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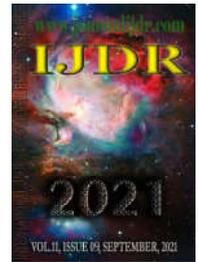
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## THE CHALLENGES OF EDUCATION AND IT RELATIONSHIP WITH NEW DIGITAL TECHNOLOGIES DURING LEARNING IN THE MIDST OF THE COVID-19 PANDEMIC IN AMAZONAS

\*<sup>1</sup>Michelli Domingos da Silva, <sup>2</sup>Aline de Almeida Benchaya, <sup>3</sup>Alisson Rojas Rodriguez, <sup>4</sup>Francilene de França Trindade, <sup>5</sup>Giovanna Ribas Chicre, <sup>6</sup>Mailla Brenda Maia da Silva Reis, <sup>7</sup>Raquel Salgado Marques, <sup>8</sup>Rebecca Pereira Seffair, <sup>9</sup>Thaise Cardoso Dourado,<sup>10</sup>CarlaThais Soares Portilho and <sup>11</sup>Cyntia Costa Guimarães

<sup>1</sup>PhD in Public Health from the Universidad de Ciencias Empresariales y Sociales (UCES), Buenos Aires – Argentina; <sup>2</sup>Specialization in Basic and Clinical Hematology (Unyleya) and Professor at the University NiltonLins (UNL) - AM – Brazil; <sup>3</sup>Medical Student, Universidade Nilton Lins (UNL), Manaus - AM- Brazil; <sup>4</sup>Education student, Metropolitan Faculty of Manaus (FAMETRO) - Manaus- AM – Brazil; <sup>5,6</sup>Medical Student, Universidade Nilton Lins (UNL) - Manaus- AM – Brazil; <sup>7</sup>Master in Society and Culture of the Amazon and Professor at the University NiltonLins (UNL) - AM – Brazil; <sup>8</sup>Medical Student, Universidade NiltonLins (UNL) - AM – Brazil; <sup>9</sup>Master's student in Health Services Administration, Universidad de CienciasEmpresariales y Sociales, (UCES), Buenos Aires, Argentina; <sup>10</sup>Nursing student, Universidade Nilton Lins (UNL), Manaus - AM- Brazil; <sup>11</sup>Medical Student at the University Nilton Lins Manaus - AM – Brazil

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#### \*Corresponding author:

Michelli Domingos da Silva,

### ABSTRACT

**Objective:** To analyze and describe through literature the challenges of education and its relationship with new digital technologies during learning in the midst of the covid-19 pandemic in Amazonas. **Methods:** This is a descriptive research in the form of thematic literature review, with quantitative and qualitative methodological approach in the treatment of data collected from virtual questionnaires (Google form) distributed to 150 students from private and public schools, in the period from 01 to 13 June 2021. The collection of published material used the following databases: Google Academic, Periodicals, SCIELO, database of the Ministry of Education (MEC), database of the National Education Council (CNE) and IBGE database. **Results and Discussion:** In Amazonas, the Government and the Manaus City Hall, through the municipal and state secretariats have spread the Home Classroom Project, using the virtual platforms and television channels, to achieve and minimize the current scenario that school education. It is worth mentioning that despite the investments of the Education Secretaries and the MEC in the area of training for teachers in the use of digital technologies; the training is not satisfactory to meet all the demands of these professionals. We know that these classes are offered remotely and many of the teachers still have resistance in dealing with this situation. **Final considerations:** The remote teaching adopted by private and public educational institutions occurred due to the need for social isolation caused by the Covid-19 pandemic. In addition to witnessing the consequences of the pandemic itself, the difficulties brought by the technology, the effectiveness and sometimes even scarcity, in addition to the main factors pertinent to the family environment, it is also possible to measure the impact for parents in adapting to the teaching method caused by this implementation.

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## INTRODUCTION

The technological tools have, over the years, been guiding traditional teaching and offering subsidies to teachers and students to contribute to the learning of the theoretical classes, which used to take place in a school environment composed of blackboard, projector, data show, and a room full of students. For many years, this was a reality experienced by students and teachers that needed to be revised due to the COVID-19 pandemic (Nobrega, 2020). At this juncture, the educational institutions, teachers and students had to adapt to the emergency moment, avoiding the circulation of all involved from the school environment to prevent the spread of the coronavirus. Suddenly, the need to use the tools of Information and Communication Technology - ICT, went from optional methodology to the basis of remote classes (Medina, 2020; Nhantumbo, 2020). Yet, according to the research, it was analyzed that all the actors in this storyline did not have within their immediate reach the physical and material structures to deal with this new situation. Depending on the situation, the social distance influenced either positively or negatively with a single goal to continue teaching and remote learning (Nhantumb, 2020). This article aims to analyze and describe through literature the challenges of education and its relationship with new digital technologies during learning in the midst of the covid-19 pandemic in Amazonas.

### Covid-19's Interference in Education

According to the studies, the Covid-19 pandemic represents the greatest challenge to science in the 21st century. In February 2020, Brazil had the first case of Covid-19 in the state of São Paulo<sup>4</sup>. Covid-19 is defined as a coronavirus because it has a crown shape. It is known and classified as an emerging and re-emerging infection that undergoes constant mutations and is a challenge for public health in Brazil. Coronavirus is an acute viral infection of the respiratory system, with high transmissibility and global distribution. An individual can contract it several times throughout life and, in general, it has a self-limited evolution; however, it can present itself in a severe form, requiring hospitalization (Jesus Café *et al.*, 2008; Silva, 2021). The coronavirus is capable of causing recurrent epidemics and can evolve into pandemics when a new virus is spread in a population that lacks immunity to the new viral subtype. The magnitude and impact of the disease will depend primarily on the virulence and the degree of transmissibility of the virus, in addition to preventive intervention measures, and the effectiveness of treatments. The Severe Acute Respiratory Syndrome (Sars-CoV-2) causing Covid-19 is defined as a coronavirus because it is part of a larger family, which has members already known to scientists, such as the influenza syndromes (Lana, 2020). The covi-19 changed the programming of educational institutions around the world, as educational systems, from the effects of the pandemic, found themselves in the midst of the dilemma of altering "all school activities to minimize risk and save lives at the same time and helping to maintain functioning by allowing workers to maintain personal and social economies (Burgess, 2020)".

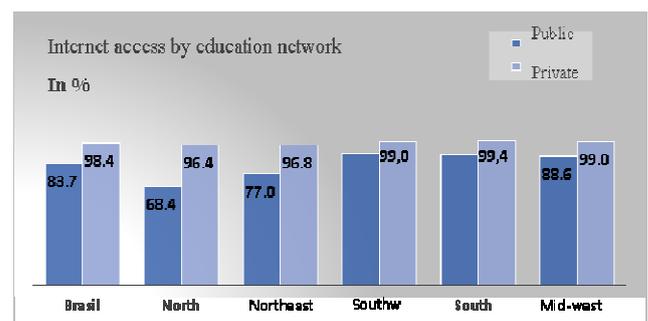
Teaching and learning, in general, has been compromised. According to data from the United Nations Educational, Scientific, and Cultural Organization - UNESCO, educational institutions have been temporarily closed in more than 190 countries, leaving more than 1.57 billion children, adolescents, and youth without classroom instruction. These figures reflect over 90% of the world's student population (Unesco, 2020). In Brazil it was no different, the Ministry of Education (MEC) issued several normative acts, taking into account the observations of the World Health Organization

- WHO and the Ministry of Health, adopting measures to address the pandemic caused by the new coronavirus - Covid-19, of which MEC Ordinance No. 617/2020, of August 3, 2020 (BRASIL, 2020c), which regulates the activities of educational institutions maintained by the Union, higher education institutions maintained by the private initiative and federal education agencies, and the national learning

services maintained by the federal education system (Lima Yamaguchi, 2020). This normative act, MEC Ordinance No. 617/2020, authorized the above-mentioned institutions to suspend face-to-face classes or replace them with non-face-to-face activities in technical high school professional education courses in progress until December 31, 2020. For this, the institutions that, according to Article 3 of Ordinance No. 617/2020, opted for non-face-to-face activities should organize themselves, meeting the recommended prerogatives. The institutions that chose to continue school activities during the pandemic period had to mediate the offline activities, making use of digital tools (Lima Yamaguchi, 2020; Rossi, 2020).

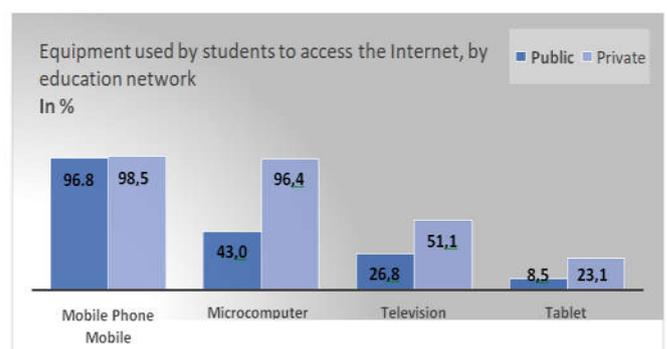
### The challenges of the teaching and learning process in times of pandemic in Amazonas

Based on the traditional teaching and learning processes, the school must prepare itself for the new technologies made available in the educational universe that are conducive to learning, transforming the educational environment into motivating spaces and meaningful learning for the students, seeking to contribute to the development of student autonomy Souza *et al.*, 2020; Nascimento *et al.*, 2020). Research conducted during the pandemic by covid-19, confirmed that students had access to the internet through a data package, but that it was not enough for them to develop their activities and learning. According to the IBGE, about 99.5% of students have access to the internet through cell phones and 0.5% of the remaining students have access through computers and notebooks (Charts 01 and 02) (Nascimento, 2020).



Source: Prepared by the author, based on IBGE, 2020.

Chart 01. Internet access by education network in Percentage

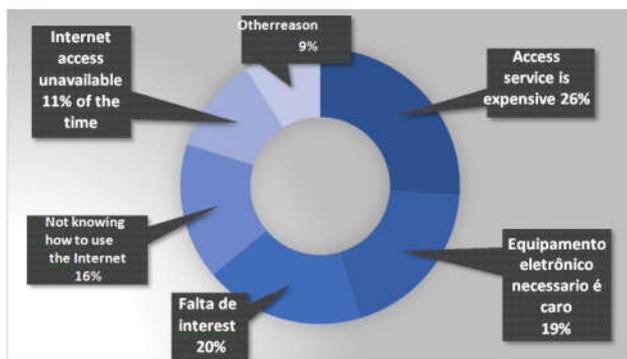


Source: Prepared by the author, based on IBGE, 2020.

Chart 02. Equipment used by students to access the internet, by education network in %

In the North of the country, about 38.4% of rural households did not have access to quality internet. According to IBGE, the lack of internet in rural areas is due to the price, which is not compatible with the economic power of this population and the services of the telephone companies and internet providers, the lack of knowledge of how to use the internet on smartphones, tablets, computers, notebooks (Radio Agência Nacional, 2021). The cost to have internet is also the greatest difficulty for students, followed by the extremely high price to acquire an electronic device to be able to enter the remote learning platforms. The inequality in access to equipment hurts more the

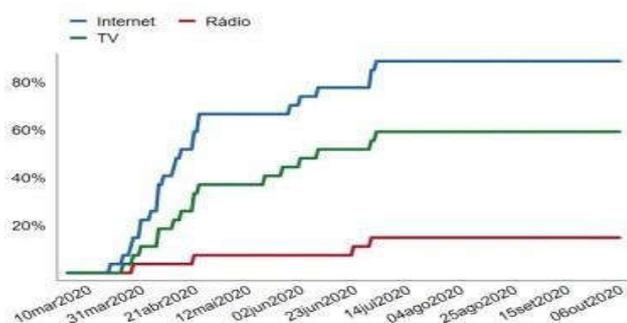
public network students who have access to 64.8%, compared to the private network about 92.6% have access to cell phones, notebooks, smartphone among others (chart 04) (RIGO, 2020).



Source: Prepared by the author, based on IBGE, 2020.

**Chart 3. Reason for not using the internet by students from the public network of Amazonas**

Even so, when we compare the private network to the public network, 89.3% of students have access to digital technologies, unlike the public network, where coverage is equivalent to 47.5%. This inequality is unfair, where 43% have access to microcomputers in the public network and 81.8% of students in the private network have access to other devices with internet (OLIVEIRA, 2020). According to IBGE<sup>16</sup>, teachers dedicate themselves every day to plan classes where they need continuous interactions with students, while still respecting social isolation. There has also been a reduction in spending on lighting, cleaning materials, and hygiene in these educational institutions. Learning of the remote classes took place through three distinct means: (a) online streaming or posting of video lessons on social networks or official websites, (b) public television channels, and/or (c) radio. We compiled so that students had quick access to the classes offered by the government, and embraced the distance learning programs for each modality, since each form of transmission offers an important tool for access and inclusion to different populations in the national territory (Figure 01) (Santos Junior, 2020).



Source: CGRT-BRFED<sup>18</sup>.

According to Barberia, Cantarelli & Schmalz (2020, p. 9)<sup>19</sup>.

**Figure 01. Transmission of classes in the period from March to October 2020**

The main strategy adopted by the states for distance education was the Internet. However, until April, only about 50% to 60% of the states offered classes over the Internet. In the following months there was a great expansion, reaching 90% of the states by July. Televised classes, a more inclusive channel considering that 95% of Brazilian households have a television, against only 71% with internet access, were offered by more than 50% of the states. However, by the end of May less than 40% of the states offered classes on television.

The private network teachers have no choice, you may even disagree, because once hired to teach they have to fulfill their workload regardless of whether they are teachers of traditional or remote classes. For this reason, everyone has had to adapt to the new digital

tools available in the teaching market, where education managers have continued to charge tuition fees, yet services have not ceased to be offered to students, even if in a precarious way (MACIEL, 2020). For this reason, SEDUC (SILVA, 2021), defined that for the initial years of elementary school (1st to 3rd years) printed activities would be used and indicated in the portals of free access educational websites, to broaden the contact of the students with the school contents. In the pedagogical guidelines, game applications were suggested, such as: reading and telling stories, Piano Kids-music, children's educational games, Game Kids, among others. The television shows O espetáculo da Luna, Dora a aventureira, Peixonauta, Cocoricó, Castelo Rá-Tim-Bum, associating activities for the development of motorcoordination, the acquisition of the writing system, and math skills. Suggestions were also presented for Youth and Adult Education and for the 4th and 5th grades of elementary school. For the final years of elementary school (6th to 9th grades) (PAULA RIBEIRO, 2021). For high school SEDUC/AM (SILVA, 2021; Secretaria de Estado de Educação E Desporto do Amazonas (SEDUC), 2021), it was defined that students should follow the classes broadcasted by TV Encontro das Águas (three hours of daily transmission), access the content and digital pedagogical resources available on the Saber Mais platform on the virtual learning environment. Other complementary strategies listed were: suggestion of films, videos, documentaries, websites, readings and research and textual production.

## METHODS

This study had two moments in its elaboration. The first, based on the method of exploratory review of the literature available on the subject, sought to create the theoretical basis that brings elements of analysis and reflection on remote learning and its emergency adoption in the country. The search occurred in the following databases: Google Academic, Periodicals, SCIELO (Scientific Electronic Library Online), Ministry of Education (MEC), National Education Council (CNE) and Brazilian Institute of Geography and Statistics (IBGE). In a second step, we sought to understand how students feel about this sudden change in the teaching process and, to do so, we used a case study with a sample of 150 students who answered an online questionnaire, available via Google form, in the period from June 1st to June 13th, 2021.

The questionnaire begins with the following explanatory heading:

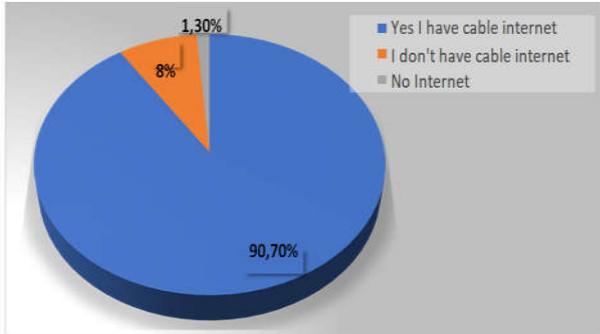
All students from the private and public network were invited to contribute by participating in the research that has the objective of analyzing the relationship of education with new technologies during the covid-19 pandemic in the state of Amazonas in Basic Education. The participation was voluntary and anonymous, besides the possibility of withdrawing your form at any time, without any prejudice to your person. In the text sent from the invitation: he was asked to voluntarily answer, in case he studied in the Amazonas Elementary School, the following form, whose majority of questions are multiple choice or short answer, with an average time of filling out of 15 minutes. The information collected was analyzed and published only for scientific purposes.

Next, the respondent is asked to decide whether or not to participate in the survey, and then the concordant respondents are presented with 10 questions, divided into multiple choice categories (10), which require respondents to provide certain information, such as what activities they are performing (synchronous/asynchronous classes, synchronous activities, among others), and whether they intend to continue using these technological resources after the covid-19 pandemic.

## RESULTS AND DISCUSSION

In the current context, the actions of the different state and municipal teaching centers linked to the remote teaching program are focused on the structuring and organization of knowledge and information related

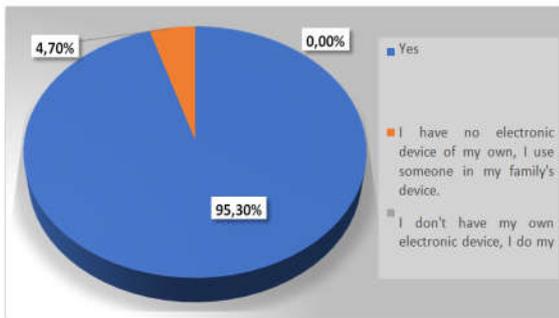
to COVID-19, seeking to build qualified support as an action to confront the pandemic. Educational initiatives related to the epidemic have been organized, under the guidance of the MEC/CNE, responsible for establishing the guidelines for virtual classes in Amazonas, where the teaching platforms are linked, as foreseen in some states' contingency plans, in addition to extensive production of questionnaires that were careful, to respect the answers of the students consulted in the charts below.



Source: Prepared by the author.

**Chart 04. Students who have access to cable internet in their residence**

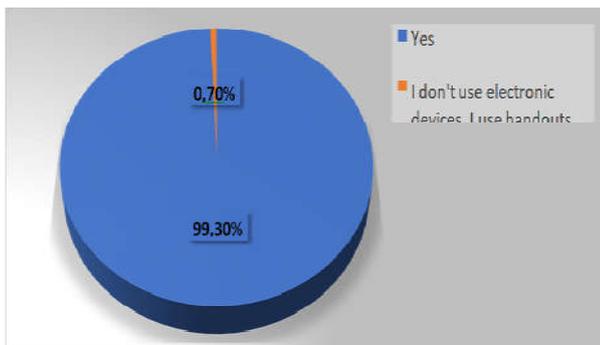
As per chart 04, the figures described, 90.7% of the students assume that they use *cable* internet at home. 8% of the students do not have finished internet and use the data package from mobile internet service providers. 1.3% of these students have no access to any kind of internet.



Source: Prepared by the author.

**Chart 5. The student has access to some type of device such as: notebook, tablet, smartphone, among others**

The Chart 5, above demonstrates that 95.3% of students have access to this equipment in the classroom and at home. In contrast to 4.7% of the students who stated that they do not have devices to study and that they depend on others to follow the remote classes.

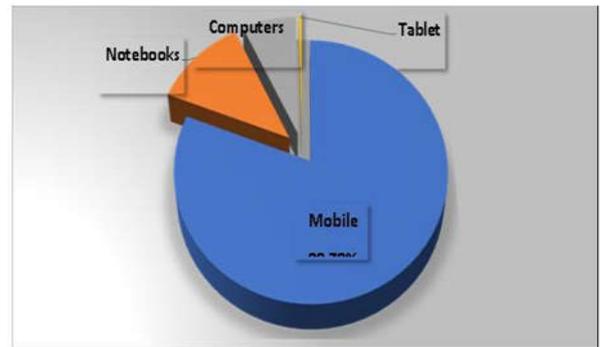


Source: Prepared by the author.

**Chart 6. Students' performance when receiving and sending their activities to teachers remotely**

The graph above shows that, despite the efforts of teachers and school managers to ensure the continuity of the classes with remote modality, 99.3% of students were able to deliver and receive their

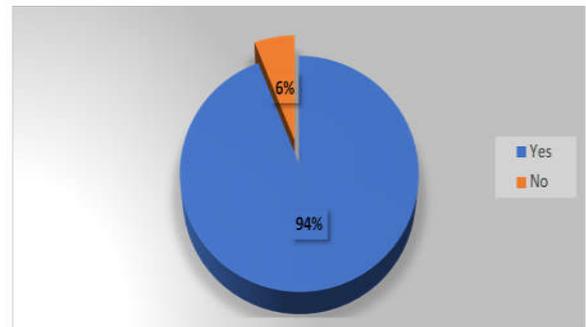
activities without difficulty, unlike 0.7% who did not adhere to the devices that are available on the teaching platforms and opted for handouts.



Source: Prepared by the author.

**Graph 07. Electronic devices used to access the remote classes.**

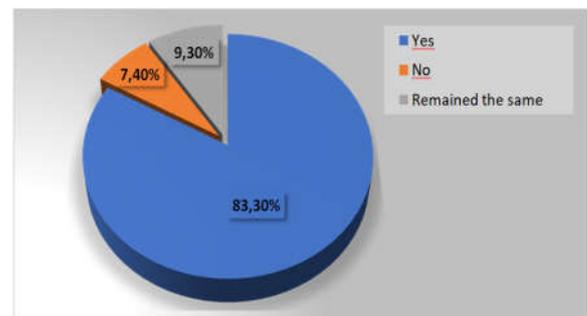
The data presented in graph 07 clearly show that the devices used by students in the state of Amazonas, where 80.7% use cell phones, 12% notebooks, 7% computers, and 0.3% tablets.



Source: Prepared by the author.

**Chart 08. The educational institution makes available some specific platform or application for the teaching and learning process**

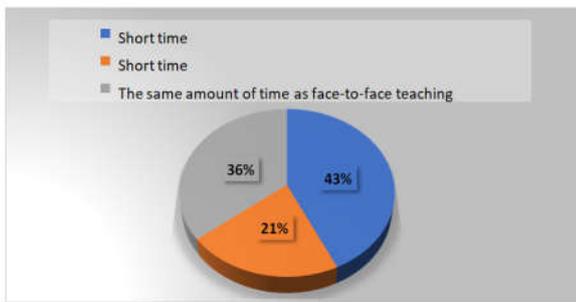
The platforms and devices offered by the educational institutions were safely designed so that these students could have access in a clear and concise way, where 94% said that the schools had these resources available and 6% said that the resources available by the institutions met the expectations of these students (chart 09).



Source: Prepared by the author.

**Chart 9. The technologies such as: (IPAD, Smartphone, Tablet, Cell phones, Computers, Notebooks among others), helped in some way in your teaching and learning process during the covid-19 pandemic**

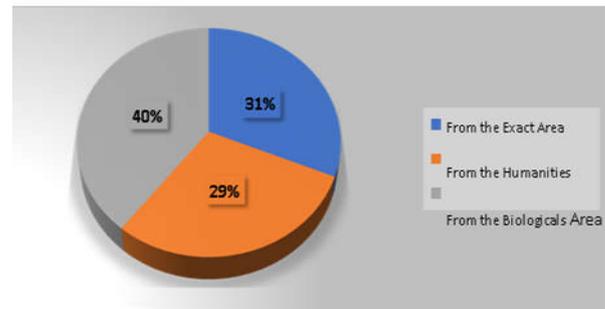
Chart 9 presents the data from May to June 2021. Note that in 2021, the percentage of iPad, Smartphone, Tablet, Mobile Phones, Computers, Notebooks increased to 83.3% and approximately, 9.3% of students said they felt no difference with the help of these technologies, as opposed to 7.4% saying that remote learning remained the same without any changes for them.



Source: Prepared by the author.

**Chart 10. How much time the student spends in front of the IPAD, Smartphone, Tablet, Cell phones, Computers, Notebooks, to perform their school activities during the pandemic.**

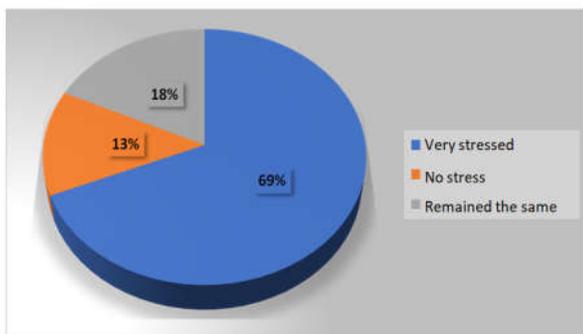
According to chart 10, 43% of the students who participated in the survey stated that they spend little time studying. Still, 21.5% confirmed that they spend a lot of time using these devices to study and 35.6% report that they study an average of 4 to 5 hours a day.



Source: Prepared by the author.

**Chart 13. Which subjects became more difficult to learn after the onset of the covid-19 pandemic and still had to do their activities remotely using the technologies available by the educational institutions**

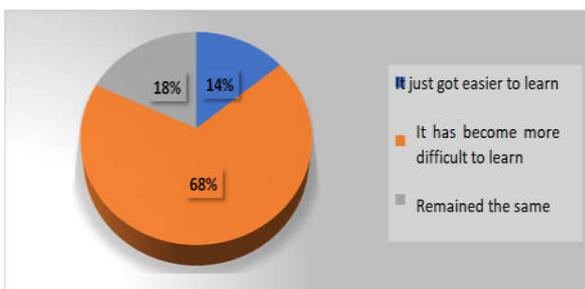
Although this is an arduous path, it is fundamental that every one is aware of the MEC's guidelines (Secretaria de Estado de Educação E Desporto do Amazonas (SEDUC); (Secretaria de Estado de Educação E Desporto do Amazonas (SEDUC); Gobbo, 2020). Even so, the implemented measures are intended to motivate students and teachers to remain in the educational process even if it is at a distance, but with the purpose of contributing so that these subjects stay connected and interact with each other harmonizing all the moments in virtual coexistence, because, besides content, dialogue, interactivity, and creativity are elements that make the difference in this level of uncertainty (Barros, 2019). In Amazonas, the Government and the City Hall of Manaus, through the municipal and state secretaries have disseminated the Aula em casa project, used virtual platforms and television channels, to achieve and minimize the current scenario that the state school education is going through. It is worth mentioning that despite investments from the Education Secretaries and the MEC in the area of training for teachers in the use of digital technologies; the training is not satisfactory to me *et al* the demands of these professionals. We know that these classes are offered remotely and many of the teachers still have resistance in dealing with this situation (Cordeiro, Karolina Maria de Araújo, 2020).



Source: Prepared by the author.

**Chart 11. How was the stress level of students and teachers during the covid-19 pandemic in carrying out teaching and learning**

As per chart 11, 68.7% stated that they were very stressed, 13.3% confirmed that they were not stressed at all, and 18% reported that their stress level remained the same according to the survey.



Source: Prepared by the author, 2021.

**Chart 12. Ease of learning after the onset of the pandemic by covid-19 and having to do your homework activities using the new technologies**

Chart 12 reports that 68% of the students said it became more difficult to learn, yet 14% said that teaching and learning during the onset of the covid-19 pandemic became easier to learn as opposed to 18% who said it remained the same and unchanged. According to graph 13, 39.5% of the biological area say they are more difficult to study and learn, compared with 31.3% of the exact area and 29.3% of the human area. These difficulties are in accordance with the materials made available by the teachers and often do not have access to other teaching materials to assist in the studies. It is worth noting that not all Brazilian educators have had adequate training to work with these new digital tools, and need to reinvent themselves and relearn new ways of teaching and learning.

## FINAL CONSIDERATIONS

The remote teaching adopted by private and public educational institutions occurred due to the need for social isolation caused by the Covid-19 pandemic. In addition to witnessing the consequences of the pandemic itself, the difficulties brought about by the technology, the effectiveness and sometimes even scarcity, and the main factors pertinent to the family environment, it is also possible to measure the impact for parents in adapting to the teaching method caused by this implementation. In the same way, it was difficult for teachers to use their tools in their work activities to continue teaching. In this perspective, the relationship between teaching and new technologies, teaching and learning had to be shared and discussed by governments, teachers, students, and their parents, in order to minimize the possible damage to education, as it was the most consistent solution found by the system. It is believed that education professionals and society will adapt and adopt new ways in the expectation that how to deal with the coronavirus still present in the population.

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