PROGRAMA DE PÓS-GRADUAÇÃO EM EDUCAÇÃO
EDUCAÇÃO EM FOCO | UEMG

Rede pública de ensino: reflexos da covid-19

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Abstract

Adotando como objeto de estudo os docentes de uma escola estadual, pertencente rede de educação pública do Estado do Paraná, situada na cidade de Fazenda Rio Grande, contemplando os profissionais que atuam no ensino médio. Desse modo, o objetivo da pesquisa consiste em identificar reflexos causados pela Covid-19 no processo de ensino-aprendizagem na visão dos professores que atuam na rede pública de ensino. Partindo desse ponto, o estudo adotou com método o estudo de caso, assumindo uma abordagem mista, caracterizada como quali-quanti. O processo de análise, ocorreu, por meio de um questionário em escala Likert, utilizando o software Excel em conjunto com o ATLAS.TI®. Com isso, se averiguou, alguns dos impactos resultantes da pandemia, caracterizando com positivos e negativos. Por fim, é válido ressaltar o papel desempenhado pelos docentes, como agentes informacionais, atuando no compartilhamento do fluxo de informações, auxiliando a suportar o ensino no ambiente físico e virtual.

Palavras-chave: Ambiente virtual. Aprendizagem; Docente. Pandemia.

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PROGRAMA DE PÓS-GRADUAÇÃO EM EDUCAÇÃO
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Public education: repercussions of covid-19

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Abstract

The focus of this study is on high school teachers from a public school in Fazenda Rio Grande, State of Paraná. The research aims to identify the effects of Covid-19 on the teaching-learning process from the perspective of teachers working in the public school system. The study adopted the case study method, with a mixed-methods approach, characterized as both qualitative and quantitative. The analysis process was conducted using a Likert scale questionnaire, employing Excel software with ATLAS.TI®. The study investigated some of the impacts resulting from the pandemic, categorizing them as both positive and negative. Finally, it is important to highlight the role played by teachers as informational agents, contributing to the flow of information and supporting education in both physical and virtual environment.

Keywords: Virtual environment. Learning. Teacher. Pandemic.

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Red de educación pública: reflexiones de covid-19

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Resumen

Adoptando los profesores de la escuela estatal como objeto de estudio, perteneciente a la red de educación pública del Estado de Paraná, ubicada en la ciudad de Fazenda Rio Grande, contemplando los profesionales que actúan en la enseñanza media. De esta forma, el objetivo de la investigación es identificar los efectos que provoca el Covid-19 en el proceso de enseñanza-aprendizaje en la mirada de los docentes que laboran en el sistema escolar público. A partir de este punto, el estudio adoptó el método de estudio de caso, asumiendo un enfoque mixto, caracterizado como cuali-cuantitativo. El proceso de análisis se llevó a cabo a través de un cuestionario en escala Likert, utilizando el software Excel junto con ATLAS.TI®. Con ello, se indagaron algunos de los impactos derivados de la pandemia, caracterizándolos como positivos y negativos. Finalmente, vale la pena mencionar el papel de los profesores, como agentes de información, actuando en compartir el flujo de información, ayudando a apoyar la enseñanza en el entorno físico y virtual.

Palabras clave: Entorno virtual. Aprendizaje. Maestro. Pandemia.

Introduction

The educational environment, whether in the private or public sector, presents a challenging scenario for teachers working in a society immersed in data. With the use of technological resources, such as computers and smartphones, in the process of communication and information dissemination, driven by their internet connectivity, there emerges a pressing need for teachers to develop new skills. This need is focused on enabling them to master the technological resources available in an educational setting (FARIA, 2004).

Thus, a negative aspect involving COVID-19 and education professionals becomes evident. After the protocols and guidelines issued by the Ministry of Health (MS), such as social distancing and quarantine, aimed at reducing the spread of the new coronavirus, the result was the cancellation of the in-person academic year, redirecting school activities to the virtual environment (BRASIL, 2020b).

The first cases related to the spread of pneumonia were detected in Wuhan, China, on December 31. 2019. As the virus spread to several countries, it was declared a pandemic by the World Health Organization (WHO) (PAHO, 2020). In Brazil, on February 6. 2020. Law 13.979 was enacted, addressing quarantine measures and other procedures such as the use of masks, hand sanitizer, and social distancing.

With all these events, it was possible to observe devastating consequences in education. Due to the new social distancing protocols and the decrees that led to the cancellation of in-person classes, new teaching methodologies became necessary. This shift generated a new flow of information, as in-person classes began to migrate online, aiming to fulfill the minimum required hours of the school calendar (BRASIL, 2020a).

Although public schools have redoubled their efforts to adapt to the challenges posed by the spread of COVID-19. utilizing technological resources such as digital platforms to enable millions of students to access the academic year's content, it is important to highlight certain human characteristics, such as individuality. Each individual synthesizes information at different levels, making it clear that social distancing has brought disadvantages for many students. According to Palangana (2015), the social interaction processes that occur in schools between teachers and students contribute to the learning process, influencing the relationship between the school and the student.

In this context, where society was subjected to social isolation—a measure considered important for combating the new coronavirus—the research problem emerges: to identify the effects of COVID-19 on the teaching-learning process from the perspective of public school teachers. The research seeks to explore the impacts of the pandemic on the teaching-learning process throughout an academic year marked by social distancing.

Teaching-Learning Process

The learning process focuses on what a child is learning rather than on the knowledge absorbed (VYGOTSKY, 1996). The school environment sets the stage where the teaching-learning process takes place, playing a significant role by facilitating interaction between teachers and students, thereby contributing to the development of the student's critical thinking (ABONDANZA, 2002).

However, it is important to note that the learning process in a public school system in Brazil predominantly relies on the use of textbooks. These textbooks guide teachers in their instruction and students in their learning, facilitating interaction between the teacher and the student (BITTENCOURT, 1996; LAJOLO (1996).

According to Libâneo (2009), the school plays a crucial role in fostering dialogue between teachers and students, promoting interaction. It is tasked with the mission of welcoming both the poorest and the wealthiest members of society, providing social, technical, and scientific education equally to all students.

The school is a space where various interactions take place, fostering the development of new skills, social interaction, and the dissemination of knowledge, enabling students to perceive reality (LINHARES et al., 2014). This environment facilitates contact between different individuals, creating an informational flow due to the unique characteristics of each person, highlighting education as a mechanism to break down social, economic, and cultural barriers (TESSARO; TREVISOL; BERNARDI, 2021).

Due to the pandemic caused by the new coronavirus and the sanitary restrictions adopted at the national level, which led to the suspension of in-person classes, the teaching process was redirected

to an online format in an effort to minimize the effects resulting from the suspension of the school calendar (OLIVEIRA MENEZES; FRANCISCO, 2020).

Another point highlighted by Oliveira Menezes and Francisco (2020) relates to the transition from in-person to remote learning. This process required the implementation of new technologies and the training of the teaching staff.

According to Macedo (2021), the transition from in-person teaching to the virtual environment primarily affected students in public schools, due to the social inequalities and financial conditions inherent to this group, highlighting a significant challenge experienced during the pandemic.

In this context, it is possible to recognize the importance of the interaction between teacher and student, which is a key feature of the teaching process. This interaction enables students to engage with the proposed activities, thereby enhancing their mental capacity (LIBÂNEO, 1994). Considering the events related to the teaching process, it is important to highlight the necessary elements such as:

- Focus on the learning process
- The environment in which learning takes place
- The processes of teacher-student interaction.

Thus, it becomes evident that teaching, combined with the elements present in the learning process, highlights education as a source of knowledge. This knowledge is a result of the interaction between this new generation, where both teacher and student learn together, drawing on theoretical foundations and personal experiences (FREITAS; GUIMARÃES; MENEZES, 2019).

Freitas, Guimarães, and Menezes (2019) highlight the importance of interaction between teacher and student, enabling the development of new competencies. The dynamism of the new generations drives teachers to develop new skills so that knowledge sharing can occur through interaction (FREITAS; GUIMARÃES; MENEZES, 2019). Understanding that learning is a process of continuous interaction, whether in a physical or remote environment, it is relevant to discuss the characterization of education as a source of knowledge during the pandemic period.

Education as a Source of Knowledge in Times of Pandemic

Gómez (1996) relates knowledge to an interpretative process, in which individuals or groups interpret information. Following Gómez's (1996) line of reasoning, Davenport (1998) explains the process by which information is transformed into knowledge through procedures where people make comparisons, analyze the consequences of their decisions, establish connections with previously acquired information, and finally use conversation as a parameter for their decisions.

Bringing this concept into the context where educational processes and procedures are developed, Vygotsky (1996) emphasizes that the construction of knowledge occurs through the student's relationship with objects, as well as through social interaction. Corroborating Vygotsky, Boghossian (2015) highlights that knowledge depends on social interaction, meaning that knowledge is conceived through the externalization of information by a group of people who come together with a common purpose. Silva and Navarro (2012) underscore the importance of analyzing education from a constructivist perspective, presenting a series of principles where knowledge is understood as the relationship between individuals who seek learning, both in harmony.

Understanding the relationship between knowledge, data, and the informational flow, as highlighted by Davenport (1998) in relation to the value assumed in decision-making, it is important to emphasize the overwhelming amount of data generated by various communication mechanisms (radio, television, social media). It becomes crucial to analyze which information is truly important, as Strauhs et al. (2012) point out that information and knowledge are essential in innovation processes, being fundamental for generating new ideas. Thus, it is evident that information is a necessary input in the construction of different types of knowledge, which are important in an individual's learning process.

Therefore, the construction of knowledge in the classroom between teacher and student involves various complexities, whether cultural, social, or even temporal differences between the two. It is necessary to reconcile this relationship in a way that it is not reduced solely to a didactic interaction, nor overly focused on the emotional aspects of human relations. Instead, it should address the entirety of the needs present in a classroom setting (MORALES, 1998).

Considering the challenges observed during the pandemic period, particularly in the informational flow encountered through the use of digital platforms in the teaching-learning process,

Oliveira Menezes and Francisco (2020) highlighted difficulties in the interaction between teachers and students. As a result of these difficulties, Pifero et al. (2020) emphasize the implementation of new methodologies in the teaching-learning process, guiding students in the construction of knowledge by providing opportunities for reflection on their actions.

Santos (2015) identifies active methods as an essential tool for problem-solving, enabling students to engage with challenges either individually or collectively. According to Santos (2015), the teacher assumes a secondary role in this process by providing the means for students to develop their skills.

However, Silva, Bieging, and Busarello (2017) explain that when implementing new methodologies in the teaching-learning process, a pressing need arises for education professionals to understand their role in their students' learning. This understanding enables students to develop their autonomy by taking on a central role, which, in turn, allows them to develop new competencies and generate knowledge.

The experience with active methodologies has a positive impact on the learning process by giving meaning to the content, deepening hypotheses, and reinterpreting knowledge, ultimately resulting in new understandings. However, it is important to note some challenges, such as the level of commitment required during the lessons, which demands a shift in attitude from both students and teachers (HENZ et al., 2019).

Although teaching is full of challenges, a good teacher can capture the students' attention, transforming the lesson into something surprising. Even though students might feel overwhelmed by the amount of information, they remain enthusiastic and engaged in the learning process (FREIRE, 1996).

In this statement by Professor Paulo Roberto Freire, it is essential to engage in a reflective action on the practice of a good teacher. When disseminating information, this process must be in sync with both theory and practice, as there is a need for knowledge sharing that enables students to adopt a systemic thinking approach. This approach allows them to assimilate and understand complex problems that go beyond common sense, as discussed in the classroom (SCHON, 2000).

Challenges of the Teacher in the School Environment

In a constantly changing society, various challenges arise in the teaching profession. According to Tedesco (2000), both technology and cultural transformations that have occurred over the years have necessitated changes in teaching methodologies, as conduct patterns have shifted. Given this context, the teacher is traditionally characterized as a professional whose primary role is to teach. However, in light of social changes and the flow of information facilitated by the internet, the teacher has assumed the role of a mediator. In this role, the teacher is no longer solely the holder of knowledge but rather someone who shares and learns from the experiences of their students (ROLDÃO, 2007).

Based on this premise, the teaching process involving the teacher is constantly evolving, requiring the professional to engage in continuous learning due to the dynamic nature of the transformations happening around them (PACHECO; FLORES, 1999). According to Pacheco and Flores (1999), the process through which the teacher seeks to learn and teach is shaped by four key elements:

a. Metacognition - the process through which the teacher, based on learning, develops new concepts;

b. Discontinuity - a phase that marks evolution, where the student becomes a teacher, characterized by different developmental stages;

c. Internalization - an element that characterizes the phase in which the teacher is absorbing information, a process that provides greater confidence in solving problems with more flexibility;

d. Externalization - an element that shapes the teacher's identity construction, indicating that they are ready to disseminate the knowledge they have acquired.

Understanding that teaching is a constant challenge, especially due to generational conflicts and the changes experienced in the teaching-learning process, Ventura et al. (2011) highlight in their study on what makes a good teacher distinct indicators necessary for a teacher to be considered an excellent professional from the students' perspective. These indicators frame the teacher within the human, technical, and ideological dimensions.

In this discussion of the challenges present in teaching, it is important to highlight the perspective presented by Modelski, Giraffa, and Casartelli (2019), who emphasize the transformations in the field of science throughout human history, which have facilitated the development of new technologies.

Analyzing the contemporary scenario, the impact of information and communication technology (ICT) is evident, particularly in a context marked by the shift from traditional in-person activities to those conducted in a virtual space. It is important to recognize that society has evolved and developed new skills through the use of technological resources, making it necessary to adopt new educational methodologies. The technological component has become essential and cannot be ignored, both in the training of teachers and in its application in the classroom (MERCADO, 2002).

Another point highlighted by Mercado (2002) in relation to new technologies and the use of computers interconnected by the internet, as well as social media platforms like Facebook, Instagram, WhatsApp, and other communication apps, is the opportunity they provide for teachers to adopt different approaches in the teaching process. These technologies enable greater dissemination of information through student collaboration and autonomy, with the teacher assuming the role of a mediator.

According to Rocha and Nogueira (2019), technology has assumed a significant role in the teaching process, as technological resources are available to both teachers and students. Therefore, teachers working in this new educational landscape need to develop innovative practices. In this perspective, Mercado (2002) emphasizes the importance of continuous teacher training, which is essential for their role in a society immersed in information and technology. This ongoing training allows teachers to act dynamically, enabling them to incorporate technological resources into the teaching and learning process effectively. However, it is important to highlight issues such as the social disparities in Brazil, where a portion of the population lacks internet access. Nevertheless, it is also worth noting the growing wave of studies aimed at integrating technological resources into the teaching-learning process (SANTOS, 2013).

Therefore, the act of teaching requires continuous learning, as Freire (2001) asserts that those who teach must constantly renew their knowledge to act with excellence and competence. However, it is important to highlight that the changes brought about by the COVID-19 pandemic have altered

the flow of information between teachers and students, shifting education to the virtual environment a space still relatively unexplored by public school teachers. This shift resulted in an increased workload for teachers and educators (ANASTÁCIO; ANTÃO; CRAMÊS, 2022).

Methodology Applied in the Research

The procedures adopted in this article are characterized as qualitative, as they seek to interpret social phenomena through collected data and the analysis process, without being limited to obvious and easily identifiable information (STAKE, 2011). After selecting a qualitative-quantitative approach as the guiding framework for the analyses throughout this work, a case study method was employed. This choice was made because the topic under discussion explores a current issue that affects society as a whole.

Aiming to generate knowledge about the studied phenomenon, the analyses conducted adopted both quantitative and qualitative approaches, with exploratory strategies focused on identifying the impacts caused by COVID-19 on the teaching-learning process (YIN, 2001).

Among the various purposes of a case study, this work aims to explore a real-life situation, seeking to describe a current scenario, potentially formulating new hypotheses or developing a new theory. By studying the current event of the coronavirus outbreak and its effects on the teaching-learning process, the research objective is to generate new information by combining statistical data with the perceptions captured from respondents' statements (GIL, 2002). According to Marconi and Lakatos (2003), statistical phenomena in qualitative research allow for an objective approach by applying mathematical formulas, thereby validating qualitative perceptions.

The research was developed in mid-2021. but due to the challenges posed by sanitary measures such as social distancing and quarantine instituted by State Decree No. 4230/2020 and Municipal Decree No. 5.284/2020 in the city of *Fazenda Rio Grande*, Paraná, the researchers initially made contact with respondents to invite them to participate in the study. Subsequently, it was necessary to reconnect with the school principal to send out the questionnaire, allowing data collection to begin in the second half of 2021 at the state school in *Fazenda Rio Grande*. Due to the voluntary nature of participation and the researchers' respect for each respondent's availability, the completion of this work was finalized in 2022.

The first contact was made on August 10. 2021. with the school principal to explain the relevance of the research and to request authorization for the application of the research instrument, as shown in Table 1 below.

Table 1 – Research Instrument

RESEARCH INSTRUMENT – LIKERT SCALE SURVEY QUESTIONNAIRE

This research is focused on the public education network located in the municipality of Fazenda Rio Grande, in the state of Paraná. The study aims to understand, from the perspective of teachers, the effects of the pandemic on the teaching-learning process throughout an academic year marked by social distancing. It is important to emphasize that the information obtained will be used solely for academic purposes. All information you provide will be kept confidential before, during, and after the study. Your participation in this study is voluntary. If you choose to participate, you will need to complete a questionnaire, providing data for the study. By completing the research instrument, you indicate your agreement with the terms outlined in the Informed Consent Form (ICF).

The collected data is protected by confidentiality, in accordance with Law No. 13.709/18 (LGPD), and will not be disclosed individually or in a way that identifies respondents. No monetary compensation will be provided for your participation in the study. When the results are published, your name will not appear; instead, a code will be used to represent your responses.

There is no need to identify yourself. I would like to thank you in advance for your cooperation,

If you have any questions, please feel free to contact us:

xxxxxxxxxxxxxxxxxxxxxxx

E-mail:xxxxxxxxxxxxxxxxxxx

WhatsApp: xxxxxxxxxxxxx

Respondent Characterization

Identification 1) Gender: a) Male b) Female c) Other.	2) Age _____
3) Academic Background	4) Years of Teaching Experience

_____ _____	_____
5) Teaching Area _____ _____ _____	

6) Characterization of the School Regarding Changes Caused by the Pandemic from the Teachers' Perspective.

Use the grading scale on the side to rate your answers.	**1 – Strongly Disagree; 2 – Partially Disagree; 3 – Neutral; 4 – Partially Agree; 5 – Strongly Agree.**

LEVEL OF OPTIONS	**1**	**2**	**3**	**4**	**5**
6.1 – The school was prepared to transition from in-person to distance learning due to social distancing caused by COVID-19.					
6.2 – During the pandemic, activities were conducted entirely online.					
6.3 – During social isolation, the use of the internet as a tool for interaction between the school, teachers, and students.					
6.4 – Tools like Zoom, Google Meet, and WhatsApp were important for social interaction with the school and students.					
6.5 – The activities developed in the virtual environment improved the relationship with students.					
6.6 – During the period when activities were conducted in the virtual environment, there were improvements in the quality of the teaching process due to the use of technological tools.					
6.7 – The school provided support to students, aiming to reduce the impact of the pandemic on the teaching process.					

6.8 – Although the pandemic caused social distancing, the relationship between students and teachers was not affected.					
6.9 – During the pandemic, there were cases of students being disadvantaged due to digital exclusion, caused by social disparities.					
6.10 – Knowledge can be equally acquired by all students without the interaction between students and teachers that occurs in the classroom.					

7) Characterization of the Teacher in Relation to Teaching.

Use the grading scale on the side to rate your answers	**1 – Strongly Disagree; 2 – Partially Disagree; 3 – Neutral; 4 – Partially Agree; 5 – Strongly Agree**

LEVEL OF OPTIONS	**1**	**2**	**3**	**4**	**5**
7.1 – Regarding the use of the internet and communication tools such as Zoom, Google Meet, and those provided by the government of the state of Paraná, there were no difficulties in operating these tools.					
7.2 – Before the pandemic, the internet was used as a relevant tool for developing lesson plans.					
7.3 – Due to the transition to virtual classes, planning became unnecessary.					
7.4 – During the pandemic, training courses were offered due to the new model adopted, where students began to complete their activities on digital platforms.					
7.5 – Understanding that each individual absorbs information differently, it is important to adopt a new methodology to level knowledge.					
7.6 – Classes conducted on digital platforms provided more safety for the physical integrity of the teacher.					
7.7 – After the vaccination period, returning to in-person classes will provide personal satisfaction for the teacher by allowing interaction with students.					
7.8 – Some subjects can be effectively taught in a virtual environment.					

7.9 – This period of social distancing was marked as a setback in education due to the lack of socialization and social disparities.					
7.10 – After the pandemic, the possibility of some subjects migrating to digital platforms and being offered in a distance learning format causes anxiety and concern among teachers regarding a potential decline in opportunities.					

Source: The authors, 2021

The procedures outlined in Table 1 highlighted the relevance of the research to the respondent by seeking to capture their perception of the teaching-learning process. Additionally, these procedures ensured their anonymity, providing the freedom to respond to the questionnaire openly.

As a result of the procedures outlined, an electronic form was created using the Google Forms© platform, based on the elements presented in Table 1. and sent to the research's target audience via email. The data collection process concluded on August 30. 2022. with a total of ten respondents.

Regarding the data analysis tabulation, this procedure was carried out between October 5. 2021. and October 10. 2021. The technical procedures were characterized as bibliographic, using books, scientific articles, dissertations, and theses as secondary data. The primary data were obtained through a research instrument (available in Appendix A), which was created in an electronic form on Google Forms© and sent via email.

This procedure provided greater safety for researchers during data collection due to the risks of contagion and the spread of the novel Coronavirus. Consequently, teachers from a state school located in *Fazenda Rio Grande* participated in the research, classifying the study as applied.

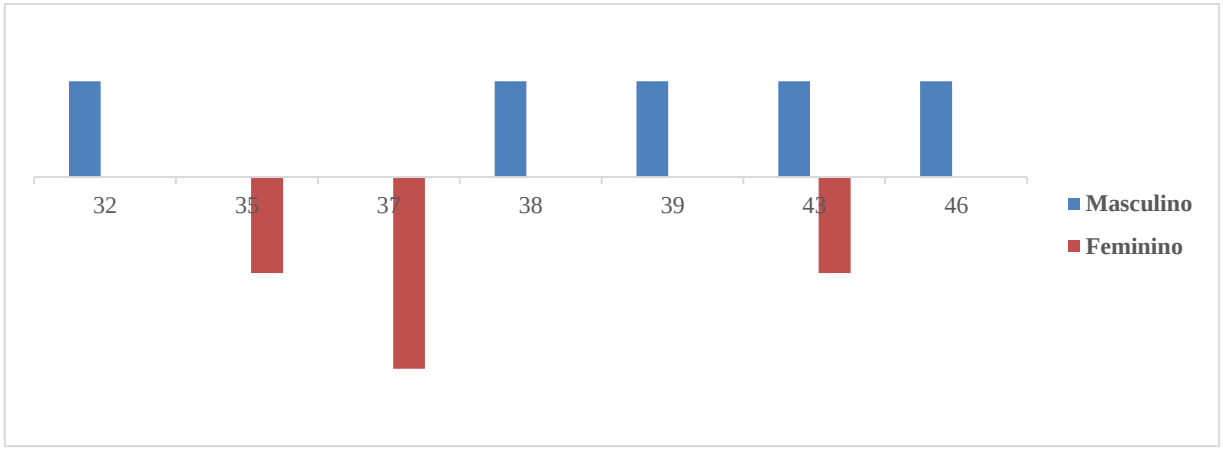
Finally, the ATLAS.TI® software was used as a technological resource in the analysis process. This tool helped to assess the respondents' positions (negative, neutral, or positive) regarding the questions in the questionnaire, allowing researchers to address the proposed issue through the obtained results.

Results Obtained

Following the data collection process, this section presents the results obtained after tabulating the data using Excel® and ATLAS.TI®. The analysis began with the characterization of the

respondents, as shown in Graph 1. This graph illustrates the gender and age distribution of the educators.

Graph 1 – Relationship between respondents' gender and age

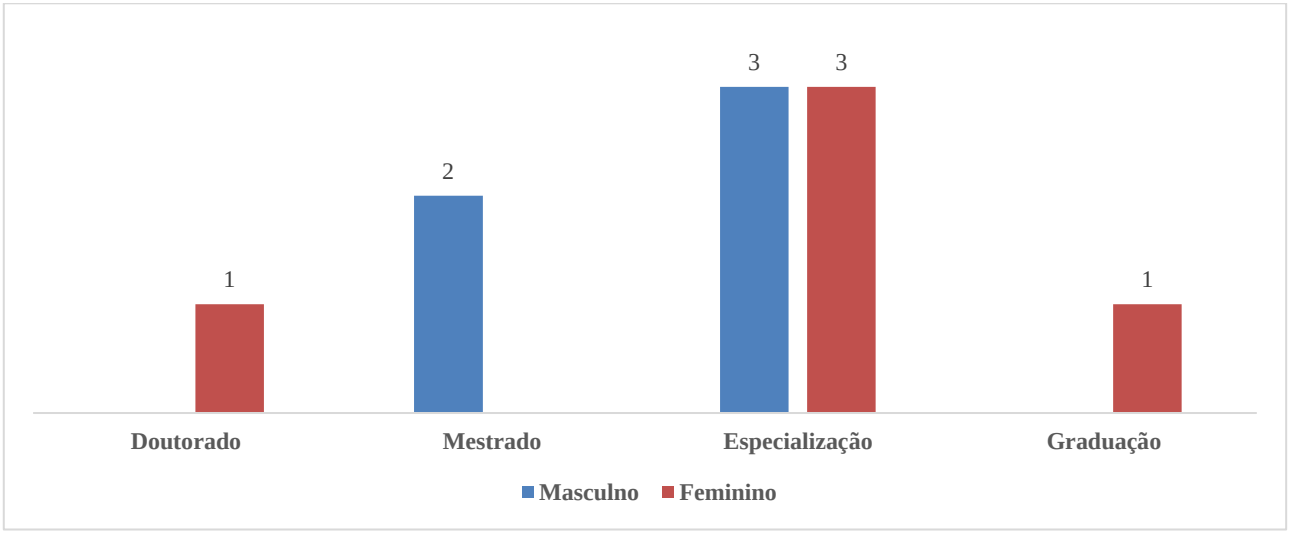


Source: survey data, 2021

Graph 1 illustrates the number of respondents, highlighting their age range and gender, allowing us to observe that the teachers belong to the same generation. This factor influences their perspectives on the teaching process.

Graph 2 presents a relationship between educational level and the gender of each research participant.

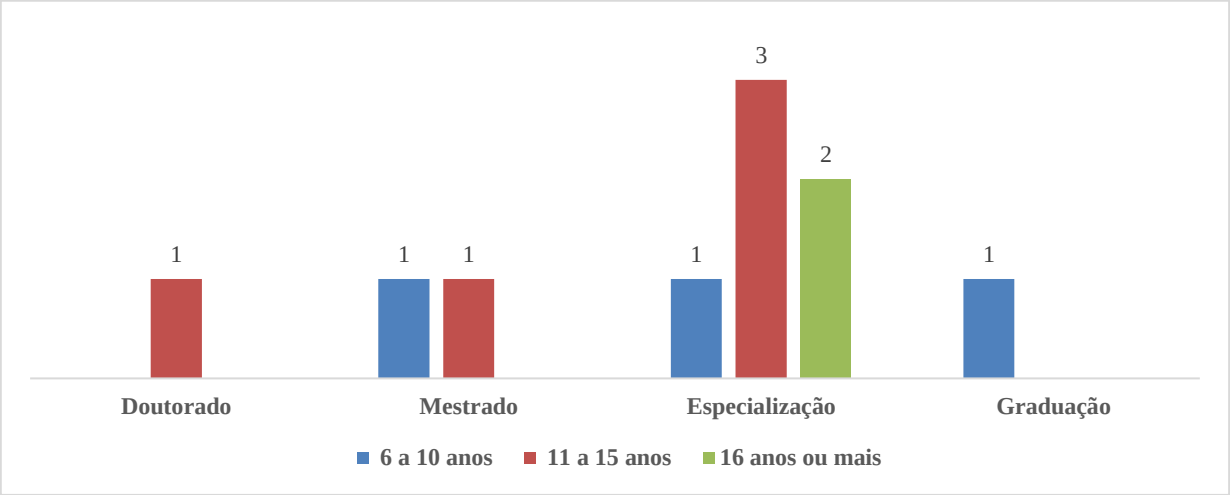
Graph 2 – Relationship between Educational Level and Gender of Participants



Source: survey data, 2021

The relationship presented in Graph 2 highlights a peculiar point where one teacher achieves the highest level of education by holding a doctoral degree. This indicates a commitment among educators to seek knowledge and professional development, resulting in a high level of professional excellence, as explained by Ventura et al. (2011). Concluding the analyses conducted in Excel®, Graph 3 illustrates the relationship between teaching experience and educational background as follows.

Graph 3 – Relationship between the level of education and the gender of the participants



Source: survey data, 2021

Graph 3 relates the teacher's qualifications with their years of teaching experience, highlighting that teacher education is an ongoing process throughout their years of work. This process enables overcoming difficulties arising from new technologies and methods implemented in the classroom (MERCADO, 2002; MODESKI; GIRAFFA; CASARTELLI, 2019).

Another analysis conducted in Excel is related to the statistical description between the questions and the answers. This analysis allowed for the calculation of elements such as the mean, standard deviation, variance, overall mean of the constructs, and the total mean of the standard deviation among each obtained response, as can be seen in the following Table 2.

Table 2 - Descriptive Analysis

	Questions	Mean	Standart desviation	Variance	Total Mean of Constructs	Total Mean Standard Deviation
Characterization of the School Regarding the Changes Brought About by the Pandemic from the Teachers' Perspective	P7.1	3.1	1.57	2.49	3.19	8.21
	P7.2	1.6	1.02	1.04		
	P7.3	4.6	0.66	0.44		
	P7.4	4.6	066	0.44		
	P7.5	2.2	0.87	0.76		
	P7.6	1.8	0.7.4	0.56		
	P7.7	3.9	1.13	1.29		
	P7.8	4.4	0.66	0.44		
	P7.9	4.1	1.22	1.49		
	P7.10	1.6	0.8	0.64		
Characterization of the Teacher in Relation to Teaching.	P8.1	3.3	1.00	1.01	3.64	1.05
	P8.2	3.7	1.1	1.21		
	P8.3	4	1	1		
	P8.4	2.9	1.51	2.29		
	P8.5	2.9	1.35	1.29		
	P8.6	3.3	0.64	1.61		
	P8.7	4.7	0.64	0.41		
	P8.8	2.8	1.4	1.96		

	P8.9	4.2	1.07	1.16	
	P8.10	4.6	0.8	0.64	

Source: survey data, 2021

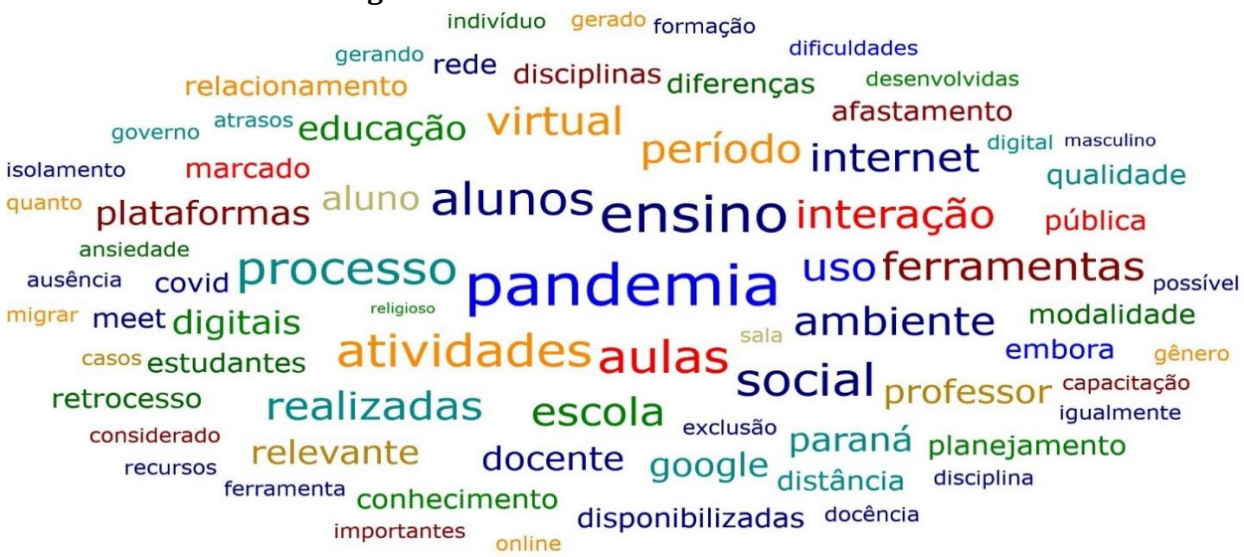
Table 2 lists the process that resulted in the descriptive analysis of the statistical calculations, leading to relevant findings. For instance, the lowest mean was observed in P7.2, due to discrepancies among teachers regarding the question on whether activities were directed online during the pandemic. In contrast, P7.3 and P7.4 showed the highest means (4.6), indicating a greater agreement among respondents. When addressing the characterization of teachers in relation to teaching, similar events occur, but the disparities are less frequent.

Considering the relevance of the topic addressed, the calculation of the standard deviation was performed to facilitate the visualization of data dispersion relative to the mean. Another important measure is variance, which, as a measure of dispersion around the mean, highlights some fluctuations due to disagreements on certain points and agreements on others.

In concluding the tabulation and analysis of data characterizing the profile of the educators, the next step, aided by ATLAS.TI® software, allowed for the identification of several relevant points present in the questionnaire. This facilitated establishing a connection with the responses of the ten respondents who participated in the research.

In the first step, a lexical analysis was conducted to identify the main topics covered in the research, as illustrated in Figure 1 below.

Figure 1 - Word Cloud of Most Used Terms



Source: survey data, 2021

The lexical analysis presented in Figure 1 highlights some relevant elements related to the teachers' experiences. Among the key elements to be noted is the issue of the pandemic, which appears at the center of the word cloud with the highest recurrence index. This reflects the period covered by the research and the teachers' concern about the situation caused by the new Coronavirus.

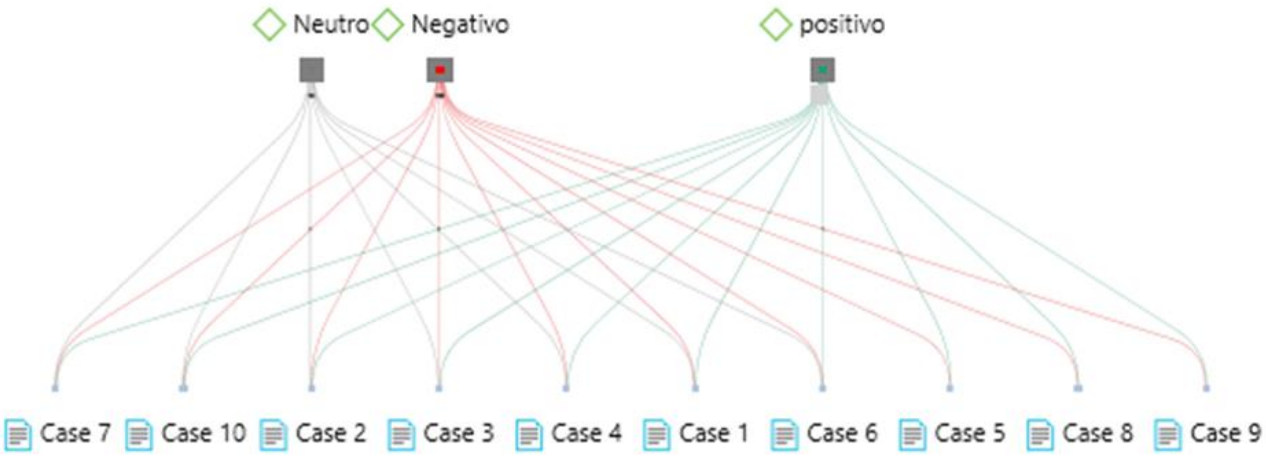
Other words with lower recurrence indices emerged in this analysis, such as “process,” “student,” and “activities,” among others, establishing connections with the overall objective of the research.

Although the word “pandemic” stands out due to its frequency, it was possible to identify the participation of the government in providing technological tools such as digital platforms that facilitated online classes. However, it is important to highlight that virtual classes were conducted in a context fraught with difficulties, including the use of new technologies and the social disparities that affect public education in Brazil (MACEDO, 2021). Regarding other words related to anxiety and exclusion, these reflect the negative impact of the pandemic, as there are millions of Brazilians without access to the internet.

In light of the results obtained from the preliminary analysis, a sentiment analysis was conducted using a Sankey diagram. According to Subramanyam (2014), this method allows readers

to visualize the flow of information as characterized by the respondents, regarding their positions taken in response to the questions posed in the questionnaire, as can be seen in the following Figure.

Figure 2 - Sentiment Analysis



Source: survey data, 2021

In this sentiment analysis, each of the ten respondents is identified by a code, from Case 1 to Case 10. This approach allows for the examination of their stances, revealing that the minority chose to remain neutral regarding the issues surrounding the teaching-learning process during the pandemic. However, a pattern of both disagreements and agreements is evident, as illustrated in Figure 2. Analyzing sentiments is crucial as it helps in determining the stance of each participant and classifying their feelings about the discussed topics, as emphasized by Pang and Lee (2008).

Understanding that the Sankey diagram highlighted the need to precisely present the relationship between the flows of information related to positive, negative, and neutral sentiments, a table was created to display the absolute and relative frequencies derived from the data in the diagram. This table, shown in Table 3 below, provides a clearer view of the sentiment distribution among the respondents.

Tabela 3 - Sentiment Analysis

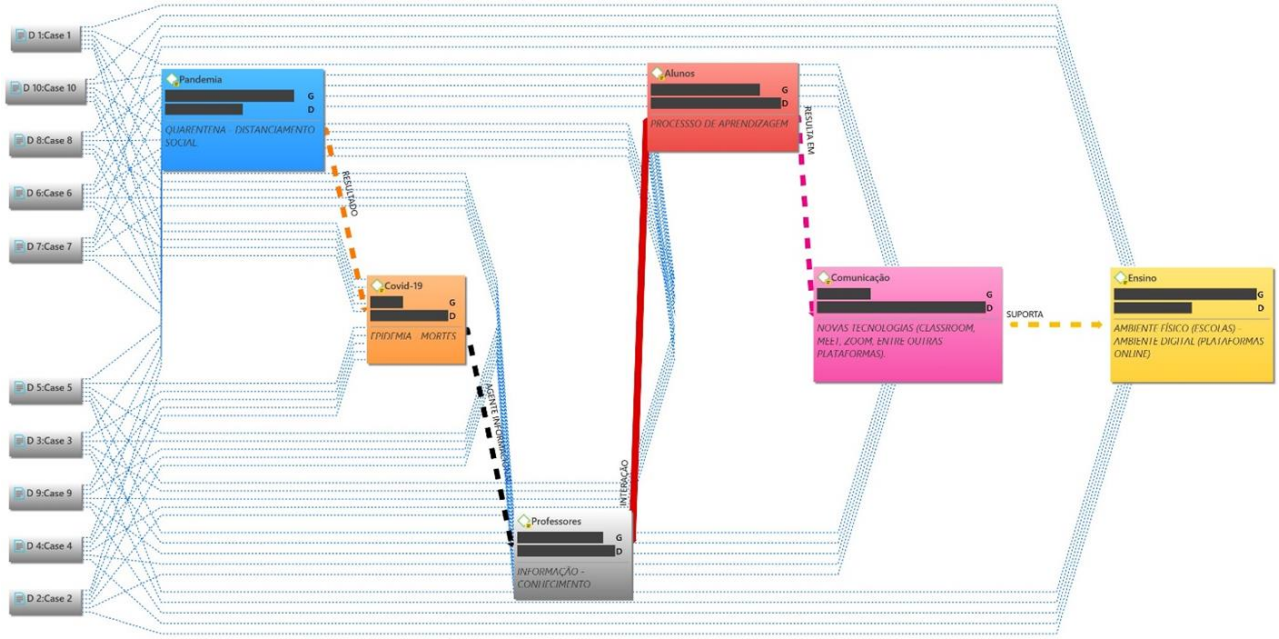
Codification	Absolute frequency	Relative frequency
● Negative	55	33.33%
● Neutral	30	18.18%
● Positive	80	48.48%

Source: survey data, 2021

Analyzing the absolute and relative frequencies, it was evident from the respondents' positions that, based on the coded sentences, the majority of participants felt confident that the methodologies used during the pandemic addressed a gap evident during that period. This confidence reached a percentage of 48.48%, highlighting the role of technological resources in facilitating interaction between teachers and students. This finding underscores the school's role as an environment dedicated to the sharing of knowledge (LIBÂNEO, 2009; LINHARES et al., 2014).

Regarding the teachers who preferred not to comment, their percentage was 18.18%. In terms of negative positions, the rejection percentage was 33.33%. Finally, an analysis was conducted using coding with both highly recurring and less recurring words present in the word cloud, but interconnected, as illustrated in Figure 3 below.

Figure 3 - Linkage of Used Terms



Source: survey data, 2021

The network map created using ATLAS.TI® content analysis software illustrates the relationship between the respondents and the research questions, along with the codifications developed within the software environment. This map encompasses the terms “pandemic,” “COVID-19,” “teachers,” “communication,” and “education.” It visually represents how these key concepts are interconnected based on the data and responses collected during the study.

Thus, the network map reveals distinct interactions between each coding and the respondents' answers, highlighting teachers’ roles as mediators in the flow of information resulting from the learning process. This dynamic is crucial for overcoming the challenges posed by the pandemic and adopting new approaches (TEDESCO, 2000; ROLDÃO, 2007; HENZ et al., 2019). It is important to note that the information related to the codifications and the participants' responses interact with each other, converging towards the teaching process. This interaction encourages students, together with their teachers, to adopt an autonomous stance in reestablishing engagement in their learning process, ultimately leading to knowledge acquisition (SILVA; BIEGING; BUSARELLO, 2017; FREITAS; GUIMARÃES; MENEZES, 2019; HENZ et al., 2019; PIFERO et al., 2020).

Final Considerations

Education can be considered one of the pillars of this new society due to the vast amount of information generated in both virtual environments and physical spaces. However, it is important to emphasize that millions of people are still excluded from this social sphere, either due to financial conditions or high rates of school dropout experienced in underprivileged communities.

Thus, it is important to highlight that the Covid-19 pandemic resulted in both positive and negative impacts on the teaching process. Among the positive aspects, it is relevant to emphasize the use of technological resources, which were highlighted in the process of interaction between teachers and students. These were facilitated through various mechanisms, such as virtual platform classes.

Regarding the negative impacts highlighted in this research, the risk of school dropout emerged as a significant concern, resulting from the new teaching model adopted during the pandemic. This issue reflects a chronic problem in Brazil, involving social disparities, especially within the public education system, where students come from various social classes. However, it is important to acknowledge the efforts made by the Ministry of Education, in collaboration with states and municipalities, to implement measures such as broadcasting classes on open channels. These initiatives aim to reduce perceived disparities and promote the inclusion of students who lack access to virtual platforms.

Thus, after the data collection and analysis process, the researchers concluded that from the perspective of public school teachers, there are positive aspects such as the introduction of technological resources and active methodologies that, in the long term, could benefit education. However, the negative effects encompass various issues such as socioeconomic problems, digital exclusion, individual student challenges, and teachers' proficiency with technological tools. Nevertheless, these are estimates that still need to be evaluated after the return to in-person classes.

This conclusion is supported by the data analyzed, where significant relationships were established, creating distinct connections with teachers' teaching experience, educational level, age, and gender. These factors provided parameters for understanding the questions related to the pandemic.

A relevant point to highlight is the generational similarity among teachers and its relationship with the new technologies implemented in the teaching and learning process. Although they are not

Millennials, they view the virtual environment as a suitable space for interaction and information dissemination.

This article characterized distinct events related to the learning process, highlighted during the pandemic period, encompassing the scenario where the teacher had to assume their role as a mediator in the dissemination of information, emphasizing their relevance in the teaching process, whether in a physical or virtual environment. Finally, as a suggestion for future research, the researchers propose an approach involving the learning process from the perspective of students, aiming to identify the difficulties experienced during the pandemic period.

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