Remote teaching in times of social distancing: a study in the accounting and actuarial sciences courses

Enseñanza a distancia en tiempos de aislamiento social: un estudio en las carreras de ciencias actuariales y contabilidad

Ensino remoto em tempos de distanciamento social: um estudo nos cursos de ciências contábeis e ciências atuariais

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Abstract
Purpose: Considering the imposed social isolation measures to contain the spread of the Sars-Cov-2 virus, the cause of COVID-19 pandemic, the in-person classes started to be held remotely. Those measures had an impact on education, mainly because they had to be adopted

quickly, with no time for preparation. In our current study, we investigate how remote teaching has been occurring in the undergraduate courses of Accounting and Actuarial Sciences at a Public Higher Education Institution (PHEI), in times of social distancing.

Methodology: An e-survey was carried out with teachers and students, in order to obtain information on the subject. The collected data were processed using statistical techniques to generate the results.

Results: It came across that the studied PHEI did not have resources such as a Flipped classroom, Digital Whiteboard or any other technological tools to support remote classes, since the remote teaching modality became a need during the COVID-19 pandemic. The PHEI launched, via public notices, programs for digital inclusion in order to acquire mobile data and equipment, such as computers/smartphones/tablets for students; however, only few of the students could have access to those resources.

Contributions of the Study: Our research results contribute to the state-of-the-art regarding undergraduate courses, by investigating their evolution towards remote learning. Such contributions provide information and knowledge on this subject to the national scientific literature, and give support and guidance to other courses offered by public and/or private higher education institutions.

Keywords: Remote teaching; Higher education; Public higher education institution; Social distancing.

Resumen

Objetivo: Debido a las medidas de aislamiento social impuestas para contener la propagación del virus Sars-Cov-2, que provocó la pandemia de COVID-19, las clases presenciales se empezaron a realizar de manera remota. Estas medidas impactaron en la educación, principalmente porque ocurrieron de manera abrupta, sin ningún tiempo para preparación. Este estudio se propone en investigar cómo se está desarrollando la enseñanza a distancia en las carreras de Ciencias Actuariales y Contabilidad en una Institución Pública de Educación Superior (IPES) en tiempos de distanciamiento social.

Metodología: Se realizó una encuesta tipo electrónica con los profesores y los estudiantes para obtener información acerca del tema. Los datos obtenidos fueron procesados utilizando técnicas estadísticas para generar los resultados.

Resultados: Se observó que la IPES estudiada no cuenta con recursos como Salón de Clase Invertido, Pizarra Digital u otras herramientas tecnológicas para asistencia a las clases a distancia, ya que la modalidad de "enseñanza remota" se dio por la insistente pandemia de COVID-19 en cursos presenciales. La IPES proporcionó programas de inclusión digital a través de avisos públicos para la adquisición de datos móviles y compra de equipos, como computadoras/teléfonos inteligentes/tabletas a los estudiantes, pero pocos de ellos lograron obtener estos recursos.

Contribuciones del Estudio: Esta investigación contribuyó con resultados en estado del arte acerca de los cursos superiores al investigar su evolución hacia el aprendizaje a distancia. Dichas contribuciones pudieron aportar informaciones y conocimientos sobre el tema para la

literatura científica nacional, y para apoyar como así también orientar otros cursos ofrecidos por instituciones públicas y/o privadas.

Palabras clave: Enseñanza a distancia; Educación universitaria; Institución pública de educación superior; Distanciamiento social.

Resumo

Objetivo: Considerando as medidas de isolamento social, impostas para conter a disseminação do vírus *Sars-Cov-2*, causador da pandemia COVID-19, as aulas presenciais passaram a ser realizadas de forma remota. Essas medidas impactaram na Educação, principalmente por terem ocorrido de forma brusca, sem tempo sequer para preparação. O estudo se propõe a investigar como o ensino remoto está sendo desenvolvido nos Cursos de Ciências Contábeis e Ciências Atuariais, em uma Instituição de Ensino Superior Pública (IESP), em tempos de distanciamento social.

Metodologia: Foi realizada uma pesquisa tipo *e-survey* com os docentes e discentes para obter informações sobre o tema. Os dados coletados foram processados utilizando técnicas estatísticas para gerar resultados.

Resultados: Observou-se que a IES estudada não dispõe de recursos como Sala Invertida, Lousa Digital e outras ferramentas tecnológicas para auxiliar nas aulas remotas, uma vez que a modalidade "ensino remoto" se deu pela pandemia da COVID-19, que impediu os cursos de serem realizados presencialmente. A IES lançou programas de inclusão digital por meio de editais para aquisição de dados móveis e compra de equipamentos, como computadores/*smartphones*/*tablets* para os alunos, só que poucos alunos conseguiram esses recursos.

Contribuições do Estudo: Esta pesquisa contribuiu com resultados em estado da arte, no tocante aos cursos de graduação ao investigar sua evolução para o ensino remoto. Tais contribuições puderam vislumbrar informações e conhecimentos sobre o referido tema para a literatura científica nacional e para alicerçar e nortear outros cursos de instituições públicas e/ou privadas.

Palavras-chave: Ensino remoto; Educação superior; Instituição de ensino superior pública; Distanciamento social.

1 Introduction

Distance Learning (DL) is part of the Higher Education Policy in Brazil (Gonçalves, & Silva, 2020), grounded by the Information and Communication Technology (ICT) (Yamanaka, & Cappellozza, 2018), whose tools expand the entire teaching and learning process in the Higher Education (Cassundé, Mendonça, & Barbosa, 2017). That said, we understand that, as long as the Higher Education potentialities are made possible, with the ICT support, countless activities become viable with DL, greatly influencing both the Higher Education Institutions (HEI) and the teaching (Cassundé, Mendonça, & Barbosa, 2017). It is reiterated that, according to the Ordinance no. 2,117, of December 6, 2019, the PHEI can offer distance education, containing 20% of the course workload, which, in special cases, can be extended to 40% (Souza *et al.*, 2020).

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The use of distance learning tools has risen nowadays, mainly due to the Severe Acute Respiratory Syndrome coronavirus 2 - Sars-CoV-2 pandemic, caused by the COVID-19 virus (Souza *et al.*, 2020). Added to that, the social isolation measures, considered as the main public health policy, in the fight against this pandemic (Kuwahara, Kuroda, & Fukuda, 2020), have boosted distance learning in the world (Manchein, Brugnago, Silva, Mendes, & Beims, 2020) and, consequently, in Brazil (Camacho, Fuly, Santos, & Menezes, 2020). In view of this scenario, the Ministry of Education established the Ordinance number 343, of March 17, 2020, which determines the replacement of in-person classes with classes via digital media while the COVID-19 situation lasts (Barbosa, Viegas & Batista, 2020; Camacho, Fuly, Santos, & Menezes, 2020).

The distance learning activities, the online and remote classes are examples of methodological strategies (Silva, Miranda, Diaz, Teles, & Malloy-Diniz, 2020) implemented and practiced by HEI in several countries, as well as in Brazil, to adapt to the pandemic context and to continue to play its fundamental role during social isolation. The undergraduate courses, object of our study, can make use of remote methodologies to guarantee the continuity of the Higher Education, by providing students and teachers with the feeling of being immersed in the classroom, by interacting in a virtual environment. In those digital environments, it is the teachers' responsibility to respect the educational principles and make good professional use of the pedagogical approach, to not transform this moment into mere remote education, "properly speaking" (Bezerra, 2020).

Fernandes, Henn and Kist (2020) made a general history overview of the different forms for distance learning development in Brazil. These researchers observed that the virtual training environments have potential to contribute to remote courses, and to the dissemination of scientific research involving this theme in the national scientific literature; such courses are still in the process of construction and reflection. The same authors (2020) suggest the need to carry out studies focusing on teachers and students, and their respective understandings, regarding the distance learning in Higher Education.

The changes generated in the teaching and learning process caused impacts on education and brought new challenges to society, especially due to the emergency nature of how this process took place. Based on those facts, we pose the research question that will guide this study: **How is the remote teaching being developed in the Accounting and Actuarial Sciences Courses at a Public Higher Education Institution in times of social distancing**?

In order to answer this guiding question, the study starts from its objective: To investigate how remote teaching is being developed in the Accounting and Actuarial Sciences Courses of a Public Higher Education Institution, in times of social distance.

One reason to study distance / remote education is the fact that it has been developing worldwide, especially during the pandemic period and, consequently, in social distancing (Camacho et al., 2020). From that comes the relevance to better understand it in regard to the performance in undergraduate courses, at Public Higher Education Institutions (PHEI). Therefore, we aim to contribute to optimizing the understanding on this topic by promoting reflections on its performance in the undergraduate courses, and to increase the possibilities to leverage similar research, to expand information and knowledge about remote teaching in higher education in Brazil.

Another contribution of this research is to observe and, a posteriori, to evidence the virtual, digital, online environments/platforms/simulacra, created and, concomitantly, used by the investigated PHEI, based on Information and Communication Technologies; and aiming to better understand how the PHEI in focus managed to perform remote teaching in the Higher Education, both in the Accounting Sciences and Actuarial Sciences Courses, in the light of its teachers and students. That said, we reinforce the need to develop new technologies that allow

conducting the remote teaching process in the Higher Education, in an ethical and safe way (Marasca, Yates, Schneider, Feijó, & Bandeira, 2020).

In 2019, the in-person classes were suspended due to the COVID-19 pandemic; schools across the country, from elementary to higher education, had to stop their in-person activities. The PHEI focus of our research was, in 2019, one of the first PHEI to implement remote classes for graduate and undergraduate courses in Paraíba state. At that time, diverse online courses, such as regular disciplines, short courses and extension courses were offered to students of the Institution, as well as of other PHEIs.

2 Social Distancing, Higher Education and Remote Learning

The drugs for effective treatment and/or vaccines to prevent the Sars-CoV-2 infection were not available to everyone at that time. As consequence, the social distancing, respiratory etiquette and hand hygiene were the advised measures to combat the COVID-19 (Garcia Filho, Vieira & Silva, 2020). The social distancing was planned as a non-pharmacological, preventive measure to control the extensive spread of COVID-19 (considered a pandemic in the world and, therefore, in Brazil). In other words, the social isolation was preponderant to mitigate the epidemic curve of this pandemic (Valenti, Menezes, Abreu, Vieira, & Garner, 2020).

In the research of Manchein et al. (2020), the authors analyzed the growth of the cumulative number for confirmed cases of COVID-19 infection among countries of Asia, Europe, North America and South America continents. Their study results showed that people's social isolation is the main strategy, so far, able to flatten the curve of infections and deaths caused by the virus (Manchein et al., 2020). And here, in Brazil, the social distancing was the most prominent resource among the containment measures (Garcia Filho et al., 2020).

In the Higher Education context, in Brazil, the social isolation measures were taken to prevent and mitigate the spread of COVID-19. That way, the competent authorities determined the closing of PHEI, which urgently needed to suspend classes and all the in-person activities, counting on distance learning for feasibility and continuity of the teaching and learning process. However, it is salutary to emphasize that some teachers, and especially the students did not have all the resources to access the contents taught in the distance education modality; for that, it was necessary to provide the viability of their needs, in terms of preparation, to deal with ICTs in the higher education remote teaching (Camacho et al., 2020; Silveira, Bertolini, Parreira, Cunha, & Bigolin, 2020).

The Higher Education, in any country, is massive and diversified, has relevance and prominence among the cultural, economic, political and social spheres. It is considered an important source of research under different perspectives, especially in the PHEIs that are on the rise in the educational segment of Brazil (Maciel, Cunha Júnior, & Lima, 2019; Pimenta, Rosso, & Sousa, 2019; Santos, Pereira, Palmisano, & Lucas, 2020). The distance learning has an ascending trajectory in the Higher Education, especially nowadays, due to the pandemic (Fernandes, Henn, & Kist, 2020).

In terms of strategic education, the remote work can be presented and can contribute in a variety of forms, having each of them its own benefits and challenges, according to the objective and purpose. The outcome of those remote activities depends directly and substantially on technologies, and simultaneously, on the adopted methods and implementation of the remote systems (He et al., 2020); it depends yet on the teacher's pedagogical strategy. Based on that, we observed that the restrictions imposed by the social distancing from COVID-19, required teachers' adaptations to a new work reality that favors the remote activities (Marasca et al., 2020), used as mechanisms to support distance education and training in virtual learning environments.

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According to the stated above, we can say that the remote work follows the evolution of digital/virtual environments and its resources. The potential of those environments are still unexplored, since they are yet in the process of construction and reflection, either related to their actions in distance education courses, as well as in scientific research involving this theme (Fernandes et al., 2020). In order to succeed, we understand that, the remote activities in the Higher Education environment need, besides ICT, to use teaching and learning strategies; that way, the teacher and students quickly can learn to change their previous workflows to those that are currently in focus, due to the changes imposed by the social distancing (He, Lai, Mott, Little, Grock, Haas, & Chan, 2020).

Dhawan (2020) emphasizes that some teaching strategies, such as lectures, case studies, debates, discussions, experiential learning, brainstorming sessions and games, can be used online to enable effective and efficient teaching and learning practices. Such practices represent a transition from traditional norms and practices, prevailing and imposing on PHEI the challenges associated with both the adoption and implementation of distance learning strategies for Higher Education; all that in search of positive results and, consequently, the satisfaction of the actors involved in the teaching and learning process.

Consider that all these agents (teachers, students, directors, coordinators, employees, among others) accepted and adopted the activities and practices of remote work in distance learning (He et al., 2020). In this regard, Malan (2020) stated that the students' involvement is crucial for learning, notably during the online practices.

Due to COVID-19, the whole courses had to be converted to online teaching (Malan, 2020). That said, Malan (2020) discussed a fully online one-level accounting module, where the collaboration was purposefully integrated using an engagement framework. The results indicated that the incorporation of five forms of involvement in the module was positively received by the students, and resulted in more students successfully completing the modules presented. The students' reflections showed that the modules have cognitive proposals, that a personal preference would guide the social engagement, and that working in cooperation will always be challenging. We understand that the provision of the appropriate techniques and technologies, as well as the satisfactory support for teaching and learning, either to teachers and students, is essential for the success of remote teaching in higher education (Dhawan, 2020).

In the study of Silveira et al. (2020), the authors presented technological alternatives that can be adopted to support the remote teaching process during the period of social isolation, due to COVID-19. The authors highlighted the following alternatives: flipped room, problem-based learning, project-based learning, Virtual Learning Environments (VLE), simulators, virtual labs, Moodle.

In order to understand those effects during social isolation, Barbosa et al. (2020) analyzed and presented the impacts identified and reported by professionals of the Higher Education, from the city of Rio de Janeiro and its Metropolitan Region, about their experiences with the new class model proposed by the institutions, called remote class. They pointed to conclusions of efficient actions and activities from teacher/student in the remote class model, considering a good performance for tasks and activities, as planned. However, it is not effective, while looking at the reduced number of students with access to the teaching and learning process, a factor that compromises the quality of service provided by PHEI.

It is also important to inform that the software, presented and adopted by the PHEI, is adapted for the class model. That way, those tools are means of interaction that meet the PHEI models, with the aim of connecting teachers, students and employees, and to improve interaction among them, by providing an alternative for communication, and even replacing the use of e-mail. Under the teachers' eyes, they are very well adapted because it allows the student to get in contact with the reality of a VLE (Barbosa et al., 2020).

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In the study of Martins and Ribeiro (2019), they observed the importance of knowing the level of engagement that students have in the scope of the remote higher education. The authors proposed a model to make possible the assessment to the level of commitment, applied to different courses, as well as to Universities, University Centers or Colleges, regardless the number of students. Such information obtained from this model is relevant to better understand the performance of the different actors involved in the process of remote teaching in the Higher Education, especially the students; it contributes to and influences the enhancement and robustness of the remote courses quality (Martins & Ribeiro, 2019).

It is also worth to consider that in this teaching-learning process, teachers may be affected by another problem, perhaps unknown, which is the frustration of not knowing and fully mastering ICT; this can increase their workload in the search for competence and skill. Even more attention is needed, as all this is happening during the COVID-19 process, under total social distance, which requires emotional balance and good practices to maintain physical, mental, economic and financial health. In short, we consider the fact that, in order to obtain a good connection between technology and the teacher, there is a need for a minimum training, even for those teachers who somehow already had ICT skills (Barbosa et al., 2020).

3 Methodological procedures

To carry out the empirical on-screen study, we developed an online questionnaire (e-survey) hosted on the Google Forms platform to collect data. The data collection tool was composed of two parts: i) general information about the participants' social nature, to identify the profile of the respondents; and ii) specific information about the studied topic, to verify the hypothesis proposed in the present work. Each questionnaire question (Figure 1) is rated on a five-category Likert scale (from 1 – No Correspondence to 5 – Total Correspondence). Therefore, this study is, methodologically, an exploratory research carried out by means of a survey, using the questionnaire as an instrument. In this way, it is qualitative with numerical aspects.

The object of our study is focused on the Accounting and Actuarial Sciences Courses of two Campuses (called Campus A and Campus B in this text) of a Public University in the State of Paraíba; the data collection took place voluntarily between the days of 10/03 to 11/30/2020. On campus A, there are two courses: Accounting Sciences and Actuarial Sciences; and, on Campus B, the Accounting Sciences Course. The questionnaire was sent to a sample of 44 teachers and 1,164 students, both active in the current period mentioned here (2020.1 academic period); the two campuses have 1,638 active students in the surveyed courses. The application of the questionnaire generated a series of qualitative information in its first part, and a Likert-type scale, in the second part.

In the first analyses, we generated spreadsheets and graphics that summarized the results, by question. After that, we carried out some statistical analyzes in order to observe and understand the studied phenomenon in more depth. For the data processing part, we performed the descriptive statistics of the data, the correlation analysis (Linear Correlation) and the Principal Components Analysis (PCA). With the objective of minimizing the number of variables, since there were many of them, we used the Factor Analysis with the PCA technique. The PCA aggregates the statistically similar variables, converting them into components. In the Principal Component Analysis study, the evidenced statistics associated with the factor analysis were the following: Bartlett's Sphericity Test and Kaiser Meyer Olkin's Sample Adequacy Measure (KMO).

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4 Analysis and Results Discussion

The total of 311 questionnaires was answered by teachers and students from the two Campuses and from the three aforementioned courses. Among the answered questionnaires, four of them were excluded due to data inconsistencies, and 307 were considered for analysis. Of these, 21 (6.84%) are responses from teachers and 286 (93.16%) from students.

4.1 General Research Analysis

The part I of the questionnaire aimed to search information, mainly about the social nature of the participants. Of the respondents, 47.88% are male and 52.12% are female. Regarding the groups, 33.33% of the teachers are male; and 66.67% are female. And the students, 48.95% are male; and 51.05% female. Schmitt et al. (2021) carried out a work of the same nature, but only analyzing the teachers' perspective with a sample of 52 individuals, being 50% of male. Ribeiro and Corrêa (2021) analyzed the influence of remote teaching during the period of social isolation due to Covid-19, in the Private HEI of Piauí state, with a sample composed of students and teachers, being 53% of female gender and 47% of male gender.

The majority of teachers' respondents, 66.67%, is graduated in Accounting Sciences; 9.52% in Actuarial Sciences; 9.52% in Administration; and 14.29% in Economic Sciences. We observed that teachers trained in Actuarial Sciences teach for the Actuarial Sciences Course, while those trained in Accounting, Administration and Economics teach for Accounting and/or Actuarial Sciences Courses.

Respondents were asked if they had received from the PHEI any mobile data resource for Internet access, in order to assist them with the remote teaching. Of the teachers, 95.24% answered that they use their own Internet; and one of them did not respond. Of the students, 95.80% are from Campus A and 4.20% from campus B. All the students from Campus B (12) use their own Internet; the students from Campus A, 44 of them (15.38%) signed up to obtain the resources, but only 4.55% received it; 3.51% are still waiting for resources; and the others use their own Internet. "It causes strangeness that, in 2020, we are faced with the lack of Internet connection; besides, the lack of access to this technology, as well to its numerous resources, generate a new type of exclusion, the digital one" (Martins, 2020, p. 244).

Via the Simplified Emergency Notice No. 07/2020, the PHEI made public the selection process for the Digital Inclusion Action (Distribution of a Chip for Personal Mobile Service with data for Internet access). This Public Notice is aimed at students in a situation of socioeconomic vulnerability, enrolled in the 2020.1 remote supplementary school term, to have access to the academic content made available remotely (UFPB, 2020). We observed that the digital exclusion "has showed its most negative effects at the current moment, when a pandemic has hit us, by bringing to light all the uncertainties and vulnerabilities generated over decades of neglect with the pillars of social well-being: science, education, health, culture and security" (Martins, 2020, p. 244).

By inquiring if the PHEI had supplied the resources for acquisition of the information technology equipment (IT), in order to attend classes in remote format, which ensures the determination of the Simplified Emergency Notice No. 06/2020 of PHEI (UFPB, 2020), the 286 (100%) of the students and 20 of the 21 teachers answered to the question. Teachers use their own equipment. On the other hand, the students of Accounting Sciences at Campus A, Actuarial Sciences at Campus A and Accounting Sciences at Campus B, respectively, 7.35%, 1.75% and 0% registered and received the funds; 2.10%, 2.45% and 0% were still waiting for

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resources; 4.90%, 2.79% and 0% applied and were not selected; 56.64%, 18.18% and 100% use their own equipment.

The research by Barbosa et al. (2020) shows that 91.9% of the interviewed teachers have their own resources to teach classes remotely; this result corroborates our research founds, in which all teachers use their own resources for remote classes.

The authors also add that "when asked if they had received any financial incentive from the institutions they teach, 79% answered negatively, meaning that they did not receive" (Barbosa *et al.*,2020, p.269). It is worth to remark that the Ordinance MEC 343 (2020), Art. 1º, authorized the replacement of in-person classes with classes that use information and communication media and technologies, digital technologies; however, in its text there is no explicit financial support for teachers.

The Instrumental Assistance published by the PHEI aimed to grant the student, in a single installment, resources for the acquisition of IT equipment such as a computer (desktop or notebook) or Tablet, to attend classes in remote format; directed to students enrolled in the supplementary academic period 2020.1 (UFPB, 2020). In times of social isolation, consequence of the COVID-19 pandemic, the in-person interaction became limited, making the use of digital technologies essential for teachers, educational managers and students to maintain the teaching-learning processes working. Therefore, the use of those technologies can become a highly efficient instrument when teachers are properly trained for their implementation, and all the students can have full access to them (Freitas, & Boechat, 2020).

The part II of our questionnaire consists of 16 questions, on a Likert-type scale, focusing on the general objective of the on-screen research, and aiming to answer our research problem, according to the answers presented below.

Respondents were asked whether social isolation, as a result of the COVID-19 pandemic, had interrupted their academic practices, since the three courses in question are in-person courses. The Figure 1 summarizes their responses.
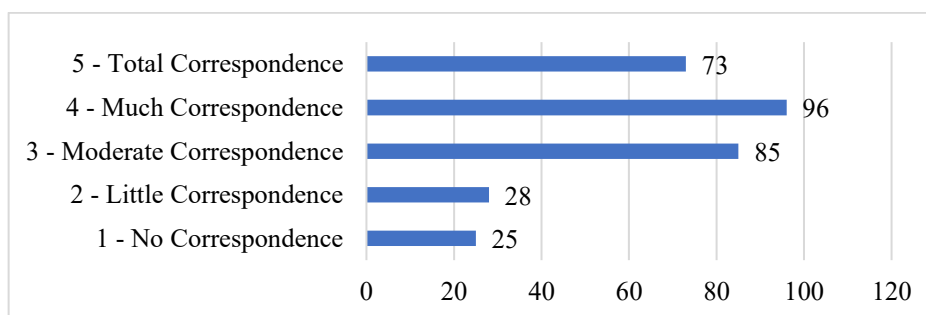

Figure 1 *COVID-19 pandemic and academic practices*
Source: *Elaborated by the authors, 2021.*

We observed that the COVID-19 pandemic had direct influence on the academic activities of the respondents, with 55.05% of them indicating the alternatives from "much to total correspondence". However, we observed that the responses of teachers and students do not converge; while teachers agreed that the pandemic did not significantly affect their academic activities, with 57.14% choosing the "little to no correspondence" alternatives, the students indicated 14.34% only. In this regard, Ribeiro and Corrêa (2021) identified that in the Private HEIs of Piauí, students and teachers mostly stated "no correspondence or little correspondence" to this issue of academic practices interruption, due to the pandemic.

The identified divergences between the two surveys may be due to the nature of the approached HEI. In the case of the present research, the Public Institution (PHEI) did not adopt the remote teaching from the beginning of the social isolation. However, in the case of Private

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HEI, their reaction to the students request was fast due to their requirement and need, since the income of those institutions depends on the students, and they would not be willing to pay without having academic activities.

According to Martins (2020), in 2005, the Decree 5,622/2005, of December 19, was approved to regulate the Art. 80 of LDB 9394/1996. In that, it was established that distance learning is a teaching modality apart from the in-person education. However, "At the beginning of the year 2020, the effect of the Covid-19 pandemic put down all the legal barriers that separated the education system into the in-person and distance education" (Martins, 2020, p. 245). Difficulties and resistance are expected during the implementation of the remote teaching process, but that was the way to continue with the teaching-learning process in PHEIs. For Martins (2020), the effect of the Covid-19 pandemic broke the legal barriers that separated the educational system into in-person and remote education. For this author (2020), "in the post-Covid19 educational paradigm, the division between distance education and in-person education will lose meaning, and that the new "normal" will be the education mediated by digital educational resources" (p.245).

The Figure 2 shows the results about the challenges in the activities implementation in the remote teaching modality.
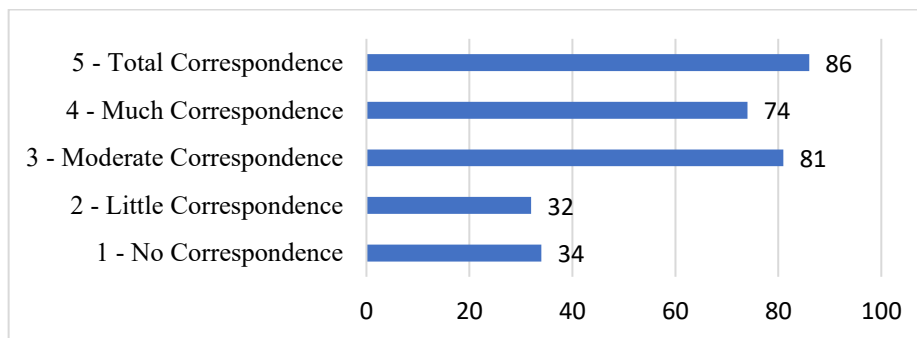

Figure 2 *Challenges for the activities implementation in the remote teaching modality*
Source: *Elaborated by the authors, 2021.*

Analyzing the answers to this question, we see that the majority answered that the implementation of activities in the remote teaching modality was a challenge, as 52.12% agreed with the affirmative from "much to total correspondence". When we analyze the answers by group, we see that the answers of students and teachers converge; 66.67% of teachers and 51.05% of students agree with the mentioned statements.

The Figure 3 is about to know if teachers and students had experiences with remote teaching / distance learning. The result is similar to that found by Ribeiro and Corrêa (2021) when analyzing the Private HEIs in Piauí, as 78% of the respondents to their survey stated that it was a big challenge to move from in-person to remote teaching.
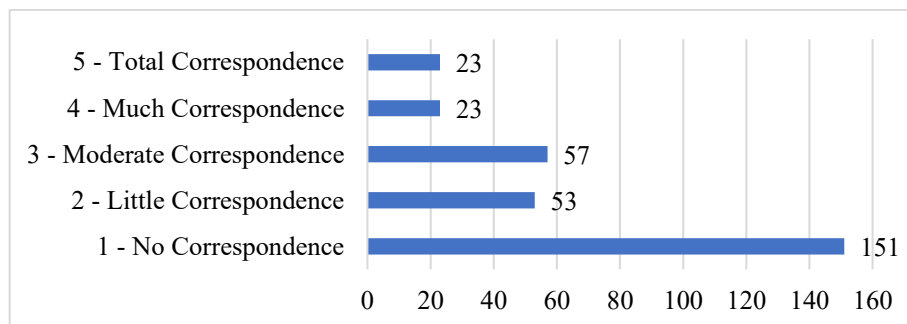
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Figure 3 *Experience with remote teaching/Distance Learning*
Source: *Elaborated by the authors, 2021.*

As shown in Figure 3, the 66.45% of respondents said they had none or little experience in remote teaching / distance learning, highlighting that most teachers and students taking part of this research were not prepared for this teaching model. The answers by group had similar percentages: 66.67% of teachers and 66.43% of students, respectively. The remote classes were an action taken from PHEIs so that the courses could continue happening during the pandemic without making problems to students.

According to the result presented in Figure 3, remote teaching is not a teaching modality; instead it is the in-person teaching being applied through technology. In this teaching modality, there is a different behavior, also found by Ribeiro and Corrêa (2021) in the Private HEI of the Piauí State, where most of respondents claimed to have previous experience with remote teaching.

The Figure 4 refers to the question of whether the PHEI has tools such as flipped room, active methodologies room, digital whiteboard or other technologies to assist them in the remote teaching.
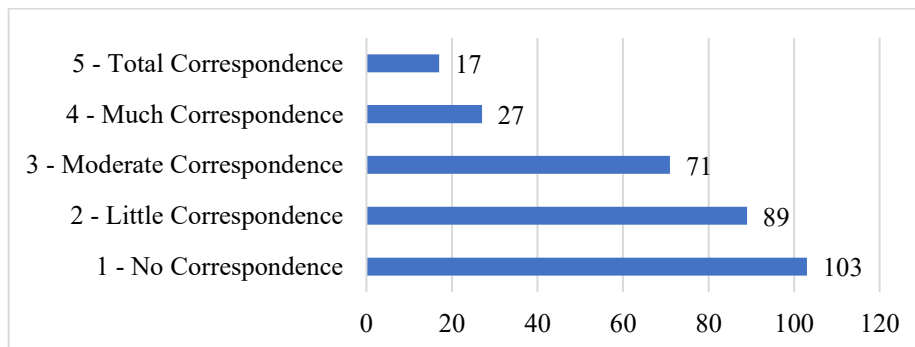

Figure 4 *Flipped room, active methodologies room, digital whiteboard and others at PHEI*
Source: *Elaborated by the authors, 2021.*

We found that the PHEI does not have resources such as flipped room, active methodologies room, digital whiteboard or other tools for remote teaching. Figure 4 shows that 62.54% of respondents indicated the statements "from none to little correspondence" about whether the PHEI had such resources. Both, teachers, 80.95%, and students, 61.19%, agree that the PHEI does not have such resources for remote teaching.

In comparison with the studies by Ribeiro and Corrêa (2021), they had identified a totally different situation in the Private HEI of Piauí, where most of respondents stated that they had from "much to total correspondence" in regard to the structure addressed in this item. This observation highlights the difference between the investments for public and private higher education. Another research, carried out by higher education teachers in Rio de Janeiro, pointed

out that 85.5% of teachers know and make use of active methodologies in the in-person classes (Barbosa et al., 2020).

The concept of active methodologies is directly linked to placing the learning as the focus in the process, for which the students are assembled to generate knowledge, both internally and externally. For Ferrarini; Saheb and Torres (2019) "The main feature of this concept relies on problem solving, a situation that requires students to produce knowledge instead of its simple reproduction" (p.25). In the active methodologies process, such as the flipped room, for example, students must develop the ability to search, analyze, summarize, elaborate, question, etc. "The whole process can be carried out with or without the use of digital technologies. However, the use of those digital technologies facilitates and enhances the process, as can be demonstrated by the performed studies" (Ferrarini; Saheb, & Torres, 2019, p.25). That way, due to the transition from in-person to remote teaching, teachers and students had to reinvent themselves, to learn new methodologies and to work with Digital Technologies.

The Figure 5, below, describes whether the difficulty in implementing the remote teaching is due to resistance from teachers.
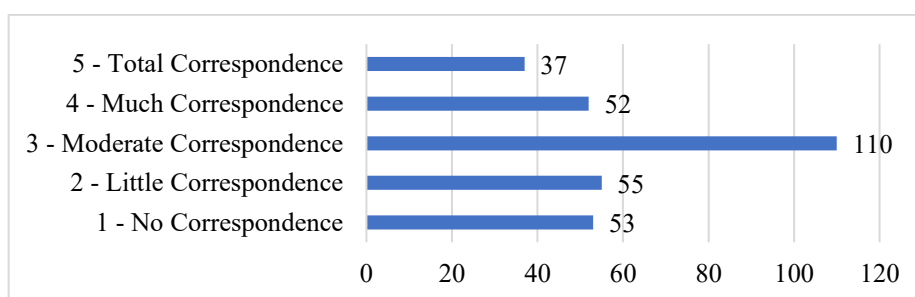

Figure 5 *Teachers' resistance to remote teaching*
Source: *Elaborated by the authors, 2021.*

By analyzing the Figure 5, one can observe that 35.18% of the respondents indicated that the difficulty of implementing the remote teaching was due to the teachers' resistance. However, in a more accurate analysis, we observe that 38.10% of the teachers believe "there is none or there is little correspondence" between the difficulties of implementing remote teaching and the teachers' resistance. What drew attention in this matter is that teachers and students indicated the statement "moderate correspondence", being 33.33% and 36.01%, respectively, between teacher resistance and the implementation of the remote teaching.

In this regard, Ribeiro and Corrêa (2021) identified that in private higher education there was no resistance from teachers related to the implementation of the remote teaching.

Next, Figure 6 describes whether the resistance to the remote teaching implementation was due to the students' resistance.
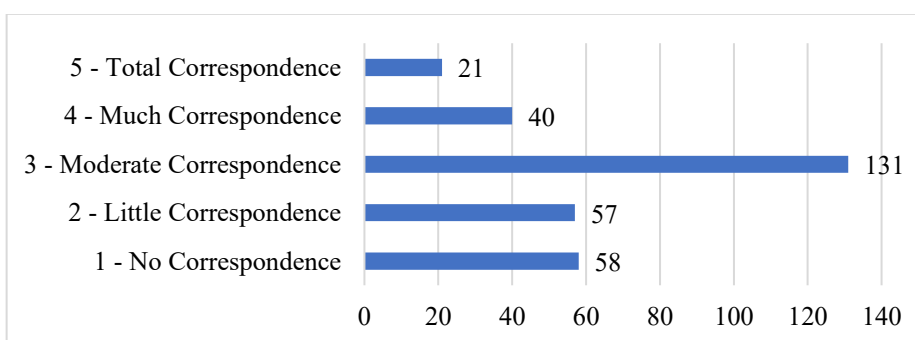

Figure 6 *Students' resistance to remote teaching*
Source: *Elaborated by the authors, 2021.*

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In this analysis, we observe that the results of the question presented in Figure 6 are very close to the data of the previous question, which leads to understand that, in the view of the respondents, 37.46% focus on the answers from "little to no correspondence". Teachers and students indicated "moderate correspondence" to the question, 42.86% and 42.66%, respectively; concluding that teachers and students believe that there is no strong correspondence between students' resistance and the remote teaching implementation. In the opposite, the study by Ribeiro and Corrêa (2021) showed that 64% of the students were resistant to the implementation of the remote teaching.

By analyzing the answers in Figures 5 and 6, it is possible to observe that the difficulties in implementing the remote teaching are not directly linked to the resistance of the students, neither of the teachers, since the highest concentration of answers occurs between the items of "moderate to no correspondence". In the answers, there are 71.42% and 80.27% for teachers and 70.97% and 80.07% for students in the questions 12 and 13, respectively.

The Figure 7 below describes the difficulties of remote teaching in regard to exam-based assessments.
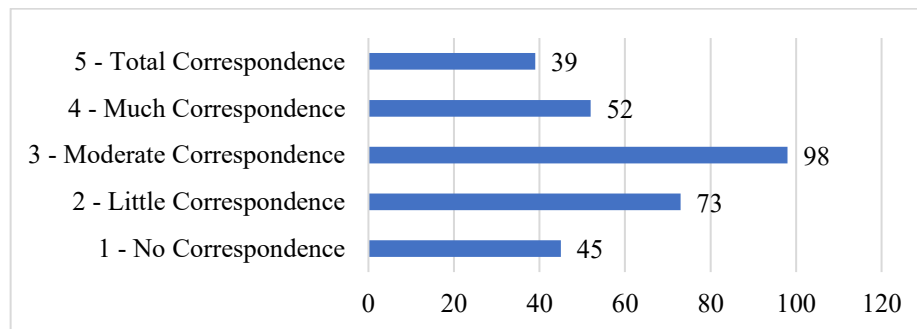
Figure 7 *The hardest part of remote teaching was the exams*
Source: *Elaborated by the authors, 2021.*

The answers above indicate that the respondents do not consider the exams as a difficult part of the remote teaching, since 29.64% of the answers are from "much to total correspondence". When analyzing the classes separately, we observe that the tests weighed more for the teachers than for the students; 47.62% of the teachers and 28.32% of the students concentrated their answers on those alternatives.

Ribeiro and Corrêa (2021) observed a similar result in the Private HEI of Piauí State. Although the remote teaching has limitations, Schmitt et al. (2021) identified that teachers perceived that the assessment used in remote teaching achieved the expectation. Therefore, it can be seen as a possible strategy that should be maintained by the teachers, in case they need to carry out the assessments remotely.

Figure 8 shows whether the system implemented for remote classes had enabled the inclusion of students in the online classroom.

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Figure 8 *Remote teaching and inclusion of students in the online classroom.*
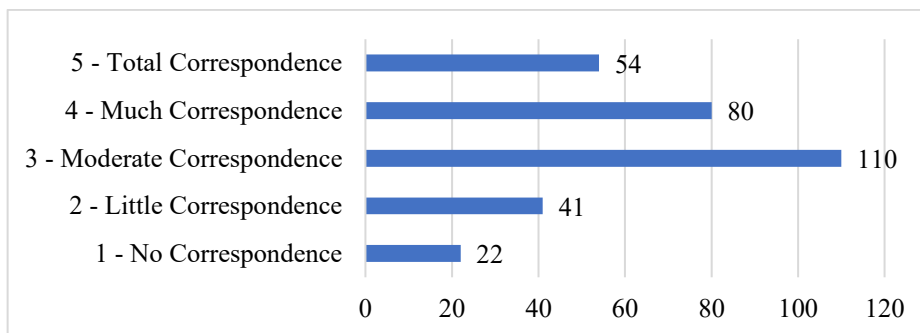**Source:** *Elaborated by the authors, 2021.*

Observing the answers in Figure 8, one can see that, according to the respondents, the remote teaching contributed to the inclusion of students in the online classroom, as 43.65% chose the affirmative from "much to total correspondence" and 20.52% chose from "none to little correspondence".

In regard to the statement "moderate correspondence" (35.83%) one can conclude that, according to respondents, there was inclusion of students in online classes. In the Private HEI of Piauí, Ribeiro and Corrêa (2021) had found a slightly different result. For these authors, the opinion of teachers and students on this aspect was predominantly from "moderate to little correspondence".

The Figure 9 below shows whether the pedagogical didactic process of remote teaching occurs in a more productive way than in the in-person teaching.
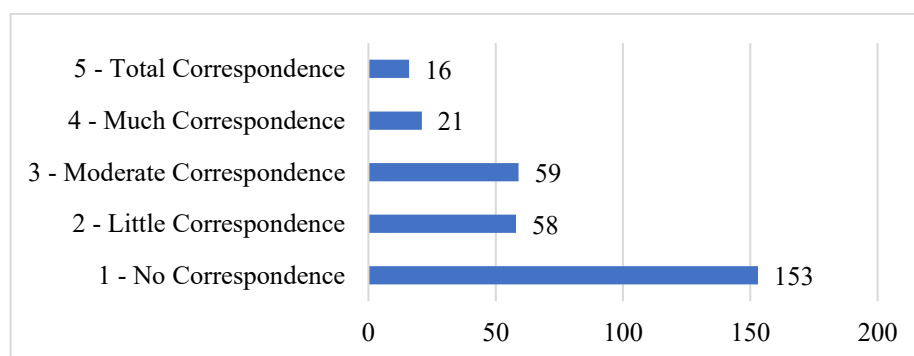
Figure 9 *Pedagogical didactic process in remote teaching.*
Source: *Elaborated by the authors, 2021.*

With 68.73% of affirmative from "none to little correspondence", the respondents agreed that the pedagogical didactic process of the remote teaching is not better than in the in-person teaching. When the groups are analyzed individually, the results converge to the global. Ribeiro and Corrêa (2021) observed a predominance of the "moderate correspondence" responses regarding the perception of a better pedagogical didactic process of teaching in relation to the in-person teaching.

Currently, both teachers and students are facing new experiences in their teaching and learning activities with some more complexity. For this reason, it is normal that, during the process of migrating from in-person to remote teaching, they experience some difficulties. This is because, "in the face of so many fundamental methodologies for this learning process, there is the need of many enabled devices, such as equipment to support the installations, Web connections, and the care with data and information security" (Barbosa et al, 2020, p.262).

The Figure 10 presents the impact of the transition from the in-person teaching model to the remote one.

Figure 10 *Significant impact from in-person teaching to remote teaching*
Source: *Elaborated by the authors, 2021.*

The impact caused by the moving of teachers and students from in-person teaching to remote teaching is noticeable. The 65.15% of respondents 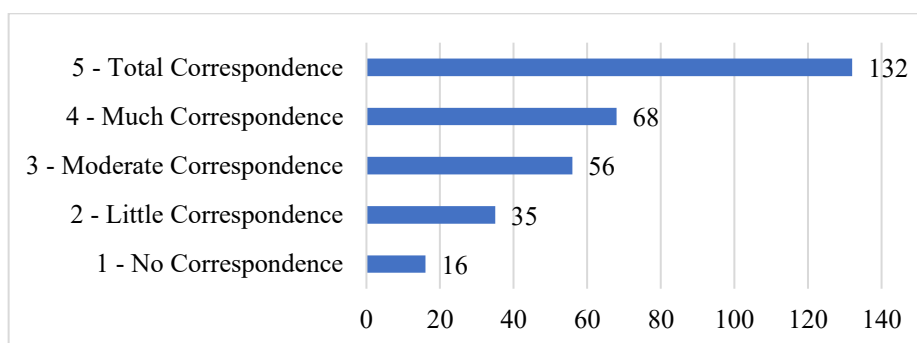agree with the affirmative from "much to total correspondence", which shows that there is a considerable impact when facing the virtual modality of the remote teaching, related to in-person teaching.

To corroborate this point of view, Schmitt et al. (2021) identified that teachers had certain dynamism in adapting methodologies to be used in remote teaching, in order to mitigate the impacts of this transition. Unlike the present result, Ribeiro and Corrêa (2021) found a moderate correspondence on the impact of the change from in-person to remote teaching in the Private HEIs in Piauí State.

The Figure 11 is about the mastery of technologies by teachers and students in order to deal with the remote teaching, and whether the change from in-person to remote modality has been comfortable.
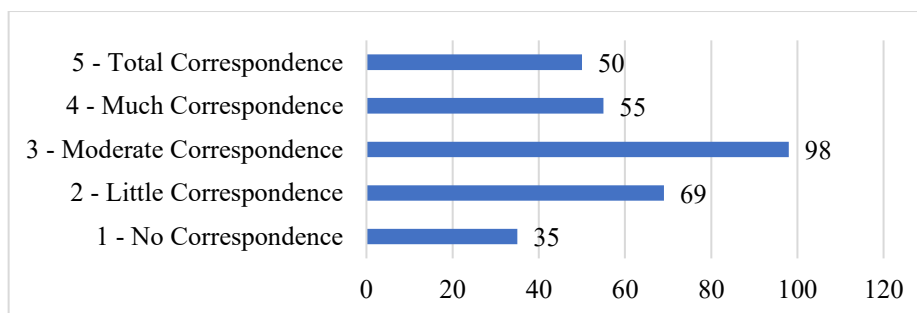
Figure 11 *Mastery of technologies and comfort in the switch to remote teaching*
Source: *Elaborated by the authors, 2021.*

According to the results, we observe that 34.20% of the respondents have technological knowledge and, therefore, the switch to remote teaching has been comfortable, indicated by the affirmatives from "much to total correspondence". However, 33.88% disagreed when choosing the affirmatives from "little to no correspondence".

By looking at the groups individually, we observe that the teachers felt less comfortable than the students, pointing to a result similar to that found by Ribeiro and Corrêa (2021), in the study of Private HEIs in the State of Piauí.

The Figure 12 points out the adaptation to remote teaching: whether it was experienced more intensely due to the lack of some face-to-face meetings.
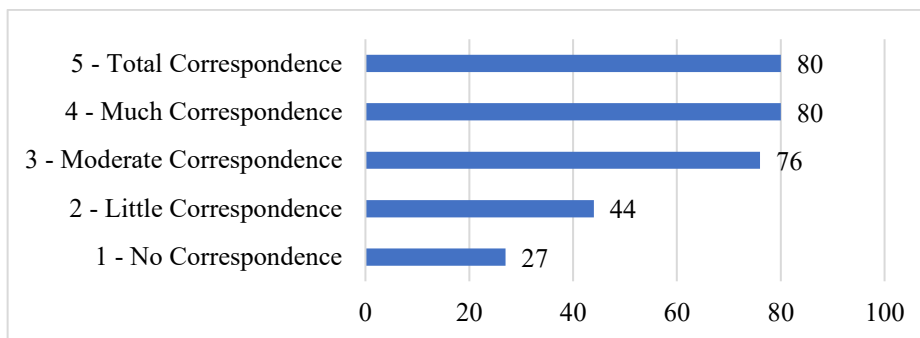
Figure 12 *Adaptation to remote teaching and the lack of face-to-face meetings*
Source: *Elaborated by the authors, 2021.*

About the adaptation to remote teaching, it was found that 52.12% of respondents felt the process with more intensity due to the absence of face-to-face meetings. The 42.86% of teachers and the 52.80% of students agreed with this statement by marking the alternatives from "much to total correspondence". Opposed to that, Ribeiro and Corrêa (2021) identified a predominant result from "moderate to little correspondence" regarding the lack of face-to-face meetings", in the Private HEI of Piauí State.

The Figure 13 refers to the respondents' insecurity regarding the remote teaching.
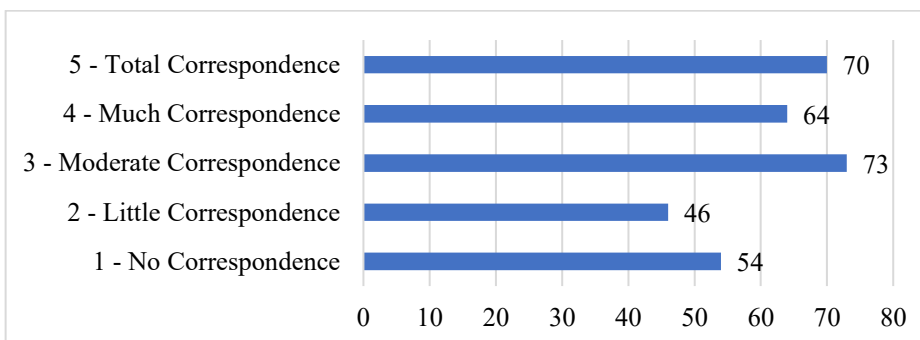
Figure 13 *Insecurity regarding the remote teaching*
Source: *Elaborated by the authors, 2021.*

Asking whether the respondents felt insecure about the remote teaching, we observed that 43.65% were insecure and 32.57% disagreed with the statement. In this matter, there is a clear positioning between professors and students. In regard to the affirmatives, 47.62% of the teachers agreed with the statement from "moderate to total correspondence", against 68.88% of the students. This evidences a greater insecurity on the part of the students.

The Figure 14 shows whether the main difficulty in distance learning, and, consequently, in remote teaching, is due to the insecurity on Internet.
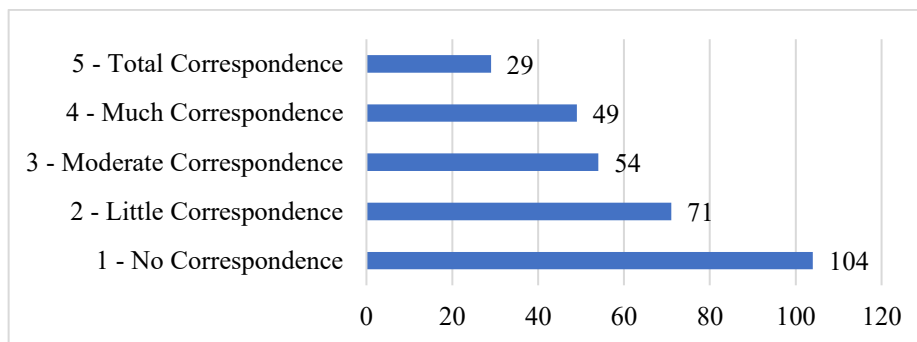
Figure 14 *Difficulty in remote teaching due to the insecurity on internet*
Source: *Elaborated by the authors, 2021.*

Based on the results, we observed that 57.00% disagreed with the statement. Therefore, the lack of security on the Internet was not the reason that led to difficulties in the remote teaching. The results of teachers and students converge; they did not believe there is a correspondence between the difficulties in the distance learning and the lack of a secure Internet. A similar result was found by Ribeiro and Corrêa (2021) in their study involving the Private HEIs in Piauí.

The Figure 15 points out whether the difficulties with distance learning are due to the lack of resources, such as computers and/or Smartphones, in order to participate in the remote classes.
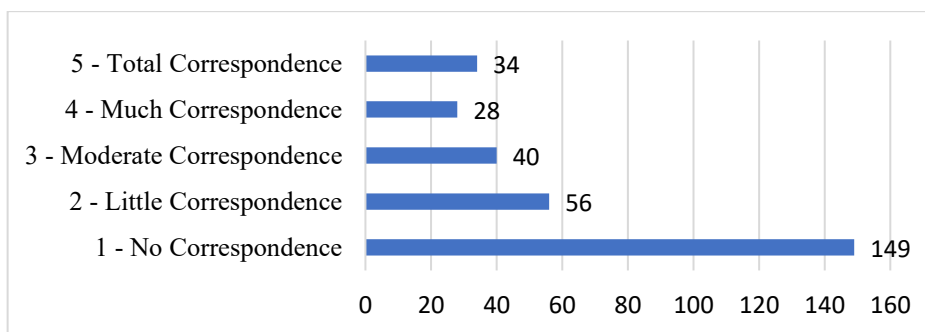
Figure 15 *Difficulties associated with the absence of computer and/or smartphone*
Source: *Elaborated by the authors, 2021.*

The 66.78% of the respondents disagreed that the lack of computers and/or Smartphones was the main difficulty in the access to remote classes. Schmitt et al. (2021) identified that interaction is the main difficulty for students in the remote teaching.

And lastly, the respondents should agree or not with the following statement: During this period, the PHEI had an ICT team to provide solutions to the demands of the academic community and, consequently, to the remote teaching. The results are represented in Figure 16.

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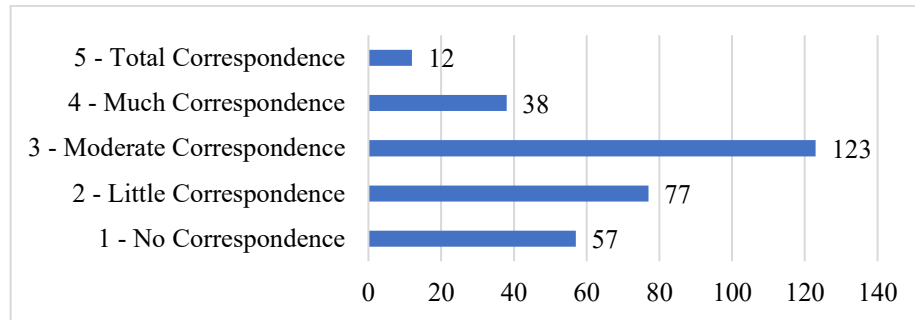
Figure 16 *PHEI and the availability of ICT*
Source: *Research data, 2021.*

According to the answers, one can observe that 16.29% of the respondents agreed with the statement. This is due to the fact that the analyzed courses are in-person courses, and the distance learning is an atypical modality for those involved, both teachers and students. On the other hand, 43.65% disagreed with the statement, indicating from "little to no correspondence", while the 40.07% agreed with the affirmative of "moderate correspondence". The answers give evidence that the PHEI has limitations related to ICT, and does not meet the requirements of the academic community. A similar finding on this issue was cited by Ribeiro and Corrêa (2021), when they analyzed the Private HEI in State of Piauí.

4.2 Statistical Analysis of Data

In order to strengthen the results of the aforementioned study, we performed a statistical analysis using the data generated from the e-survey.

Next, we present the Table 1, Table 2 and Figure 17 with the results obtained from the descriptive analysis of the data and the Pearson's correlation.

Table 1
Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
cat	307	1.068404	0.25285	1	2
gen	307	0.521173	0.500367	0	1
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
f_eta	307	2.833876	1.029829	1	5
form	307	1.859935	1.363599	1	7
q4	307	1.771987	1.166021	1	7
q5	307	1.827362	1.280638	1	7
q6	306	3.326797	1.380568	1	9
q7	307	4.859935	3.154506	1	12
q8	307	3.534202	1.183203	1	5
q9	307	3.47557	1.299279	1	5
q10	307	2.068404	1.285367	1	5
q11	307	2.237785	1.168265	1	5
q12	307	2.885993	1.230083	1	5
q13	307	2.703583	1.123175	1	5
q14	307	2.892508	1.222679	1	5

q15	307	3.335505	1.129583	1	5
q16	307	1.986971	1.199057	1	5
q17	307	3.863192	1.234385	1	5
q18	307	3.052117	1.230291	1	5
q19	307	3.462541	1.260666	1	5
q20	307	3.162866	1.397777	1	5
q21	307	2.439739	1.347517	1	5
q22	307	2.159609	1.399322	1	5
q23	307	2.579805	1.049112	1	5

Subtitle: cat (category: teacher or student); gen (gender); f eta (age group); form (highest level of teacher education); q4 a q23 (correspond to the questions of the research instrument): q4 (teacher graduation); q5 (Course taught at PHEI and workload); q6 (Obtaining Data Resources by PHEI); q7 (Obtaining resources for equipment by PHEI); q8 (Interruption of academic activities due to Covid-19); q9 (challenges with the implementation of remote activities); q10 (Remote teaching / Distance Learning experience); q11 (PHEI features like flipped room, digital whiteboard and others); q12 (Teacher resistance in the implementation of remote teaching); q13 (Student resistance in the implementation of remote teaching); q14 (The exams were the main difficulty in remote teaching); q15 (Inclusion of students in the online classroom); q16 (Pedagogical process in remote teaching is better than in-person); q17 (Impact by moving from in-person to remote model); q18 (mastery of technology and shift to remote teaching); q19 (Adaptation to remote teaching due to the lack of face-to-face meetings); q20 (Insecurity with remote teaching); q21 (Insecurity in remote teaching due to lack of secure internet); q22 (Difficulty in remote teaching due to the lack of computers/smartphone); q23 (PHEI made ICTs available for the academic community demands).
Source: *Elaborated by the authors, 2021.*

The descriptive analysis is based on the worksheet data, in which the qualitative information is converted into quantitative, when necessary; that means, for the affirmatives that used the Likert-type scale, the conversion is not necessary.

Table 2
Pearson's coefficient.

	cat	Gen	f_eta	form	q4	q5	q6	q7	q8
cat	1								
gen	0.0781	1							
f_eta	0.4201	-0.1772	1						
form	0.7672	0.1583	0.3174	1					
q4	0.6183	0.1352	0.2583	0.9396	1				
q5	0.7229	0.1492	0.2669	0.9554	0.9276	1			
q6	0.7797	0.0224	0.4341	0.6485	0.5424	0.6169	1		
q7	0.5322	0.1337	0.2139	0.8956	0.9099	0.9137	0.5493	1	
q8	-0.2323	0.0014	-0.1993	-0.1206	-0.0617	-0.1212	-0.2979	-0.0842	1
q9	0.0602	0.0714	-0.0815	0.1198	0.1073	0.1172	-0.0792	0.069	0.4154
q10	0.0559	-0.0966	0.179	-0.0375	-0.0551	-0.0346	0.0279	-0.0469	0.0166
q11	-0.0563	-0.0039	-0.1033	0.0435	0.0955	0.0735	-0.0817	0.0648	0.0932
q12	0.0463	-0.0037	0.055	-0.0484	-0.0773	-0.085	-0.0955	-0.1093	0.2128
q13	-0.0079	0.0765	-0.0908	0.0436	0.0657	0.0487	-0.1247	0.0358	0.2917
q14	0.0656	0.0468	-0.0526	0.1386	0.1901	0.1538	0.0145	0.1432	0.2717
q15	0.0328	-0.1067	0.1156	0.0091	0.021	0.0355	0.0274	0.0045	-0.1415
q16	0.0022	-0.0515	0.1711	-0.0909	-0.0906	-0.0928	-0.0416	-0.1354	-0.1485

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q17	-0.0005	0.0238	-0.2217	0.0975	0.1258	0.1133	-0.0711	0.0935	0.2892
q18	-0.0438	-0.1059	-0.0238	-0.1555	-0.1647	-0.154	-0.057	-0.1406	-0.1936
q19	-0.0782	-0.0375	-0.1418	0.0481	0.0548	0.0625	-0.0768	0.0715	0.2548
q20	-0.1242	0.0695	-0.2928	-0.0225	0.0186	-0.0283	-0.1736	-0.0277	0.3088
q21	-0.0019	0.058	-0.1441	0.0292	0.0025	0.0337	-0.0612	0.0069	0.2157
q22	0.0238	0.0274	-0.0655	0.0375	0.0066	0.0356	-0.0684	-0.0336	0.2257
q23	-0.015	0.0183	0.0699	0.0078	0.003	-0.0067	-0.0727	-0.0219	-0.0458
	q9	**q10**	**q11**	**q12**	**q13**	**q14**	**q15**	**q16**	**q17**
q9	1								
q10	-0.2074	1							
q11	0.0301	0.1524	1						
q12	0.2078	0.1021	-0.0491	1					
q13	0.2909	-0.0288	0.1181	0.3994	1				
q14	0.371	-0.1411	0.1852	0.1443	0.2229	1			
q15	-0.0296	0.0922	0.1637	-0.0498	-0.0433	0.1374	1		
q16	-0.2092	0.3104	0.1772	0.0458	0.0781	-0.0655	0.2857	1	
q17	0.5416	-0.2414	0.0168	0.0691	0.1918	0.2854	-0.1279	-0.3949	1
q18	-0.4383	0.3824	0.1183	-0.0909	-0.1564	-0.0941	0.2743	0.4023	-0.4738
q19	0.3674	-0.1367	0.1273	0.0845	0.1092	0.2311	-0.0682	-0.2986	0.5369
q20	0.5207	-0.2391	0.1081	0.142	0.2462	0.278	-0.1286	-0.3777	0.5956
q21	0.2456	-0.0834	0.1302	0.2945	0.2799	0.2522	-0.083	0.0533	0.1492
q22	0.3461	-0.0335	0.072	0.2846	0.2817	0.2129	-0.1245	-0.0537	0.2637
q23	-0.02	0.1571	0.2564	-0.0295	0.0654	0.0756	0.1009	0.2049	-0.1011
	q18	**q19**	**q20**	**q21**	**q22**	**q23**			
q18	1								
q19	-0.2491	1							
	q18	**q19**	**q20**	**q21**	**q22**	**q23**			
q20	-0.4315	0.5041	1						
q21	-0.1746	0.1557	0.2432	1					
q22	-0.2469	0.1583	0.2841	0.6458	1				
q23	0.1601	0.0063	-0.0604	0.0765	0.0823	1			

Source: *Elaborated by the authors, 2021.*

The variable Teacher education (form) has a very strong and positive correlation coefficient with the following variables: Teacher graduation (q4); and Course taught at PHEI and workload (q5). We observed that the variable Graduation course (q4) presents a positive and very strong statistical correlation with the variables Course for which the teacher gives classes (q5) and Obtaining resources for equipment by PHEI (q7). Yet, the variable Course taught at PHEI and workload (q5) presents a positive and very strong correlation with the variable Obtaining resources for equipment by PHEI (q7).

The variable Category: teacher or student (cat) strongly correlates with the variables Highest level of teacher education (form), Course taught at PHEI and workload (q5) and Obtaining Data Resources by PHEI (q6). There is also a strong correlation between the variables Highest teacher education (form) and Obtaining resources for equipment by PHEI (q7).

The moderate correlations among the variables of the current study can be verified in Figure 17.

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Variables	Moderate correlations
Cat (categories: teachers and students)	Age group; q4 (teacher graduation); and q7 (Obtaining resources for equipment by PHEI)
f_eta (Age group)	q6 (Obtaining Data Resources by PHEI)
Form (the highest teacher education)	q6 (Obtaining Data Resources by PHEI)
q4 (Teacher graduation)	q6 (Obtaining Data Resources by PHEI)
q5 (Course taught at PHEI and workload)	q6 (Obtaining Data Resources by PHEI)
q6 (Obtaining Data Resources by PHEI)	q7 (Obtaining resources for equipment by PHEI);
q8 (Interruption of academic activities due to covid-19)	q9 (challenges with the implementation of remote activities)
q9 (challenges with the implementation of remote activities)	q17 (Impact by moving from in-person to remote model); negative correlation with q18 (mastery of technology and shift to remote teaching)
q16 (Pedagogical process in remote teaching is better than in-person);	q18 (mastery of technology and shift to remote teaching)
q17 (Impact by moving from in-person to remote model);	negative correlation with q18 (mastery of technology and shift to remote teaching); q19 (Adaptation to remote teaching due to the lack of face-to-face meetings); q20 (Insecurity with remote teaching)
q18 (mastery of technology and shift to remote teaching)	negative correlation with q20 (Insecurity with remote teaching)
q19 (Adaptation to remote teaching due to the lack of face-to-face meetings); q20 (Insecurity with remote teaching)	q20 (Insecurity with remote teaching)
q21 (Insecurity in remote teaching due to lack of secure internet)	q22 (Difficulty in remote teaching due to the lack of computers/smartphone);

Figure 17 *Moderate correlation between the variables of the aforementioned study*
Source: *Elaborated by the authors, 2021.*

The other correlations between variables, as shown in Table 2, are from weak to very weak. Only 13 results do not show correlation of all the crossings performed between the variables.

4.2.1 Analysis of the Main Component

Considering that the original set has a large number of variables, what makes both the production of results and the study of the phenomenon more complex, we used the Principal Component Analysis (PCA) statistical technique to aggregate the variables.

That way, it was possible to support the data analysis process and to produce more robust and understandable results. For Mingoti (2007), the main objective of PCA is to explain the structure of variance and covariance of a random vector composed of p-random variables via the construction of linear combinations of the original variables. While the eigenvalues represent the explanatory power of the component in relation to the variance of the original variables, the eigenvectors are the coefficients of the standardized X variables used to calculate scores of the principal components, and the scores of the component 1 represent the largest variance (Table 3).

Below, the Table 3 shows the result of the explained variance of the main research components.

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Table 3
Explained variance of principal components.

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	4.20087	1.96367	0.2334	0.2334
Comp2	2.2372	0.598772	0.1243	0.3577
Comp3	1.63842	0.196273	0.0910	0.4487
Comp4	1.44215	0.378952	0.0801	0.5288
Comp5	1.0632	0.0572466	0.0591	0.5879
Comp6	1.00595	0.17735	0.0559	0.6438
Comp7	0.828603	0.0343001	0.0460	0.6898
Comp8	0.794303	0.0622326	0.0441	0.7339
Comp9	0.732071	0.0542362	0.0407	0.7746
Comp10	0.677835	0.117043	0.0377	0.8123
Comp11	0.560791	0.0326567	0.0312	0.8434
Comp12	0.528135	0.0185047	0.0293	0.8728
Comp13	0.50963	0.108498	0.0283	0.9011
Comp14	0.401132	0.0125707	0.0223	0.9233
Comp15	0.388561	0.0153952	0.0216	0.9449
Comp16	0.373166	0.0426044	0.0207	0.9657
Comp17	0.330561	0.0431472	0.0184	0.9840
Comp18	0.287414	.	0.0160	1.0000

Source: *Elaborated by the authors, 2021.*

According to the results represented in Table 3, the principal 18 components were generated with their respective variances explained, being 6 of them with their variances greater than one. Based on Kaiser's rule (1960), the retained principal components should have variances (eigenvalues) greater than one. The variance explained by the 6 selected components is 64.38% of the total. For Hair, Black, Babin, Anderson and Tatham (2009), in social sciences is plausible to consider a solution that explains 60% of the total variance, or even less, as satisfactory. The KMO and Bartlett tests were processed after factors estimation, and the results support this technique (Kaiser, 1960). The KMO coefficient is 0.558 and the p-value of Bartlett's test is 0.000. The factors extracted in the analysis were obtained via the Varimax Rotation.

Next, the Table 4 points out the Components Formation Matrix.

Table 4
Components Formation Matrix

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
q6	-0.0825	0.0231	0.6754	-0.0191	-0.0568	-0.0108
q7	0.0760	-0.0295	0.6851	0.0252	0.0713	0.0116
Variable	**Comp1**	**Comp2**	**Comp3**	**Comp4**	**Comp5**	**Comp6**
q8	0.2559	-0.1194	-0.1511	0.3950	0.0690	-0.0674
q9	0.3376	0.0687	0.0129	0.1407	-0.0781	0.1844
q10	-0.1436	-0.2288	0.0980	0.4312	0.4192	-0.2599
q11	0.1149	0.0357	0.0268	-0.0480	0.5874	0.1088
q12	-0.0544	0.1114	-0.0061	0.5815	-0.1836	0.0020

q13	0.0549	0.1205	0.0384	0.4715	-0.0464	0.1086
q14	0.2043	0.0840	0.1108	0.0890	0.0245	0.4829
q15	-0.0673	-0.1012	-0.0218	-0.0485	0.0081	0.7252
q16	-0.3243	0.1081	-0.0726	0.1577	0.1479	0.2757
q17	0.4425	-0.0308	0.0219	-0.0239	0.0010	-0.0022
q18	-0.2634	-0.1744	-0.0978	0.0931	0.2488	0.1447
q19	0.4193	-0.1001	0.0091	-0.0219	0.2222	-0.0513
q20	0.4162	0.0434	-0.0994	-0.0231	0.0403	-0.0048
q21	-0.0377	0.6430	0.0027	0.0226	0.0414	-0.0094
q22	0.0122	0.6072	-0.0087	0.0372	0.0414	-0.1044
q23	-0.0306	0.2115	-0.0383	-0.1648	0.5342	-0.0190

Source: *Elaborated by the authors, 2021.*

Table 4 shows the formed components and the respective factor loadings for each one of the variables that contributed to their formation. The significant loads for each variable are highlighted. Typically, the relevant factor loadings are those whose values are greater than 0.5. However, Hair et al. (2009) point out that the factor loadings considered significant are linked to the sample size. Loads of 0.30 are significant for samples of 350 or larger. As for samples of 250, the significant factor loading is 0.35. Considering that in our study the sample had 307 respondents, the significance load is close to 0.30.

The component 1 is formed by the positive factor loadings of the following variables: q9 (Obtaining Data Resources by PHEI); q17 (Impact by moving from in-person to remote model); q19 (Adaptation to remote teaching due to the lack of face-to-face meetings); and q20 (Insecurity with remote teaching). It is valid to say that this same component receives a negative loading from the variable q16 (Pedagogical process in remote teaching is better than in-person). Therefore, the present component was renamed to "remot".

The second component is formed by the positive loadings of the following variables: q21 (Insecurity in remote teaching due to lack of secure internet) and q22 (Difficulty in remote teaching due to the lack of computers/smartphone). That way, the component 2 was renamed to "dific". The component 3 is formed by the positive factor loadings of variables: q6 (Obtaining Data Resources by PHEI); q7 (Obtaining resources for equipment by PHEI). Therefore, the component 3 was renamed to "recur".

The component 4 is composed by the positive factor loadings of the following variables: q8 (Interruption of academic activities due to Covid-19); q10 (Remote teaching / Distance Learning experience); q12 (Teacher resistance in the implementation of remote teaching) and q13 (Student resistance in the implementation of remote teaching). That way, the component 4 was renamed to "resist". The fifth component is formed by the positive factor loadings of the variables: q10 (Remote teaching / Distance Learning experience) and q23 (PHEI made ICTs available for the academic community demands), and was renamed to "tic". And the component 6 is composed by the positive factor loadings of the following variables: q14 (The exams were the biggest difficulty in remote teaching) and q15 (Inclusion of students in the online classroom), being renamed to "prov".

One can observe that only the variable q10 has more than one significant load, i.e., it has a cross load. In addition, the variable q18 does not contribute with a significant factor loading for the formation of any of the components. According to the test results, the correlation matrix is in the range of -0.0005 to 0.9554 (Table 2); the determinant of the correlation matrix equals to 0.655; Bartlett's sphericity test – chi-square (calculated) is 127,654 with 15 degrees of freedom; and the p-value of 0.000.

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Next, the Table 5 points out the Pearson's Coefficients.

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Table 5

Pearson's coefficient

	cat	Gen	f_eta	form	q4	q5	remot	dific	recur
cat	1								
gen	0.0781	1							
f_eta	0.4201	-0.1772	1						
form	0.7672	0.1583	0.3174	1					
q4	0.6183	0.1352	0.2583	0.9396	1				
q5	0.7229	0.1492	0.2669	0.9554	0.9276	1			
remot	-0.0751	0.0704	-0.2577	0.1007	0.1415	0.1116	1		
dific	0.0337	0.0901	-0.0951	0.061	0.0337	0.0539	0.3583	1	
recur	0.7433	0.0896	0.3757	0.8672	0.815	0.8636	-0.0014	-0.034	1
resist	-0.0207	-0.0037	-0.0074	-0.0515	-0.0453	-0.0648	0.1771	0.3547	-0.1515
tic	-0.0661	-0.0548	-0.0033	-0.0046	0.0247	0.0149	-0.1724	0.0153	-0.0655
f6	0.0488	-0.0346	0.0414	0.0634	0.1013	0.089	-0.0173	0.0547	0.0241

	resist	tic	prov
resist	1		
tic	0.0980	1	
prov	0.0993	0.2441	1

Subtitle: cat (category: teacher or student); gen (gender); f eta (age group); form (highest level of teacher education); q4 to q23 (correspond to the research instrument questions): q4 (teacher graduation); q5 (Course that teaches classes at PHEI and workload); remot (component 1); dific (component 2); recur (component 3); resist (component 4); tic (component 5) and prov (component 6)

Source: *Elaborated by the authors, 2021.*

According to Pearson's correlation, performed between the variables and the six generated components, from the PCA, we observe that the component called "recur" presents a strong positive correlation with the following variables: cat (0.7433); form (0.8762); q4 (0.8150) and q5 (0.8636). This was the only created component that presented a significant correlation when analyzed with the other variables of the study.

5 Final Considerations

By facing a new scenario, experienced as a result of the pandemic in the years 2019 and 2020, teachers and students had to deal with the remote teaching model. The methodologies previously adopted had to be reconfigured and adapted to meet the new needs. As consequence, different technologies used in the contemporary world had to be adopted as allies for the teaching and learning activities.

The aim of this study is to investigate how remote teaching has been developed, in times of social distancing, for the Accounting Sciences and Actuarial Sciences Courses of a Public Higher Education Institution (PHEI), located in the State of Paraíba. Methodologically, our research is initially focused on a qualitative approach with numerical aspects. And after the data collection, we carried out a statistical study of the information obtained from the qualitative responses.

As an exploratory study, we could reach some conclusions; however, a more in-depth study may reveal other findings, either improving or refuting what is presented here. Initially and in most cases, we observed that teachers and students converge to the same answers for the

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questions presented in the research instrument. The majority of the respondents are female with age ranging from 17 to 25 years old for students, while the teachers are over 45 years old (52.38%).

The academic activities were highly impacted by the COVID-19 pandemic, caused by the coronavirus. Teachers and students had to adapt themselves to a new reality, that of remote teaching. They still had to deal with the resistance to remote teaching on the part of some teachers and students. In addition, the PHEI did not have the tools, such as an inverted room, digital whiteboard, active methodologies or other technological tools that could support the remote classes. Regarding the replacement of in-person teaching by the remote modality, everyone agrees that there was a great impact from one modality to the other, and that the pedagogical didactic process of remote teaching is no better than the in-person teaching.

By applying the Principal Component Analysis (PCA) to the study, we found it to be the appropriate technique, as it achieved the objective of reducing the initial number of 22 variables to 18 principal components. From those, 6 of them have variance greater than "one" and the variance explained by the 6 selected components is 64.38% of the total.

The analysis of the results also enabled the indication of variables that have the greatest impact within the factors. They are: (q15) Inclusion of students in the online classroom; (q7) Obtaining resources for equipment by PHEI; (q6) Obtaining Data Resources by PHEI; (q21) Insecurity in remote teaching due to lack of secure internet; (q22) Difficulty in remote teaching due to the lack of computers/smartphone and (q23) PHEI made ICTs available for the academic community demands, among others.

One has to consider that the remote teaching developed in the Accounting and Actuarial Sciences Courses of the PHEI, focus of this research, has happened in times of social distancing caused by the COVID-19 pandemic, and has faced difficulties and limitations, added to some resistance from teachers and students. That is due, mainly, to the abrupt transition from the in-person teaching modality to the remote one, the lack of training of the actors involved and, also, due to the lack of technological resources to those actors, which could lead to their exclusion, being this time, the digital exclusion. It is worth noting that, from the active students, a total of 1,638, in the Accounting and Actuarial Sciences Courses of the surveyed PHEI, the amount of 414 students did not enroll, which represents an exclusion of 25.27% in the academic period of 2020.1.

In order to obtain a propitious relation between the technology and the users, a prior training is necessary. Even the teachers who previously had ICT (Information and Communication Technologies) skills usually do not use those digital tools for in-person classes. Considering that the pandemic problem and social isolation itself can lead to emotional imbalance, many teachers and students had to deal with the frustration of not being knowledgeable about the technological tools involved in the remote teaching process, which increases the workload, especially for teachers in search of those skills and abilities.

In regard to the remote teaching model, although some shortcomings, it has been developed by PHEIs at times of social distancing, with the performance of activities such as teaching, research and extension. Although not so effective, since it did not serve to all students with the access to the teaching and learning process.

In consequence to the difficulties encountered to perform the present study, which are: the approach of only two undergraduate courses – Accounting Sciences on Campus A and B, Actuarial Sciences on Campus A – of a PHEI, the social isolation and the reduced number of students enrolled, we obtained a return lower than expected. For future studies, we suggest: (i) deepening the aforementioned study, by covering a larger number of undergraduate courses at the PHEI, focus of the current research; (ii) expanding the aforementioned research in terms of

emphasizing other PHEIs, either public and/or private of the Northeast region, and, perhaps, of other regions of Brazil.

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