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METACOGNITION AND THE CONTRIBUTION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHER TRAINING: CHALLENGES AND PERSPECTIVES IN THE COVID-19 PANDEMIC

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ABSTRACT

This article investigates the experiences and difficulties faced by teachers with the advent of the COVID-19 pandemic regarding the use of ICTs, as well as the performance of these professionals in a new education model that presented new metacognitive experiences. The formation of active individuals is directly linked to the search for knowledge and learning, and we investigated how the teaching/learning process was experienced, in contrast to the actual teacher training. The research site was the Emílio Nemer State High School, located in the municipality of Castelo, state of Espírito Santo, Brazil, through data collection, through a survey conducted among teachers and management team. The research observed the teacher's perspective, focused on the use of Metacognition in teaching/learning relationships.

Keywords: Teacher training. Metacognition. TDICs. Pandemic.

INTRODUCTION

The year 2020 began with the outbreak of COVID-19 and the World Health Organization (WHO) declared a public health emergency of international concern, adopting numerous measures that culminated in the creation of several global emergency public policies, with the aim of reducing the impact of this pandemic. The social distancing measures suggested by the WHO, adopted in most countries, caused the closure of schools and the suspension of in-person classes in public and private schools, when the first online learning experiences began to be implemented in education, and remote teaching was implemented.

In contemporary times, New Digital Information and Communication Technologies (TDICs) permeate all processes in society, including educational processes. Humanity is going through this technological revolution, which has had a greater impact than Gutenberg's creation of the printing press or the Industrial Revolution itself, which is why it needs to be understood and worked on.

It is undeniable that the use of technologies was boosted, in the school context, with the COVID 19 Pandemic, however, many factors and difficulties were faced and mediated by educational management, referring to the teacher, who was not prepared for the virtual environment, which is the object of this study.

Current education has faced a scenario in which it was necessary to involve technological practices in the classroom. Technological tools, in addition to assisting teachers in daily school activities, encourage students to seek new knowledge and socialize with resources, in a way that is favorable to the acquisition of knowledge.

The science that allows the development of new technologies is the same that is developed through the use of these new technologies, in a relationship of mutual nourishment, acting in society and being demanded by it (PEIXOTO; BRANDÃO; SANTOS, 2007).

Technological education can transform more complex subjects into something more accessible and attractive. The absorption of new technologies in classes also contributes to increasing participation, creativity and proactivity. However, Information and Communication Technologies are not just a teaching tool; their scope goes far beyond the activities proposed by teachers.

Postmodernity is characterized by a paradigm shift, in which a set of processes configure the discontinuity of the modern condition. In other words, there is a predominance of the instantaneous, of the loss of borders, generating the idea that the world is getting smaller and smaller, through the advancement of technologies. We are faced with a virtual world, with images, sound and text in real time.

In this scenario, this research aims to understand how, at the beginning of the Pandemic, teachers developed virtual teaching, at the Emílio Nemer State School, through the use of Information and Communication Technologies (ICTs) and also, how the metacognition process occurred.

The Pandemic

With the impacts of the COVID-19 pandemic on school education, schools were abruptly closed and remote teaching was adopted and according to Nóvoa (2020)

> [...] school closures and the suspension of in-person teaching activities led public and private schools to abruptly adopt a remote teaching model using digital technologies. Teachers had to adapt their teaching practices and teaching plans to a distance learning model from one moment to the next, in many cases without the essential digital knowledge and skills to promote quality learning.

The school community remained silent, as never before in history had such a situation occurred. The Ministry of Education proposed distance learning for basic education and many questions arose, the main ones being: how would classes be counted? How would everyone have access? And how would technological tools reach the communities?

> Distance learning in the LDB - Law of Guidelines and Bases for Brazilian Education, Law No. 9,394 of 1996, in its Article 80, establishes that the "Public Power shall encourage the development and dissemination of distance learning programs, at all levels and modalities of education, and of continuing education". With regard more specifically to Elementary Education, we find in Article 32, § 4, which states that "Elementary education shall be in-person, with distance learning being used as a complement to learning or in emergency situations". Regarding High School, Article 36, § 11 states that "For the purpose of fulfilling the curricular requirements of high school, the education systems may recognize competencies and enter into agreements with distance learning institutions with notable recognition". As for Early Childhood Education, no reference was found in the current LDB regarding the possibility of distance learning. (BRAZIL, 1996)

Before the pandemic, planned distance learning experiences were already significant, however, the remote teaching adopted at the beginning of 2020 was very different. In-person teaching suddenly became virtual and the success of the action would depend on factors such as motivation for learning, access to the internet and technology, and teachers' competence for the teaching modality now in place.

And in the period experienced, Almeida and Alves (2020) state that the implementation of remote teaching further highlighted the socioeconomic and cultural disparities that exist in Brazil.

Adapting to the new reality was not easy, but students and teachers began studying virtually all over the world and this need awakened a feeling that everyone in the school community should develop digital skills and competencies.

Information and communication technologies - ICT

The research has its central axis defined by education and technology in the school environment, during the Covid-19 Pandemic, using interdisciplinarity and deepening studies on the importance of education involving the use of technologies.

We are looking for to substantiate our search node theme technology and according to Moran (1995)

> To the technologies of communication no change necessarily the relationship pedagogical. To the technologies both serve to reinforce one vision conservative, individualistic as one vision progressive. THE person authoritarian will use the computer to reinforce even more your control on you others. Put other side, one mind open, interactive, participatory, you will find wonderful tools in technology to expand interaction.

And still according to Moran (2018),

> In schools with fewer resources, we can develop meaningful and relevant projects for students, connected to the community, using simple technologies such as cell phones, for example, and seeking support from more connected spaces in the city. Although having good infrastructure and resources brings many possibilities for integrating in-person and online learning, I know many teachers who are able to carry out stimulating activities in minimal technological environments.

Technological education can transform complicated subjects into something useful, simple and attractive. The use of new technologies in classes can also increase participation , creativity and proactivity. However, information and communication technology is not just a teaching tool; it goes beyond the activities proposed by teachers.

The use of educational technology as a symbol can be an efficient strategy for achieving metacognition, that is, this new perspective of knowledge and society is essential for teachers to be prepared to promote reflection, providing transformations in mentality and social practices. This implies the continuity of teacher training in the application and use of strategies, in Postmodernity, with the purpose of incorporating them into the academic environment effectively.

Teacher training

During the pandemic, the vast majority of teachers, with little or no prior training, had to

suddenly change their teaching practices by using completely new contexts. From the traditional in-person classroom, students suddenly began to have classes virtually. This was an extremely difficult process, with a lack of technological resources and professionals lacking technological training. In the initial phase, the reality of the disorganization of public education was evident, both for students and for teachers who did not have the tools available for study and satisfactory learning.

The fragility of the educational system was exposed to everyone. Teachers with experience in teaching were completely unprepared for classes in the virtual environment. Education professionals who should have mastered ICTs began a process of learning how to use technologies, while at the same time passing on the content to their students.

According to Nóvoa (2020), keeping up to date with new teaching methodologies and developing more efficient pedagogical practices are some of the main challenges of the teaching profession. Completing a teaching degree or a degree is just one of the steps in the long training process that cannot be interrupted as long as there are young people wanting to learn; teachers are trained at school.

Although we already have many continuing education courses to prepare education professionals, these still leave something to be desired, as they do not focus on situations such as the pandemic. We need to look at innovative practices and models, as stated by GENTILE (2001).

The invitation that has been extended to teachers for some time to reinvent themselves has become essential with the pandemic. More than ever, teachers need to be able to think, analyze and question their own practice in order to act and improve it, building autonomous performance, while also enabling students to build autonomy.

Training, as Gentile (2001) reports, is something that belongs to the subject itself and is part of a process of being (our lives and experiences, our past, etc.) and a process of becoming (our projects, our idea of the future).

And Paulo Freire (2003) explains to us that education never happens through mere accumulation. It is an achievement made with many aids: from teachers, books, classes, computers. But it always depends on personal work. No one educates anyone else. Each person educates themselves.

Metacognition as a basis for reflection on practice pedagogical

By including metacognition as a basis for reflecting on pedagogical practice, it has become an extremely relevant topic today and is already becoming a reality in educational spaces, as it influences reflection on pedagogical practice. Metacognition refers to the ability to think about one's own thinking, understand how to learn and make conscious decisions about learning processes.

The word “metacognition” is a neologism, originated in the field of contemporary psychology. According to the Aurélio Dictionary (sd), etymologically the word metacognition comes from Meta + cognition, from the Latin cognitio.onis , action of knowing. It is a word composed of the Greek prefix “meta” which means “change”, “projection”, “transformation” and “end to which an action tends”. It is the knowledge that an individual has about their own cognitive (mental) processes, being able to reflect or understand the state of their own mind (thinking, understanding and learning). The word “cognition” refers to the acquisition of knowledge; the ability to discern, to assimilate this knowledge; perception.

Maraglia (2018) reinforces that the word "metacognition" is a coined word that adds the prefix "meta" to the word "cognition". The prefix "meta" complements the concept of transcendence, a critical consideration of something. In fact, the structure of the word metacognition refers to the transcendence of cognition, a thinking about learning. According to Bransford (2007), metacognition can collaborate with investigative processes and

other tools in the student's work environment, in situations in the teaching/learning process. Metacognition contributes to student engagement in their learning, highlights important situations, and advances the understanding of what an individual learns and how he or she learns.

The form and/or model of how teachers conduct their classes and the way students learn are constantly improving, which makes analysis and teacher training essential so that they are, in fact, prepared to deal with transformations in the teaching/learning process (BUSNELLO; JOU; SPERB, 2012).

Metacognition has been worked on in some fields of research, such as: developmental psychology, with an emphasis on theory of mind; experimental and cognitive psychology, with a focus on metamemory; and educational psychology, which emphasizes self-regulation of learning, being the three main areas responsible for production in metacognition (MARAGLIA, 2018).

Cognitive psychologist John Flavell (1979) is often cited as one of the pioneers in the study of metacognition. The researcher defined metacognition as the knowledge that people have about their own cognitive processes and the effectiveness of these processes, that is, metacognition can be defined as the process of thinking about one's own thinking. Flavell argues that educators can promote metacognition by helping students develop a deeper understanding of how to learn and become self-regulated learners. In other words, it refers to the ability of human beings to monitor and self-regulate their cognitive processes.

Busnello, Jou and Sperb (2012) years later, state that metacognition is the ability to reflect on one's own actions and decisions, considering different strategies and possible results. In the teaching practice sector, metacognition refers to the teacher's ability to reflect on his/her personal practice, his/her teaching strategies and the impact they have on the students' learning process.

The best-known concept of metacognition is that of Flavell (1979), who establishes metacognition as cognition about cognition, describing a thought about knowledge. Flavell presented the first model that encompasses four aspects: metacognitive knowledge, metacognitive experience, goals and actions or strategies.

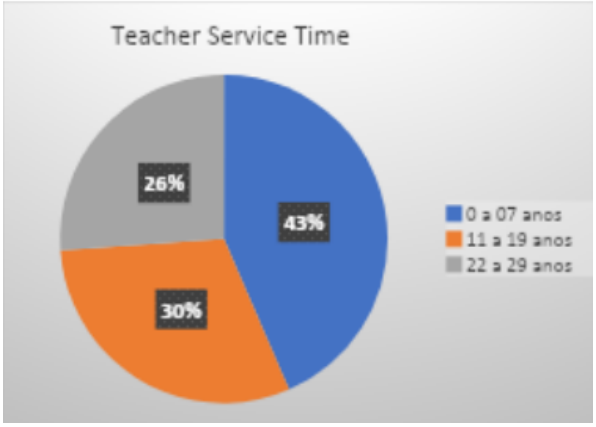
Interviewee profile

In our research, we interviewed 20 teachers, 01 pedagogue and 01 course coordinator according to:

Institution	School	Teachers	Pedagogues	Coordinator Shift
State Public High School	Emilio Nemer	20	01	01

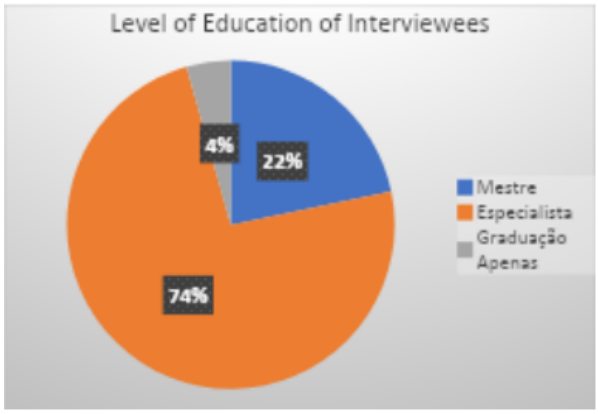
Table 1 – professionals interviewed

In graph 1 we have the average length of service of the teachers involved, with the concentration of less experienced teachers being dominant among those interviewed:



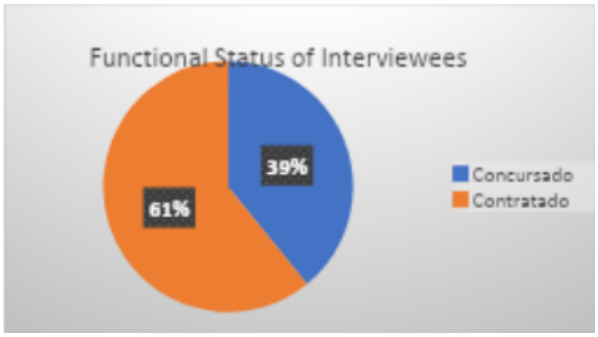
Graph 1

In graph 2, it becomes clear that the highest level of education is for specialists, with few having a master's degree and, despite all the facilities available for studying today, a minority still only have a degree in the public with the least amount of time in service:



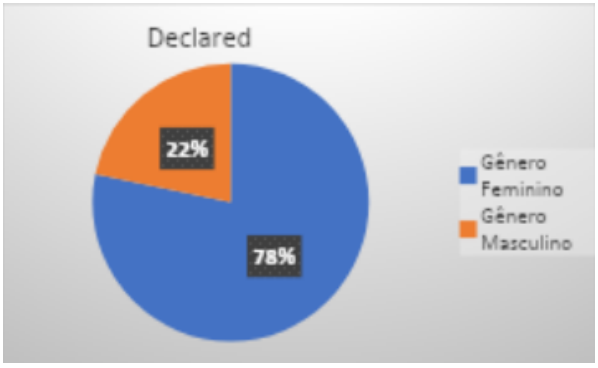
Graph 2

Regarding the current functional situation of the interviewees shown in graph 3, we found that those hired under a temporary designation system are dominant at the Emilio Nemer school, as shown in the graph:



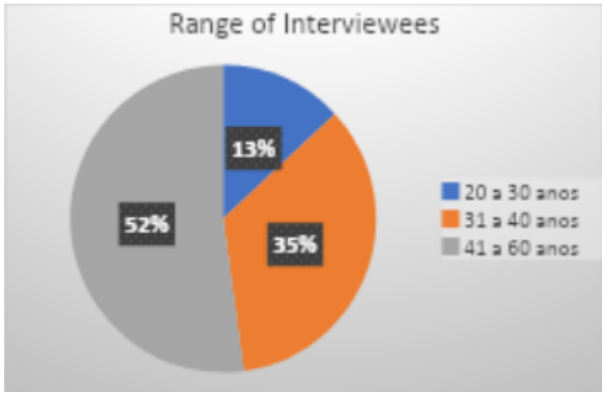
Graph 3

In graph 4 we can clearly see that the female gender is dominant among the teachers working at the institution:



Graph 4

And in graph 5, we demonstrate the age range of teachers, with more than 50% being between 41 and 60 years old.



Graph 5

FINAL CONSIDERATIONS

This research is relevant because it makes it possible to understand the training of the teacher investigated, as well as the profile of these interviewees so that we can understand the teaching practice in the classroom, regarding the use of ICTs and the role of these professionals with the advent of the COVID-19 Pandemic in the metacognitive context.

The aforementioned study also allowed us to understand an evolution in the teaching/learning process, focused on Information and Communication Technologies (ICTs), as innovation tools, intertwined in scientific thinking, active methodologies; such technological tools have become the facilitating and transformative means in society.

When investigating the use of metacognition in the development of teaching planning, it was noted that technological equipment is used as a didactic facilitator , thus demonstrating efficiency in the teaching process. Metacognition is a source for changing strategy, but planning is a priority for success. Positive stimulus is a source of power and domination in interactions so that teaching/learning happens and is strengthened for the future.

Teachers worked on the use of technologies from the perspective of metacognition during the pandemic period, and the teachers' work procedures regarding the use of technology in the classroom from the perspective of metacognition, as they learned to learn, in a process of advances and setbacks. There was a

focus on the use of metacognition in the school context and interactions in teaching/learning relationships, in which teachers showed concern for mediation, learning and planning, considered a fundamental part of success in the teaching/learning, leading to the search for metacognition as an effective means, to develop efficient methods to favor learning, in the pandemic context, which were forced to adapt.

In the midst of a situation of extreme need, it was necessary to reinvent teaching/learning. Adapt to the new, the unexpected, use metacognition to learn how to learn.

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