Teachers amid emergency remote teaching: repercussions of social distancing on formal education*[1]

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Abstract

The article analyzes formal education in schools and universities during social distancing due to the covid-19 pandemic. The objective was to understand how social isolation reverberated in the teaching practices to enable teaching and learning through emergency remote teaching. The study had a qualitative approach with the participation of 146 teachers from basic and higher education using an online questionnaire. Data were processed in Iramuteq software and interpreted using content analysis according to Bardin. Five categories of analysis emerged: students' digital exclusion; impacts on teachers' health; difficulties in the teaching-learning process; pedagogical demands to handle the situation; and precariousness of teaching work. The results indicated that the students' lack of access to adequate technological equipment and the internet, the increase in the demands of teaching work, and the inability of some teachers to teach online classes using digital information and communication technologies increased the precariousness of teaching work, which caused damages to teachers' health. Concluiu-se que a superação deste cenário inóspito exige medidas urgentes e efetivas, sobremodo aquelas de iniciativa do poder público, para a promoção da equalização social, com o fomento abrangente do acesso às tecnologias digitais da informação e comunicação, além do investimento em capacitação profissional voltada às novas demandas pedagógicas do ensino remoto emergencial e à valorização do magistério.

Keywords

Education – Covid-19 – Pandemic – Digital divide – Teaching and learning.

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Introduction[4]

The World Health Organization (WHO) declared the outbreak caused by covid-19 as a public health emergency of international relevance on January 30, 2020 (PAHO, 2020). This disease, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), started in Wuhan, China, and soon reached all continents (GUY *et al*., 2020). On March 11, 2020, when the WHO considered covid-19 a pandemic, Brazil already had dozens of confirmed cases, showing an uncontrolled growth in the number of infected in the subsequent months, that way, on January 10, 2021, there were 22,184,824 confirmed cases and 616,691 accumulated deaths (BRASIL, 2021b; PAHO, 2020).

With the rapid spread of contagions, social isolation was adopted in an attempt to minimize the number of contaminated and, consequently, there was a discontinuation of in-person teaching in public and private schools and universities around the world. In Brazil, this process was determined by Law number 13.979/2020, whose article 3 established isolation, quarantine, and other measures "[...] to face the public health emergency of international significance resulting from the coronavirus" (BRASIL, 2020).

The United Nations Educational, Scientific and Cultural Organization (Unesco) estimated that about 70 percent of the world's school community has been negatively affected by covid-19, which means that the number of students affected in Brazil exceeds 52 million. This situation mobilized Unesco, in March 2021, the second year of the pandemic, to bring together 160 countries to discuss the educational context, since the health crisis still had negative effects on more than half of the students who had their classes abruptly changed from usual patterns of in-person attendance to be able to continue with their schooling[5].

As a palliative measure so as not to halt teaching in schools and universities that adopted the in-person model of formal education, educational activities were resumed through emergency remote teaching (ERT). Unlike online learning, the last form of education provided for in Decree No. 9,057/2017 (BRASIL, 2017), which regulates article 80 of Law No. 9,394/1996 - Law of Guidelines and Bases for Education, whose offer is up to the legally accredited educational institutions and has a team in charge previously trained –, ERT did not have a broad national discussion, did not present activities standardization nor did it have a specific platform for educational purposes, in an emergency and in an improvised way, other means had to be used, including social networks, such as WhatsApp, video conferencing services, such as Google Meet, among other unusual tools to ensure the continuation of classes (NEVES; FIALHO; MACHADO, 2021). However, given the exceptional health situation, the Ministério da Educação (MEC), through Ordinance number 343/2020, announced the replacement of in-person classes for online classes during the covid-19 crisis, initially for higher education. Next, with updates consistent with the pandemic situation, the Conselho Nacional de Educação (CNE), through the Conselho Pleno (CP), started to provide guidance for pedagogical activities at all stages and levels

4- The entire dataset that supports the results of this study is publicly available on Zenodo, in open access, and can be accessed at: https://doi.org/10.5281/zenodo.5849616.

5- On the return to in-person classes during the pandemic, see the guidebook with recommendations devised by Brandenburg *et al* (2020).

of the education system, including conveying guidelines for implementation of remote and hybrid teaching in Brazilian education and the possible effects on students learning. This decision was observed by the councils of the other federated entities (BRASIL, 2021a).

Faced with this complex context, the following question emerged: how did Brazilian teachers perceive and face the challenges of the covid-19 pandemic, considering the abrupt changes in teaching work and the teaching-learning process as a result of social isolation? In an attempt to respond to this concern, a scientific study was developed to understand how teachers mobilized and how social isolation reverberated in the modified teaching praxis to enable the continuity of teaching and learning through ERT. To this end, a qualitative study was developed, which is better described in the subsequent section, whose data collection took place through a *Google Forms* questionnaire. The organization of the results was carried out using Iramuteq software, and the content analysis followed Bardin's (2016) teachings.

It is important to highlight that teaching-learning is understood as a complex system of behavioral interactions between students and teachers, resulting from the intentions and actions of the human beings, in an interdependent and inseparable way, resulting in processes of personal development, in which competencies, behaviors, and abilities are mobilized to add new knowledge to previously assimilated knowledge (TARDIF, 2012). Consequently, teaching practice is dynamic and temporal, as the articulation of theoretical knowledge with pedagogical practice varies according to teachers' and students' knowledge and the culture to which they belong (ABU-EL-HAJ; FIALHO, 2019).

The relevance of the study lies in the fact that it allows us to reflect on the current reality of the health crisis due to the covid-19 pandemic, concerning the new ways for teachers to enable the continuity of teaching and learning. After all, as ERT was suddenly implemented in the Brazilian context, marked by inequality in admission and permanence in school and access to digital information and communication technologies (TDICs)[6], it is important to know better how Brazilian teachers perceived and faced the challenges in their practice in an attempt to minimize the damage caused by the suspension of in-person classes.

Methodology

Based on the concept that qualitative studies make it possible to question theories and hypotheses, to understand, interpret and discuss human and social experiences, values, and attitudes (MINAYO, 2012), a qualitative research was carried out with 146 Brazilian teachers who worked in basic or higher education, in the private or public education systems, at the federal, state and/or municipal levels, during the covid-19 pandemic.

Data collection was online through a Google Forms questionnaire, published on WhatsApp and Facebook social networks, in addition, it was made available individually via personal or institutional email from March 31, 2021, to May 28, 2021. The survey

6- According to Costa, Duqueviz, and Pedroza (2015, p. 603), "[…] TDICs are instruments that mediate learning, especially concerning knowing and doing, and also to access technopopular culture, although such potential is underused in school".

had sixteen questions, seven of which were objective, with multiple-choice answers, and nine were subjective. The first questions gathered sociodemographic data and sought to outline teachers' profiles: 1) age; 2) gender; 3) how long they have been teaching; 4) administrative sphere of work, whether public (federal, state, or municipal) or private; 5) level, stage, and modality of formal education in which they taught; 6) nature of the employment regimen, whether effective or temporary, in a public or private system; and 7) monthly salary bracket. The latest questions allowed teachers to give their opinions about teaching during the covid-19 crisis: 1) if they started to teach remote classes instead of in-person classes; 2) if there was an increase, or not, in the workload; 3) if they had previous experience with remote classes; 4) if they had pre-pandemic training or qualification for remote teaching; 5) if they had training or qualification after the start of the pandemic for remote classes; 6) their perception about themselves in terms of knowledge and skills for remote classes; 7) which vulnerabilities that they identified in their students in remote classes; 8) the impacts of the pandemic on the teaching-learning process; and 9) if they had an open space for reflections and additions about their work during the pandemic. The questions referred to the teachers' professional experiences caused by the implementation of ERT, not in a specific time frame because some teachers started ERT at the beginning of suspensions of in-person classes and others started this activity later.

To validate the questionnaire, Gil's (2017) recommendations were taken into consideration, meaning that the survey was previously tried out with subjects belonging to the same universe as those investigated, three teachers working with ERT during the pandemic, whose considerations allowed the reformulation of the statement of two questions. Only after validation, the questionnaire was answered by the other participants.

For data processing, the R Interface was used *pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (Iramuteq), version 0.7 alpha 2, because it's an open software. Based on R software and python language, this program provides textual statistics, group specificity research, descending hierarchical classification (DHC), similitude analysis, and word cloud. Furthermore, in qualitative studies, including those in the humanities and social sciences, this software does not exclude the researcher from their role in mastering the literature on the study's object and in analyzing the data collected (CAMARGO; JUSTO, 2013). Even with the lexical analysis facilitated by Iramuteq, Bardin's (2016) content analysis technique allowed the corpus interpretation constructed by the grouping of subjective answers.

It is worth clarifying that, due to the profusion of data obtained with the application of the questionnaire, this study limited to two thematic blocks: the first was composed of the participants' profiles; and the second subdivided into four sub-blocks according to the answers to the related questions, which dealt with: the biggest challenges to teaching a proficient class remotely; the vulnerabilities identified in students related to remote teaching; the perceptions about the effects of the covid-19 pandemic on the teaching-learning process; and the impacts of the pandemic on work itself.

As the answers on the second block were open ended, Bardin's (2016) content analysis method was used for this segment, which provides for the exploration of data from inference or deduction following the pre-analysis steps, exploration of the material, and

treatment of the results, and inference and interpretation. Thus, in Iramuteq's "Profiles" tab, the typical text segment was accessed and the content of each class was analyzed. From that, the nuclei of meaning representing the categories submitted to Bardin's (2016) method were extracted.

The results presentation consisted of tables, figures, and textual clippings to demonstrate the synthesis of the data from the profile of the participants and the formulations of the Iramuteq in confluence with the content analysis based on the transversal dialogue with the national and international theoretical framework about the theme.

It should be noted that the entire research procedure complied with Resolution No. 510/2016 of Conselho Nacional de Saúde (CNS), as well as the "Guidelines for research procedures with any stage in a virtual environment" of the National Research Ethics Commission, on 24 February 2021 (BRASIL, 2016, 2021c). The research project received a favorable ruling with the No. 4,740,147 and followed strictly the ethical and legal guidelines, including the Free and Informed Consent Term (ICF) in the initial part of the questionnaire and secured participants' right not to respond to any question and contact the researchers for clarification at any time.

Results

To outline the study participants' profiles, the answers to questions were assigned numbers from one to seven: gender; age; how long they have been teaching; the administrative sphere of work; nature of the employment regimen; level, stage, and modality in which they work; and monthly salary bracket.

At this point, it is necessary to make it clear that none of the questions in the data collection instrument, except for the consent expressed in the ICF, was mandatory. Therefore, few abstentions were found in isolated answers, duly indicated by the variable "not informed" in Table 1. In addition to specifying the variables obtained, it was decided to present the absolute number and percentage of each one, setting as a reference the total number of responses (146). The expression "Educação de Jovens e Adultos" was also designated by the acronym "EJA", and "MS" was conventionally used for the term "minimum salary", and the reference value for the answers was R$ 1,100.00, as it was the MS at the time of data collection.

Table 1 – Sociodemographic profile of research participants

VARIABLES	N	%
Gender		
Female	114	78.1
Male	32	21.9
Others	0	0.0
Not informed	0	0.0

Total	146	100
Age group (in years)	**N**	**%**
20 to 29	9	6.0
30 to 39	37	25.0
40 to 49	45	31.0
50 to 59	42	29.0
60 or more	10	7.0
Not informed	3	2.0
Total	146	100
Time teaching (in years)	**N**	**%**
Less than 1	4	2.7
From 1 to 10	56	38.4
From 11 to 20	58	39.7
From 21 to 30	23	15.8
More than 31	5	3.4
Not informed	0	0.0
Total	146	100
Administrative sphere of work (educational system)	**N**	**%**
Federal	33	20.5
State	56	34.8
Municipal	52	32.3
Private	20	12.4
Not informed	0	0.0
Total*	161	100
Nature of the employment regimen	**N**	**%**
Effectively hired by the public administration	110	71.4
Temporary contract with the public administration	22	14.3
Contract with the private school system	19	12.3
Not informed	3	1.9
Total*	154	100
Level, stage, and modality of work	**N**	**%**
Higher education	65	44.5
High school and higher education	2	1.4

Elementary school from 1st to 9th grade	2	1.4
Elementary school from 1st to 5th year	19	13.0
Elementary school from 6th to 9th grade	9	6.2
High school	10	6.8
EJA	1	0.7
Elementary education from 1st to 5th year and special education	1	0.7
High school and special education	1	0.7
Early childhood education	14	9.6
Elementary education from 1st to 5th year and higher education	2	1.4
High school, EJA and higher education	2	1.4
Elementary school from 6th to 9th grade and high school	4	2.7
Elementary school from 6th to 9th grade, high school and EJA	2	1.4
Early childhood education and elementary education from 1st to 5th grade	3	2.1
EJA and higher education	2	1.4
Early childhood education and higher education	1	0.7
Elementary school from 6th to 9th grade, high school and higher education	1	0.7
Elementary school from 6th to 9th grade, high school and special education	1	0.7
Not informed	4	2.7
Total	146	100
Monthly salary bracket (reference: minimum salary in force in 2021)	**N**	**%**
Less than MS	4	2.7
MS	1	0.7
Above one MS up to two times MS	14	9.6
Above two times MS up to four times MS	44	30.1
Above four times MS up to ten times MS	50	34.2
Above ten times MS	28	19.2
Not informed	5	3.4
Total	146	100

*The N of these sociodemographic dimensions exceeds the total number of 146 because some teachers are working on more than one sphere and effectively working in more than one level/stage/modality of education.
Source: Authors' own elaboration based on questionnaire data (2021).

A total of 146 teachers participated in the study, of which 114 were female and 32 were male, with a predominance of women at all stages and levels of education. In the age group variable, ages ranged from 23 to 73 years old, with the 40 to 49 age group being the most prominent, with 45 teachers. Next, there are 50 to 59 years old, with 42 educators, and 30 to 39 years old, with 37.

As for the time of teaching experience, if they had more than one contract, the oldest was considered. Thus, the shortest time teaching was three months, and the longest was 37 years. Only four teachers had less than one year of experience; 56 were between 1 and 10 years old, and 58 had 11 to 20 years of experience.

Regarding the sphere of practice, it was found that many teachers work simultaneously in more than one instance. The same occurs to the nature of these contracts and the stages or modalities of professional practice, in which teachers combined working public and private systems at various stages of formal education.

Regarding the monthly salary bracket, there were distortions because four teachers received less than one MS, and fourteen, a considerable number, were paid only one to two times MS with remuneration below the legal salary of the category. Still, fifty received from four to ten times the MS and, exceeding the bracket of ten times the MS, 28 participants were identified. It is important to highlight that the lowest salaries were for teachers of early childhood education and the first stage of elementary school, while the highest was for teachers of higher education.

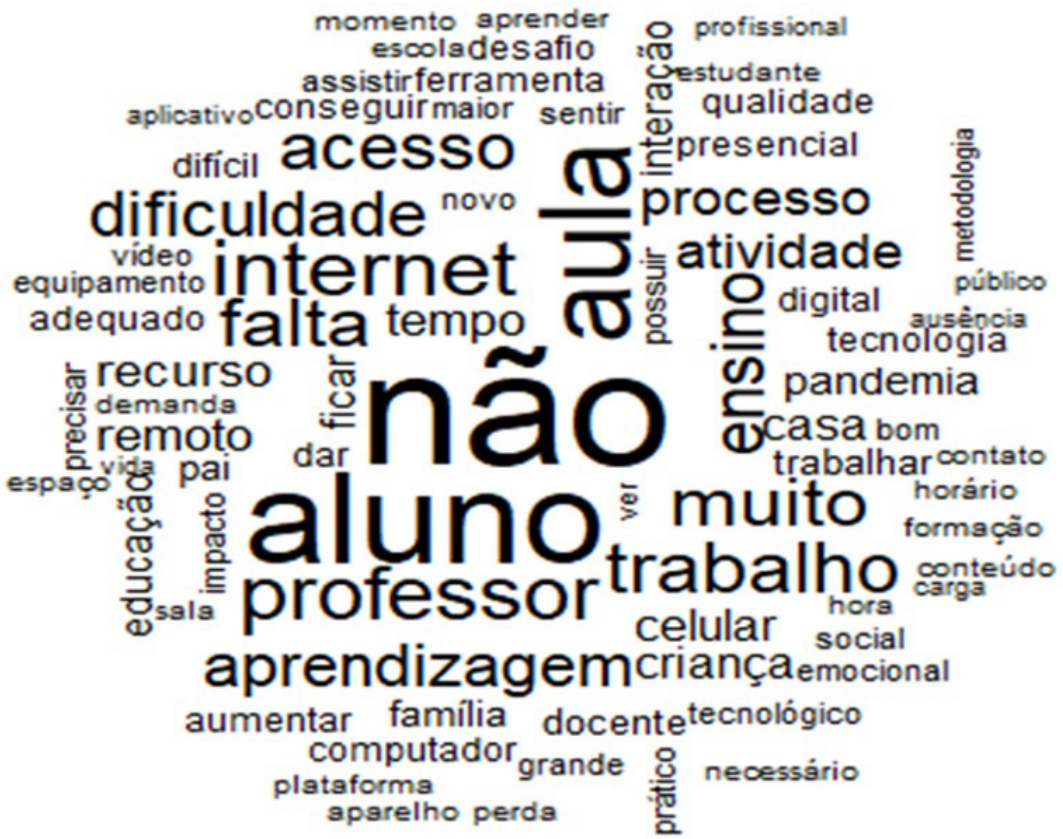
The general corpus submitted to the Iramuteq software consisted of four texts - a set of text segments (TSs) –, separated by 362 TSs, with the use of 304 TSs (83.98 percent). Each text corresponded to the set of answers presented by the 146 participants to the four questions: 1) 1) “Describe your biggest challenges to conduct remotely a proficient class”; 2) “Concerning your students, do you identify any vulnerability related to remote (distance) learning? If yes, describe what they are”; 3) “What else do you have to say about the impacts of the covid-19 pandemic on the teaching-learning process?”; and 4) “What do you have to say about the impacts of the covid-19 pandemic on your work as a teacher?”. Therefore, 12,839 occurrences arose – words, forms, or vocables –, 2,659 distinct words, and 1,569 with a single occurrence.

It is important to mention that the occurrences, at first, were compiled considering the total number of teachers. Then, to avoid bias in the analysis, as the responses of higher education professors, who were the majority, predominated, the procedure was repeated, separating the occurrences by stage of education. However, the same classes and thematic categories were obtained. As the problems pointed out by teachers to continue with remote teaching were similar, regardless of the level and stage of education, it was decided to develop a macro analysis, however, highlighting the stages of education in which each category was most prevalent.

The most recurrent active forms of use by the participants were: *no* (*f*=218), student (*f*=165), class (*f*=138), Internet (*f*=91), teacher (*f*=89), work (*f*=80), many (*f*=78), lack (*f*=75), teaching (*f*=72), access (f=71), difficulty (*f*=67), learning (*f*=63), activity (*f*=48), process

(*f*=48), resource (*f*=46), remote (*f*=44), time (*f*=44), cellphone (*f*=42) and child (*f*=42). Figure 1 visually highlights the most frequent words.

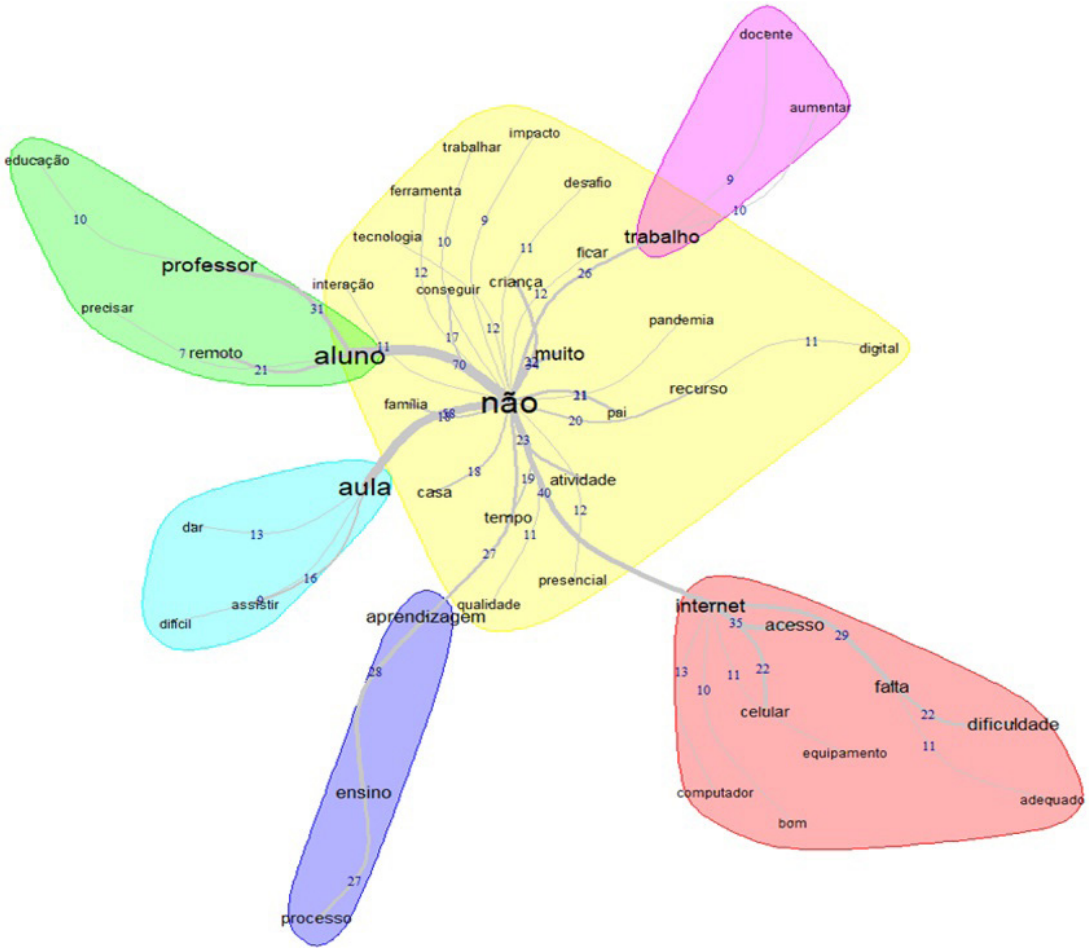
Figure 1 – Word cloud



Source: Answers to the open-ended questions on the survey processed in Iramuteq (2021).

The connection between these words was established in the similarity analysis, which helped to identify the textual corpus' content structure. Figure 2 shows the most prominent forms in the set of responses obtained. The word does not stand out in halo , grouping many, pandemic, impact, and other forms that occupy the center of the tree. The five main branches are arranged clockwise in: 1) work, teaching and increase; 2) Internet, access, lack, difficulty, equipment, suitable and computer; 3) teaching-learning process; 4) class, teach, watch and difficult; 5) student, teacher, education and need.

Figure 2 – Similarity analysis chart

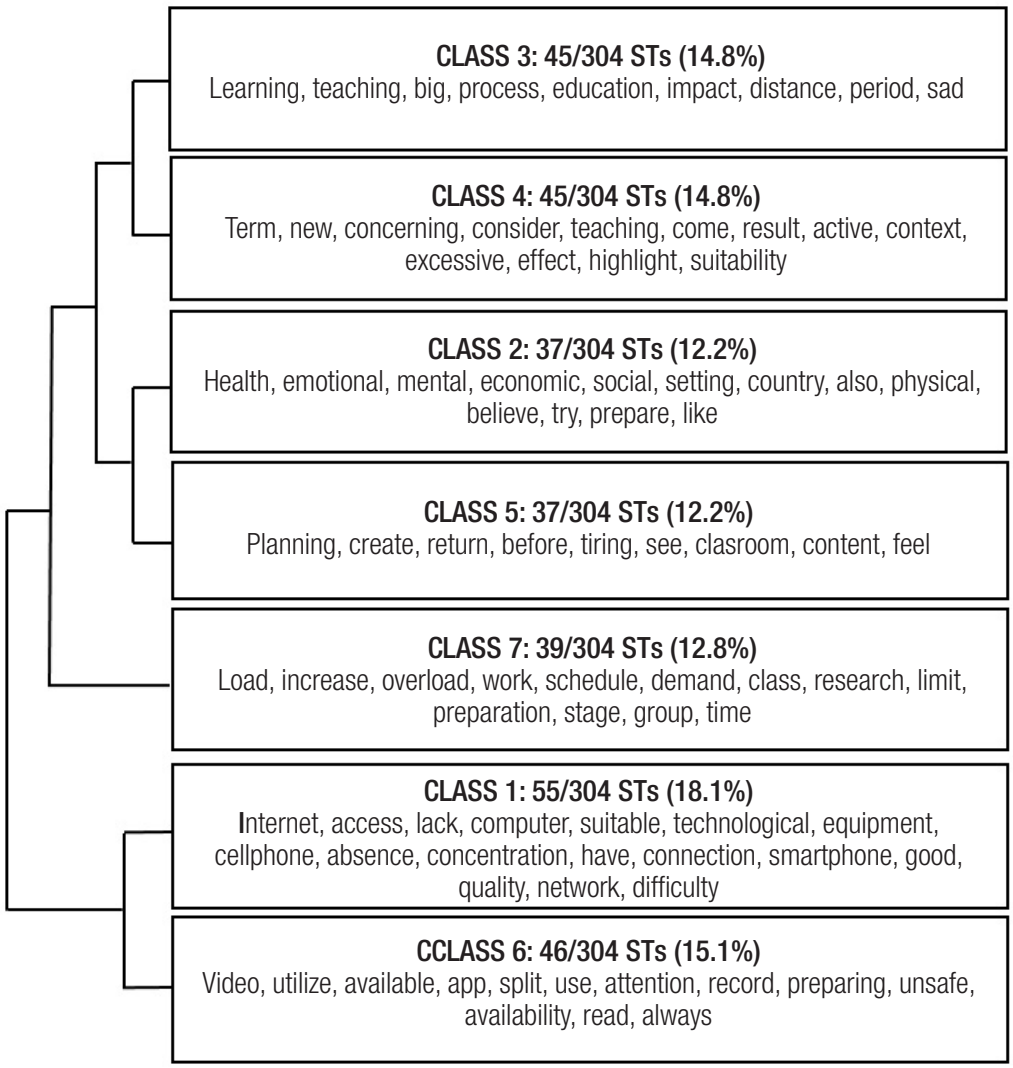


Source: Answers to the open-ended questions on the survey processed in Iramuteq (2021).

Due to lexical similarity, DHC categorized the content into seven classes: class 1, with 55 TSs (18.1 percent); class 2, with 37 TSs (12.2 percent); class 3, with 45 TSs (14.8 percent); class 4, with 45 TSs (14.8 percent); class 5, with 37 TSs (12.2 percent); class 6, with 46 TSs (15.1 percent); e class 7, with 39 TSs (12.8 percent).

In Diagram 1, the relationships and divisions between classes are illustrated using the dendrogram, which was adapted from the one provided by Iramuteq. In it, the classes formed from the content partitions are observed in the same hierarchical order presented by the program: 6, 1, 7, 5, 2, 4, and 3. It's important to note that all subdivisions are interrelated. When reading them from left to right, classes 6 and 1, at the top level, are connected and, subsequently, they are associated with class 7, which branches out to classes 5, 2, 4, and 3. The latter occupy the same hierarchical position. Also, within each class, in order of relative importance, lexical forms with P<0.0001 were registered, as they are the most significant.

Diagram 1 – DHC dendrogram adapted from Iramuteq software



Source: Answers to the open-ended questions on the survey processed in Iramuteq (2021).

The data in the "Profiles" tab, in the Typical text segments tab, from each class processed by Iramuteq, provided the idealization of five thematic categories submitted to Bardin's (2016) method:

• Category 1 (students' digital divide): showed the responses incorporated to class 1: "many students do not have the necessary equipment and means"; "most watch classes on their cellphones"; "most of the students only have a cellphone, often it is a device shared with their siblings and with little memory"; and "they do not have a suitable environment at home to watch classes" (data from class 1).

• Category 2 (consequences for teachers' health): reproduced in the answers ordered in class 2: "the current scenario is compromised; our physical and mental health has distressed and discouraged us, revealing a country that neglects education" (data from class 2).

• Category 3 (difficulties detected in the teaching-learning process): characterized by the answers classified in class 3: "the physical distance from the school significantly weakened the teaching-learning process"; and "in the public education system, the teaching-learning process has become a game of make-believe" (data from class 3).

• Category 4 (pedagogical coping mechanism): expressed in the answers gathered in classes 4 and 6: "students and school workers had to re-signify the teaching and learning processes"; "we had to reinvent ourselves as teachers"; "we have to fill out several additional reports and rethink the way we present the content"; "reporting exercises, [...] an infinite bureaucracy"; "we do not have the necessary pedagogical support, including information that makes our work with distance learning effective" (data from class 4). "I'm shy and insecure"; "I do everything intuitively"; "[...] I feel insecure and do not master the instruments used well"; "there are numerous resources available, but unfortunately we still do not have access [...]" (class 6 data).

• Category 5 (precariousness of teaching work): constituted by the answers compiled in classes 5 and 7: "the work has become more difficult, I am working more than before"; "I felt that I was working with no return, this is frustrating"; "I already feel the effects on my vision"; "I had to make some purchases of tech support and equipment"; "I have to work sitting down, which brings physical damage, in addition to the emotional damage caused by immediate responses required on WhatsApp" (data from class 5). "My workload has increased dramatically, I live in my work environment"; "it goes on during the weekend and holidays, there are no more boundaries between work and your personal life" (data from class 7).

It is important to point out that the teachers' narratives regarding the problems faced, although very similar, were different in the following way: categories 1 (students' digital divide), 2 (consequences for teachers' health), and 5 (precariousness of the teaching work) were unanimous among the teachers, regardless of the stage and level of education, but being more predominant in the narratives of higher education professors. On the other hand, categories 3 (difficulties detected in the teaching-learning process) and 4 (pedagogical coping mechanism) were more present in the comments of basic education teachers, especially those who worked in early childhood education.

Discussion

The association of Google Forms and Iramuteq with Bardin's (2016) content analysis technique made the collection, treatment, and analysis of data more dynamic, constituting an interesting investigative experience. There were no inconsistencies between these collection and analysis techniques, on the contrary, the program did not exempt researchers from interpretive reasoning for the construction and interpretation of thematic content categories, instead, they complemented each other. In fact, the textual corpus obtained the retention of 83.98% of the TSs, when the recommended minimum, according to Camargo and Justo (2013), is 75%. Likewise, the functions, frequencies, and

connections pointed out by the software were also found in the careful reading of the set of responses to the online questionnaire, and in the inferences and interpretations made by the researchers.

The word cloud showed the data panorama, in which the word no, the most frequently used, alludes to the scarcity of appropriate means for the qualified ERT. In the teachers' concerns, students occupy a central place, perceptible by the emphasis on the terms student and class. Moreover, the interdependence of all these issues is verified in the main ramifications of the similarity analysis, namely: increase in teaching work; lack of internet access and adequate equipment; and difficulty in teaching and watching classes. All this permeates the teaching-learning process and directly influences teaching work, teachers' health, and student learning, as can be seen in the study's categories.

Category 1 (students' digital divide), individually, is the most expressive of the content, as it corresponds to 18.09 percent of the 304 TSs. In it, the students' and their families' deficiencies regarding access to TDICs for remote classes are noted. On the subject, it is also worth mentioning the data on the teachers' profiles: the fact that some receive less than a minimum salary and others earn little more than the minimum suggests a probable insufficiency of resources to meet the most elementary material needs, adding the essential connectivity to the remote classes. The teachers' complaint about the precarious access to the Internet and digital tools was the most frequent difficulty pointed out by all teachers, regardless of the stage and level of education.

In Brazil, the covid-19 pandemic has exacerbated social inequalities that were already a neoliberal legacy. In this context, even though the ERT was a solution to the interruption of in-person classes, its implementation excludes those with few resources appropriate to digital access (NEVES; FIALHO; MACHADO, 2021) because social classes, racial groups, residents in certain geographic regions – rural and urban – families, teachers and students are experiencing the pandemic in heterogeneous conditions (CAMPOS; VIEIRA, 2021). A comparative study of how the Brazilian, Spanish and Italian universities best placed in the Times Higher Education 2020 ranking conducted their activities during the pandemic showed that foreign higher education institutions migrated to the ERT more quickly, while Brazil did not offer a quick answer for this problem (CASTIONI; MELO, 2020).

It's a given that even before the pandemic, educational inequalities in the world were already characterized by profound distortions at the level of students, but also of many teachers (PEREIRA, 2021). In Brazil, ruptures and inaccuracies are observed in the successive educational reforms, which do not materialize in the supply of educational needs, due to limited investments and/or ideological disputes at all levels of the federation (SAVIANI, 2008). Here, education experiences an abundant list of norms, from the current Federal Constitution to the normative acts of lower instances, which, however, in the face of omissive governments, lack social effectiveness. Such findings allow us to infer that the problems go against fulfilling the goals established in the current Plano Nacional de Educação (PNE), especially goal 7, whose strategies provide for the increase in the use of TDICs focusing on the diversity of methods and pedagogical proposals. They also determined that, by 2019, all basic education schools should have guaranteed access to high-speed broadband internet and, by 2020, triple the computer/student ratio (BRASIL,

2014). In the same sense, the general competencies outlined in the Base Nacional Comum Curricular (BNCC) are not satisfied, specifically competencies number 1, 2, 4, and 5, which include in the agenda towards students' integral education the following categories "digital culture", "technological solutions", "digital language" and "digital technologies" (BRASIL, 2018).

As can be imagined, this context is not unique to Brazil. In a study carried out by Abarca (2021), it was observed that Chilean elementary, secondary, and kindergarten teachers, in the initial months of the pandemic, obtained different levels of participation in their classes, depending on the students' socioeconomic status and the school profile: the more vulnerable they were, the less they attended classes. In turn, the investigation by Uwizeyimana (2021) reported that there was a lack of training at the University of Rwanda, as well as equipment and computer programs for teachers and students. In higher education in Turkey, the research by Özüdoğu (2021) attested to the preexistence of problems in distance education that increased during the pandemic.

Category 2 (consequences for teachers' health) alludes to the physical, emotional, and mental illness reported by teachers given the worsening of problems related to teaching and the new issues imposed due to the current health crisis. From early childhood education to higher education, teachers were unanimously mentioning, with equal concern, the physical and psychological problems that the pandemic context and the requirement of the ERT caused. Among the responses cataloged in this category, it is noted that teachers attribute the discomfort they suffer to the political-administrative neglect of education, often having to circumvent adverse scenarios improvising, alone and without public support, in addition to the fact that they already had an extensive workload. Santos and Oliveira (2021, p. 1), point out that, in Rio de Janeiro's public school system, it was common for high school teachers, elementary school teachers, and early childhood education "[...] who continued to work, carried out activities autonomously, without direction and coordinated actions".

In addition, the harm to teachers' health is associated with how the State manifests itself while applying educational policies, which, not infrequently, the democratizing discourse diverges from practices and, therefore, the desired results are not achieved. Thus, it does not seem prudent to attribute the blame to the pandemic for all the omissions that, in the end, affected teachers' health. However, it is possible to state that, undoubtedly, the situation was worsened during the crisis. Souza et al. (2022) clarify that the changes in teaching work, that became more emphatic in the pandemic, are the result of structural changes in progress and that press on teachers several new obligations, causing signs and symptoms of illness.

A pre-pandemic study by Rodrigues et al. (2020), on the health and work of public universities professors from Rio de Janeiro, found that the new forms of organization and control, governed by increased demand and productivity goals, nullify the time-space limits of the work and reverberate in health, causing depression, sleep disturbances, and other ailments. Campos and Vieira (2021), Souza et al. (2021), and Troitinho et al. (2021) endorse these findings, highlighting that it cannot be disregarded that, in the pandemic,

the school space-time is not cohesive, which causes mental illness in teachers, and that, at all levels/stages, difficulties concerning the ERT increase stress, anxiety, and depression.

In the international context, the reality is similar. As an example, it is worth mentioning the cross-sectional study carried out by Klapproth et al. (2020) in Germany, which evaluated primary, elementary, and secondary school teachers during remote teaching in social isolation, identifying that most of them had experienced technical barriers and increased stress levels. In the United States, research by Pressley, Ha, and Learn (2021), with elementary school teachers, identified a higher level of stress and anxiety in those teaching online, indicating that schools should offer the necessary support to ease these problems. In the Philippines, Oducado et al. (2020) identified a moderate level of stress associated with self-rated health in half of the teachers participating in the study, who were licensed to work in public and private schools, mainly women. In Peru, Estrada Araoz and Gallegos Ramos (2022) draw attention to the emotional exhaustion of Peruvian university students from the education course worsened during the covid-19 pandemic.

Category 3 (difficulties detected in the teaching-learning process) deals with the study participants' experiences regarding the obstacles caused by the pandemic in the teaching-learning process, most emphatically mentioned by basic education teachers. The students' inequalities and the educational measures' possible ineffectiveness to promote egalitarian teaching with remote teaching were pointed out. Research participants envision that access to higher education, during or shortly after the pandemic, will likely be more difficult for students from less favored social classes, as they didn't have essential resources for quality remote classes. By the way, this factor led to an accentuation in the students' learning gap. According to Neves et al. (2021), the Brazilian educational system has profound differences between public and private education that are noticeable in how the suspension of in-person classes was handled in both spheres at all levels of education.

Similarly, in basic education, Dusseault, Pitts, and Lake (2021), in research presented by the Center on Reinventing Public Education (CRPE), estimate that the cumulative effects of the pandemic on educational performance will likely have repercussions for decades, not least because the new viral variants still threaten another academic year and in-person classes. On November 25, 2021, Unesco ([2022]) updated Brazil's situation regarding education by region and state, proving the disparities between federated entities, still within their scope, between public and private educational institutions. In the public education system, some schools had a gradual return, but others adopted the hybrid model, optional in-person classes, at the student's discretion, or 100% in-person classes.

Another obstacle mentioned by teachers in this study, especially in early childhood education and in the early years of elementary school, is the disruption of family and school routines, which impose on parents not only the necessity to fulfill their chores but also to guide the teaching-learning process, when, in most cases, they are not qualified or do not have the means for this new role. Also, for parents of younger students or students with special conditions, such as in early childhood education, the complications are even bigger and assistance is even weaker. Corroborating these findings, a Canadian study carried out by Timmons et al. (2021) with teachers and parents of primary education revealed that parents and families were impacted by the new situation, in addition to being stressed and

overwhelmed by having to teach school contents and tasks in conjunction with their various other roles and for lacking understanding regarding children's development and learning.

Furthermore, the data seized show that material shortages and/or the inability to use digital tools perpetuate training gaps. Likewise, international studies document barriers similar to those identified in this study, such as precarious housing conditions, students' and parents' low motivation, difficulty in connectivity, and lack of equipment with Internet access (KLAPPROTH *et al*., 2020; ÖZÜDOĞRU, 2021).

In some subjects, the obstacles are even greater. Thus, a study that explored how Math teachers in France, Israel, Italy, and Germany, at all levels of schooling, managed the teaching-learning process during school closures revealed that these teachers experienced the conflict between the desire to return to in-person classes and the disappointment of not being able to do so, aggravated by the difficulties observed in the virtual creation of interactive and effective learning, mainly in the applications of the evaluations (ALDON *et al*., 2021).

Category 4 (pedagogical coping mechanism) refers to the reformulation of the ways of learning and teaching in substitution for the suspended in-person classes. In it, teachers identified their training gaps as they had to teach remotely and considered the mandatory nature of the new demands, as they were forced to learn how to face the circumstances related to the pandemic. Regarding basic education teachers, they assert that there was an increase in bureaucratic demands, understood as an excess of procedures, and reports, among others. They also stated that, despite the new emergency requirements for the continued remote classes, they lack pedagogical support and access to TDICs. It was observed that the requirement of reports and the demands of school management fell heavily on teachers of basic education, rather than on teachers of higher education, especially in elementary education.

Notably, teacher training for remote teaching is essential, since, despite the difficulties in accessing TDICs, contact with digital tools does not guarantee digital skills for optimal use of technology in pedagogical practice, as it requires broader knowledge, diverse skills and attitudes to work using these technologies (SILVA; BEHAR, 2019). Therefore, it implies acquiring materials – appropriate equipment, programs, and Internet provider – and understanding how to use them. Thus, it is recommended to consider Benini et al.'s (2020) understanding that the value of the teachers' workforce is connected to the costs of training and professional development, but the purposeful reduction of the cost of education represents an increase in capitalist profit at the expense of the needs of students and teachers. Category 5 (precariousness of teaching work) presents the extensive problems that hinder and depreciate teachers' work. The qualitative data that support this inference are observed by the TSs representing the answers received and grouped in classes 5 and 7, in the results section, in which the teachers mention that the degree of difficulty and the working day were augmented, with no limits between work and paid weekly rest. Another issue highlighted in the study is that, although 44.6% of the participating teachers work in higher education, 16.5% of those also declared that they work, cumulatively, in other stages and levels of formal education. Thus, it can be

inferred that this category was frequently reported by all teachers, regardless of the stage or level of education.

On this topic, Araújo and Mourão (2021) recall that, in teaching, precariousness is a political term that represents the insecurities and uncertainties resulting from neoliberal transformations in the educational policies of the capitalist system, which make labor rules more flexible and subtract workers' rights. In addition, in Brazil, there is no due recognition of teachers' work, either in terms of remuneration or the appreciation for the profession, especially early childhood education teachers, which is historically considered an extension of home education and predominantly the teachers at this level are women, and there is also the erroneous belief that no specific training or qualification is required to exercise it.

Even before the pandemic, the precariousness of teaching work already challenged Brazilian educators, as evidenced by the study carried out by Barbosa et al. (2021), between 2014 and 2018, with teachers from the final years of elementary and high school who worked in the state of São Paulo's public school system. In this study, it was found that the working hours exceeded the contractual workload, due to extracurricular activities essential to the performance in the classroom, without the corresponding salary increase, or even taking up other jobs to complement the low salaries. Adding to this analysis, Neves, Fialho, and Machado (2021), in a state-of-the-art study on all levels and stages of education, identified that Brazilian studies, in the first year of the covid-19 pandemic, revealed that the precariousness of teaching work, despite being structural in Brazil, was exacerbated by the health crisis. In line with these studies, the terms written in the answers to the questionnaires of this study indicate: increase in difficulties, lack of recognition, acquisition of equipment, increase in working hours, the blur of limits between work and rest, among other difficulties that highlight the accentuation of the problem. This reality is also seen in other Latin American countries, such as Chile, where teachers who taught remotely in the initial months of the pandemic used their own resources and increased their working hours (ABARCA, 2021).

Detailing the causes of the worsening precariousness of work in the pandemic, a study carried out with teachers of basic education, from urban and rural areas of the five Brazilian regions, suggests that this phenomenon is a repercussion of online presence, the accumulation of domestic work, and the loss of teacher identification (TROITINHO *et al.*, 2021). Notably, despite the limited number of participants not allowing generalization, most participants are from the Northeast region and working in public schools, the profile raised corroborates the distortions between salary/remuneration and working hours, denouncing the precariousness experienced by many Brazilian teachers, which is not restricted to the Northeastern reality, but permeates all regions of the country.

Because of this, the correction of the problems requires deep reformulations on how the State has positioned itself in the face of educational demands, due to the neoliberal primacy of minimum investments that goes against the strengthening of the state's capacity to fulfill the constitutional requirements for education (PEREIRA, 2021). However, it must be considered that, in addition to the challenge of the ERT, there is a commitment made by teachers to contribute to educational equity, which, for the time being, has been very compromised, especially for students with low academic performance (ALDON *et al.*,

2021). Thus, the State needs to do its part to promote the overcoming demand for training to handle the necessary resources for remote teaching and increase investments to equip schools and students (KLAPPROTH *et al.*, 2020).

Final considerations

This study focused on Brazilian formal education during the suspension of in-person classes due to the covid-19 pandemic, intending to understand how social isolation reverberated in teaching practice, which sought to enable the continuity of teaching and learning through ERT.

Among the results, it was noticed that the words most evoked in the responses in each halo – work, student, class, learning, Internet – were correlated with the negation adverb no. This suggests that the weaknesses inherent to remote teaching, access to TDICs, and their handling interfere with the quality of teaching and learning and teachers' health, in addition to worsening teaching work in Brazil.

There was congruence in the association of Iramuteq with the content analysis technique because, when applying this technique to the data grouped by the aforementioned software, five representative analytical categories emerged: 1) students' digital divide; 2) consequences for teachers' health; 3) difficulties detected in the teaching-learning process; 4) pedagogical coping mechanism; and 5) precariousness of teaching work.

The first category denounces the various students' deficiencies – access to adequate equipment and Internet provider –, which interfere with ERT effectiveness. The second reveals the illness of teachers due to the new and growing demands related to the suspension of in-person classes and ERT implementation in inadequate conditions, without specific training for the use of technologies, and with precarious or no government support. The third specifies the multiple aspects that hinder the teaching-learning process, including those related to family issues, such as the inability of parents or guardians to mentor students in their homes. The fourth comprises the demands placed on teachers, especially those concerning training for remote teaching, for which most teachers did not feel prepared. The fifth indicates the precariousness of teaching work, which, in Brazil, is a structural and multifactorial problem, currently accentuated by the covid-19 pandemic.

As in other countries, the abrupt adoption of ERT negatively interfered with the quality of teaching and learning in both basic and higher education, especially in the former, as it affects children and adolescents who need more support from parents or family members, who also faced technological limitations. However, in Brazil, some teachers' low salaries, added to professional devaluation, and social inequality, reflected in the precarious access to TDICs, and the individual responsibility of the teacher to meet ERT demands without the proper qualification and access to the necessary technological resources, increased the precariousness of work conditions.

The study provided the expression of the participants' proficiency regarding the research object, which made possible to hear the teachers' perceptions. In it, teachers reported similar situations at all levels of education and teaching stages in the face of the difficulties experienced in the teaching-learning process in these inhospitable days

for education, with the requirement of isolation as a measure to contain the covid-19 pandemic and ERT as practically the only alternative to keep classes going without physical contact. It was also observed that, although the problems highlighted in the discussions are similar between the levels and stages of education, in early childhood education and the first stage of elementary school, teachers mention make-believe situations, with no real use for the students, implying that the younger the students, the more the quality of teaching was harmed with ERT.

It was noticed, when discussing the results considering international studies on the subject, that the problems faced by Brazilian teachers were not so different from those faced by teachers from other countries, such as Chile, Peru, the United States, Philippines, France, and Germany, etc. However, in Brazil, there was a perception that the government was slow to invest in teacher training for the use of TDICs and in the democratization of access to technologies, which further accentuated the historical social inequalities, reflected in the difficulties of access and permanence at school and university.

It is noticeable that the research report does not have a quantitative nature, so its data should not be generalized to all Brazilian realities. Even so, it is possible to infer, in congruence with other related national and international studies, that students' digital divide, added to the lack of professional qualification and the precariousness of teaching work, resulted not only in harm to teachers' health but also barriers in teaching and learning, and it is not possible to accurately measure the negative consequences for education. It can be suggested, for future studies, the comparison between the time frame of this data collection and the period after the course of the covid-19 pandemic, in an attempt to measure the losses and possible interventions to minimize them.

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