

Digital technologies in higher education in health in the context of the pandemic

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Abstract: Digital technologies were essential for maintaining teaching during the Coronavirus pandemic. They were widely used in remote classes, bringing benefits and challenges to teachers. Thus, through descriptive research, the objective was to understand the tools and digital media used by teachers of face-to-face health courses at a university in Santa Catarina before, during and after the pandemic. The results obtained, after applying an electronic questionnaire, highlight the difficulties faced by teachers in relation to technologies. They also show an increase in the use and variety of media used during the pandemic compared to the previous period. It is concluded that digital technologies were very important during the pandemic period and will continue for a long time with regard to education.

Keywords: Health education; Remote teaching; Digital media.

Tecnologias digitais no ensino superior em saúde no contexto da pandemia

Resumo: As tecnologias digitais foram essenciais para manutenção do ensino durante a pandemia do Coronavírus. Elas foram amplamente utilizadas nas aulas remotas, trazendo benefícios e desafios aos docentes. Desta forma, através de uma pesquisa descritiva, objetivou-se conhecer as ferramentas e mídias digitais utilizadas pelos professores de cursos da saúde presenciais de uma universidade de



Santa Catarina antes, durante e pós pandemia. Os resultados obtidos, após aplicação de questionário eletrônico, apontam as dificuldades enfrentadas pelos docentes em relação as tecnologias. Também mostram um aumento no uso e na variedade das mídias utilizadas durante a pandemia em comparação ao período anterior. Conclui-se que as tecnologias digitais foram muito importantes durante o período pandêmico e perpetuarão por muito tempo no que diz respeito a educação.

Palavras-Chave: Educação em saúde; Ensino remoto; Mídias digitais.

Tecnologías digitales en la educación superior en salud en el contexto de la pandemia

Resumen: Las tecnologías digitales fueron fundamentales para mantener la enseñanza durante la pandemia de Coronavirus. Fueron ampliamente utilizados en clases remotas, aportando beneficios y desafíos a los profesores. Así, a través de una investigación descriptiva, el objetivo fue comprender las herramientas y medios digitales utilizados por profesores de cursos presenciales de salud en una universidad de Santa Catarina antes, durante y después de la pandemia. Los resultados obtenidos, tras la aplicación de un cuestionario electrónico, ponen de relieve las dificultades que enfrentan los docentes en relación a las tecnologías. También muestran un aumento en el uso y variedad de medios utilizados durante la pandemia en comparación con el período anterior. Se concluye que las tecnologías digitales fueron muy importantes durante el periodo de pandemia y lo seguirán siendo por mucho tiempo en lo que respecta a la educación.

Palabras clave: Educación para la salud; Enseñanza remota; Medios digitales.

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1 INTRODUCTION

Changes in education were notable with the emergence of the Coronavirus pandemic. Social and behavioral changes caused by physical distancing have made many Higher Education Institutions (HEIs) adapt to this new scenario, thus adapting teaching, research and extension activities to remote mode (Almeida; Dos Santos; Cavalcanti, 2020).

In this sense, the Ministry of Education (MEC) in March 2020 enabled the implementation of distance learning in the face-to-face curriculum of basic and higher education institutions, both public and private. This measure aimed at not interrupting the routine of studies of academics, leaving educational institutions with autonomy to choose the disciplines, the tools used and the form of evaluation used during the remote period (BRASIL, 2020).

Approximately 60% of public universities did not adopt the MEC recommendation during this period, even if on an emergency basis. This decision was justified by the social inequalities presented by the academics, where the lack of a technology and/or internet could hinder learning (PALHARES, 2020; TORRES; ALVES; COSTA, 2020).

The sudden introduction of technologies challenged teachers of the face-to-face modality to use digital resources hitherto little known. To ensure the quality of classes, it is necessary that both teachers and educational institutions are willing to explore digital tools and bring pedagogical innovations capable of motivating students (BEZERRA, 2020; ROSO *et al.*, 2015; TORRES; ALVES; COSTA, 2020).

Online classes should be interesting to the point of making teachers and students feel motivated and comfortable in relation to this teaching model. That is why it is necessary that educational institutions offer teacher qualification through training programs focused on digital education (FÁVERO; PARREIRA, 2020; GARCIA *et al.*, 2022).

In addition to the qualification of teachers in the face of technologies, another worrying factor for the HEIs is in relation to the classes of the health courses. According to the regulatory bodies of health professionals, the so-called councils, the presence of the teacher is indispensable during the process of acquiring the skills and competencies necessary for the training of a health professional. The use of technologies in remote education, when in excess, can compromise, in the medium to long term, the performance of future health professionals by removing them from practical situations necessary for professional training (TORRES; ALVES; COSTA, 2020).

Technologies and digital media are increasingly inserted in people's daily lives, whether for leisure, work or educational purposes. During the physical distancing they were extremely important, because they enabled the continuity of classes in basic and higher education. In this sense, the present research, of a descriptive nature and with qualitative and quantitative approaches, aimed to understand the tools and digital media used by teachers of face-to-face courses in the area of health at a University of Santa Catarina at three different moments: before, during and after the Coronavirus pandemic.

The discussion will be based on the answers obtained by teachers, after applying an electronic questionnaire, described in the results. In this way, the guiding questions for discussion in this article address the difficulties faced by teachers in the use of technologies, the most used media and tools and future perspectives for using technologies in classes with the return of in-person classes.

2 METHODOLOGY

A descriptive, cross-sectional study was carried out with data collection through an electronic questionnaire (Google forms) elaborated by the researchers. The questions, qualitative and quantitative, are related to technologies and digital media, and their use by the professors of face-to-face undergraduate courses in the health area of a university located in the south of Santa Catarina.

Descriptive research is research that aims to describe characteristics of a given population, phenomenon or the establishment of relationships between variables. In this type of research, information is collected, where data collection is carried out using standardized techniques such as questionnaires and systematic observation (GIL, 2002).

Along with the questionnaire, the free and informed consent form (ICF) was sent where all possible risks and benefits were informed. Participants responded anonymously and were free to drop out at any time during the survey.

The sample was obtained by census collection, that is, the questionnaire was sent to all health teachers at this higher education institution. The study included all teachers who agreed to participate by confirming the reading of the ICF and who answered the mandatory questions of the questionnaire.

The questionnaire was applied during the month of August 2022. After this period, the results were tabulated for statistical analysis in Excel version 2019. Quantitative variables were expressed as mean and standard deviation. And the qualitative variables by means of frequency and percentage.

This research was carried out following the ethical aspects established in resolutions 466/12 and 510/16 of the National Health Council (CNS), which provides for the Guidelines and Regulatory

Standards for research involving human beings, obtaining approval by the Ethics Committee on Research with Human Beings (CEPSH) of an HEI in Santa Catarina, under the opinion number 5,540,844 (BRASIL, 2012, 2016).

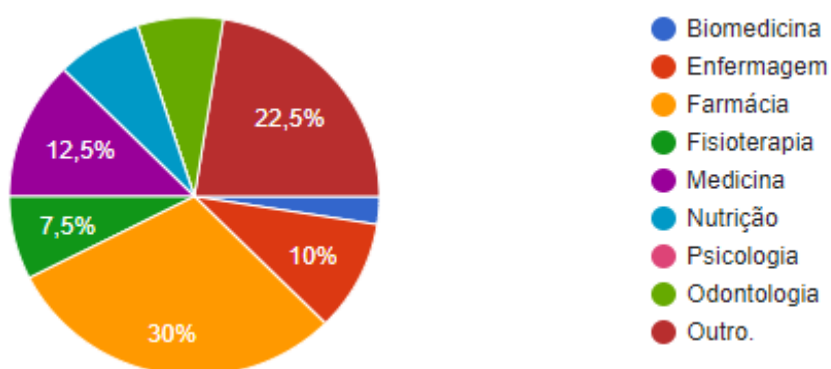
3 RESULTS

The questionnaire was composed of questions to characterize the sample, such as gender, age, academic background, teaching time and teaching modalities (face-to-face, distance education or hybrid) in which the teacher teaches. It was also composed of questions about knowledge about technologies, media, digital tools and their use before, during and after the Coronavirus Pandemic.

The results obtained in this study show that of the 40 professors who answered the questionnaire, 27 (67.5%) were female and 13 (32.5%) were male. The minimum age was 26 years, the maximum was 65 years and the mean was 42.15 years.

Most of the professors have academic training in the health area, of which 30% are pharmacists. The other category (22.5%) was represented by professors graduated in Biological Sciences, Mathematics, Engineering and Physical Education (Figura 1).

Figure 1. Training at the undergraduate level of teachers



Source: Prepared by the authors (2022).

Regarding the highest academic degree, 18 (45%) professors are doctors, 18 (45%) are masters and 4 (10%) are specialists. All professors teach in one or more undergraduate health courses. In terms of teaching time in an undergraduate course in the health area, 20 (50%) have been teachers for more than 10 years, 12 (30%) are teaching between 5 and 10 years, 7 (17%) between 1 and 5 years, and only 1 professor for less than 1 year. About 95% of the

professors work in the face-to-face graduation, but some also teach in the distance learning modality (5%) and/or hybrid (37.5%).

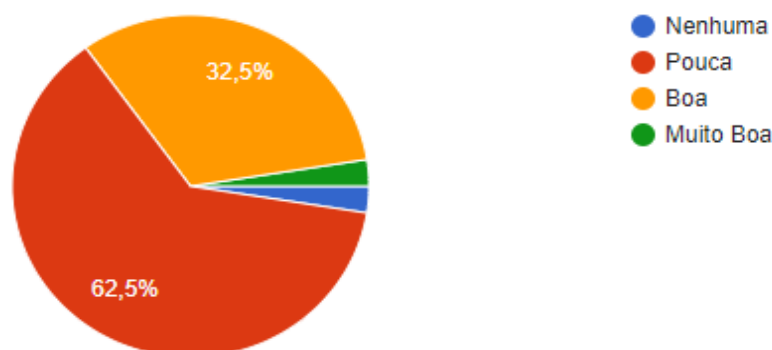
First block of questions:

1. Regarding the use of media, technologies, digital tools for undergraduate teaching of health courses (before the pandemic):

1.1 What was your experience/familiarity with technologies, media, digital tools?

For this question, 25 professors answered that they had little experience or familiarity, 13 professors reported having good familiarity with digital resources, 1 professor said they had none and 1 professor said he had a very good relationship with digital resources (Figure 2).

Figure 2. Experience/familiarity of teachers with technologies, media, digital tools



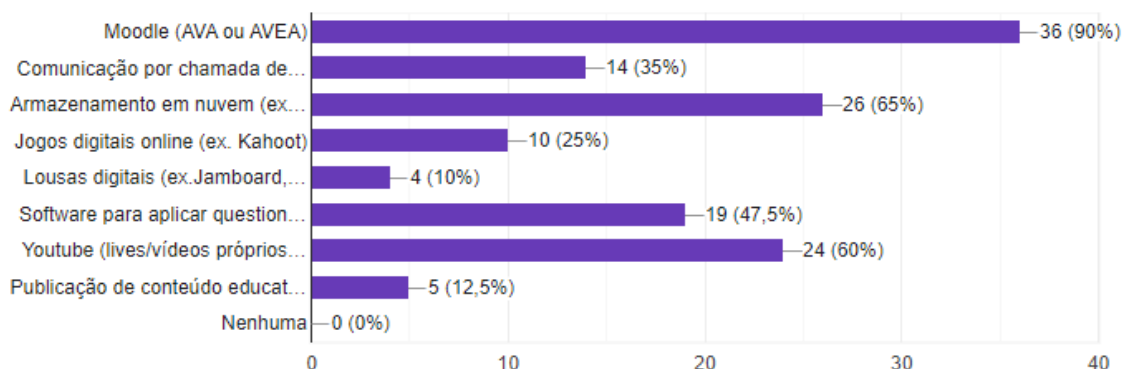
Source: Prepared by the authors (2022).

1.2 Did you use any of the technologies, media, or tools below in your classes? Which(s)?

As shown in figure 3, Moodle (VLE or AVEA) was the most used tool by teachers, followed by cloud storage and Youtube (Lives, own or third-party videos).



Figure 3. Digital technologies, media, or tools used in classes before the pandemic



Source: Prepared by the authors (2022).

Second block of questions.

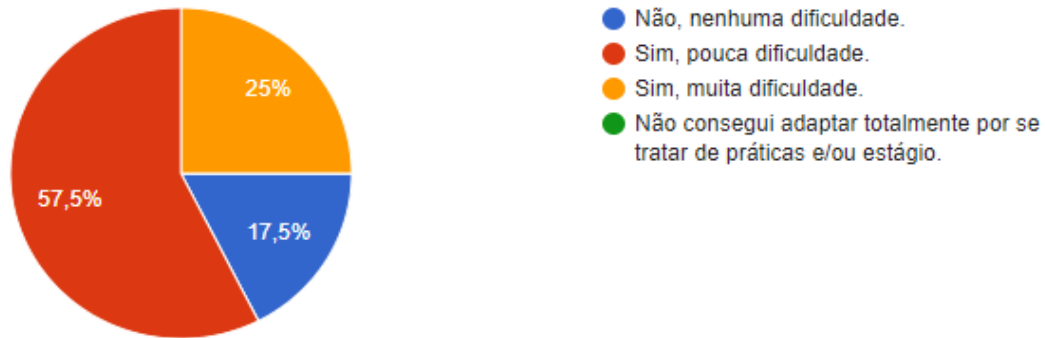
2. During the Coronavirus pandemic, some in-person health care courses began offering classes remotely (synchronously or asynchronously). In this period you:

2.1 Did you have any difficulty preparing/adapting your in-person classes for remote learning?

Most of the teachers reported that they had some difficulty in preparing and/or adapting the classes to the remote form. Regarding the degree of difficulty, 23 teachers (57%) had little difficulty, while 10 (25%) teachers had a lot of difficulty. Only 7 (17.5%) teachers did not present any difficulty in preparing their classes (Figure 4).

Figure 4. Degree of difficulty in preparing classes for remote form during the pandemic



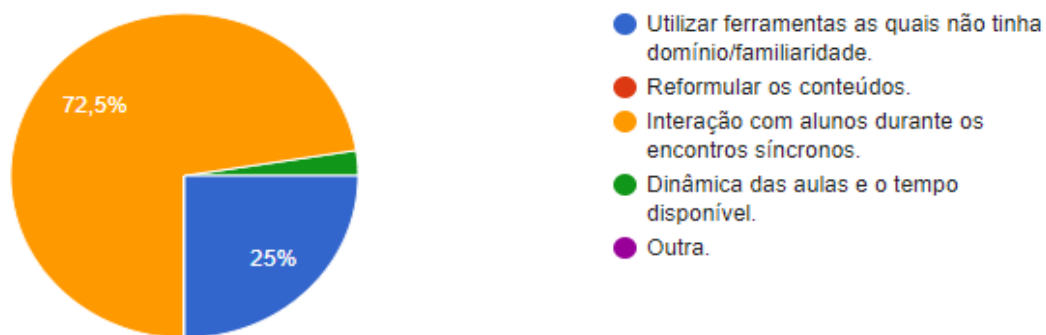


Source: Prepared by the authors (2022).

2.2 What did you find most difficult about remote classes (synchronous and asynchronous)?

In figure 5, it is possible to observe that 29 (72.5%) teachers consider that the interaction with the students during the synchronous meetings was the greatest difficulty. While 10 (25%) teachers consider that the greatest difficulty was to use tools that they did not have mastery/familiarity. Only 1 teacher (2.5%) reported that the dynamics of the classes and the time available was their greatest difficulty.

Figure 5. Greater difficulty of teachers in relation to remote classes



Source: Prepared by the authors (2022).

2.3 Did the higher education institution where you work offer courses or training so that teachers could learn to deal with technologies, media or tools?

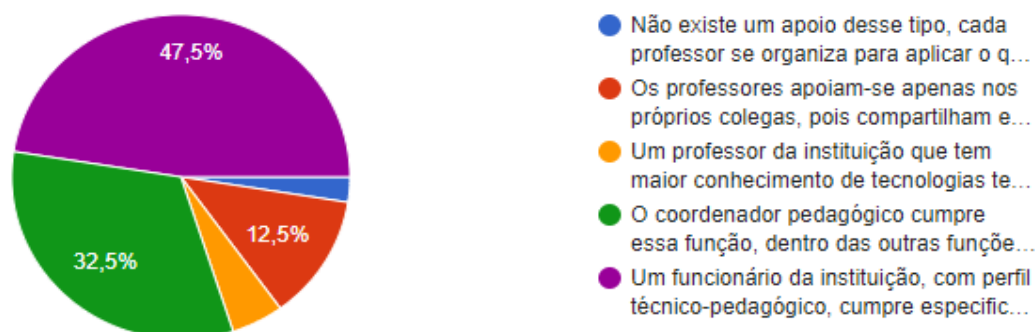
In this question, all the professors answered that the institution was present and offered training. Of these, 35 (87.5%) teachers did only training

offered by the institution, while 5 (12.5%) took other courses and training in addition to those offered by the institution.

2.4 Is there any support structure for teachers for the integration of technological resources into pedagogical practices? (If there is more than one, mark only the main support)?

All teachers reported that there is a support structure for integrating technology into pedagogical practices. In figure 6, it is possible to notice that 19 (47.5%) teachers understand that this support comes from a professional with a pedagogical technical profile, who specifically fulfills this function, having a workload and a clear definition of this responsibility. For 13 (32.5%) teachers, this support comes from a pedagogical coordinator who fulfills this role along with his other functions.

Figure 6. Support to teachers for the integration of technological resources into pedagogical practices



Source: Prepared by the authors (2022).

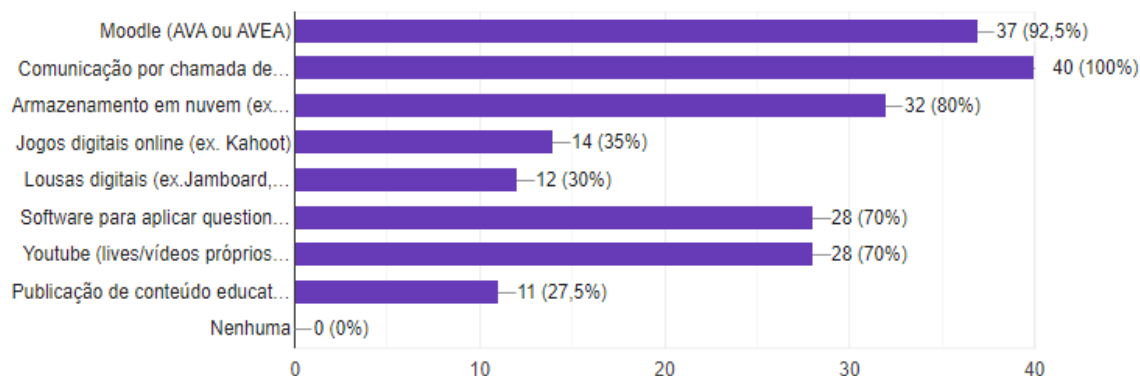
2.5 In relation to your dedication and learning in the use of technologies, media, digital tools, you consider that:

In this question, 23 (57.5%) teachers reported that they had no difficulty in learning and were able to use the resources in their classes. While 17 (42.5%) teachers reported difficulty in learning, but dedicated themselves and were able to use such resources in their classes.

2.6 During the period in which you taught synchronous or asynchronous remote classes, what technologies, media, digital tools did you use?

Video call communication was used by 100% of teachers, the second most used by 92.5% of teachers was Moodle, followed by cloud storage with 80% utilization. Softwares were also used by teachers to apply questionnaires and Youtube (lives, own or third-party videos), both with 70% of use each, as shown in figure 7.

Figure 7. Media, technologies, tools used by teachers during the pandemic



Source: Prepared by the authors (2022).

Third block of questions

3. We are currently at a time when the pandemic is more under control and in-person classes in in-person undergraduate education are returning.

3.1 Do you consider that technologies, media, digital tools can still be used to a lesser degree in your face-to-face classes in order to make them more attractive / interesting?

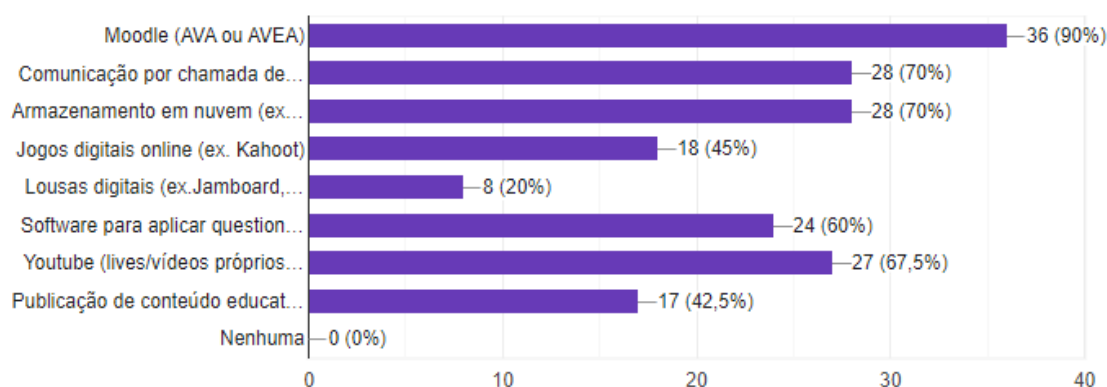
To this question 100% of the participants answered yes, that is, they intend to use the technologies, media, digital tools in their classes whenever possible.

3.2 Of the technologies, media, tools below which (is) are you still using or intend to continue using in your classes?

As shown in figure 8, 90% of teachers still use or intend to use Moodle, in second place appear

tied video call communication and cloud storage, cited by 70% of teachers. Some teachers use or intend to use Youtube (67.5%) and Software (60%) to apply questionnaires. Digital games, publication of educational content on social media and use of digital whiteboards were the resources least cited by teachers.

Figure 8. Use of technologies, media, digital tools by teachers after the pandemic



Source: Prepared by the authors (2022).

4 DISCUSSION

The Coronavirus pandemic that began in late 2019 and spread around the world in early 2020 was a major public health problem. In relation to education, she showed how fragile education is in Brazil, especially free public education. For Silva and Silva (2020), the education made available during the pandemic, in addition to being segregating and of low quality, makes the social and educational differences of Brazilian students evident. The authors also point out the need for public policies that guarantee public education students' access to information and communication technologies, in order to avoid the growth of social inequality in the country.

Physical distancing, one of the measures adopted as a way to reduce the spread of the SARSCOV-2 virus, has led numerous educational institutions, including higher education, to stop in-person classes.

On an emergency basis, some institutions began to offer courses remotely. Many challenges were encountered from there: students without a computer, tablet or smartphone to follow the classes, students without access to the internet or with poor quality internet, teachers without knowledge about

digital technologies and / or with difficulties in the elaboration or adaptation of classes to the distance education format.

Another difficulty encountered by the HEIs that offer undergraduate courses in health was in relation to the practical disciplines and internships. In higher education in health it is important that there is the development of competencies and skills that allow students to analyze problems for making assertive decisions and the use of digital technologies in education can enhance the dissemination of information in the teaching-learning process (KENSKI, 2007; LACERDA, 2019). In this context, the use of technologies in health education has become an important ally in learning and should be used whenever possible, but in a moderate way (TORRES; ALVES; COSTA, 2020; LACERDA, 2019; VALENTE, 2014).

On February 26, 2020, the university where the present survey took place began in-person classes for the first semester and two weeks later discontinued them due to the rising number of cases of people infected with the Coronavirus. The institution adopted the recommendation of the MEC and continued the classes remotely, taking into account the possible disciplines to be taught in this format and the replacement of practical classes and internships with the return of face-to-face.

Still on the university, it has 8 undergraduate courses in the area of health and an extensive staff of teachers. All teachers who answered the electronic questionnaire teach classes in at least one health course. The sample is composed of 67.5% of female professors and has a mean age of 42.15 years.

Most of the professors are health professionals, of which 90% are masters and/or doctors. About 80% have been teaching for more than 5 years in face-to-face undergraduate courses in the health area, that is, they were already teachers even before the start of emergency online classes.

When asked about their experience/familiarity with digital technologies, media or tools, most teachers answered that they had little mastery in the use of these digital resources. Moodle, cloud storage, and YouTube were the most widely used resources before the pandemic. Wanderley *et al* (2018), highlight that despite the advantages inherent in the use of technologies in education, there are some difficulties in their inclusion, such as deficient teacher training, resistance of the faculty to new technologies and absence of continuing education programs for teachers.

In this study, about 80% of the teachers presented some difficulty in using digital media in their classes during the pandemic. Just over 70% of teachers consider that the greatest difficulty faced in relation to online classes was the interaction with students during synchronous meetings: students with closed camera, microphone off, without great participation during class and without questions

about the content taught. For 25% of the professors, their greatest difficulty was the use of media that they did not have mastery.

The lack of participation and involvement of students in remote classes during the pandemic was also reported by health professors of an HEI in Paraná (GARCIA *et al.*, 2022). In another study, Pimentel (2020) found that 67% of teachers surveyed felt unprepared to use digital technologies during the period of social distancing.

All the professors in this research reported that the institution in which they work offered training courses. And that in addition to training, offered support for the integration of technological resources to pedagogical practices, through a pedagogical coordinator or an employee with a pedagogical technical profile. This made it possible for all teachers to be able to use technologies, media or digital tools in their classes.

During the emergency remote classes 100% of the teachers used the communication by video call, because the classes took place in this period, predominantly or exclusively online. Practically all teachers continued using Moodle, since on this platform it is possible to store content (slides, articles and other documents), as well as to carry out evaluations through Moodle's own questionnaires. The storage of materials in the cloud and Youtube continued to be widely used in the remote emergency period.

Software that enables the creation of electronic questionnaires began to be used by most teachers. Digital games, digital whiteboards and the publication of educational cards on social media saw a slight increase in usage when compared to the period leading up to the pandemic.

In the study conducted by Pimentel (2020) with teachers from all over Brazil during the period of social isolation, 72% of teachers used videoconferencing or video call platforms, such as Skype and Jitsi. And only 38% were aware of or used teaching resources, such as Moodle. In another study with health professionals, where some were also teachers, it was found that the most used media for contact with patients/students during the COVID-19 Pandemic was Whatsapp (93.3%), followed by Instagram (53.33%). In third place are Youtube and Facebook with 40% of use each. Of the video calling platforms, Skype was the most cited with 40% of use (BUENO; BUENO; MOREIRA, 2021).

In the present research, when asked if they still use or intend to continue using the technologies in their classes, to a lesser extent, in the post-pandemic period, all teachers answered yes. And when asked what media they are using or intend to use, all media have been listed. Moodle was the most cited, followed by cloud storage and video call communication. The other technological resources were cited showing an increase in the use of digital games and the publication of cards on social

media, when compared to the period of the pandemic.

In a pandemic scenario, the insertion of remote classes in the context of education was a viable alternative for the continuity of studies. The transition from face-to-face to remote teaching happened suddenly, which ended up forcing teachers to self-learn to quickly continue through technologies to interrupted face-to-face work (ALMEIDA, 2020).

Digital media and technologies are widespread and widely used in distance education, but not in face-to-face teaching. Therefore, it can be said that the sudden insertion of digital technologies, in addition to being challenging, brought innovation to many HEIs that had their classes based on face-to-face and synchronism between teacher and student. In this way, inserting technologies into teaching in the health sector at a time when face-to-face interaction was not possible, without a doubt, was innovative.

The use of digital media in higher education contributes to important aspects in the professional training of students. They enable the sharing of content, facilitate the interpretation and organization of information, make classes more dynamic and attractive, contribute to constant evolution of both student and teacher, help problem solving and decision making (CELESTINO, 2019; SOARES, 2021).

The pedagogical mediation with the use of media is valid, however it is important to emphasize that it does not replace face-to-face education. The educational process goes beyond the content or technologies addressed, it needs human mediation to be effective (CORDEIRO; COSTA, 2020). As innovative as technologies may be, in health education, in order to have quality education with a more humanized look, the interaction between teachers and students is essential and indispensable.

4 FINAL CONSIDERATIONS

It is undeniable that technologies have been of utmost importance for the continuity of education in a time of uncertainty experienced during the pandemic.

It was evidenced in this work a growing learning in relation to technologies during the period of social isolation. There was also an increase in the amount of media used. Before the pandemic, Moodle, cloud material storage, and YouTube were the most commonly used resources by teachers. Already in the pandemic and post-pandemic period, in addition to these digital resources, video call platforms and software for the elaboration of questionnaires also began to be used. In addition to other tools such as games and digital whiteboards that were unknown until then by some teachers.

It is important to emphasize that the present research brought punctual data, where a small group of professors from a single educational institution answered the questions of this study. Even bringing results that may reflect the situation experienced by the majority of teachers in our country, the importance of new studies with teachers in other regions of Brazil in order to know the reality experienced by them is highlighted.

Finally, it can be said that digital media have undoubtedly been very important during the pandemic period and will perpetuate for a long time in the educational context.

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