THE PERCEPTION OF PARFOR TEACHERS ABOUT LEARNING IN REMOTE TEACHING: EVALUATION OF THE USE OF TECHNOLOGIES

A PERCEPÇÃO DOS DOCENTES DO PARFOR SOBRE A APRENDIZAGEM NO ENSINO REMOTO: AVALIAÇÃO DO USO DAS TECNOLOGIAS

LA PERCEPCIÓN DE LOS PROFESORES DE PARFOR SOBRE EL APRENDIZAJE EN EDUCACIÓN REMOTA: EVALUACIÓN DEL USO DE TECNOLOGÍAS

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ABSTRACT: This construct addresses the origin of educational technologies, how they emerged in the historical-philosophical course of the conception of new teaching methodologies, with a view to achieving results that positively influence society by seeking scientific knowledge transposed to empirics. Thus, the research aims to identify the perception of PARFOR teachers about remote teaching, based on the use of technologies. In the experiment, the digital competencies for the teacher in remote teaching were adopted, by means of the model of Garcia *et al*. (2020), for being generated for the teachers attended in PARFOR and for being based on the relational aspect between the teacher and the student. In this demand, it is noted that the emergence of remote teaching has brought out formative weaknesses in teachers, thus emerging the great challenge, configured in moving from the face-to-face system to the virtual modus operandi

KEYWORDS: Remote teaching. Evaluation. Education. Technologies. Virtual.

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RESUMO: *Este constructo aborda a origem das tecnologias educacionais, como emergiram no decurso histórico-filosófico da concepção de novas metodologias de ensino, com vistas a atingirem resultados que influenciem de maneira positiva a sociedade buscando conhecimento científico transposto à empiria. Assim, a pesquisa tem como objetivo identificar a percepção dos docentes do PARFOR sobre o ensino remoto, com base no emprego das tecnologias. No experimento, foram adotadas as competências digitais para o professor no ensino remoto, por intermédio do modelo de Garcia et al. (2020), por ser gerado para os professores atendidos no PARFOR e por basear-se no aspecto relacional entre o docente e o aluno. Nesta demanda, nota-se que a emergência do ensino remoto fez aflorar fragilidades formativas nos professores, surgindo, então, o grande desafio, configurado em passar do sistema presencial para o modus operandi virtual.*

PALAVRAS-CHAVE: *Ensino remoto. Avaliação. Educação. Tecnologias. Virtual.*

RESUMEN: *Este constructo aborda el origen de las tecnologías educativas, tal como surgieron en el curso histórico-filosófico de la concepción de las nuevas metodologías de enseñanza, con miras a lograr resultados que influyan positivamente en la sociedad que busca el conocimiento científico transpuesto al empírea. Así, la investigación tiene como objetivo identificar la percepción de los docentes de PARFOR sobre la educación a distancia, a partir del uso de las tecnologías. En el experimento se adoptaron las competencias digitales para el docente en la docencia a distancia, a través del modelo de García et al. (2020), porque se generó para los docentes atendidos en PARFOR y porque se basó en el aspecto relacional entre el docente y el alumno. En esta demanda, se observa que la aparición de la enseñanza a distancia provocó debilidades formativas en los docentes, surgiendo así el gran reto, configurado en pasar del sistema presencial al modus operandi virtual.*

PALABRAS CLAVE: *Enseñanza a distancia. Evaluación. Educación. Tecnologías. Virtual.*

Introduction

The academic demand manifests the need to know the origin of educational technologies, the way they emerged in the historical-philosophical time of the idea of new teaching methodologies, in order to achieve results that really transport positive influxes to society for the search of scientific knowledge, in surpassing empirical knowledge.

It will be a search for the understanding of the phenomena that subsidize the practices of teacher training in the profession of pedagogues in the last decade, because there are no simple phenomena, since the phenomenon is a fabric of relationships.

> There is no simple nature, nor simple substance. ...] simple ideas are working hypotheses, labor concepts, which will have to be revised to receive their just epistemological role (BACHELARD, 1968, p. 130, our translation).

In this essay, we opted for a methodology used in the Social Sciences, constituted by the dialogue of four poles, which talk to each other, in time that allows us to take care of the investigation under the aegis of the approaches: epistemological or the origin of the research subject; the theoretical or what grounds the Program under study; the morphological or models that grounded the investigation and production of knowledge and techniques that portray the field search and the data collected through a survey strategy of these (DE BRUYNE; HERMAN; SCHOUTHEETE, 1977), which will be possible to realize in the morphological pole later on. The understanding of the epistemological level defines the scientific framework. The pole performs a function of critical surveillance. To the extent of all research, it was the guarantee of the objectification - that is, of the production - of the scientific object, of the explicitness of the problem conjunctions of the research (DE BRUYNE; HERMAN; SCHOUTHEETE, 1977).

In this perspective, it is relevant to proceed to an investigative study to know the difficulties inherent to the whole process, mainly in the remote teaching experienced by teachers. Therefore, it was important to investigate to answer the following questions: What are the perceptions of PARFOR teachers about the emergence of adaptation to remote teaching? What aspects of their practice, in the teacher-student relationship and from the point of view of the meanings given to their previous knowledge about technologies, were evidenced?

This writing expresses three assumptions that guided the work, reported in the following.

1. Remote learning is an open and formulating modality, which provokes reflection on the instructional designs based on industrial models, in which the focus is on the development of skills (memorization, application of knowledge).

2. Teachers' knowledge has been challenged, under the prism of digital literacy, in the face of social isolation.

3. Remote teaching has demanded an increase in teachers' digital literacy, which has had an impact on the ways in which they have sought training to compensate for these shortcomings.

The purpose of this quest (of university character) is to identify the perception of PARFOR teachers about remote teaching, supported by the application of technologies, studying the epistemological bases of the models and conceptions of evaluation in the use of Digital Information and Communication Technologies (ICTs) in education; to contextualize

the characteristics of the use of educational digital technologies and teachers' knowledge; and to discuss teachers' advances and difficulties regarding learning and evaluation in remote teaching.

This experiment aims to contribute during the long course of the Covid-19 pandemic, a scenario that is impossible to predict, but research spaces are seeking to understand aspects of coping with these circumstances in the educational field, which made it possible to study the National Plan for Training of Basic Education Teachers - Degree in Pedagogy (PARFOR). According to the Pedagogical Proposal, PARFOR is one of the programs of the Coordination for the Improvement of Higher Education Personnel (CAPES), which aims to induce and foster the offer of free, quality higher education for teachers working in the public basic education network, so that these professionals obtain the training required by the Law of Directives and Bases of National Education (LDB) and contribute to improving the quality of basic education in the country..

Epistemological pole

It starts from the research's guiding question, which seeks to evaluate the technological tools and remote teaching for PARFOR teachers, using the understanding of applied rationalism, advocated by Gaston Bachelard (1884-1962), French philosopher, essayist and poet.

> [...]science commonly postulates a reality. From our point of view, this reality presents, in its unknown, inexhaustible aspect, an eminently proper character that calls for an endless search. Its whole being resides in a resistance to knowledge. We take, therefore, as a postulate of our epistemology, the fundamental unfinishedness of knowledge (BACHELARD, 2004, p. 13, our translation).

The epistemological pole is relevant as a provider of information that supports the entire research and its findings, or rather, it acts in a vigilant and critical manner beyond the positivism of Comte, who for many years defended that the result of a search for knowledge ends in itself, which for Bachelard (1968), knowledge must be based on evolution and the possibilities of construction or rethinking for a new knowledge, a new way of looking at and understanding the object that is being investigated, the scientific action. It is verified that realism and rationalism endlessly exchange their advice. Neither one nor the other, in isolation, is enough to constitute scientific proof. In the realm of Physical Sciences, there is no place for an intuition of the phenomenon that would designate at once the foundations of the

real; nor is there room for a rational conviction - absolute and definitive - that would impose fundamental categories to our experimental research methods.

In this article, a bridge was established with Bachelardian epistemology, because the concept itself reveals how necessary is the reflection inherent to the origin and evolution of facts. The function of epistemology is based on the conditions of objectification of scientific knowledge. Moreover, it comprises the modes of observation and experimentation, also examining the relationships that sciences establish between theories and facts (DE BRUYNE; HERMAN; SCHOUTHEETE, 1977).

At this pole was established the dialogue of Gaston Bachelard, born on June 27, 1884, in rural France, and died on October 16, 1962, in cosmopolitan and industrialized Paris. Philosopher and essayist, he was born in Bar-sur-Aube into a modest family. Doctor of Philosophy in 1927, with a thesis entitled "Essay on approximate knowledge and study on the evolution of a problem of physics", he became recognized by academia and was later awarded the prize as the landmark of the new scientific spirit.

Therefore, in this study, the new scientific spirit emerges in the condition that the evaluation is a possibility to constitute new perspectives, and this was possible when investigating a situation that occurred in the midst of a pandemic reality, unlike the common experience, in a Teacher Training Program (PARFOR), reverberating the importance of the evolution of scientific knowledge, as reinventing itself, which will be seen in the analysis of the technical pole.

The continuist conceptions of the history of science are criticized by Bachelard, introducing the category of "rupture" to point out the double discontinuity - historical and epistemological - that occurs in it. The continuous rectification of previous knowledge is the key to all scientific progress. Science is not absolute knowledge, nor is it rigorous, but only ever closer to the deepest meaning of nature. Scientific progress occurs in successive ways of ruptures, such as those observed during this study of the Program in Ceará.

As Lima states (2005, p. 37, our translation)

> [...]Bachelard's epistemology is a dialectical rationalism that makes use of reason and technique, called 'applied rationalism', which should not be used in generalities, but rather in limited parts of experience (regional nationalism), to draw its applications from there.

Finally, the epistemology tries to establish a dialogue between practice and practice, practice and theory, theory and theory, as a way to confront or associate the knowledge formulated in the work expressed here. The reflective connotation of always questioning what

is in place and trying to explain or not what was observed about the models of technological education in the field of educational assessment, described later in the other poles, in which some epistemological obstacles were observed when facing the subject of this research that was conceived for its execution in a face-to-face way, because this, abruptly, had to be replaced by remote education, this one called PARFOR, whose research was based on the challenge of online collection, being subject to obstacles and adversities or

> [...]causes of inertia, which are also called "epistemological obstacles [...] the act of knowing takes place against a previous knowledge, destroying badly established knowledge, overcoming what, in the spirit itself, is an obstacle to spiritualization (BACHELARD, 1996, p. 17, our translation).

Such considerations reinforce the need for the researcher to continuously reflect on his/her practice during the course of the scientific investigation, noting that, for the "[...] scientific spirit, all knowledge is an answer to a question. If there are no questions, there can be no scientific knowledge. Nothing is self-evident. Nothing is free. Everything is constructed" (BACHELARD, 1996, p. 18, our translation).

According to Maciel (2009), in his master's thesis, when investigating the evaluation models of learning organizations of the "S" System, one of the great challenges to thought and education in these last centuries is the contradiction between the two thoughts. On the one hand, increasingly global, interdependent and planetary thoughts and, on the other hand, the persistence of a mode of knowledge that still favors fragmented, fragmented and compartmentalized knowledge, providing the emergence of the need and urgency to promote the development, in teaching and research, of a properly transdisciplinary spirit or, at least, the valorization of interdisciplinary knowledge for a reform of thought and education, in this case for a drastic change regarding the methodological aspects of the feasibility of face-to-face teaching for 100% remote teaching. In such a way, what once seemed very distant from happening in education has become reality and an important option, and, in many cases, the only possibility for education to reach students.

Currently, there is a growing interest in remote teaching, within the vies of technological education, and with it the great challenge of evaluating its results and influxes, motivated by several reasons, among which those linked to a pedagogical analysis and the redefinition of an educational strategy, since the fact that the training of pedagogues in PARFOR is in the remote model leads to a more in-depth examination of the shocks of this format, seeking to know about it with the knowledge published by several authors commented in the theoretical pole.

Theoretical Pole

Given the terms that make up the epistemological pole, we will now deal with the theoretical pole, corresponding to the methodological instance in which the hypotheses are organized and in which the concepts are defined. For Lessard-Hébert *et al.* (2005), this is the sphere of the systematic formulation of scientific objects. This pole proposes rules for the interpretation of facts, for the specification and definition of solutions provisionally given to problems.

Thus, it is relevant to discuss the pedagogical approaches of education with technologies. According to Aranha (2006), still in the Middle Ages, the education movement was constituted in two approaches, being one as patristic education, whose philosophy was contained in the works of the Fathers of the Church, from which the name originated, starting in the decadent period of the Roman Empire, in the third century, and the resumption of Platonic philosophy, based on the need to create a rigorous moral ethic, rational control of passions and the predilection for the suprasensible.

As in the Middle Ages, the "[...] goal of education remained the same as the one established in antiquity, i.e., human training and the preparation of officials trained for the administration of the State" (ARANHA, 2006, p. 104, our translation), but the incentive for the increase of practices for arts and crafts was developed, thus, the professions emerged. The meaning of profession goes further, "[...] profitere indicates the commitment (professing) of the individual with respect to the social pact, that is, with respect to his specific activity, in community life or role of the individual in the group"(LIMA, 1983, p. 9, our translation).

The concept of technology is much broader than one might think, perceived in the work of Pinto (2005, p. 137-138, our translation), who defines technique as techne coming from the Latin (sic) by the term ars, it is the concept of work without matter; that is, from the perspective of this research, it will be grounded as, still, "[...] technique is the movement of the instruments used, and this movement contains the principle of art (technique). Technique is, therefore, the starting point (or the principle, *archê*) and the form of the product".

It is worth mentioning that the perspective of learning evaluation with the use of technologies, in its various definitions, includes, according to Panerai and Mohr (1989), the repercussions of technologies at different levels and the degree of planning of these repercussions, with emphasis on the beneficial or adverse nature of its consequences. Ammenwerth *et al.* (2003) emphasize the notion that, in the field of ICTs, in addition to its political character, the evaluation should not be restricted only to the technology, but it must

cover the interaction between them and the users in the processing of information within a given socio-environmental context, because this interaction determines how the incorporation of technologies to the evaluation processes occurs.

With respect to educational technologies, Almenara (1998) points out that their evaluation, as well as the DTICs, denotes a procedural character that involves progressive decision making about the determination of the object to be evaluated, the timing, the specification of reasons and needs, and the determination of techniques and strategies to be employed, as well as their execution and concretization in a product.

In the application of educational technologies, it is important to discuss teaching knowledge. In Bombassaro's (1992) understanding, the idea of knowing indicates: to be able to understand, to master a technique, to be able to handle, to be able to understand, referring to the practical world which, besides being a condition for the possibility of any notion, is also the effective place in which the notion is to be produced. The teacher is a professional who holds knowledge from various sources about education, and his main function is to educate children, young people, and adults. The teachers' professional knowledge guides their activity in a multiplicity of functions that act in different circumstances, therefore, needing to act in different ways, mobilizing different theories, methodologies, and skills.

In relation to teachers, according to Tardif, Lessard, and Lahaye (1991, p. 218, our translation) show us, "[...] with knowledge is not reduced to a function of transmitting knowledge already constituted, (since) their practice integrates different knowledge, with which teachers maintain different relationships". To achieve the goals set, teachers usually use: subject knowledge, curricular knowledge, knowledge from professional training, and knowledge from experience. Thus, this mix of knowledge possibly constitutes what is necessary to know in order to teach, according to the authors.

Another point to be highlighted refers to technological competencies, since the teaching activity, with the advent and increase of new digital technologies in education, especially ICT, is challenged to overcome the presentiality as a territory of action and assume more proactive and mediating positions. Complex and simple technologies are part of this new parameter of action that need to be appropriated (RABARDEL, 1995) and understood in the perception of the subject's action over them, in order to develop new perspectives, other schemes of action and interaction with other media (BITTAR, 2011).

Under the recent situation of social isolation as a result of the Covid-19 pandemic, which imposed changes in the formats of performance of several human activities, including

education - having been adopted in the country the remote teaching (MINISTÉRIO DA EDUCAÇÃO - MINISTRY OF EDUCATION, 2020), studies guide the creation of instructional designs that take into account not only the way of performing the activities, but also the formative characteristics of the teacher. Thus, Garcia *et al.* (2020) point out criteria for the teacher's self-assessment of their digital competencies, comprising the didactic organization - with the presentation of content, the definition of learning objectives and the proposal of assessment activities - and the digital competencies, understood by the authors as skills and attitudes, namely: synchronous or asynchronous communication with the student, increased use of technological resources and planning and time management.

Following the research on pedagogical competences, much has been produced on the learning competences of students, but little is found on the competences of university teachers, specifically with regard to pedagogical competences. Thus,

> There is a need to forge a specialized meaning of competence in education and teacher training, around which researchers can converge for more consistent interventions by professionals (ESTEVES, 2009, p. 37, our translation).

Goergen (1998) highlights four fundamental competencies of the educator for the complex scenario of education today: i) competence to deal with the provisional, the error, the illusion, because the education of the future must recognize the principle of uncertainty, historicity and, therefore, keep open the critical and self-critical perspective; ii) rejunctive competence, which promotes general and complex intelligence, able to perceive the dimensional whole to understand in it the meaning and quality of the partial; iii) communicative competence, because to constitute oneself as an individual requires a process of hominization, of insertion in the culture, in the space of the polis, common, public locus; iv) sensitive and ecological competence, to find again the lost faces of the human, the sensitive, the ludic, the imaginary, the poetic.

In hoc sensu, "[...] the teaching profession can be understood as a complex profession, one in which professionals must face the unknown and permanent change" (LE BOTERF, 2003, p. 58, our translation). Thus, professional competence uses, integrates, mobilizes knowledge to face a set of complex situations.

Morphological Pole

The Covid-19 pandemic carried, as one of the many challenges to education worldwide given the condition of social isolation, the adequacy of the teaching and learning relationship from the face-to-face teaching structure to the virtual mode, with all its peculiarities. In Brazil, the Law 14.040, of August 18, 2020, established educational standards to be adopted by institutions and, as far as Higher Education is concerned, the development of "[...] non-presence pedagogical activities linked to the curricular contents of each course, through the use of information and communication technologies, for the purposes of completing the respective workload required" (BRAZIL, 2020, our translation).

It is understood that remote teaching is a temporary adaptation to give continuity to educational activities, which uses available resources, including virtual ones, for this maintenance. Garcia *et al.* (2020) point out as a characteristic of this adaptation the adaptation of digital resources for the communication of classes and activities, as well as the insertion of innovative practices, to which the authors link the teacher's competencies. It forms a know-how, which, for Tardif (2014), is related to the constitutions of their professional practice and that, in terms of the development of a digital culture, is constituted as an appropriation of knowledge about the artifacts for their pedagogical use (RABARDEL, 1995), since "The variability of the resources and strategies as well as the practices is defined from the teacher's familiarity and ability to adopt such resources" (GARCIA *et al*., 2020, p. 5, our translation).

Moran (2012) points out as formative characteristics of the teacher the ability to adapt the necessary skills to learning with the mediation of technologies. Two competencies are inventoried - pedagogical and technical - to be developed by the teacher. It is expressed that the technical dimension is in the appropriation of digital technologies, in order to develop their pedagogical activity with the necessary competence, overcoming the instrumental knowledge. Garcia et al. (2020) point out that the challenges of remote teaching are the same as those of face-to-face teaching from the didactic point of view. Thus, they offer a didactic organization whose arrangement is described in Table 1.

Table 1 – Didactic organization for the teacher in remote teaching

Introduce the content:	Indication and availability of the subject to be discussed in the class, in a clear and objective way, the methodology of topics followed by short sentences describing the subject can be adopted.
Define learning objectives:	Indication, followed by description of what knowledge, skills and attitudes the student should develop as a result of learning.
Propose assessment activities:	Defining, informing and clarifying for students the ways and methods of monitoring learning.
Assessment in process:	It involves monitoring the student's progress during the stage of presentation of the subject and its contents. This stage corresponds to the phases of learning acquisition and retention. The analysis of learning performance in process seeks to identify the knowledge constructed, considering those of the cognitive domain [knowledge, understanding, evaluation and analysis] and procedural [application and synthesis], therefore, referring to the specific objectives.
Evaluation of results:	It consists of learning verification at the end of the presentation of the topic or unit of study, whose deadline is set by the teacher or according to the UFRN regulations. This evaluation is applied according to the objectives proposed for mastery based on the theme or unit of study with a strong appeal to the general objectives [macro competencies].

Source: Research data. Prepared by the authors, with support from Garcia *et al*. (2020)

It can be seen that, in order to adapt didactics to digital resources, it is necessary knowledge about the available devices to mediate the relationship with students - technical competence - as well as its adequacy to the didactic purposes - pedagogical competence - going through the knowledge of these resources by the teacher, as well as an experience for which, in its majority, is not part of their educational culture, according to the (COMITÊ GESTOR DE INTERNET NO BRASIL, 2018 - INTERNET MANAGING COMMITTEE IN BRAZIL). The teaching culture is the result of coexistence, repetitions and consolidations arising from the experiences of practice (TARDIF, 2014), which requires coexistence, exploration, overcoming distances (MORAN, 2012), this being one of the aspects of technological appropriation, where reciprocity in the transformations that arise from the exchanges of subject with artifact, in the field of education with technologies (RABARDEL, 1995). In these loci, Garcia *et al*. (2020) gather skills for the teacher to act in remote teaching: communication with the student, increased use of resources, and time management. To situate the teacher within their digital culture, self-assessment questions were created for each skill, as outlined in Table 2.

Table 2 – Self-assessment questions according to teachers' digital competencies for remote teaching

Competencies	Questions for self-evaluation
Communication with students	What are the means you could use to communicate with your students: Social networks? WhatsApp, Telegram? E-mail? Others:
Increased use of digital resources and tools	Regarding skills identify those that are in your field of mastery: a. Do you already use digital strategies, resources, or tools? b. Have you mastered digital resources, technology, and platforms for teaching and assessment with ease? c. What do you need to learn to use them in remote teaching?
Time Management Planning	To make time management from remote learning, what skill level are you at? Learning: need help to master the technology Familiarization: know, but have no practice Adaptation: has mastered the technology and tools using it periodically, but needs to identify which ones will best fit the current reality of your teaching practice Innovation: has adequate competence to apply, in the current situation, effective and efficient practices in order to serve students remotely.

Source: Research data. Garcia *et al*. (2020)

It is inferred that there is a training gap in relation to teachers' knowledge about technological appropriation, which, when it comes to teacher educators, has repercussions in their initial training, replicating traditional teaching models. Remote teaching demands skills to be developed by teachers according to their activities and the realities of the teacher-student relationship in the virtual environment. Communication with the student, increased use of resources, and planning, with respect to time are the constituent competencies of the design proposal by Garcia *et al*. (2020). This model of analysis of the teacher's competencies in remote teaching was used in this work with the purpose of instructing the survey conducted with PARFOR teachers. This use is justified both by the comprehensiveness and pertinence of the model and by its original purpose: to guide the development of course plans and remote activities at the Federal University of Rio Grande do Norte, already in the context of the pandemic and as a consequence of the experiences evaluated in 2020.

The lightened transition from face-to-face to remote mode revealed the formative shortcomings of teachers, but did not position their perceptions about the imposed changes, the structural and pedagogical feasibilities, nor the epistemological bases for the continuity of educational activities. In Tardif's (2014) reflection, the teaching profession is inserted in the knowledge constituted through formal learning, coexistence with peers, and in the validation of pedagogical strategies through educational practice. The teacher assumes a pedagogy - a

teaching-learning theory - within a relational activity. Teaching comprises "[...] triggering a set of interactions with a group of students in order to achieve certain educational goals, concerning knowledge learning and socialization" (TARDIF, 2014, p. 118, our translation). The relevance or otherwise of a digital strategy, innovative practice, or technology is based on this relational experience. Therefore, it is time-dependent. Here it is worth questioning how much the emergence of remote teaching has unbalanced this relationship and how its implications have been perceived by teachers.

Considering the peculiarities of the teacher's digital skills assessment model, it is noted that they should not be treated as requirements for the exercise of the teaching activity, but desirable proficiencies and, now, since the experience/urgence of remote teaching, necessary from a perspective of the establishment of a digital fluency (TAROUCO, 2019). In this sense, a questionnaire was proposed with a view to capturing teachers' perceptions about their experience with remote teaching in the 2020 school year, a period of major changes and adaptations, more specifically under the aspects of communication - synchronous or asynchronous - with the student, more accentuated use of technological resources, and time planning and management (GARCIA *et al.*, 2020). The data search instrument was sectioned to better guide the respondents about what it required to know. Table 3 illustrates this distribution.

Table 3 – Distribution of the contexts of the data search instrument according to Garcia *et al*'s model parameters. (2020).

Thematic Group	Objectives of the questions
Relationship of adaptation and management of time dedicated to work	To know the teachers' perceptions about the adaptations made for remote teaching and their relationship with communication in the teacher-student relationship, about the adaptations for preparing classes, activities and content, and the effort spent on their level of digital literacy, personal adaptations, and repercussions of the experience of using technologies in remote teaching.
Relationship between previous knowledge and digital resources in communicating with students	To know the teachers' perceptions about their level of digital literacy and the students' monitoring of their activities and the development of evaluative activities.
Relationship to the resources available for remote learning	To know teachers' perceptions of available resources (physical and virtual), access modes, student monitoring, and communication with students.
Relationship between your experience in remote teaching and teacher training.	To know the teachers' perceptions about aspects of their experience in adapting to remote activities from the perspective of composing their teaching knowledge.

Relationship with the perspectives about the insertion of technologies as a means of interaction from the experience with remote teaching.	To know teachers' perceptions about implications of technologies used in remote teaching on the teacher-student relationship.

Source: Research data (2021)

The questionnaire was composed of multiple choice items, a 5-point linear scale, and drop-down lists. This instrument seeks - in addition to information - ideas, feelings, plans, and beliefs, among other knowledge, although it also contributes to this knowledge through observations, experiments, documents, and other interactions. Since the questionnaire is a set of questions that seeks data for further analysis, the ways of expressing them should be prioritized by the feasibility of getting the answers (GÜNTER, 2003). Still on the feasibility of obtaining the answers, it is important that the instrument, without the participation of the interviewer/applicator, establishes trust, minimizes costs for the respondent and offers rewards.

This search for "friendliness" in the instrument has become more than necessary in this period, when the virtual has become a constant interaction environment. The design was therefore followed, seeking to increase rewards, "[...] making the questionnaire itself interesting to fill out, adding questions that arouse interest, and increasing trust" (DILLMAN, 1991, p. 223, our translation). In this sense, the questions were designed trying to meet the recommendations proposed by Dillman (1991) about empathy: showing consideration, supporting their values, offering a sign of appreciation, and in the demand of reducing the respondent's physical and mental effort.

In order to meet the research objectives of knowing the teachers' perceptions about their experience in the adaptation of their activities from face-to-face to remote mode, as a result of the social isolation imposed by Covid-19, we tried to treat the data supported by the ARCS modeling (KELLER, 1987). It is a motivation evaluation model based on the user's perception of the ability to maintain attention, the relevance of the content offered, the confidence in success as a result of learning activities, and satisfaction about learning. These categories serve as a parameter for instructional design of a course or planning of school activities by teachers. Table 4 demonstrates its categories and proceeds to briefly describe the motivation criteria.

Table 4 - ARCS model categories, Keller (1987)

Attention	Promoting active participation; variability; specific stimuli
Relevance	Experience; advantage; future utility; response to specific needs
Reliability	Knowledge of learning objectives and expectations for success; small levels of knowledge, learner control over knowledge; small levels of knowledge feedback
Satisfaction	Simple rewards - checking the benefits of learning;

Source: Research data. Adapted from Keller (1987)

We tried, *ex expositis*, to treat the data based on Keller's (1987) categories, modelled on Garcia's digital competencies for remote teaching *et al.* (2020).

Technical Pole

In the technical pole, from which the methodological process is segmented, is the moment of research in which the path traced and traveled in the search for scientific knowledge is exposed, a means of identifying how academic research that addresses social research is configured. The methodology used was qualitative in nature, since it is characterized by an exploratory approach, followed by the analysis of the contents found and analyzed in the PARFOR Program documents.

The methodology used for the interpretation of the documents was the one developed by Bardin (2016), structured in three phases: pre-analysis, material exploration and treatment of the results. These were also part of the inference and interpretation. In this article, as the analysis is expressed, in the constituent poles of the quadripolar methodology, these poles make up the quadripolar methodological space proposed by Bruyne, Herman and Schoutheete (1977).

It must be remembered that in order to access the status of "fact," the data collected must be pertinent to precise theoretical hypotheses, that is, they must constitute the confirmation or counterposition of these hypotheses and, ultimately, verify or falsify the theoretical systems in which these particular hypotheses are embedded. Hence,

> [...]scientific facts are conquered, constructed, verified, and their very nature is instrumented by the techniques that collected them, made meaningful by the theoretical system that produced or embraced them (BRUYNE; HERMAN; SCHOUTHEETE, 1977, p. 203, our translation).

Under the pandemic reality, we proceeded to the collection of information considered as field research, through the online format using the Google Education Platform in its App

Google Forms, enabling a quick approach to the 33 teachers of the Degree in Pedagogy of PARFOR, through e-mails and WhatsApp, where they received the links of the questionnaire, given the impossibility of contagion by Covid-19. This population portrays the PARFOR cutout in the state of Ceará. In this section, we present the answers to the questionnaire applied to teachers about their perception of their experience with remote teaching.

Regarding the first group of questions, which dealt with adaptation and management of time dedicated to work, questions 1, 2, 3 and 4, the respondents pointed to a considerable demand for student attendance, with great investment of their personal time. Although there is agreement on this point, the group is divided as to whether it sees this change in the dedication of time as positive. 54.5% understood that communication with students was improved, that it was possible to interact even better than in the face-to-face way, but 45.6%, despite having this routine transformed, did not see this situation as positive.

As far as time management is concerned, the planning and preparation of classes and activities was considered from the point of view of the demands on teachers' previous knowledge and their digital literacy. For 24.2%, preparing activities with digital resources was challenging. In contrast, 27.3% resorted to more traditional modalities of activities and assessment, as they considered their knowledge of ICTs insufficient to carry them out in a more innovative way. Likewise, 30.3% had difficulty when there was only this possibility of interaction with students. Considering also the access of teachers and students, 18.2% felt frustrated in relation to this preparation of materials. From this we can infer the notion that the challenge posed to teachers required more than adaptation to the demands of ICT activities in remote teaching.

The third question points to a re-dimensioning of the home space and the perception of the need for quality in the interaction with students. 24.2% indicate inconvenience and difficulties in treating the home space as a work environment. 12.1% show concern with the quality of classes as a result of possible noise. The reorganization of the house was cited by 45.5%. Noteworthy are the situations in which it was possible to conciliate, in the rate of 36.4% of the respondents.

Finally, in this group, the perception of the experience of remote teaching as a contribution to their training brought some elements that are worth mentioning. New professional horizons based on the competencies developed, 21.2%; perception of the permanence of ICT in the teaching activity, implying new methodologies and attitudes,

24.2%; understanding of the contributions of ICT and its requirements for better teacher training, 39.4%; and the concern with this interference in the teaching activity, 24.2%.

The second group of questions dealt with the relationship between previous knowledge and digital resources in communication with students. For 60.6% of the respondents, the skills resulting from their experience in using communication applications facilitated the interaction with students in the transition of the teaching modality. 15% of the respondents believe that their previous knowledge and the available digital devices contributed to an increase in their activities, integrating knowledge and enhancing communication with students, even satisfactorily for 12.1% of the respondents. Nevertheless, there were also experiences that did not have good effects. For 18.2%, their skills were not enough to maintain communication with the students due to their doubts and difficulties.

As far as evaluation is concerned, the interaction with the available tools was questioned, and the results point to a successful experience for most of the respondents. 51.5% confirmed that the available tools helped them to evaluate the students' development, and 9.1% helped them to clear doubts about the assessment contents and procedures. Among the difficulties encountered by the other respondents, the lack of familiarity with the tools was a hindrance to the performance of the assessments, 36.4%; and they considered the difficulty of access to the content by the students: 18.2%.

The third group of questions sought to find out the similarities and differences in the experiences of teachers regarding access to and use of digital resources for interaction with students, monitoring of their activities, and assessment. About this, the respondents point to a great contribution of the available resources to access the resources, although they mostly agree about the importance of the available resources - 85.8% of the respondents point to their precariousness, and that a small part of them had access to the available contents. On this pretext, the question was asked about the follow-up of students and their activities. 69.7% of the respondents disagree that this follow-up was compromised in terms of the teacher-student relationship. There were 15.2% neutral and 15.1% agreed with this statement. This is confirmed in the next item, where 97% agree with the idea that communication with students was essential for the course of the subject they teach and the continuity of their studies. This follow-up showed some limitations. For example, 27.3% had difficulties in monitoring the students' return on their activities, with delays in giving feedback; 6.1% had difficulties in evaluating due to the students' distance from them; and 12.1% had difficulties in giving

feedback to the students about their learning. Despite this, 63.6% of teachers were still able to use the available tools to monitor and evaluate students.

The fourth group of questions sought information about teacher training to work with digital technologies - initial and/or continued training - and the emergent situation of remote teaching. About previous knowledge 55.5% of the respondents said that their previous computer knowledge helped them to make the transition to the remote mode, while 30.35% considered it insufficient to deal with the new situation. Added to this are the initial training and preparation for the job, to which the respondents attribute some of their difficulties in thinking with technologies to design and monitor student activities, including in relation to adapting to the situation: 24.2%.

The last group of questions aimed to find out what horizons teachers perceived in the face of experiences, successful or not, with remote teaching. The changes resulting from the pandemic have brought out very significant elements about the ways in which the subject learns. This was perceived by the teachers, to the point that their perception of this aspect of student learning with technologies has changed a lot: 65.6%. Partnerships were established and there were changes in relationships with students, including group learning, for 25%. For 21.9%, impressions remained unchanged.

Regarding the perception that teachers had of themselves as a result of changes in their activities caused by the pandemic, considering that the composition of teaching knowledge takes place in the teacher-student relationship, although the praxis is not unaccompanied by a theoretical foundation - including the perspective of assigning meanings to aspects learned in the context in which their profession takes place - the experience of working in remote teaching was, exceptionally, also formative in the sense of acquisition of knowledge. In this perspective, for 30.3%, the transition to remote teaching was accompanied by a great effort of adaptation, even though the respondents had some contact with ICT. 21.2% already used digital devices for their classes. For them, the transition was smoother. For those who used multimedia kits, there was also some ease in adapting, but not without effort: 24.2%. Finally, 24.2% envisioned positive contributions to education.

Keller (1987) offers in his instructional model elements to consider how much motivation an educational activity maintains for the development of learning. In this sense, the more the activity is able to keep the attention, is relevant and foresees future usefulness, generates confidence about what is known and in relation to what is learned and, finally, brings satisfaction, such as pleasure in learning something. Observing the results in the light

of Keller's (1987) categories, it is inferred that the experiences impacted and displaced the PARFOR teachers from their "comfort zone", implying new and necessary attitudes to recompose their formative base in order to comply with the activities inherent to the teaching profession. *In alia manu*, the adaptation to the new reality carried another understanding of the teacher-student relationship, revealing new potentialities of technological mediation in learning and in the students' follow-up. The limitations about the skills in the use of ICT also point to a perception of the formative limits in which these same teacher trainers are immersed. This perception by the teachers deserves to be highlighted, since they perceive on the horizon practical and didactic transformations with the increasing insertion of ICT in the teaching activity.

From this perspective, the categories of the Garcia *et al.* (2020) model on teacher competencies for remote teaching are expressed - the relationship with students, time management, and increased use of digital resources. It can be seen that, in the action-reaction situation to which teachers were compulsorily submitted, these categories emerge as a formative problem, of adaptation and composition of the knowledge of experience.

Complementary remarks

The research proposed the analysis of the perceptions of PARFOR teachers regarding the experience with remote teaching, demonstrating the difficulties and advances that PARFOR teachers found in remote teaching regarding the use of digital devices for teaching-learning.

In the epistemological pole, the impressions are relevant and gave meaning to the research data, the mode of conception and application for data collection and formulation of information in the light of the history and evolution about the evaluation and education in the metric of programs like PARFOR in "post-facto", because the great objective was to understand what happened in this pandemic moment in the execution of PARFOR in Ceará, but the understanding of what happened until this moment of investigation concurred to the full conception of what education counts for not stopping before the unexpected.

In the theoretical pole, it was perceived that the constitution of the knowledge of teachers takes place in the field of work, where the events have repercussions in the formation of the teacher, as well as in the banking formation, being possible to confront and resize this knowledge with the realities experienced. Thus, the teacher-student relationship, the relationships woven in the contexts of teacher culture and the knowledge of their specific

training are ordered and rearranged, given the circumstances and contexts of their performance.

The mediation of the learning relationships with the insertion of the DTIC provokes an attitudinal change in the teacher, due to the possibilities of new ways of acting and methodologies for his/her activity. It is required, in this context, proficiency in the use of ICT in order to overcome its instrumental use, in search of the collective formulation of knowledge, in a more propositional and mediating performance and, under this aspect, proficiency is more connected to the skills for the treatment of digital resources in a sense of transition from artifact - object with predefined function - to instrument - object with predefined function, whose purposes meet the intentions and needs of the subject - in a process of appropriation. For this, it is necessary the development of technical skills: knowledge of digital devices, experience of use, ability to evaluate its usability and pedagogical skills: perception and understanding of the artifacts according to the teaching performance for learning purposes, in a perspective of thinking-with, rather than thinking-about these technologies, which, in the analysis carried out in this experiment happens in the experiences of the teacher.

In the morphological pole, it was observed that there is a great effort in tracing which knowledge and know-how qualify the individual about his or her level of appropriation of digital technologies, especially for educational purposes. Based on extensive research about the presence, quality, and use of digital technologies, in general, these models aim to overcome the instrumental aspect, more connected to the technicist aspects of a positivist pedagogical proposal, in search of a perception that integrates instrumental, pedagogical, social, and ethical knowledge, more connected to the experiences of the educational contexts. These models, besides tracing this knowledge, also aim to parameterize evaluations of the level of digital proficiency of teachers, education workers, and students, in order to generate data for institutions to design training projects. On the other hand, in the nature of these models, the self-evaluation of the person about his/her proficiency level according to the standards of these models is privileged, also pointing to self-training as a way to approach - and, why not, appropriate - digital technologies, according to his/her curiosity and perception of needs.

Among the models for measuring digital proficiency levels, the digital competencies for the teacher in remote education (GARCIA *et al.*, 2020) and the model (CIEB, 2019) stand out to guide the research instrument of this work. We chose to work with the model of Garcia

et al. (2020), because it is generated for higher education teachers, in the case of this research, the PARFOR and because it is based on the relational aspect between teacher and student and the management the working time, pillars of the formulation of teaching knowledge, as well as the development of skills in using digital resources sharply, which approximates the concept of appropriation in Rabardel (1995).

In the technical pole, the data analysis pointed to diversified experiences with convergences in the needs and difficulties of adapting the home space for the remote activity, implying radical changes in the management of the teacher's time; in the perception that a greater interaction with the students qualified the teaching performance; in the perception of the formative limitations that implied making the transition to emergency remote teaching difficult, bringing physical and emotional wear; in the understanding that, after this experience of massive insertion of ICTs in education, the teaching performance will no longer evade the mediation of digital technologies.

From the point of view of Keller's (1978) motivations for learning, it was perceived in the answers to the questionnaire that, as the relationships between students and teachers were strengthened and pointed to partnerships in learning, there was greater satisfaction and more perception of improvement in the teaching performance. The understanding of the usefulness of the teachers' knowledge of digital culture was also another element that positively influenced the satisfaction with the activities and the motivation to continue the work, including the follow-up of the actions. On the other hand, it was noticed a greater tiredness and weariness in the performance of activities, time management, and student attendance when the proximity with the use of technologies was lower. Especially when considering the more pronounced difficulties regarding the resources available to students and teachers.

With the research, it was observed that the emergence of remote teaching brought out the formative weaknesses of teachers and the great challenge that was to abruptly go from the face-to-face mode to the virtual one. In this essay, we focused on the teacher-student relationship, the use of digital resources, and time management, but the answers to the questionnaire reveal the teachers' tiredness and difficulty in adapting, regardless of their level of proficiency in the use of ICT. The concern with monitoring the students also evidenced the need that this relationship, often difficult, needs to be a partner, especially in the formulation of knowledge about the best use of ICT and the ways in which students learn. In this sense, the students, who are also active teachers in their schools, had an impact on the ways of dealing with the teaching work.

It was noticed the need to continue this research on important points about technology mediated teaching in relation to institutional support, the treatment of content and possible curricular resizing, internship, as well as the perception of themselves as students and teachers, which in this context run in parallel. Finally, open to the formulation of knowledge, this research points, in view of the results, to future directions on the formative situation of PARFOR teachers, mental health and teaching activity with technologies in the situation of emergency remote work and on possible resizing of pedagogical times, with the more intensive insertion of technologies.

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