

## **CHALLENGES OF REMOTE TEACHING DURING THE PANDEMIC: Limited Access to Technological Resources and Their Implications on the Teaching-Learning Process**

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### **Abstract**

The year 2020 will be remembered as a period when one of the largest pandemics in history, COVID-19 (Sars-CoV-2), emerged unexpectedly and shook the world. This led to deep reflection and the implementation of strict preventive measures to contain the spread of the virus. Considering the challenges faced, it's evident that education was also severely affected in the early months of the pandemic as it was caught off guard. The methodology employed in the composition of this work is based on a literature review, structured through various readings of scientific articles and articles from websites. The conducted research has a qualitative-quantitative nature and addresses the fundamental characteristics, according to the mentioned theorists. "Quantitative research presupposes a large amount of data in accordance with the confirmation of hypotheses. At first, we obtained a total of 187 student responses to the respective questionnaire on the topic, and these students reside in various municipalities in Maranhão, all of whom are enrolled at the State University of Maranhão. The findings presented in this study shed light on a critical issue: the lack of access to technological resources for students. This situation, as evidenced, contributes to a form of exclusion, which, in turn, poses a significant obstacle to the learning process. The insights gained from this research underscore the urgent need to address this digital divide in education.

**Key words:** COVID-19. Education. Exclusion.

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### **I. Introduction**

The year 2020 will be remembered as a period when one of the largest pandemics in history, COVID-19 (Sars-CoV-2), emerged unexpectedly and shook the world. This led to deep reflection and the implementation of strict preventive measures to contain the spread of the virus, now known as "Coronavirus." In this scenario, a series of regulations and drastic measures were introduced with the aim of containing the disease. This included restrictions on the presence of people in public places, the implementation of social distancing measures, lockdowns, and the widespread use of masks and hand sanitizer, among other necessary actions.

The measures adopted -975a crucial role in preventing the spread of the current health crisis. However, despite these measures, they were unable to contain the increase in daily death numbers. As a result, we have witnessed a growing global crisis that rapidly affected various sectors, from the most productive to educational systems. The consequences of these actions are still visible and continue to

worsen constantly, leading to various problematic situations. This is evident in many aspects, especially in the socio-economic realm of some countries, where abrupt changes have caused an incalculable deficit. These measures had a significant impact on the economy, making the process of social distancing complex and prolonged. This has had effects on interpersonal relationships, the mental health of the population, and many other aspects (ARRUDA, 2020; MS, 2020; WHO 2020).

Considering the challenges faced, it's evident that education was also severely affected in the early months of the pandemic as it was caught off guard. This resulted in significant losses and delays in regular educational activities. According to a survey conducted by the World Health Organization (WHO, 2020), it is estimated that around 90% of the student population worldwide was prevented from attending classrooms during the month of April 2020. This disruption extended into the beginning of the second quarter due to the lack of actions and knowledge regarding support tools that would enable the resumption of classes.

In this context, it is important to recognize the positive impact of technological tools. Since the beginning of the pandemic, these tools have played a crucial role in such a challenging time for the global population, allowing barriers to be broken and limitations to be overcome in a matter of seconds. In the field of education, technologies and their tools are playing a fundamental role in enabling the continuity and improvement of a teaching modality that had already been in development for several years, Distance Education (EAD).

To maintain educational activities and connection with students, many countries and educational institutions have adopted remote education as a viable alternative (BRASIL, 2020; XIAO and LI, 2020; UNESCO, 2020; NY DEPARTMENT EDUCATION, 2020).

Remote teaching emerged from the need for schools and universities to resume their activities to mitigate a problem that could have irreversible consequences. Distance Education (EAD) is a teaching/learning process that provides a wide range of materials developed by a team of qualified professionals, adapting distance education to fit the context of information technologies (MOORAN, 2014).

In this perspective, remote teaching is constantly evolving and refining throughout this educational process. It improves according to the target audience, as it is an emergent methodology that evolves as it is used and deals with the specificities of students and teachers. The improvement of remote teaching takes into account the difficulties encountered and seeks solutions through a pedagogical approach, becoming more effective in addressing these challenges.

Based on what has been presented, it is worth mentioning the renowned State University of Maranhão, under the leadership of its Magnificent Rector, Professor Dr. Gustavo Pereira da Costa. This university was one of the pioneers in resuming its activities through Emergency Remote Teaching. Working in collaboration with the team from the Center for Education Technologies - UEMAnet, coordinated by Prof. Dr. Ilka Márcia Ribeiro de Sousa Serra, and the Coordination of Information and Communication Technologies - CTIC, the university has developed numerous initiatives to ensure the return of classes with high quality.

It is worth noting that the Center for Education Technologies - UEMAnet and the Coordination of Information and Communication Technologies - CTIC played an extremely important role throughout this process, not only in the development of educational activities but also in the development of administrative activities in a home office setting. During this time, some tools provided by CTIC were improved, and there was an expansion of their support channels for both teachers and students at the aforementioned institution.

Throughout this challenging period, we have relied on the assistance of technology professionals. The work has been demanding, but satisfying, thanks to the commitment and competence of the teams that worked diligently and fulfilled their roles exceptionally. The technological support that was previously provided by professionals regarding the use of existing platforms, such as Siguema, gained a special place in contributing to the restructuring of education with the new teaching methodology.

However, as is common in any process of evolution, some problems arose during this major transition. The lack of technological equipment, such as mobile phones and laptops, and the absence of access to quality internet became significant challenges for the effective return to remote classes. The university recognized these difficulties faced by students who lacked internet access and, in response, made efforts to create programs to address this issue. One of these programs was the implementation of a digital inclusion assistance notice, which aimed primarily to reduce the dropout rate among students who were struggling with internet access.

Technology is becoming increasingly prevalent in our lives, making it easier to perform various tasks and aiding in the learning process, as well as providing various communication channels. Technological advancements have contributed to efficiency and time savings in the execution of various activities.

In this research context, it is worth mentioning that society, organizations, and governments increasingly rely on information and communication technologies (ICT) and, above all, the internet

(BITTENCOURT and ALBINO, 2017). In the field of education, Information and Communication Technologies (ICTs) have taken on an important role as pedagogical tools that can enhance teaching and learning processes (MACHADO, et al., 2018).

Based on the presented context, we have chosen to conduct research on the topic "The Importance of Technological Tools in Remote Teaching: Challenges and Contributions." In this context, our aim is to understand the main barriers faced by higher education students regarding the relevance of technological tools in emergency remote teaching, as well as to identify the main challenges encountered in this new mode of education in the state of Maranhão.

## **II. Methodology**

### **Type of Research**

The methodology employed in the composition of this work is based on a literature review, structured through various readings of scientific articles and articles from websites.

According to Lakatos and Marconi (2001, p. 183), literature research,

"[...] encompasses all the bibliography already made public regarding the studied topic, including separate publications, bulletins, newspapers, magazines, books, research, monographs, theses, cartographic materials, etc. [...] and its purpose is to put the researcher in direct contact with everything that has been written, said, or filmed about a particular subject [...]"

The conducted research has a qualitative-quantitative nature and addresses the fundamental characteristics, according to the mentioned theorists. Quantitative research presupposes a large amount of data in accordance with the confirmation of hypotheses. "Freitas and Janissek (2000, p. 22) state, "One should try to unveil the content without excluding statistical information, focusing on ideologies, trends, and other determinants of the analyzed phenomena." Minayo (1996, p. 67).

Following the study's outline, there is also a qualitative analysis, which aims to relate the topic to the opinions expressed by the subjects, thereby allowing for a better representation of the obtained data for comparison and verification (Minayo 1996).

In addition to this, the research adopted a qualitative research method, as per Roesch's approach. It has an exploratory nature, encouraging interviewees to think and speak freely about the subject or another object or concept. This type of research elicits subjective aspects to bring out motivations that are not explicit, or even consciously recognized, in a spontaneous manner (ROESCH, 1996).

### **Target Audience**

UEMA currently has 22 centers, including the Center for Higher Studies in Bacabal (CESB), Center for Higher Studies in Balsas (CESBA), Center for Higher Studies in Barra do Corda (CESBAC), Center for Higher Studies in Caxias (CESC), Center for Higher Studies in Coelho Neto (CESCON), Center for Higher Studies in Colinas (CESCO), Center for Higher Studies in Coroatá (CESCOR), Center for Higher Studies in Grajaú (CESGRA), Center for Higher Studies in Itapecuru Mirim (CESITA), Center for Higher Studies in Lago da Pedra (CESLAP), Center for Higher Studies in Pedreiras (CESPE), Center for Higher Studies in Pinheiro (CESPI), Center for Higher Studies in Presidente Dutra (CESPD), Center for Higher Studies in Santa Inês (CESSIN), Center for Higher Studies in São João dos Patos (CESJOP), Center for Higher Studies in São Luís - Center for Agricultural Sciences (CCA), Center for Higher Studies in São Luís - Center for Applied Social Sciences (CCSA), Center for Higher Studies in São Luís - Center for Education, Exact and Natural Sciences (CECEN), Center for Higher Studies in São Luís - Center for Science and Technology (CCT), Center for Higher Studies in Timon (CESTI), Center for Higher Studies in Zé Doca (CESZD), and 19 campuses spread across the state of Maranhão.

The institution offers various courses, including but not limited to Administration, Agronomy, Architecture and Urbanism, Social Sciences, Law, Computer Engineering, Production Engineering, Mechanical Engineering, Biological Sciences, Medicine, Veterinary Medicine, Letters, Nursing, Fisheries Engineering, Mathematics, History, Geography.

The target audience consisted of all students and professors at the State University of Maranhão, totaling 187 students and 21 professors, for a total of 208 respondents. A survey was conducted specifically with the individuals associated with this institution, and data collected during this study will be presented.

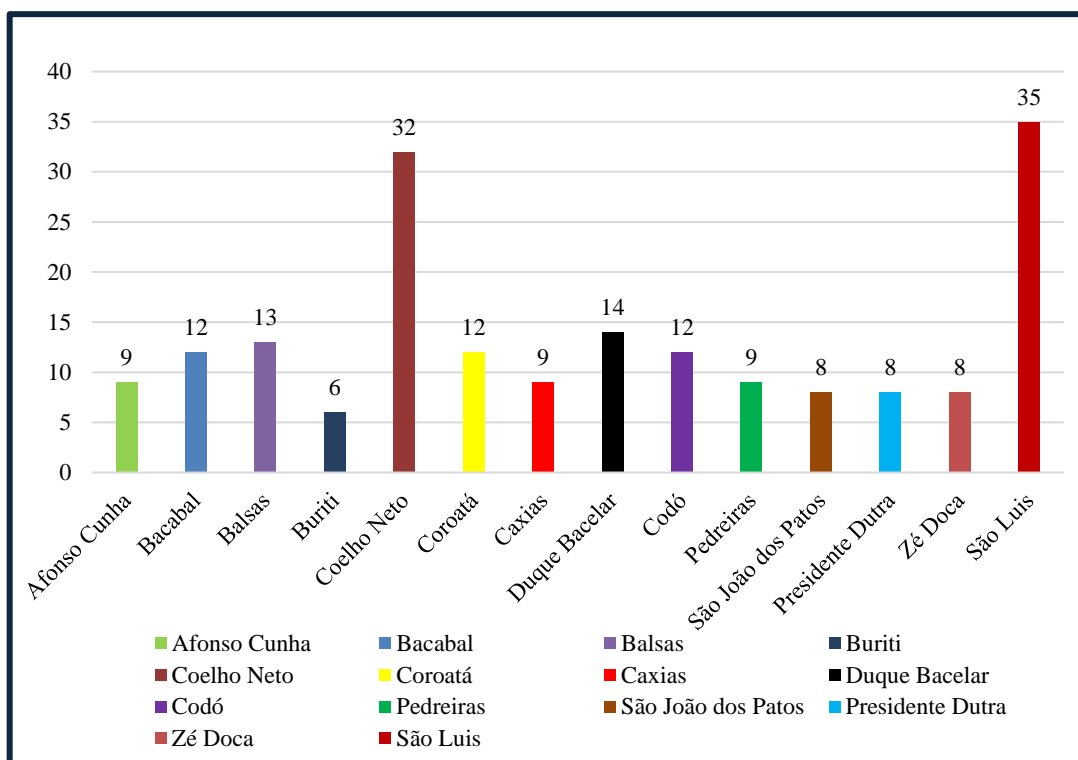
To obtain the results, a questionnaire was used on the Google Forms platform, which was developed with both open-ended and closed-ended questions on the topic in question. Following the guidance of the cited theorists, who emphasize the importance of questionnaires in data collection. According to Marconi and Lakatos (1999), "[...] a questionnaire is an instrument for collecting data, consisting of a series of ordered questions that must be answered in writing and without the presence of the interviewer[...]".

Initially, we prepared a questionnaire containing both open-ended and closed-ended questions related to the topic. Subsequently, we administered the questionnaire to the target audience, including the Informed Consent Form (ICF). After all activities were completed, we collected the obtained data to potentially refine and conduct data analysis. The interviews were conducted remotely, and the questionnaire was made available via WhatsApp and Instagram from August 2020 to March 2021 through the communication channels mentioned above.

### III. Results And Discussion

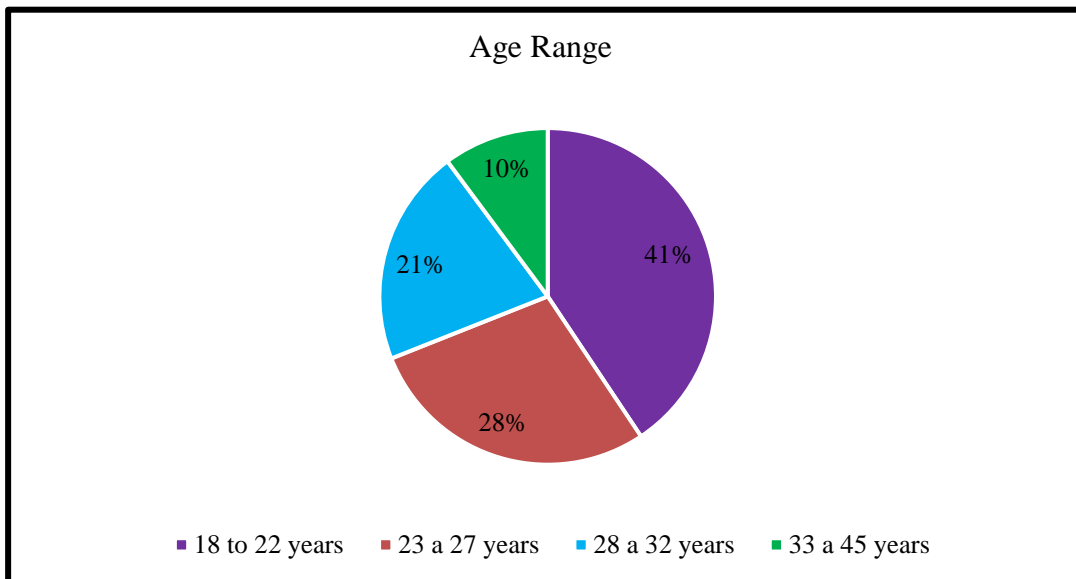
At first, we obtained a total of 187 student responses to the respective questionnaire on the topic, and these students reside in various municipalities in Maranhão, all of whom are enrolled at the State University of Maranhão. The cities represented include Afonso Cunha, Bacabal, Balsas, Buriti, Coelho Neto, Coroatá, Caxias, Duque Bacelar, Codó, Pedreiras, São João dos Patos, Presidente Dutra, Zé Doca, and São Luis. According to graph 01, we can see the total number of respondents by city:

Chart 1: Distribution of respondents by city.



Simultaneously, we observed the distribution of respondents by age group in order to observe, during the analysis, the predominance of individuals who had more difficulties with remote tools. We obtained a percentage of 41% for individuals aged 18 to 22, 28% for those aged 23 to 27, 21% for those aged 28 to 32, and 10% for those aged 33 to 45. You can see this distribution in the chart below

**Graph 2:** Distribution of respondents by age group



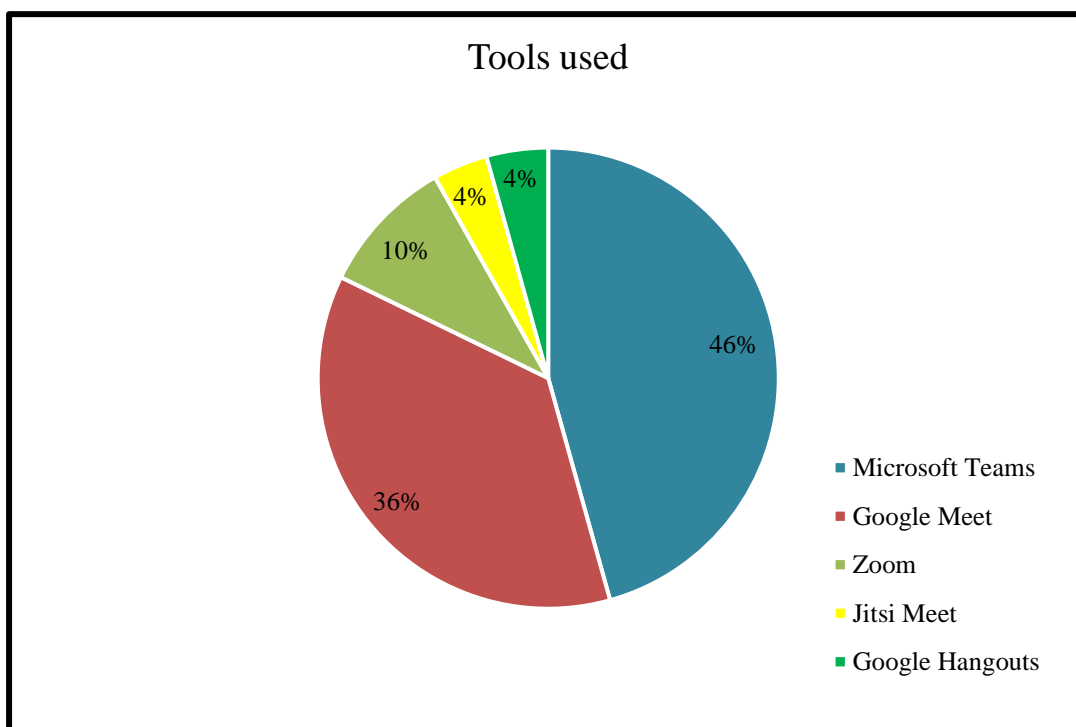
When analyzing the collected data, it became evident that despite the availability of numerous technologies, some students do not have access to the necessary resources for their educational activities. It was found that 38% of the surveyed population lacks resources such as laptops, and in some cases, even internet access.

The interpretation of these results points to a lack of resources as a limiting factor, which can significantly contribute to school dropout, especially during the pandemic. According to Bettega (2010), technology should be a motivating factor to enrich the educational environment, thus enabling the construction of knowledge through active, critical, and creative involvement on the part of both students and teachers.

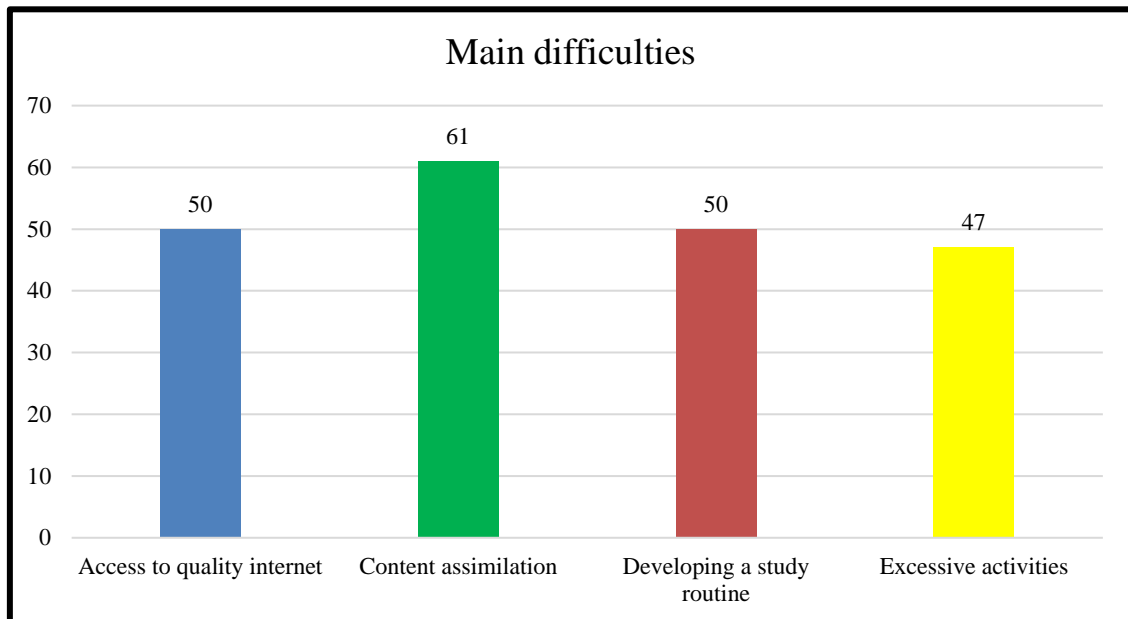
Other authors such as Belonni (2003), Tori (2010), Tori (2015), and Gortazar (2020) emphasize that the role of such technological tools is to provide many students with a means to break down barriers and serve as mitigating tools in the teaching/learning process.

Continuing with the analyses, we asked all the interviewees, "what are the main platforms used for accessing remote classes?" (Graph 3), and we also took the opportunity to inquire about "what are the main difficulties encountered in this new mode of education?" (Graph 4).

**Graph 3:** Main tools used for conducting remote classes



**Graph 4:** Main challenges reported by the interviewees in the face of remote learning



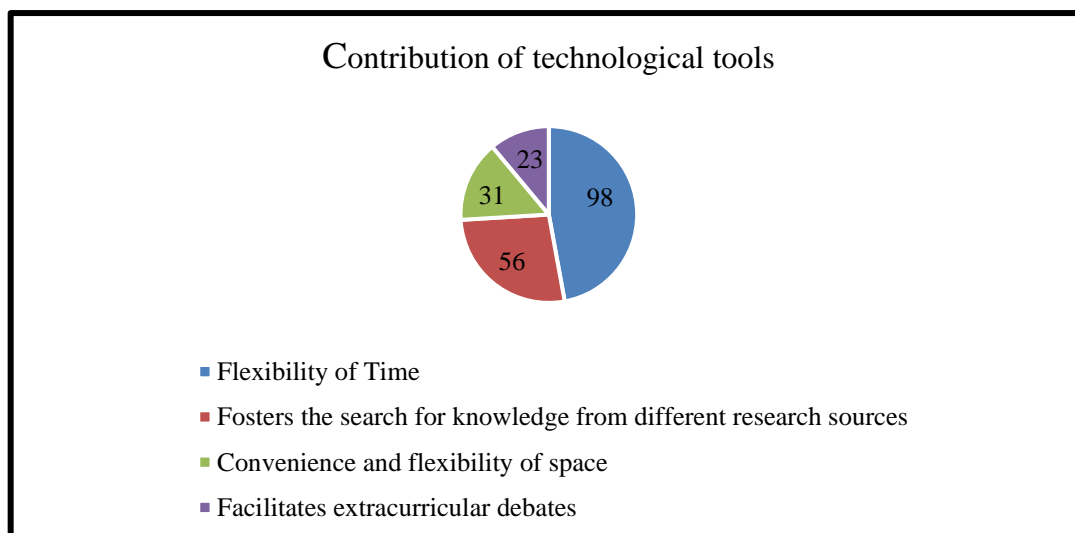
According to Oliveira, Gandini, and Delgado (2018), the internet has played a fundamental role in the evolution of today's society, bridging distances and providing access to information from around the world with just one click. However, as we can see in Graph 4, internet quality, the lack of devices like cell phones, and the absence of an adequate study routine continue to be persistent issues in the 21st century.

Despite living in a technology-dominated era, we still face significant challenges when it comes to remote education. The sudden onset of the COVID-19 pandemic brought a series of obstacles for both educators and students.

The authors Oliveira, Gandini, and Delgado (2018, p.45) mention in a passage from their work that: "Technological advances are increasingly influencing people's way of life; thus, education cannot lag behind; it must also use this mechanism to its advantage."

Continuing with the research, we asked the interviewees about "the contributions that technological tools have provided in this new teaching methodology," and we obtained the following data presented in the graph:

**Graph 5:** Interviewees' Perspective on Technological Tools



With the investigation in question, it can be affirmed that technology has provided a flexibility in the way of teaching in recent years, enabling the integration of new means that allow students to understand the content covered in the classroom. Corroborating this argument, Garcia (2013) states: "with changes in the way of teaching and the incorporation of technologies into this teaching process, the forms of learning also change.

#### **IV. Conclusion**

In light of this information, it is evident that there is a lack of technological resources for students, which in a way contributes to the process of exclusion and hinders the learning process. Based on the contributions of theorists in the construction of this research, it is sought to demonstrate through the qualitative and quantitative methodology that, according to the interpretation of the graphs, it is necessary to engage in new active methodologies.

The findings presented in this study shed light on a critical issue: the lack of access to technological resources for students. This situation, as evidenced, contributes to a form of exclusion, which, in turn, poses a significant obstacle to the learning process. The insights gained from this research underscore the urgent need to address this digital divide in education.

As per the insights derived from both qualitative and quantitative methods employed in this study, it becomes abundantly clear that there is an imperative to embrace innovative, active teaching methodologies. The interpretation of the data, as reflected in the graphs, highlights that traditional teaching approaches are no longer adequate in a world increasingly driven by technology.

In conclusion, the study underscores the pressing need for educational institutions and policymakers to address the digital divide, ensuring that all students have equitable access to the technological resources necessary for effective remote learning. Furthermore, it emphasizes the importance of adopting new, active teaching methodologies that harness the power of technology to enhance the learning experience. Failure to do so not only perpetuates educational inequalities but also hinders the overall learning process in the digital age.

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