

Coping mechanisms in Education in the face of the COVID-19 pandemic: adoption of technologies, psychological impacts and new teaching-learning paradigms

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ABSTRACT. This research addresses the challenges faced by teachers and students as a consequence of the COVID-19 pandemic, highlighting the psychological impact associated with the abrupt need to adopt digital teaching tools in everyday school life. Studies of this nature are necessary to support preventive and/or therapeutic actions aimed at coping with emerging changes. Therefore, it was intended to understand the current scenario of remote teaching and how it interferes with the mental health of teachers and students, in such a way as to train them to deal with this new context, which tends to remain active beyond this pandemic. It was performed a survey of publications on the Web of Science and Google Scholar databases. Eight field researches on the topic were found and analyzed. The main difficulties reported by research participants refer to problems related to the adaptability of computer programs, the adaptation of didactic strategies to the digital model and the need to deliver, simultaneously, distance and face-to-face synchronous classes. Reports of exhaustion, anxiety, stress and fear due to the possibility of job loss and/or exposure to the virus were found, besides work overload. As a gap in the literature, it was noted an absence of studies on the topic involving teachers and students of elementary and high school in Brazil and abroad.

Keywords: remote teaching; educational technology; schooling; teaching-learning.

Mecanismos de enfrentamento (coping) na Educação ante a pandemia de COVID-19: adoção de tecnologias, impactos psicológicos e novos paradigmas ensino-aprendizagem

RESUMO. Esta pesquisa aborda o desenvolvimento de mecanismos de enfrentamento adotados por docentes e discentes a partir da pandemia de COVID-19, destacando o impacto psicológico associado à abrupta necessidade de adoção de ferramentas digitais de ensino no cotidiano escolar. Estudos dessa natureza são necessários para embasamento de ações preventivas e/ou terapêuticas destinadas ao enfrentamento de mudanças emergentes. Pretendeu-se, portanto, compreender o cenário atual do ensino remoto e como esse interfere na saúde mental de docentes e discentes, de modo a capacitá-los a esse novo contexto, que tende a permanecer ativo além-pandemia. Foi realizado um levantamento de publicações junto às bases de dados *Web of Science* e *Google Scholar*. Foram encontradas e analisadas oito pesquisas de campo sobre o assunto. As principais dificuldades informadas por participantes das pesquisas se referem a problemas relacionados à adaptabilidade de programas de computador, à adaptação de didáticas ao modelo digital e à necessidade de ministrar, concomitantemente, aulas síncronas remotas. Foram encontrados relatos de exaustão, ansiedade, estresse e medo ante a possibilidade de perda do emprego e /ou exposição ao vírus, além de sobrecarga de trabalho. Como lacuna na literatura, foi observada a ausência de estudos sobre o assunto, envolvendo docentes e discentes de ensino fundamental e médio no Brasil e no exterior.

Palavras-chave: ensino remoto; tecnologia educacional; educação escolar; ensino-aprendizagem.

Mecanismos de afrontamiento (coping) en Educación ante el COVID-19: adopción de tecnologías, impactos psicológicos y nuevos paradigmas de enseñanza-aprendizaje

RESUMEN. Esta investigación aborda el desarrollo de los mecanismos de afrontamiento adoptados por los profesores y los alumnos a partir de la pandemia del COVID-19, destacando el impacto psicológico asociado a la abrupta necesidad de adoptar herramientas didácticas digitales en la vida escolar cotidiana. Los estudios de esta naturaleza son necesarios para apoyar las acciones preventivas y/o terapéuticas

destinadas a afrontar los cambios emergentes. Por lo tanto, se pretendió comprender el escenario actual de la enseñanza a distancia y cómo dicho escenario interfiere en la salud mental de profesores y alumnos, con el fin de capacitarlos para este nuevo contexto, que tiende a permanecer activo más allá de la pandemia. Se realizó una encuesta de publicaciones con las bases de datos *Web of Science* y *Google Scholar*. Se encontraron y analizaron ocho investigaciones de campo sobre el tema. Las principales dificultades señaladas por los participantes en la investigación se refieren a problemas relacionados con la adaptabilidad de los programas informáticos, la adaptación de la didáctica al modelo digital y la necesidad de impartir, simultáneamente, clases sincrónicas a distancia. Se encontraron reportes de agotamiento, ansiedad, estrés y miedo por la posibilidad de pérdida del empleo y/o exposición al virus, además de sobrecarga laboral. Como laguna en la literatura, se notó la ausencia de estudios sobre el tema, con la participación de profesores y estudiantes de educación primaria y secundaria en Brasil y en el extranjero.

Palabras clave: enseñanza a distancia; tecnología educacional; educación escolar; enseñanza-aprendizaje.

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Introduction

Due to the pandemic of the new coronavirus (COVID-19), which ravaged the world in 2020, there was an abrupt need for teachers to adapt to the technological advances that were already at their disposal, which required them to face challenges, in such a way as to meet the new reality (Peninsula Institute, 2020). Official documents for the adoption of digital teaching and learning tools (Ordinance, n° 544, 2020) were added to the current norms, being that school activities were remodeled and presented with new labels. The transition period that the world has gone through in the last months of 2019 (caused by COVID-19) has reinvented teaching, which, from a face-to-face style, has come to be considered hybrid.

In Brazil, public school teachers, from Kindergarten to High School, face inadequate working conditions, with an overload due to the fact of teaching in several places to compensate for low incomes and stress arising from the devaluation of the profession. They are also exposed to episodes of violence perpetrated by students against teachers (Lima, Andrade, & Damasceno, 2017). The country is still negatively assessed by the National Program for Student Assessment – PISA (as per its Portuguese acronym) (Government of Brazil, 2019), and this situation remains, despite the fact that the Directorates of Education provide teachers with frequent training in relation to the content of the subjects of the National Common Curricular Base – BNCC (as per its Portuguese acronym) and training for the use of digital teaching media – Information and Communication Technologies (ICT). Many schools already have equipment for this purpose: “[...] although the use of technology is recognized today as extremely necessary for the development of new teaching methodologies, it has historically been resisted within the school itself” (Antunes Neto, 2020, p. 7).

Information technologies were spread around the world between the 1970s and the 1990s through a machine revolution, connecting the world through information technology (Castells, 2002, 2003). Until today, disconnected areas can be considered ‘culturally and spatially deficient’, which would become a discriminatory factor, with the need for emerging governmental actions to mitigate social exclusion. In Brazil, according to data from the National Household Sample Survey (PNAD, as per its Portuguese acronym), from the last quarter of 2018 (Arruda, 2020), the percentage of young students between 10 and 13 years old with Internet access remains around 92% in the South, Southeast and Midwest regions, compared to 71% in the North region and 79% in the Northeast region. These factors, pointed out by the researcher, can be considered positive, in terms of connection and digital inclusion. It remains to be seen whether the new methodologies based on strategies for non-face-to-face teaching, offered by the Ministry of Education for the public network, are enough to supply the minimum content necessary for evolution at each teaching level, when compared to private schools.

The Law of Directives and Bases of National Education (LDB, as per its Portuguese acronym) (Law n° 9.394, 1996; Ordinance n° 544, 2020; Ordinance n° 395, 2020; Resolution CNE/CP 1, 2002) highlights distance education and foresees the need to use this resource. Nevertheless, the updated text of LDB (Ordinance n° 395, 2020) clarifies that the format used at this time has a differential from the Distance Education modality (DE), because, in this format, the courses are mostly asynchronous, i.e., without a predetermined schedule, self-instructional and conducted by tutors. In order to adapt this methodology to the current reality, Remote Teaching was modeled, differentiated from Distance Education according to José Moran (2017, 2020), as the former had essentially face-to-face characteristics, with most of the learning offered *online* – by videoconference, in real time, with the use of technological tools connected to the Internet and using slides and videos –, allowing greater interaction between the individuals involved in the teaching and learning process.

In the trajectory of the transitions arising from the emergence of the COVID-19 pandemic, it became apparent that educational institutions needed to maintain a curricular model for the sake of standardization. Therefore, it was necessary to modify the teaching in order to prioritize a greater participation of the student in school activities. It was adopted, for example, the methodologies already used in the classroom and cited by Moreira (1999) and Moran (1997, 2013), i.e., active methodologies, with project-based teaching in an interdisciplinary way; hybrid teaching; blended learning; flipped classrooms; mind maps; and conceptual schemes (working models that explain events that took place). These devices, adapted to the needs of remote classes, have become important tools for communication between teachers and students in times of quarantine via interactive media. Moran (2009, 2015, 2017, 2020) describes how active methodologies happen in a connected and digital world in hybrid teaching format, showing flexible learning models and bringing important contributions to the current moment. According to the author, resource management platforms such as Moodle and Google Classroom, which use synchronous (videoconferences – Meet, Zoom, lives, virtual meetings, among others) and asynchronous (chats, video classes, email, WhatsApp, among others) information and communication technologies are adaptable to this type of hybrid education that, if used in the right way, can add value to the teaching required for the situation.

Theoretical foundation

Given the urgent changes in coping mechanisms in the field of Education, it is worth reflecting on the cognitive abilities needed by the individual to adapt to such changes.

Vygotsky (1984), responsible for a cultural-historical approach to teaching and learning – when outside knowledge is continuously internalized and reinterpreted by the individual – advocated that the child is a social being, who interacts socially, which entails his/her cognitive development. From Piaget's perspective (1969), biological maturation is directly linked to cognitive development. According to Piaget (1969), socialization and ways of thinking begin in childhood, with the advent of language, the ability to anticipate future actions, as well as the affective and intellectual displays. The child reacts to social relationships and to the world of internal representations, adapting to the laws of equilibrium and reacting to the mechanisms of its own mental evolution (Piaget, 1969).

The development of higher psychological functions in the child is one of the pillars of Vygotsky's theory (1984), which includes processes such as thinking, language, memory and attention. These processes are mediated by the social-historical-cultural context in which the child is inserted. As an example, a child living in Brazil is not the same one living in another part of the world, or a public school student does not live the same reality as a private school student. According to this perspective, it is considered that the process of social development of each one can happen differently. These are important aspects to be considered in times of pandemic, once the urgency of the changes in the teaching-learning paradigm are necessary, those concerning the context in which each person lives. Most segments of the population have had to redefine their inter-social relationships in such a way as to adapt to this moment. The changes provoked by the onset of this pandemic may have favored transformations in social interactions.

It can be said that, both in the past and in the present, remote education has become an emergency measure. According to Lévy (1999), in cyberspace, knowledge is presented under new forms of knowledge, based on access to information, new learning styles and the emergence of collective intelligence. Factors such as the formation of a new style of pedagogy, where the teacher needs to lead his/her students with respect to data management and reflection, – instead of being a 'supplier' of information in the search for knowledge construction –, are emphasized by the author, as quoted below: "Knowledge trees are a computerized method for the global management of competencies in educational establishments, company, employment grants, local collectivities and associations" (Lévy, 1999, p. 177).

Another aspect of the issue deserves attention. It can also be assumed that facing the challenges related to the COVID-19 pandemic is triggering psychological effects such as distress or anxiety among teachers and students, and therefore increasing the risk of physical and/or mental health problems in the school community at all levels of education. Possibly, the abrupt need to use Information and Communication Technologies (ICT) in distance – or remote – education is a stressful event. It is necessary to take into account that many teachers and students probably have not yet developed the necessary skills to teach and/or assist classes in this modality and/or do not have access to the technologies that remote education requires.

Stress is currently understood through a biopsychosociocultural approach, encompassing reactions of neurophysiological nature and psychological aspects, such as individual perception or assessment of challenging situations. Factors of sociocultural nature influence the individual's assessment of stressful events, such as disasters, everyday problems, among others (Straub, 2014). Faced with a potential stressor, groups of responses interact with each other, raising the level of excitement and alertness of the body, triggering three mechanisms: psychological, physiological and hormonal stress (Hoogerwerf et al., 2018). The most frequent reactions are those of psychological nature, such as increased levels of stimulation, anxiety, fear or tension, and also neurophysiological reactions, such as increased cortisol secretion (Hoogerwerf et al., 2017). According to Hoogerwerf et al. (2016), anxiety can be understood as a generic stress reaction, permeated by cognitive, affective, behavioral and neurophysiological aspects. Fear can be associated with anxiety in many situations and is defined as a psychological state that results from the belief in future dangers or threats. On the other hand, anxiety is the result of a state of uncertainty about the possibility that future events may or may not have negative consequences (Chell, Waller, & Masser, 2016). According to Antoniazzi, Dell'Aglio and Bandeira (1998), the situation of social isolation and the search for new ways of teaching usually provoke in teachers the development of coping mechanisms, used for the management of psychological reactions, such as stress, anxiety, in the search for overcoming problems, involving confrontation and reconstruction of meanings that aim to control new situations that will arise.

The pathway travelled

The current study focuses on issues of this nature. The central goal was to investigate, through a bibliographic survey, the main obstacles faced by educators and students in the face of the adoption of digital teaching technologies, from the global pandemic of COVID-19, seeking to answer the question: What are the psychological effects brought by the COVID-19 pandemic to teachers and students regarding the adequacy of online classes? Studies of this nature are necessary to provide a basis for preventive and/or therapeutic actions aimed at facing emerging changes. Accordingly, this is intended to understand the current scenario of remote teaching and how it interferes with the mental health of teachers and students, in order to capacitate them for this new context, which tends to remain active beyond the pandemic.

Data collection was performed through a descriptive and exploratory Systematic Literature Review (SLR) in the *Web of Science* (WoS) and *Google Scholar* databases, using as descriptors COVID-19 OR coronavirus OR pandemic AND remote teaching AND education AND digital resources. In the *Google Scholar* database, descriptors in the authors' native language (Portuguese) were used. In the *WoS* database, no articles with descriptors in Portuguese were found; therefore, it was used the terms: COVID-19 OR coronavirus OR pandemic AND remote teaching AND education AND digital resources. The study was conducted between May and June 2020. The following criteria were adopted: selection of national and international papers, focusing on the use of digital teaching technologies during the COVID-19 pandemic; with filters for papers with field research published between 2019 and 2020 (peak of the disease), by the deadline of June 23. The final sample was composed of 8 articles. After reading, the collected material was systematized. The information were organized and described, according to the objectives established in this research.

The observed relationship among education, remote teaching and the COVID-19 pandemic

The survey with the *Google Scholar* database detected 58 papers published in 2019 and 148 in 2020. Only two consisted of field research and fit the established criteria: Vercelli (2020); Barbosa, Viegas and Batista (2020). The research by Vercelli (2020) presented the perception of students about remote classes that took place in a Professional Master's Program in Education due to the COVID-19 pandemic. It was conducted a qualitative research, with application of a questionnaire. The results revealed positive reactions from teachers and students regarding the remote classes; however, the preference for face-to-face classes stood out. The study by Barbosa et al. (2020) analyzed the impacts identified by educational professionals of Higher Education in the municipality of Rio de Janeiro and the Metropolitan Region, through social isolation and their experiences related to the new class model proposed by the institutions in which they work. The study suggests that social isolation brought negative psychological impacts to the teachers in their adaptation process to remote classes.

In the WoS database, ten publications were found in 2020, six of which met the established criteria: Rose, Mott, Alvarez and Lin (2020); Chin, Chan, Chen and Lai (2020); Cleland et al. (2020); Pather et al. (2020); Longhurst et al. (2020); Choi, Ho and Smith (2020). The authors Rose et al. (2020) worked with the didactic changes arising from the pandemic scenario for medical residents from the Stanford University School of Medicine, United States. These began to have classes offered via *YouTube*. Through a participant observation at the Center for Health Policy, Center for Primary Care and Outcomes Research, School of Medicine, Stanford University, the researchers detected difficulties on the part of teachers in establishing criteria for students to comment and ask questions about their classes. Classes via *YouTube* needed adaptability, taking into account unforeseen events such as initial connections between *Zoom* and *YouTube*, site crashes caused by increased user traffic, as well as lecturers' inability to share their *slides*. Chin et al., (2020) developed a participant observation with the students of the medical course, specialization in Ophthalmology, from the Li Ka Shing School of Medicine, University of Hong Kong, China, investigating how the teachers and students were adapting to the curricular changes arising from the COVID-19 pandemic. One limitation found was the difficulty of effectively teaching Ophthalmoscopy *online*. In order to learn this technique, students first need patients available to practice it on. In addition, much of the difficulty in this specific skill was related to understanding the correct angle of approach and the adjustments needed for fundus examination. Therefore, in the interviewees' perception, face-to-face tutorials still proved to be the most effective means of teaching this particular skill.

Through participant observation, Cleland et al. (2020) studied the behavior of teachers and students participating in the webinar 'Adapting to the impact of COVID-19: Sharing stories, sharing practice', sponsored by the Association for Medical Education in Europe (AMEE). There were 518 participants from the health field, representing the continents and global regions: the Caribbean, the Middle East, Africa, the Indian subcontinent, Asia, Australasia, the Americas and Europe. The survey indicated concern on the part of teachers about the challenges in addressing issues such as adaptation and learning about the education *continuum* and medical training in an *online* environment. The main concerns were: teaching and learning on *campus*, clinical teaching, selection and assessment of teaching needs. While there is clearly no simple solution to unprecedented problems, the study emphasizes that it is time for professionals to help each other and take advantage of potential innovations that could change the way physicians are educated and trained in the future. Pather et al. (2020) conducted a participatory observation with 18 anatomy academics from ten research institutions in Australia and New Zealand (Australian National University, La Trobe University, Macquarie University, Monash University, University of Otago, University of Melbourne, University of New South Wales Sydney, University of Tasmania, University of Western Australia and Western Sydney University), seeking to understand how remote teaching affected the development of their undergraduate classes. The analysis revealed loss of integrated practical experiences and impact on workload, traditional roles, pedagogies and personal educational philosophies of anatomists. Recognition for anatomy education included enabling synchronous teaching in remote locations, expanding offerings into the remote learning space and adopting new pedagogies. Longhurst et al. (2020) conducted a Strengths, Weaknesses, Opportunities and Threats Analysis (SWOT/FOFA Analysis) of the use of remote teaching technologies at 14 medical universities, focusing on Anatomy, in the United Kingdom and the Republic of Ireland. The academics mentioned the challenge of maintaining the quality and effectiveness of *online* classes, in order to compensate for the lack of cadaveric exposure, required for anatomy studies. It was noted that 50% of the universities were concerned about the lack of student exposure to cadavers and that 36% of them identified reductions in student engagement with classes. There were also reports of difficulties in dividing the time for teaching and for learning the new technologies. The lack of face-to-face interaction between teacher and student was considered a disadvantage, perceived by interviewers, with regard to classes in the online format.

Choi et al. (2020) conducted participant observation with students from the Bachelor of Science in Nursing course at Stanford University School of Medicine, United States, and surveyed the perceptions of these students regarding the provision of entirely *online* classes. It was noted that, even when live and *online* classes were offered, they needed to be recorded and made available for students to view. In addition, the recorded lessons (one-way communication) needed to be supplemented by interactive meetings with students. Finally, it is worth underlining that students were not very receptive to the *online* forums.

Table 1 is a synopsis of the total of eight articles analyzed in this survey.

Table 1. Summary of the analyzed articles

Year	Database	Author	Article name	Nível de ensino / país	Research instrument	Research audience	Surveyed institution	Psychological impacts	Difficulties in teaching found
2020	Google Scholar	Barbosa, A. M., Viegas, M. A. S. & Batista, R. L. N. F. F.	<i>Aulas presenciais em tempos de pandemia: relatos de experiências de professores do nível superior sobre as aulas remotas</i>	Higher education / Brazil	Participant observation <i>in loco</i>	Education professionals, higher education, the city of Rio de Janeiro and Metropolitan Region	Higher education institutions in the municipality of Rio de Janeiro and the Metropolitan Region	Social isolation	It does not report
2020	Google Scholar	Vercelli, L. de C. A.	<i>Aulas remotas em tempos de COVID-19: a percepção de discentes de um programa de mestrado profissional em educação</i>	Professional Master's Degree / Brazil	Questionnaire consisting of 10 questions, in addition to personal data	12 students enrolled, in 2020, in the first semester in Education	Private university located in the city of São Paulo	It does not report	Need for joint face-to-face teaching
2020	WoS	Rose, C.; Mott, S. & Alvarez, A.; Lin, M.	Physically distant, educationally connected: interactive conferencing in the era of COVID-19	Graduation / United States	Participant observation <i>in loco</i>	Residents of Stanford University School of Medicine, USA, who watched AliEM Connect lives, offered via YouTube	<i>Center for Health Policy, Center for Primary Care and Outcomes Research, School of Medicine, Stanford University</i>	It does not report	Training of students; need to adapt the live format
2020	WoS	Chin, K. C., Chan, J. C.-H., Chen, J. Y. & Lai, J. S.-M.	Ophthalmic clinical skills teaching in the time of COVID-19: a crisis and opportunity	Graduation / China	Participant observation <i>in loco</i>	Medical Students at Li Ka Shing School of Medicine, University of Hong Kong, China	<i>Department of Ophthalmology from the Li Ka Shing Faculty of Medicine, The University of Hong Kong</i>	It does not report	difficulty in teaching ophthalmoscopy online
2020	WoS	Cleland, J., Mckimm, J., Fuller, R., Taylor, D., Janczukowicz, J. & Gibbs, T.	Adapting to the impact of COVID-19: sharing stories, sharing practice	Undergraduate and Graduate / United Kingdom	Participant observation <i>in loco</i>	Participants of the webinar 'Adapting to the impact of COVID-19: Sharing stories, sharing practice', promoted by the Association for Medical Education in Europe (AMEE)	AMEE Webinar	Anxiety and exhaustion	Teaching and learning on campus; clinical teaching; selection and assessment of teaching needs
2020	WoS	Pather, N., Blyth, P., Chapman, J. A., Dayal, M. R., Flack, N. A. M. S., Fogg, Q. A., Green, R. A., Hulme, A. K., Johnson, I. P., Meyer, A. J., Morley, J. W., Shortland, P. J., Strkalj, G., Strklj, M., Valter, K., Webb, A. L., Woodley, S. J. & Lazarus, M. D.	Forced disruption of Anatomy Education in Australia and New Zealand: an acute response to the COVID-19 Pandemic	Graduation / Australia and New Zealand	Participant observation <i>in loco</i>	About 18 Anatomy scholars from ten research institutions in Australia and New Zealand	<i>University, Macquarie University, Monash University, University of Otago, University of Melbourne, University of New South Wales Sydney, University of Tasmania, University of Western Australia, Western Sydney University</i>	Stress related to job security and exposure to the virus. Stress due to the increase in workload	Loss of integrated practical experiences and impacts on workload
2020	WoS	Longhurst, G. J., Stone, D. M., Duloherly, K., Scully, D.; Campbell, T. & Smith, C. F.	Strength, Weakness, Opportunity, Threat (SWOT) analysis of the adaptations to Anatomical Education in the United Kingdom and Republic of Ireland in response to the COVID-19 Pandemic	Undergraduate / United Kingdom and Republic of Ireland	Questionnaire covering (1) location and size of the university, (2) adaptations to teaching and resources used in lectures and practical sessions and (3) challenges and opportunities. Once the themes were generated, they were collectively assembled using a Strength, Weakness, Opportunity and Threat (SWOT) Analysis	Four different Medical Universities in the UK and the Republic of Ireland	UK and Irish Universities	It does not report	Challenge to maintain the quality and effectiveness of classes in online resources
2020	WoS	Choi, E. P. H., Ho, M. & Smith, R.	What we can do for part-time nursing students during the COVID-19 pandemic?	Graduation / United States	Participant observation <i>in loco</i>	Bachelor of Nursing students at Stanford University School of Medicine, United States	Stanford University	It does not report	Need to record online classes and complement them with interactive meetings. Students were not very receptive to online forums

Source: Designed by the author.

These surveys are mostly qualitative in nature. Articles published in countries from different continents were found, such as Brazil, the United States, the United Kingdom, China, Australia and New Zealand. The tools used for data collection were mainly email questionnaires (Longhurst et al., 2020; Vercelli, 2020) and participant observation in live classes (Barbosa et al., 2020; Rose et al., 2020; Chin et al., 2020; Cleland et al., 2020; Pather et al., 2020; Choi et al., 2020). In one study, SWOT/FOFA analysis was used.

This is in line with what recent literature predicts. Antunes Neto (2020), for example, highlights the emerging need for paradigm shifts, perceived from the COVID-19 pandemic, emphasizing new teacher-student relationships and new knowledge organization systems, when thinking about learning strategies in times of pandemic and the use of digital technologies. Technology “[...] has changed, changes or will change by a collective need and not of individuality” (Antunes Neto, 2020, p. 5). That said, the author questions the need for adjustments between the institutional ‘time-study’ relationship and the ‘face-to-face time’ of classrooms in ‘remote time’ in the ‘preservation of individuality’.

As for the type of adopted digital teaching tool, research participants mainly mentioned strategies such as *Zoom* or *YouTube*. Rose et al., (2020) cite the use of *Zoom* and *lives*, through *YouTube*; Chin et al. (2020) highlight the use of the *Zoom* digital tool. Only in the study by Cleland et al. (2020), it was mentioned that, in addition to *YouTube*, the *Facebook* social media was used. The adoption of resources such as these is consistent with the literature on the topic in general in previous years. Works by authors such as Moreira (1999) and Moran (2013), for example, denote that active methodologies are strategies for remodeling school activities, which have been adopted in many educational institutions, even before the advent of the pandemic, in order to adapt teaching to the connected and digital world.

In only seven articles, there were mentions of the challenges faced from the pandemic (Longhurst et al., 2020; Vercelli, 2020; Rose et al., 2020; Chin et al., 2020; Cleland et al., 2020; Pather et al., 2020; Choi et al., 2020). The difficulties reported refer mainly to problems related to software adaptability, the adaptation of didactics to the digital model and the need to concurrently deliver remote synchronous classes. Figure 1 summarizes the challenges in the three categories already mentioned: adaptability to the software; adaptation of didactics; and the need to deliver synchronous and remote classes.

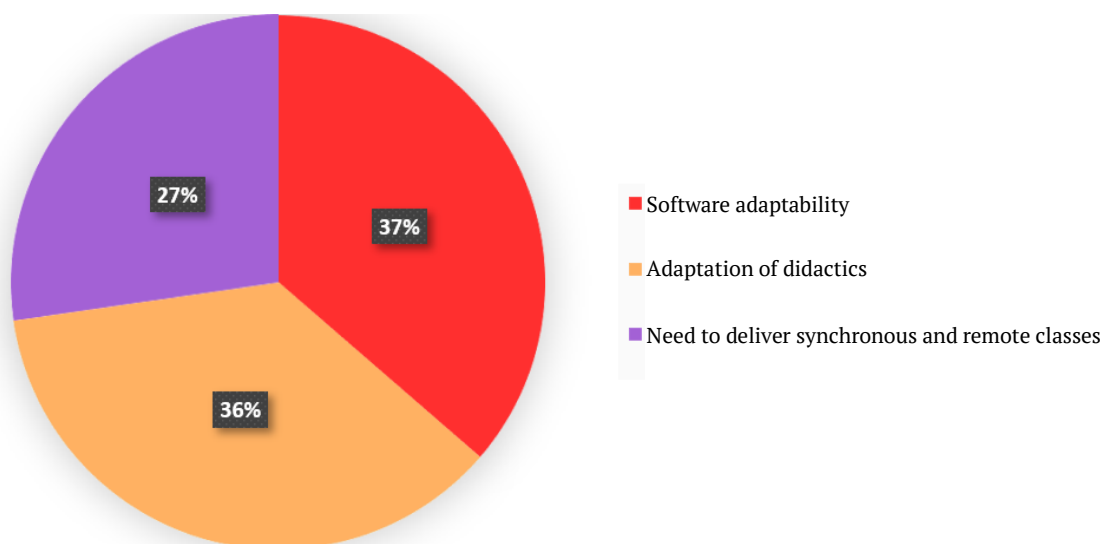


Figure 1. Difficulties regarding the urgency of remote teaching.

Source: Designed by the author.

The software adaptability category was observed in 37% of the analyzed surveys and encompasses aspects such as: the possibility of power failure during *online* classes; the indispensability of adequacy between two or more programs; the difficulty in dividing time for teaching and learning; the non-receptivity of students to the applications used for remote classes; the convenience of recording live classes (so that students could have access, more than once, to the content taught in the class) and the assessment of teaching needs, – with regard to the content to be taught by the teacher and to what extent it would be accepted by the student body.

The category related to the adaptation of didactics was observed in 36% of the studies; it highlights the challenges of maintaining the quality and effectiveness of *online* classes and the non-interactivity on the part of students in relation to the classes.

In turn, the need to deliver synchronous classes, as well as face-to-face and remote classes, was reported in 27% of the studies. Some studies mentioned positive points in relation to *online* classes, with the possibility of greater content coverage and the adoption of new pedagogical teaching strategies as a whole (Vercelli, 2020; Cleland et al., 2020).

The set of papers analyzed here allows us to state that the difficulties reported by the school community after the pandemic, mirror contradictions already existing in the educational system before it: “[...] a large gap between theory and practice can be seen in everyday school life, when, immersed in a digital world, the school still consolidates a fragmented teaching practice, whose conception of transmission separates emission from reception” (Ballmann de Campos, 2008, p. 82). For Pierre Lévy (1999), education, since ancient times, must be prepared for possible new learning formats, being necessary the implementation of ‘knowledge recognition procedures’ and specific problem solving skills, which are usually assimilated outside the school environment. The author discussed the impact of technologies on the construction of a collective intelligence and signaled that society was conditioned to them, highlighting the emergence of cyberspace. “[...] is virtual that which exists only in potency and not in act” (Lévy, 1999, p. 47). He also states that “[...] is virtual any ‘deterritorialized’ entity, capable of generating various concrete manifestations at different times and places, without, however, being itself tied to a particular place or time” (Lévy, 1999, p. 47, emphasis added).

Antunes Neto (2020), raises the questions: ‘What would be the role of the teacher in contemporaneity, even more now in this pandemic period?’, alerting on the need for reflection on the pedagogical practice and how these new relationships, based on the use of technologies, will interfere with the teaching-learning process and with the construction of new teaching methodologies. It addresses the importance of the continuous updating of teachers and the use of technologies in classrooms, in order to support possible changes in project methodologies and the development of research with interdisciplinary approaches. For Suzuki and Rampazzo (2009), the use of computers in the classroom and the way they are used can enrich the developed activities. To this end, the training of educators must be rethought, emphasizing the acquisition of new competencies; it is necessary to promote adjustments to the reality, to the actions of the teacher and the students, as well as to the role that these new technologies play in the school.

The current work also investigated to what extent the use of remote teaching tools from the pandemic generates psychological consequences in the school community. Mention of this aspect was found in only three studies (Barbosa et al., 2020; Cleland et al., 2020; Pather et al., 2020). In this sense, Figure 2 summarizes the perception of teachers and undergraduate and graduate students.



Caption: *Medo* (Fear); *emocional* (emotional); *expor* (exposing); *virus* (virus); *exaustão* (exhaustion); *emprego* (job); *ansiedade* (anxiety); *estresse* (stress); *perder* (losing); *física* (physical).

Figure 2. Main psychological impacts arising from the urgency of remote teaching.
Source: Des igned by the author from the Voyant Tools software (2020).

Complaints or symptoms such as exhaustion, fear, anxiety and stress regarding the possibility of job loss and exposure to the virus, as well as work overload, stand out as substantial for the psychological state in which teachers and students found themselves. Vercelli's (2020) study, for example, denotes that faculty overload in the face of the abrupt need to reschedule classes is the most stressful factor. Cleland et al. (2020) detected great anxiety in educators about the burden placed on them during the crisis period, emphasizing that they were feeling exhausted and overworked. Many were working long hours a day to change their ways

of teaching – via *online* and/or offering face-to-face teaching to smaller groups. They reported exacerbated working time for teachers who have a clinical load, whose roles are changing and expanding. The work by Pather et al. (2020) revealed psychological impacts, such as stress, about job security and exposure to the virus. Initially, this stress was linked to the manner in which the academic staff mobilized to offer an *online* anatomy education program, and was exacerbated when some departments chose to temporarily suspend the organ donor program due to uncertainty about the risk of patient exposure to COVID-19. Many educators also reflected that the increased workload was not accompanied by the usual rewards from interactions with students.

These data are in agreement with the literature. Variables such as important life events, daily problems, catastrophes, work-related stress and sociocultural aspects, among others, favor stress. Specifically in relation to work, factors such as overload, exhaustion, excessive or insufficient control, besides role ambiguity or conflict and shift rotation, with changes in individual rhythm, are considered some of the main stressors (Straub, 2014). Reports of feelings of exhaustion, fear, anguish and anxiety in the face of risks such as unemployment and exposure to the virus draw attention in the surveys. The presence of specific stressors such as ‘uncontrollable conditions’ can elevate the level of hormonal reactions in response to acute psychogenic stress. ‘Uncontrollable conditions’ is understood to mean exposure to emotionally distressing stimuli that cannot be avoided through any action or behavior on the part of the individual (Dickerson & Kemeny, 2004).

Reports of adoption of coping strategies to manage the difficulties faced by the school community were also highlighted. The study by Choi et al. (2020), for example, revealed that recording the lessons given *online* and making them available is a way to reducing students’ anxiety, since they will be able to access them later. In specific courses, teachers and students need to handle tools in a face-to-face manner, as is the case of Anatomy and Ophthalmology, for example. In order to overcome this challenge and minimize the psychological impacts, teachers have chosen to work on theory via remote teaching and the face-to-face practical class (Vercelli, 2020; Longhurst et al., 2020; Pather et al., 2020; Chin et al., 2020). Some emphasize the importance of mutual support among faculty members, so that decisions are made together and conflicts decrease (Cleland et al., 2020).

Possibly the problems related to stress and anxiety, among members of the school community as a whole, have increased, facing the pressure for immediate learning of the use of remote technologies from the pandemic; since, before, teachers and students had time to adapt to changes arising from the use of digital teaching technologies (Saragioto, 2015). Everything leads to believe that the adoption of remote teaching tools in the area of education, implies the need to offer programs or support/preparation strategies to the school community, in order to avoid the emergence of psychological reactions, such as stress, distress and anxiety. The study by Saragioto, (2015) mapped the experiences of high school teachers to understand how technological resources were used in public schools in the region of São Paulo. The analysis of the narratives was organized by categories, such as: organization of content by teachers, use of the Educational Portal and interdisciplinarity. One can perceive that the work in the virtual community was based on three fundamental points: production, information exchange and presentation of results. The researcher concluded that the work developed by the teachers was very rich and contributed to the use of technology. She also highlighted, as a differential in the research, the choices of some tools made by the teachers with the use of the Portal. The study suggests that the availability of technical and pedagogical support, through strategies such as educational portals, is essential at this time, when all those involved with the use of new methodologies need references for setting up non-face-to-face class strategies.

It is worth underlining the gaps detected in the literature. Most of the studies found were conducted abroad and all involve exclusively teachers and undergraduate and/or graduate students. The absence of field research at the high school and elementary school levels draws attention. The abrupt need to use technological tools due to the pandemic may be generating stress and anxiety at all levels of education. As schools were closed during the pandemic, about 1.5 billion students were left without face-to-face classes in 160 countries, according to a World Bank report (TV Brasil, 2020).

The central goal of this work was to investigate the challenges faced by educators and students during the adoption of digital technologies in daily school life, since the advent of the COVID-19 pandemic. It was sought to assess to what extent the abrupt need to adopt tools for remote teaching generates psychological consequences in the school community as a whole. This survey brought to light, among other aspects, possible shortages in the training of some teachers, regarding the mastery of new digital technologies, which may be resulting in psychological consequences such as stress, distress and anxiety, according to what the literature predicts (Saragioto, 2015; Suzuki & Rampazzo, 2009; Vercelli, 2020; Longhurst et al.,

2020; Pather et al., 2020; Chin et al., 2020). COVID-19 has provoked inquiries about aspects such as loneliness, in symmetry with lack of the presence of the 'other'. On the other hand, all this can also contribute to the growth and appreciation of virtual social groups by enabling an integration between different social and political characters (Moran, 2020). The pandemic state, throughout history, deliberates the need for reformulations in Education, as is the case of the adoption of active methodologies and the use of digital tools that facilitate the integrated performance of students and teachers (Moran, 2020, 2017, 2015, 2013, 2009; Moreira, 1999).

A system of computational wonders has exposed the teacher to a macro universe of data and information and the unforeseen issues that can arise in setting up remote activities (Ministério da Saúde, 2020). By having their work directly watched and briefly assessed, teachers may lose some of their spaces of silence and anonymity, and possibly be forced to get used to 'the society of the spectacle', as proposed by Lipovetsky (2012), when, for example, they prepare classes with resources they have little control over, control an *online* classroom and need to prepare video classes, and may be exposed to judgments regarding any failures they may commit (Weide, Vicentini, Araujo, Machado, & Enumo, 2020).

Conclusion

As was observed, in this research, the studies were predominantly focused on Higher Education. It is suggested that research involving teachers and students from Elementary and High School be carried out, in order to check the perception of the psychological impacts and difficulties found in the face of the urgency of remote teaching from the pandemic. Studies of this nature can subsidize preventive interventions in mental health aimed at this clientele.

It is concluded that the literature review constitutes a type of study appropriate to cover the issues related to the mental health of teachers and students, since it constitutes a theoretical basis for future field studies to be conducted in the sense of investigating the possible emotional and psychological sequels faced by the school community when coping with the COVID-19 pandemic, which is a recent fact. Although the literature produced so far on educational issues and the educational individuals facing COVID-19 is still quite preliminary, it is emphasized the need to develop research in the area, in such a way as to consolidate it as a reference to new studies that may subsidize intervention research. It was perceived that the literature in the area already contains works in this direction, in Brazil and abroad, involving higher education students and teachers. Nonetheless, it was not found, within the period to which this bibliographic survey refers, and in the databases consulted here, field studies involving teachers and students from elementary and high school. Accordingly, the importance of further research on the theme is emphasized, taking into account the peculiarities of different socio-cultural contexts.

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