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Technologies and teacher training: An experience during the Covid pandemic

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***Abstract*—** *The SARS-COVID-19 pandemic has generated many changes in society. The educational sphere has undergone several adaptations in this context, among them the adoption of emergency remote teaching. Thus, the need arose to rethink teaching practices in the context of the use of technologies. This work proposes to analyze some courses developed for teachers, which focused on technologies and remote teaching and their contributions to everyday teaching practice.*

I. INTRODUCTION

Today's society is experiencing major changes in various contexts - economic, political, health, and education, among others - as a result of the SARS-COVID-19 pandemic that has affected the world since 2019 and Brazil since 2020. One of the first measures of the face of the new coronavirus was social isolation, which changed human behavior in several areas.

Given the pandemic context, it was observed that the forms of communication and social interaction have changed paradigm: the experiences that previously occurred in person came to exist in the virtual world, remotely and online. In this way, Brazilian education has also adapted to the new reality, starting to be carried out in virtual learning environments.

According to Schneider et al (2020), "the pandemic scenario presented us with an unknown situation, transferring face-to-face teaching and its curriculum to a work mediated by technologies and carried out in a non-face-to-face way". Leite et al (2020) reiterate that "in this crisis of global proportion, educators and families had to deal with unpredictability, (re)learning to teach with the support of technologies".

Therefore, Emergency Remote Teaching (ERE) - a term used to define the teaching modality in the context of a pandemic - has been gaining more and more space in Brazilian schools, and rethinking pedagogical practices has become essential.

Oliveira et al (2020), discuss this context, stating that technologies became part of everyday school life, so that teaching could take place and, as a consequence, the school had to adapt and review the ways of teaching and learning.

In this sense, thinking about the continuing education of teachers within the scope of the ERE and the use of technologies in the teaching and learning process is not only a formative process but also a reflection on teaching practice, since the adoption of digital technologies as a resource for remote classes occurred quickly and for many teachers, it was a great challenge to adapt and change their work.

Several institutions - including universities, and state and municipal education departments - started to carry out continuing education programs aimed at this historic moment in which the world is experiencing the coronavirus pandemic. Here, the importance of continuing teacher education and the work developed in one of the research laboratories at the Federal University of Santa Catarina are highlighted [13].

II. CONTINUING EDUCATION OF TEACHERS: AN EMERGING NEED

Teacher training is complex and there are many studies on this topic, whether on the knowledge needed to perform the function or on the skills and abilities that are developed throughout the career.

The initial training process does not cover all the problems and challenges of the school environment, since they appear in everyday life, from a specific reality that is part of a specific context; they are not consequences of an abstract plan, but of a concrete world, composed of subjects and their cultural, social, emotional, intellectual and political characteristics. In this way, the school, which harbors all this diversity, goes through countless situations that require quick, immediate solutions and actions, to contribute to the smooth running of the school routine. Therefore, training beyond graduation is of great importance for teachers to expand their knowledge over the years of their professional careers. [13]

Gasparin (2007) states that "Knowledge, therefore, as a historical and social fact always presupposes continuities, ruptures, re-elaborations, reincorporation, permanence, and advances". In this sense, the pandemic context highlighted the need for a " reinvention" of school routine, ways of teaching, and learning. Teachers and students had to quickly adapt to the reality of the ERE.

In this way, the use of Digital Information and Communication Technologies (TDICs) for the continuity of school activities became the starting point for the planning and execution of remote classes. However, many teachers and students were not used to using technological tools during classes, and learning to use them was a challenge for many. [6]

Because of this, the relevance of the instrumentalization of teachers at this atypical moment is highlighted so that the teaching offered continues to be of quality and interactive, achieving the learning objectives. According to Santos et al (2019), the methodology influences the teaching and learning process and, therefore, teacher training needs to be thought of in terms of the applicability of teaching methodologies. To meet the need for teacher training, many teacher training courses were developed during the pandemic period, focused on the ERE.

It is also worth mentioning that it is necessary to plan with defined objectives so that the use of technologies contributes to the learning process. The teacher needs to be clear about why each technology is used, considering the specificities of their students.

Thus, the continuing education of teachers should not be limited to the acquisition of technical and instrumental knowledge but must provoke reflection in the teacher on the context in which he works, as well as on his practice and his students.

Next, a proposal for teacher training carried out in 2021 is presented, as well as data about the evaluations of the courses offered.

RExLab and courses for teachers: TDICs in the spotlight

The research group of the Remote Experimentation Laboratory (RExLab), at the Federal University of Santa Catarina, understanding the need for continuing education for teachers in the area of technology uses, organized and offered courses for basic education teachers. [6][13][14]

The courses were taught online, in the InTecEdu virtual learning environment. According to Silva & Bem, (2017) “a virtual learning environment is an educational software accessed via the internet, and its main objective is to support distance education activities".

In this sense, “InTecEdu represents an initiative of the digital inclusion line of action of RExLab, through the integration of technology in the context of Education and develops its projects and activities in Basic Education" [1][6][13[14]. Through the InTecEdu platform, teachers from all Brazilian regions were able to acquire new knowledge about digital tools, and technological resources for remote classes and develop more dynamic classes in the context of the ERE.

In this work, the courses offered in 2021 were highlighted. They are:

- Teacher training for the use of Moodle (module 1) - two editions, with 59 graduates.
- Teacher training for the use of Moodle (module 2) - two editions, with 30 graduates.
- Production of educational videos - two editions, with 43 graduates.
- Maker culture in remote teaching - two editions, with 103 graduates.

- Methodologies and strategies for remote teaching - two editions, with 78 graduates.
- Production of digital content - comics - two editions, with 59 graduates.
- Digital skills for STEAM areas - 55 graduates.
- Gamification - 18 graduates.

In all courses, the emphasis was on the use of TDICs in the ERE. However, it is worth mentioning that the tools and resources explored in the courses are not limited to the use in teaching in a remote format, since today's school is inserted in a society in which technological advancement is constant and the use of technologies in classes can contribute with more interactive, dynamic and meaningful learning.[13][14][15]

III. MATERIAL AND METHODS

After the completion of each course, the participating teachers were able to evaluate both the course content and the methodology, platform, activities, and workload, among other items. These evaluations present important indications for the work that RExLab develops, both to establish the successes and to raise possibilities for improvement of the courses offered.

Thus, to list the contributions that the courses carried out by RExLab bring to the teachers, as well as the suggestions for improvement, these evaluations answered by the course participants were used as a research source.

From the choice of the research object, it was decided to carry out a content analysis, because it is understood that. The content analysis methodology is intended to classify and categorize any type of content, reducing its characteristics to key elements, so that they are comparable to a series of other elements [2].

Therefore, the research developed can be classified as qualitative, based on content analysis, because "data from research with a qualitative approach needs to be analyzed differently from data from studies with a quantitative approach" [11].

In this sense, considering the assumptions of the content analysis methodology, the research began with a floating reading of the selected documents. As a second step, the corpus of analysis was established, which focused on the difficulties and benefits presented by the course participants in the responses, in addition to self-assessments and suggestions.

The difficulties and benefits concerning the courses were extracted, considering the following aspects: content, the platform used, methodology, workload, and proposed activities. From the collection of these data, we sought to group the information collected about the courses into two categories - positive aspects and possibilities for improvement. With the categorization established, a table was created with the data, which is presented below.

IV. RESULTS AND DISCUSSION

The table below presents a compilation of evaluation data. For the courses that were offered in two editions, only the second editions were cut out, considering that the courses were reformulated from the first to the second edition according to the evaluation notes.

Table.1: Couse – Moodle 1 – 2nd ed.

Course	Positive aspects	Possibilities for improvement
Moodle 1-	- Knowledge update.	- Provide a list of the tools presented in the closing video with links to facilitate the storage of information.
2nd ed.	- Learning about technologies, new digital resources, and tools, for using moodle.	- They could make a repository, like a Wiki, of tools and tips, and their respective functionalities and advantages.
	- Objective and easy-to-understand course.	- Increase the course workload.
	- Quality material	- Easy download videos.
	- Interaction of the lecturers.	- Longer course availability time.
	- Interesting methodology and practical examples.	
	- Easy-to-handle tools.	
	- Well-organized, easy-to-access, and practical materials.	

Table.2: Couse – Moodle 2 – 2nd ed.

Course	Positive aspects	Possibilities for improvement
Moodle 2 -	- Provided participants with the knowledge of new teaching tools	- Difficulty in carrying out activities: long videos and content.

2nd ed.	- Possibility to put into practice the acquired knowledge - Quality of class materials - Flexible hours to perform asynchronous activities	- Alternate the course with readings and videos - More writing activities.

Table.3: Couse – Educational Videos.

Course	Positive aspects	Possibilities for improvement
Educational Videos	- Possibility to acquire new knowledge and techniques. - Materials and references are available. - Learning new tools. - Learning of pre and post-recording features. - Use of free applications. - Tutorials.	- Longer deadline to finish the course and to do the activities - Greater interaction with the teachers who organize the course. - Show how the recordings of the classes are carried out since the indicated applications are used only for editing. - Improve navigability. Show on the first screen the missing activities to perform, and a better explanation of the exercises. - Higher course workload. - Leave an example of a video that you consider to be of good quality, highlighting what makes that video a good example.

Table.4: Couse – Innovative methodologies

Course	Positive aspects	Possibilities for improvement
Innovative methodologies - 2nd ed.	- Learning new resources and technologies. - TPACK model. - Courseware. - Diversity in activities and materials. - Interaction with other professionals. - Excellent opportunity for teachers to update their knowledge of technologies and methodologies. - Dynamics of classes.	- In word search, diagonal words are hard to find. - Understanding of new technological ramifications. - Difficulty finding activities and recording activities already performed. - Longer deadline for carrying out activities. - Do not use the white font (letter) on a gray/light background. The visualization is horrible. - Decrease video advertisements. - Longer term to access the course. - Apostille on the contents.

Table.5: Couse – Gamification.

Course	Positive aspects	Possibilities for improvement
Gamification	- Organization of the course. - Use of updated technologies. - Interaction with colleagues. - Exchange of	- Clearer activities; improve their explanation. - More examples of using gamification in Moodle. - More lives. - Longer access to the

	experiences.	course after completion. - Access to texts and videos before activities. - Higher workload. - Synchronous encounters. - Exemplify how to implement emblems.

Table.6: Couse – Digital Skills for STEAM areas.

Course	Positive aspects	Possibilities for improvement
Digital Skills for STEAM areas	- Interaction with other professionals from other states. - Lives. - Learning new content. - Tools and apps (canvas, in shot). - Possibility to see lives asynchronously. - Return of activities.	- Platform navigability: improve the organization of documents and activities within the course area, with activities in a logical sequence and with numbering. - Explanation of tasks and activities. - Longer deadline for delivery of activities. - Longer access to the course. - Higher workload. - Provide the contact of the speakers in advance (at the beginning of each LIVE). - There was a lack of professionals and, consequently, approaches in the areas of natural sciences. There was a course on pedagogical strategies. From the title of the course, science, engineering, and mathematics approaches were expected.] I suggest discriminating the contents at a later opportunity. - Work a little more on the STEAM approach during the course. - More diversified activities. - Teamwork.
	- Finalization with the organization in images/graphs / tables of collectively constructed knowledge	

Table.7: Couse – Maker Culture 2nd ed.

Course	Positive aspects	Possibilities for improvement
Culture maker - 2nd ed.	- Provided knowledge about new tools and methodologies. - Possibility of exchanging experiences with other professionals. - Reflection on teaching practice.	- Course navigability and progress bar. - Longer access time to the course. - Improve the organization of activities, perhaps separately from the content.

	- Accessible language.	

Table.8: Couse – Comics.

Course	Positive aspects	Possibilities for improvement
Comics	- Quality content. - Staff service. - HQ platform.	- Better organization of the moodle platform. - The longer term for activities. - More ideas and websites. - More lives. - Make a menu on the course's homepage where it illustrates what remains to be done. - Longer access to the course. - Reduce the number of activities. - Higher workload.

The courses were organized in a way that promoted different forms of interaction between the professors and the contents covered. Training actions for teachers should promote debates, study groups, congresses, and seminars, among others, so that this training contributes to improving the quality of teaching [5].

Among the positive aspects highlighted by the course, participants are the methodology used in the courses, the diversity of activities, and the dynamics of the content covered, demonstrating that the way the course was planned met the expectations of the professors.

Another relevant point for the teachers participating in the courses was the interaction in the lives and the debates triggered in these moments of learning, which contributed to the reflection on the educational processes. In this sense, it is understood that "technology alone does not change pedagogical practices, and to maximize the benefits of technological innovation, especially those referring to digital technologies, it is important to change the way education is thought of" [7]. Thus, there is an indication that future courses will continue to provide opportunities for reflections on educational practice.

Teachers also highlighted the usefulness of applications and course content and the possibility of applying what they learned to everyday life. It is of great value that teacher training is directly linked to teaching, to day-to-day school life, because "by putting into practice the acquired knowledge, the subject modifies his immediate reality" [3].

This must be the character of the educational process – to contribute to the development of citizens capable of acting in reality, transforming it. Gasparin (2007) also reiterates that "thus, theoretical knowledge loses its character of being just 'an understanding of what happens, to become an action guide'".

Understanding continuing education as a space for reflection on practice and for exchanging experiences with colleagues in the profession, it can be observed that this objective is consolidated in the courses offered, as indicated by the participants' evaluations. They highlight the importance of interaction and exchange with lecturers and course participants.

Regarding the possibilities for improvement listed by the course participants, it is possible to notice that, in most courses, a longer workload is suggested, as well as more time to carry out the activities and consequent expansion of the period of access to the courses.

From these elements, it can be inferred that, despite the teacher's busy routine, there is a commitment on the part of teachers to their continuing education and, therefore, there is a desire that the workload is greater and that they can dedicate themselves more to the activities of the teacher. course.

Because of the evaluations presented, it is worth emphasizing the importance of offering courses to teachers with themes relevant to their daily lives. According to Leite et al, (2020) "it is necessary to guarantee the necessary structures for the educational process, enabling more qualitative and meaningful ways in the teaching and learning process, with the use of technological resources".

V. CONCLUSION

It is important to understand teacher training as a process that extends throughout their professional careers and is in constant development. Therefore, so that teaching practice does not become routine and repetitive, it is

necessary for the teacher to assume his professional development, reflecting on his actions, since a new practice only develops from a reflective process on the previous practice [4].

In this way, the courses offered by RExLab achieved the objective of promoting the acquisition of new knowledge for teachers. In addition, reflection on teaching practice was also made possible in the courses, through activities and moments of exchange of experiences between lecturers and course participants and between peers.

This work sought to make some considerations about the selected courses, but it does not exhaust the possibilities of study on the subject. There is an increasing need to think about current teacher training, using technologies, and evaluating the actions that have already been developed to bring possibilities for improvement for all those involved in this training process.

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