., 2023). Stressful experiences related to the COVID-19 pandemic have been negatively associated with protective indicators, such as resilience, social support, and adaptive coping strategies. Furthermore, higher levels of resilience have been associated with lower levels of acute stress symptoms (Ye et al., 2020).

The emergency in suspending in-person classes during COVID-19 pandemic brought unexpected challenges for teachers due to compulsory home office work (Vio et al., 2020), affecting them physically,

mentally, socially, and academically (Khalili, 2020). A supportive environment can minimize the impact of loneliness at work on wellbeing (D'Oliveira; Persico, 2023). Furthermore, the perceptions of professors with regards to this drastic change may be influenced by generational differences (Culp-Roche et al., 2020) and technological skills and such perceptions may influence their satisfaction with the effectiveness of remote teaching (Wilson et al., 2021).

Other studies have shown that sudden changes in higher education during the COVID-19 pandemic brought many challenges and new experiences to the faculty (Svihus, 2024; Baskici et al., 2024; González; Ponce; Fernández, 2023; Bhatia; Joseph, 2023). One of these studies, which aimed to explore the academic staff's experiences about online education and the use of digital technologies in six countries (Türkiye, Sweden, Finland, Portugal, Latvia, Lithuania), suggests the need for a comprehensive understanding about the use of digital technologies during the remote emergency education, and that investigations of academic experiences have the potential to improve learning results with digital technologies (Baskici et al., 2024). This Brazilian study seeks to increase this knowledge base and provide a better understanding of professors' experiences during this period in Brazil.

Within this context, there is a need to gain a better understanding of the challenges faced by Brazilian university professors. Therefore, the aim of the present study was to identify factors associated with satisfaction and difficulties with the switch to remote teaching among Brazilian professors in order to provide perspectives and facilitate comparisons between local and global perceptions in addition to assisting in the creation of strategies for teaching and support for professors in similar situations.

This study can help policy makers be aware of the factors experienced in this modality, highlighting its challenges, limitations, and strengths and ensuring that students are adequately prepared in the classroom, while also with the possibility of using virtual resources as facilitating tools of the learning process. Our research can encourage other researchers to investigate aspects that are not addressed in this study to demonstrate the relevance of Brazil on the current map of investigations addressing the effects of COVID-19 in addition to contributing information on the scenario as perceived by professors in the country.

Methods

Ethical considerations

Ethical aspects of research in virtual environments were respected and the form did not have any mandatory questions in order to ensure the participant's right not to answer a given question without the need for justification as well as offer the possibility to read all questions before answering. This study, entitled "Perceptions, attitudes, challenges and acceptance of university professors regarding online teaching during the COVID-19 pandemic", received approval from the Brazilian Research Ethics Committee of the Federal University of São Carlos (certificate number: 56151622.5.0000.5504).

The statement of informed consent was inserted in the form to be read by the volunteer, followed by the options of "authorization" or "refusal" to participate in the study. The volunteer could download the

statement of informed consent or could request a signed copy via e-mail. Volunteers who agreed to participate proceeded to the questions on the form.

Data collection

The sample was obtained by convenience. Only university professors who were involved with online teaching were included in the study. Data collection of this open voluntary survey took place from April to May 2022 after divulgating the link in virtual environments (Instagram and WhatsApp), posting videos and other advertisements in addition to sending individual invitations via email to participants. The professors' electronic addresses were obtained from the websites of Brazilian higher education institutions and messages were sent individually.

The professors were informed by virtual invitations and the statement of informed consent that the survey was aimed at higher education professors and focused on emergency remote teaching, with the sample comprising participants involved in online teaching activities during the COVID-19 pandemic in Brazil. Professors who did not select the option for acceptance to participate after reading the statement of informed consent were directed to the end of the form and therefore excluded from the sample.

Data collection was performed using a structured electronic questionnaire with items addressing sociodemographic and occupational characteristics as well as online teaching during the pandemic. No validated questionnaires were used. Items on emergency remote teaching addressed attitudes, challenges, acceptance, satisfaction, expectations, and other perceptions.

This article followed the recommendations of the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach, 2012). The questionnaires were made available through the online software for Google accounts: Google Forms. Before data collection, tests were performed to verify the usability and technical functionality of the questionnaire and to correct typographical errors. Participants were informed about the approximate time of 10 minutes to complete the questionnaire on the first page of the form and on the second page when reading the statement of informed consent.

Some questionnaires were not completed, since no item was mandatory, which allowed the respondent not to answer the item and move on to the next one. Nonetheless, all forms were analyzed. Items with missing data are indicated in the results. Participants could also track their responses via the progress bar as well as review and change their answers through a back button without losing the answers already selected through automatic saving.

The form did not request the identification of the participants and all responses were anonymous. No cookies or internet protocol (IP) collections were used. After the participants finished completing the form and clicked for their responses to be sent, the following confirmation message was shown in Portuguese in order to avoid duplicate responses: "Your answers have been registered". An e-mail address was also made available for the clarification of possible doubts.

The total number of questions ranged from 27 to 29, depending on the response options chosen on the questionnaire. The form consisted of seven pages, with a brief introduction about the study on the

first page, followed by the statement of informed consent on the second page and 23 items on the third page addressing sociodemographic, occupational, and remote teaching characteristics.

The next three pages were aimed only at professors who reported teaching subjects with practical activities, while the seventh and last page had three more final questions on expectations, barriers, and satisfaction with remote teaching. There was no randomization or adaptation of questions. The form was electronically registered and open to all those interested in answering it. There were no monetary or non-monetary incentives to participate in the study.

Data analysis

The anonymous data were automatically stored in Google Drive. These data were subsequently downloaded on an Excel spreadsheet (.xlsx format) and organized in the Statistical Package for the Social Sciences (SPSS) to perform the analysis.

The data were analyzed descriptively, with the calculation of absolute and relative frequencies. The variable “satisfaction with the change to remote teaching” was dichotomized as satisfied/very satisfied (satisfied group) and uncertain/dissatisfied/very dissatisfied (dissatisfied group). The variable “general perception of the change to remote teaching” was dichotomized as very easy/easy/neutral (group without difficulty) and a little difficult/very difficult (group with difficulty).

After dichotomization, logistic regression analysis was performed to identify factors associated with the professors’ satisfaction and perception of difficulty with the switch to remote teaching. The significance level was set at 5%.

Results

A total of 428 male (50.2%) and female (49.8%) Brazilian university professors participated in this study (51.3% up to 50 years of age and 48.7% more than 50 years of age). Only two visitors to the survey link refused participate in the study. The completion rate (ratio of users who finished the survey/users who agreed to participate) was 100%. The sociodemographic and occupational characteristics of the sample are presented in table 1.

Table 1: Sociodemographic and occupational characteristics of university professors [n (%)]

Variables	Total (n = 428)
Gender	
Male	215 (50.2)
Female	213 (49.8)
Age*	
20 to 50 years	219 (51.3)
50 or more	208 (48.7)
Highest academic degree*	
Bachelor's	7 (1.6)
Master's	50 (11.7)
Doctoral	370 (86.7)
Teaching experience	
Up to 2 years	5 (1.2)

Above 2 to 5 years	22 (5.1)
Above 5 to 10 years	69 (16.1)
Over 10 years	332 (77.6)
Type of institution*	
Private	159 (37.2)
Public	246 (57.7)
Other	22 (5.1)
Frequency of use of remote teaching before pandemic*	
Never	201 (47.1)
Rarely	102 (23.9)
Occasionally	59 (13.8)
Often	65 (15.2)
Teaches disciplines with practical classes	
Yes	215 (50.2)
No	213 (49.8)

Source: Survey data (2026).

Among the participants, 42.5% reported being satisfied and 57.5% reported being dissatisfied with the switch to remote teaching. In addition, 36.7% reported having no difficulties and 63.3% had difficulties with the switch to remote teaching. Perceptions regarding remote teaching are presented in table 2.

Table 2: Perceptions of professors with regards to remote teaching [n (%)]

Variables	Total (n = 428)
Satisfaction with switching to remote teaching	
Very unsatisfied	43 (10.0)
Dissatisfied	107 (25.0)
Uncertain	96 (22.4)
Satisfied	167 (39.0)
Very satisfied	15 (3.5)
General perception of shift to remote teaching	
Very easy	23 (5.4)
Easy	79 (18.5)
Neutral	55 (12.9)
A little hard	208 (48.6)
Very difficult	63 (14.7)
Willingness to switch to remote teaching*	
Strongly against	40 (9.4)
A little against	60 (14.1)
Neutral	40 (9.4)
A little willing	124 (29.0)
Strongly willing	163 (38.2)
Availability of software/hardware for remote teaching*	
No	57 (13.3)
Some	95 (22.2)
Yes	275 (64.4)
Availability of suitable remote teaching training*	
No	112 (26.3)
Some	142 (33.3)
Yes	172 (40.4)
Hours spent preparing an online class*	
< 2 hours	105 (24.6)

2 to 4 hours	229 (53.6)
> 4 hours	93 (21.8)
Time for online class preparation*	
Less than in-person class	23 (5.4)
Same as in-person class	180 (42.2)
More than in-person class	224 (52.5)
Expectations of switching to online teaching during pandemic	
Negative	69 (16.1)
Uncertain	206 (48.1)
Positive	153 (35.7)

Source: Survey data (2026).

The barriers perceived by university professors regarding remote teaching are shown in figure 1. The three main barriers were monitoring students in remote teaching, poor internet connection, and lack of technical skills.

Figure 1: Barriers perceived by Brazilian professors regarding remote teaching during pandemic



Source: Survey data (2026).

Logistic regression analysis indicated that having positive expectations about switching to remote teaching, being willing to switch to remote teaching, not considering the inability to track student engagement as a barrier, having received adequate training for remote teaching, and considering that time spent preparing classes for remote teaching was less than or equal to the time spent for in-person classes were associated with satisfaction with the switch to remote teaching, as shown in table 3.

Table 3: Results of binomial logistic regression analysis (dependent variable: satisfaction with switching to online teaching)

Variables	OR	CI 95%	P
Positive expectations of switching to remote teaching	7.14	4.33 – 11.8	<0.01
Being willing to switch to remote teaching	3.73	2.17 – 6.43	<0.01
Not considering inability to track student engagement as barrier	2.68	1.64 – 4.39	<0.01
Having received remote teaching training	2.68	1.52 – 4.73	<0.01
Time spent preparing classes for remote teaching less than or equal to time spent for in-person classes	1.77	1.10 – 2.86	0.02

Source: Survey data (2026).

A lack of technical skills, the inability to track student engagement, the female gender, difficulty creating teaching content, negative/uncertain expectations with regards to switching to remote teaching, and considering that the time spent preparing classes for remote teaching was greater than that for in-person classes were associated with difficulties with the switch to remote teaching, as shown in table 4.

Table 4: Results of binomial logistic regression analysis (dependent variable: perception of difficulty in switching to online teaching)

Variables	OR	CI 95%	P
Lack of technical skills	3.78	2.13 – 6.70	<0.01
Inability to track student engagement	2.51	1.58 – 3.99	<0.01
Female gender	1.82	1.14 – 2.88	0.01
Difficulty creating teaching content	2.05	1.16 – 3.61	0.01
Negative/uncertain expectations of switching to remote teaching	2.28	1.43 – 3.63	<0.01
Time spent preparing classes for remote teaching greater than time spent for in-person classes	2.51	1.58 – 4.00	<0.01

Source: Survey data (2026).

Discussion

In this Brazilian survey of higher education professors, we investigated factors associated with satisfaction and difficulties related to emergency remote teaching. Most professors who participated in this study had no experience with online teaching before the COVID-19 pandemic and, despite having uncertain expectations with regards to the format, most were strongly willing to switch from in-person to remote teaching. However, the professors considered online teaching somewhat difficult and most were dissatisfied with remote teaching. Some factors were associated with satisfaction and others were associated with the perception of difficulty with regards to the switch to remote teaching.

The difficulty and dissatisfaction of most professors underscore the importance of the context and circumstances in which higher education institutions underwent the transition from in-person to online formats (Carrillo; Flores, 2020). In the study by Akour et al. (2020), most teachers experienced psychological distress during COVID-19 but also exhibited moderate to high motivation for remote teaching.

A review study conducted by Santos, Silva and Belmonte (2021) showed that professors faced new demands that had repercussions for both their work and social routines, with an increase in the pace, workload, and diversity of work, in addition to being affected in terms of emotional aspects during the COVID-19 pandemic. A study conducted in Bangladesh with university professors found that the main challenges faced in online teaching during the COVID-19 pandemic were insufficient feedback, practical classes and difficulty in monitoring students (Saha; Pranty; Rana, 2022).

Likewise, most professors (63%) in the present study perceived the inability to track the engagement of students as a barrier in remote teaching, which was associated with the perception of difficulty with this teaching format. This poor interaction and absence of feedback from students were also the cons pointed out by teachers in a study by Motte-Signoret et al. (2021). Professors from the Philippines also believed that online education results in more academic dishonesty (Moralista; Oducado, 2020),

requiring ongoing support and training for the “new normal” in the higher education landscape (Omari; Salifu Yendork; Ankrah, 2023).

All this effort to maintain the attention of the students during classes, learning new teaching practices, such as recording video classes and synchronous remote classes, in addition to the increase in class preparation time and the uncertainty of student participation were stressors experienced by professors (Freitas et al., 2021; Santos; Silva; Belmonte, 2021). However, digital stress decreases with the increase in digital competence (Antón-Sancho et al., 2022).

In the present study, having received adequate training in addition to favorable attitudes, such as being willing, having positive expectations about switching to emergency remote teaching, and not considering the inability to track student engagement as a barrier, were associated with satisfaction with the shift to remote teaching. With regards to favorable attitudes, self-esteem and resilience were protective factors against academic stressors among professors during the pandemic (Losa-Iglesias et al., 2022), requiring constant encouragement from educational institutions.

The favorable attitudes identified in our study point to how resilience was important to the adaptation and satisfaction of professors in emergency remote teaching. A systematic review (Sum; Oancea, 2022) reported strong findings of professors’ resilience in their self-exploration of various technologies during the COVID-19 pandemic and strategies to continue teaching in response to the crisis.

A study involving 1,415 general teachers in central Greece found that teachers’ perceptions of resilience predicted their attitudes to emergency remote teaching and stress levels during the pandemic (Papazis; Avramidis; Bacopoulou, 2023). In both analyses, the factor “personal competence and persistence” was the strongest contributor ($B = 0.16$ and $B = -0.52$, respectively), but all resilience variables emerged as significant predictors. These results underscore the importance of having sufficient levels of resilience in adverse circumstances. Moreover, teachers with an MSc or PhD reported higher levels of resilience than those with only a bachelor’s degree. This may explain the favorable attitudes in the present study, as most professors had a PhD (86.7%), followed by MSc (11.7%).

Lack of technical skills and creating online teaching contents were also important barriers perceived by Brazilian professors during emergency remote teaching. In our study, only 15% of professors often used remote teaching before the pandemic, which may explain these results. Digital technologies were only adopted and accepted by some educators before the pandemic, being used to a small extent compared to traditional face-to-face teaching, and experience with technology was an important factor in promoting participation in an online environment, according to the findings of the study by Svihus (2024). This author also suggests that online teaching can be challenging, even for professors with previous experience and highlights the importance of a positive attitude towards change to facilitate the transition to online teaching and contributing to a new normality in higher education after the pandemic.

A lack of training for online teaching, the repetition of traditional teacher-centered learning, and the fear of change are barriers to online learning, according to a review study that confirms our findings (Greenhow; Chapman, 2020). In our study, a lack of technical skills, difficulty in creating online teaching content, negative/uncertain expectations in switching to remote teaching, and the longer time spent

preparing classes for remote teaching compared to in-person teaching were associated with the perception of difficulty with switching to remote teaching.

A survey of 908 university professors from 21 different countries compared the results between digital immigrant and digital native professors. The correlation results show that both self-confidence and digital competence have a positive influence on the perception of adapting skills to digital learning environments, pointing to the need to carry out training actions for university professors directed at digital competence in teaching (Vergara-Rodríguez; Antón-Sancho; Fernández-Arias, 2022).

Likewise, a study conducted in Paraguay with teachers of different educational levels pointed to technological aspects as the main difficulty, such as the use of information and communication technologies, in addition to poor internet connections (Mereles; Canese, 2022). The difficulty with a poor internet connection also appeared as one of the main barriers reported by professors (51.6%) in Brazil.

In the present study, the female gender was associated with the perception of difficulty in relation to switching to remote teaching. A possible explanation for this may be related to the other activities in the home environment, which are still performed for the most part by women and were accentuated with the COVID-19 health crisis, which brought more obstacles for women (Vitória; Ribeiro; Carvalho, 2022). Results from another study showed that most of the additional housework and childcare associated with COVID-19 fell to women, who devoted more time to household chores than before the pandemic (Del Boca et al., 2020). Thus, it is necessary to develop actions that meet the needs of professors in similar situations, especially women.

A study involving 299 university professors in Jordan investigated health-related quality of life and its association with occupational and health factors during the COVID-19 pandemic. In the study, satisfaction with online teaching was a significant positive predictor of quality of life ($\beta=3.94$; 95%CI: 1.95 to 5.91; $P<0.001$) (Almhdawi et al., 2021). This result demonstrates the importance of professors' satisfaction not only to ensure adequate teaching, but also for their quality of life.

Limitations and future research

Response bias is a possibility in the data provided, since non-probabilistic sampling method and non-standardized questionnaires were used. Despite this, respondents had enough time to complete the form and without the pressure of an interviewer being present. Another limitation of this study is its cross-sectional design. A follow-up of the aspects analyzed since the beginning of the transition to remote teaching would be important to gain a better understanding of the effects of the pandemic on teaching work as well as the insertion of digital tools to facilitate teaching and innovate the traditional teaching process. The study sample is composed of professors who worked in emergency remote teaching at Brazilian higher education institutions during a pandemic situation, for this reason, the conclusions cannot be generalized to other situations.

Conclusion

The COVID-19 pandemic created unexpected challenges in the face of sudden demands for abilities in emergency remote teaching. The results of this study are important to identifying the perceptions and challenges experienced by professors in Brazil during the COVID-19 pandemic and the determination of factors associated with satisfaction and difficulties with the switch to remote teaching in this period. In summary, our study revealed that most teachers reported dissatisfaction and difficulties with the switch to remote teaching. Favorable attitudes and lack of technical skills were the main factors associated with satisfaction and difficulties, respectively.

This paper can contribute to the establishment of public policies and the promotion of actions aimed at strengthening the resilience and skills of professors, preventing dissatisfaction with new work situations and ensuring a safe and healthy environment with gender equality. Adequate training in the use of digital tools as facilitators in the teaching/learning process should be provided. Our results can be used in future comparative studies and for decision making by educational institutions to improve academic planning with a closer look at the profession, especially in extraordinary stressful situations.

Funding

This work was supported by the Brazilian fostering agencies [Coordination for the Advancement of Higher Education Personnel (CAPES)] under Grant [Finance Code 001]; and [National Council for Scientific and Technological Development (CNPQ)] under Grant [Process 308951/2022-0].

Acknowledgements

The authors would like to thank all professors who participated in this study.

References

- AIZPURUA-PÉREZ, Ibane et al. Psychological resilience and cortisol levels in adults: a systematic review. *American Journal of Human Biology*, v. 35, n. 12, e23954, 2023.
- AKOUR, Amal et al. The impact of the COVID-19 pandemic and emergency distance teaching on the psychological status of university teachers: a cross-sectional study in Jordan. *The American Journal of Tropical Medicine and Hygiene*, v. 103, n. 6, p. 2.391-2.399, 2020.
- ALMHDAWI, Khader et al. University professors' mental and physical well-being during the COVID-19 pandemic and distance teaching. *Work*, v. 69, n. 4, p. 1.153-1.161, 2021.
- ANTÓN-SANCHO, Álvaro et al. Digital pandemic stress in higher education in Venezuela. *European Journal of Investigation in Health, Psychology and Education*, v. 12, n. 12, p. 1.878-1.900, 2022.
- BASKICI, Cigdem et al. Being in the digital box. Academic staff experiences in online practical teaching: a qualitative study from six universities and countries. *Heliyon*, v. 10, n. 2, e24275, 2024.
- BHATIA, Pankhuri; JOSEPH, Angela Ann. Teaching during COVID-19 pandemic in India: an interpretive phenomenological analysis of faculty's perceptions and experiences. *Journal of Further and Higher Education*, v. 47, n. 7, p. 925-940, 2023.
- CAHYADI, Ani et al. COVID-19, emergency remote teaching evaluation: the case of Indonesia. *Education and Information Technologies*, v. 27, n. 2, p. 2.165-2.179, 2022.
- CAMARGO, Cristina Pires et al. Online learning and COVID-19: a meta-synthesis analysis. *Clinics*, v. 75, e2286, 2020.

- CARRILLO, Carmen; FLORES, Maria Assunção. COVID-19 and teacher education: a literature review of online teaching and learning practices. *European Journal of Teacher Education*, v. 43, n. 4, p. 466-487, 2020.
- CULP-ROCHE, Amanda et al. Generational differences in faculty and student comfort with technology use. *SAGE Open Nursing*, v. 6, p. 2377960820941394, 2020.
- DEL BOCA, Daniela et al. Women's and men's work, housework and childcare, before and during COVID-19. *Review of Economics of the Household*, v. 18, n. 4, p. 1.001-1.017, 2020.
- D'OLIVEIRA, Teresa; PERSICO, Liana. Workplace isolation, loneliness and wellbeing at work: the mediating role of task interdependence and supportive behaviours. *Applied Ergonomics*, v. 106, p. 103894, 2023.
- EACHEMPATI, Prashanti; RAMNARAYAN, Komattil. Covidio-pedago-phobia. *Medical Education*, v. 54, n. 8, p. 678-680, 2020.
- EYSENBACH, Gunther. Improving the quality of web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *Journal of Medical Internet Research*, v. 14, n. 1, e8, 2012.
- FREITAS, Ronilson Ferreira et al. Prevalência e fatores associados aos sintomas de depressão, ansiedade e estresse em professores universitários durante a pandemia da COVID-19. *Jornal Brasileiro de Psiquiatria*, v. 70, n. 4, p. 283-292, 2021.
- FYLLOS, Apostolos et al. University students' perception of online education: is engagement enough? *Acta Informatica Medica*, v. 29, n. 1, p. 4-9, 2021.
- GONZÁLEZ, Carlos; PONCE, Daniel; FERNÁNDEZ, Violeta. Teachers' experiences of teaching online during COVID-19: implications for postpandemic professional development. *Educational Technology Research and Development*, v. 71, n. 1, p. 55-78, 2023.
- GREENHOW, Christine; CHAPMAN, Amy. Social distancing meet social media: digital tools for connecting students, teachers, and citizens in an emergency. *Information and Learning Sciences*, v. 121, n. 5/6, p. 341-352, 2020.
- KERRES, Michael. Against all odds: education in Germany coping with COVID-19. *Postdigital Science and Education*, v. 2, n. 3, p. 690-694, 2020.
- KHALILI, Hossein. Online interprofessional education during and post the COVID-19 pandemic: a commentary. *Journal of Interprofessional Care*, v. 34, n. 5, p. 687-690, 2020.
- LIU, Yue; ZHAO, Li; SU, Yu-Sheng. The impact of teacher competence in online teaching on perceived online learning outcomes during the COVID-19 outbreak: a moderated-mediation model of teacher resilience and age. *International Journal of Environmental Research and Public Health*, v. 19, n. 10, p. 6282, 2022.
- LOSA-IGLESIAS, Marta et al. Stressors and difficulties perceived during the pandemic in the teaching activity of nursing professors. *Frontiers in Psychology*, v. 13, p. 989279, 2022.
- MERELES, Juan Ignacio; CANESE, Valentina. Dificultades docentes durante la educación remota en Paraguay. *Revista Científica em Ciencias Sociales*, v. 4, n. 1, p. 8-22, 2022.
- MORALISTA, Rome; ODUCCADO, Ryan Michael. Faculty perception toward online education in a state college in the Philippines during the coronavirus disease 19 (COVID-19) pandemic. *Universal Journal of Educational Research*, v. 8, n. 10, p. 4.736-4.742, 2020.
- MOTTE-SIGNORET, Emmanuelle et al. Perception of medical education by learners and teachers during the COVID-19 pandemic: a cross-sectional survey of online teaching. *Medical Education Online*, v. 26, n. 1, p. 1919042, 2021.
- OMARI, Emmanuel Boakye; SALIFU YENDORK, Joana; ANKRAH, Ebenezer. University students' perspectives on the benefits and challenges of emergency remote teaching during the COVID-19 pandemic in Ghana. *Education and Information Technologies*, v. 28, n. 5, p. 6.093-6.113, 2023.
- PAPAZIS, Filippou; AVRAMIDIS, Elias; BACOPOULOU, Flora. Greek teachers' resilience levels during the COVID-19 pandemic lockdown and its association with attitudes towards emergency remote teaching and perceived stress. *Psychology in the Schools*, v. 60, p. 1.459-1.476, 2023.
- PEERI, Noah et al. The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned? *International Journal of Epidemiology*, v. 49, n. 3, p. 717-726, 2020.
- POLLARD, Casey; MORRAN, Michael; NESTOR-KALINOSKI, Andrea. The COVID-19 pandemic: a global health crisis. *Physiological Genomics*, v. 52, n. 11, p. 549-557, 2020.
- ROSSONI, Luciano. Editorial: Covid-19, organizações, trabalho em casa e produção científica. *Revista Eletrônica de Ciência Administrativa*, v. 19, n. 2, p. 158-168, 2020.

- SAHA, Sourav Mohan et al. Teaching during a pandemic: do university teachers prefer online teaching? *Heliyon*, v. 8, n. 1, p. e08663, 2022.
- SANTOS, Geórgia Maria Ricardo Félix dos; SILVA, Maria Elaine da; BELMONTE, Bernardo do Rego. COVID-19: Emergency remote teaching and university professors' mental health. *Revista Brasileira de Saúde Materno Infantil*, v. 21, n. suppl. 1, p. 237-243, 2021.
- SENGUPTA, Souvik. Possibilities and challenges of online education in India during the COVID-19 pandemic. *International Journal of Web-Based Learning and Teaching Technologies*, v. 17, n. 4, p. 1-11, 2022.
- SILVA-BARBOSA, Carlos Eduardo da et al. Esgotamento profissional na docência: Síndrome de Burnout em professores universitários durante a pandemia da COVID-19. *Research, Society and Development*, v. 11, n. 8, p. e44111831385, 2022.
- SONI, Vishal Dineshkumar. Global impact of e-learning during COVID-19. *SSRN Electronic Journal*, preprint, 2020.
- SUM, McQueen; OANCEA, Alis. The use of technology in higher education teaching by academics during the COVID-19 emergency remote teaching period: a systematic review. *International Journal of Educational Technology in Higher Education*, v. 19, n. 1, p. 1-39, 2022.
- SVIHUS, Cathrine Larsen. Online teaching in higher education during the COVID-19 pandemic. *Education and Information Technologies*, v. 29, n. 3, p. 3.175-3.193, 2024.
- TOQUERO, Cathy Mae. Challenges and opportunities for higher education amid the COVID-19 pandemic: the Philippine context. *Pedagogical Research*, v. 5, n. 4, p. em0063, 2020.
- VERGARA-RODRÍGUEZ, Diego; ANTÓN-SANCHO, Álvaro; FERNÁNDEZ-ARIAS, Pablo. Variables influencing professors' adaptation to digital learning environments during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, v. 19, n. 6, p. 1-20, 2022.
- VIO, Natália Leal et al. COVID-19 e o trabalho de docente: A potencialização de aspectos precários. *Brazilian Journal of Development*, v. 6, n. 10, p. 78.717-78.728, 2020.
- VITÓRIA, Beatriz de Araújo; RIBEIRO, Maria Teresa; CARVALHO, Vânia Sofia. The work-family interface and the COVID-19 pandemic: a systematic review. *Frontiers in Psychology*, v. 13, p. 914474, 2022.
- WILSON, Jessica et al. Transitioning to teaching online during the COVID-19 pandemic. *SAGE Open Nursing*, v. 7, p. 23779608211026137, 2021.
- YE, Zhi et al. Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute stress disorder among college students in China. *Applied Psychology: Health and Well-Being*, v. 12, n. 4, p. 1.074-1.094, 2020.