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Distance Education: An Analysis of Teaching Practice According to the Assumptions About the Nature of Scientific knowledge

Educación a Distancia: Un Análisis de la Práctica Docente Según los Supuestos de la Naturaleza del Conocimiento Científico

Educação a Distância: Uma Análise da Prática Docente Segundo Pressupostos da Natureza do Conhecimento Científico

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Abstract

In this article we present a research that has been concerned with identifying teachers in a higher public institution, if they consider the different natures of knowledge when they teach distance learning classes in Biology, Physics and History. The analysis were performed through videoconferences, web conferences, didactic materials and semi-structured interviews carried out in the year 2017 and were organized from Content Analysis. It was understood with the analysis of the data obtained that, while physics teachers do not present practices and discourses that respect the nature of the knowledge of their area, the teachers of Biology consider in part the epistemological nature of

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the knowledge of this field. History teachers, however, are the ones who come closest to considering the epistemological nature of their area when they teach their subjects.

Keywords: Distance educacion. Nature of scientific knowledge. Teaching practice. Epistemological nature.

Resumen

En este artículo presentamos una investigación concluida que se preocupó en identificar en docentes de una institución pública superior, si éstos consideran las diferentes naturalezas del conocimiento cuando ministra clases en la EaD en los cursos de Biología, Física e Historia. El análisis realizado por medio de videollamadas, webconferencias, materiales didácticos y entrevistas semiestructuradas realizadas en el año 2017, fue organizado a partir del Análisis de Contenido. Se comprendió con el análisis de los datos obtenidos que, mientras los profesores de Física no presentan prácticas y discursos que respetan la naturaleza del conocimiento de su área, los docentes de Biología consideran en partes la naturaleza epistemológica del conocimiento de este campo. Los profesores de Historia son los que más se acercan a considerar la naturaleza epistemológica de su área cuando ministra sus disciplinas.

Palabras clave: Educación a distancia. Naturaleza del conocimiento científico. Práctica docente. Naturaleza epistemológica.

Resumo

Neste artigo, apresentamos uma pesquisa concluída que tem como objetivo identificar em nove docentes de uma instituição de ensino superior (IES) pública, se estes consideram as diferentes naturezas do conhecimento quando ministram aulas na modalidade Educação a Distância (EaD) nos cursos de Biologia, Física e História. A análise realizada por meio de videoaulas, webconferências, materiais didáticos e entrevistas semiestruturadas realizadas no ano de 2017, foi organizada a partir da Análise de Conteúdo. Compreendeu-se com a análise dos dados obtidos que, enquanto os professores de Física não apresentam

práticas e discursos que respeitam a natureza do conhecimento de sua área, os docentes de Biologia consideram em parte a natureza epistemológica do conhecimento deste campo. Já os professores de História são os que mais se aproximam de considerar a natureza epistemológica de sua área quando ministram suas disciplinas.

Palavras-chave: Educação a distância. Natureza do conhecimento científico. Prática docente. Natureza epistemológica.

Introduction

This article presents a summary of the results obtained in a thesis completed in 2017, whose objective was to identify, through video analyses, web conferences, didactic materials, and semi-structured interviews, if Distance Education (EaD) teachers in the areas of Biology, Physics, and History, consider the nature of the knowledge of their discipline when they teach classes in this type of teaching.

However, regardless of the modality of teaching, the teacher must understand that knowledge of different natures (logical-mathematical, physical, and social) cannot be worked in a similar way when teaching their classes. It would be incoherent for a biology teacher to deliver content without offering an efficient practical part, just as it would not make sense for a teacher of Physics to teach based only on the context of facts (NOGUEIRA, BELINI, and PAVANELLO, 2013).

Based on the aforementioned assumption, some questions regarding the teaching practice in Distance Education were timely. For example, what epistemological aspects regarding the nature of the knowledge in question can be evidenced in video lectures? Is the teachers' discourse consistent with the practice adopted in the *online* Distance Education course? From these questions, the problem of this research emerged: were teaching practices in *Online* Distance Education course in the areas of Biology, Physics, and History consistent with the epistemological nature of each of these areas of knowledge?

In order to help answering these questions, studies on the nature of scientific knowledge according to Genetic Epistemology of Jean Piaget

were carried out, which contributed to the understanding of teaching practices; among them, Assis (2003), García (2002), Nogueira; Belini; Pavanello (2013), and Saravalli; Guimarães (2010). In order to do so, teaching practices were evaluated in the *online* Distance Education course of three Physics teachers, three of Biology and three of History of the Universidade Estadual de Maringá - UEM (State University of Maringá), located in the north of the State of Paraná, in particular, in the teacher/student in this modality of teaching.

Reflections on the nature of scientific knowledge

In his research on the construction of knowledge, the Genetic Epistemology of Jean Piaget provides innumerable questions and results that are still instigators. We highlight studies that indicate knowledge is constructed in a similar way in all human beings which do not have some deficiency, being distinguished only the duration that this construction takes to occur. This cognitive development is influenced by several factors, such as social, affective and moral aspects, contradicting statements that emphasize that Piaget does not consider the social character in the construction of knowledge in the subject.

As for Genetic Epistemology, for Nogueira, Bellini, and Pavanello (2013), this science provides constructs on how concepts and scientific models were constituted in the various areas of human thought. In this sense, it is legitimate to consider that there are natures distinct from scientific knowledge, so that we must understand that the nature of knowledge, like that of Physics, differs from that of Mathematics, and this, in turn, differs from that of Sociology and Biology.

For Piaget (1981), there are three types of knowledge: physical, logical-mathematical, and social. According to Saravalli and Guimarães (2010), both physical and logical-mathematical knowledge derive from the subjects' experiences about objects. However, the first of these knowledge refers to the act of removing objects from their physical properties through empirical abstraction, while the latter is established through the coordination of the actions of the subject on the object, from the reflective and empirical abstractions. Social knowledge is the

result of social transmissions, constructed through the exchange of information between the subjects.

According to Assis (2003), the process of empirical abstraction, which bases the structures of physical knowledge, allows the subject to remove a certain property from the object, disregarding other properties that could be observed in the object. The empirical abstraction is fundamental in the structuring of physical knowledge, since it is the "abstraction of the observable properties that are inherent to the objects" (ASSIS, 2003, p.01).

The process of reflexive abstraction, which underlies the structures of logical-mathematical knowledge, has its origins in the coordination of the subject's actions, allowing the same to develop his deductive reasoning, as well as some relations between objects, such as color and quantity differentiation. In this sense, this relation is not on objects, but, rather, it was created by itself, by coordinating of its actions (ASSIS, 2003).

The third category of knowledge, according to Piaget (1981), refers to social knowledge. This knowledge is the fruit of social transmissions, in which the subject plays an active role, which corroborates the Piaget's assumptions about the construction of intelligence. In other words, in contact with the different phenomena imposed on them, the subjects seek to organize them and transform them into objects of knowledge, which are singular, since each new aspect of the social knowledge that is constructed is particular to each subject.

Contradictory to logical-mathematical and physical knowledge, in social knowledge external data are not simply imposed on the subject. According to Saravalli and Guimarães (2010), such data are taken from the social environment, interpreted, and constructed similarly to the process of assimilation and accommodation. Thus, phenomena belonging to a given social reality are understood as singular "objects of knowledge", since each individual "sees" in his own way the manifestations of the environment. Therefore, the knowledge of history, for example, involves aspects related to man in his character of socialization and cultural transmissions, thus presenting a subjective characteristic of knowledge.

As for the knowledge of Biology, which also involves aspects related to man, the subjective character vanishes, therefore, this knowledge is related to organic functioning, not needing a temporal distance to understand how some organs of our body work.

Each of the sciences, therefore, has its particularities, its concepts, and its methods to construct its theoretical body. Studies on the nature of knowledge from the perspective of Piaget's Genetic Epistemology allow the differentiation of these aspects, showing that it is not possible to construct the scientific knowledge of a certain area as a copy and methods of another. The same happens with the construction of school knowledge of the different disciplines. It is necessary to understand that the various areas of knowledge differ in their development as well as in their nature.

In this way, it is essential to understand that each scientific area has distinct objects, whose conquest depends on its own nature. It is up to the teacher to understand that each scientific area possesses objects that may be common to the various branches of science, but that, however, each one is investigated differently according to the nature of the area that constructs them.

Reflections on teaching practice in online Distance Education course

The theme "teaching practice" is the subject of several discussions among researchers studying it. With regard to teaching in Distance Education, this debate was strengthened by the introduction of this teaching modality, in particular, with developing Digital Information and Communication Technologies (DICT) and its possibilities for the elaboration of situations that could contribute to the process of building students' knowledge.

The teaching task in Distance Education poses several challenges to be overcome, fundamentally due to the specific training of each professional, resulting in a fractional teacher making. Thus, the teaching role in Distance education requires much more than mastery of the specific contents of a discipline.

Other types of knowledge are necessary for a teaching practice that considers the particularities of students of this type of teaching. Understanding the use of digital information and communication technologies, knowing collaborative and reflexive practice, as well being able of promoting debates and discussions in this new environment are fundamental for the construction of the teaching profession of Higher Education (SANTOS, 2012).

According to Mizukami (1986, apud GARBIN, 2015), the teacher should propose a learning based on the presentation of

> [...] problems to students, without teaching them the solution, with the function of provoking imbalances, to make challenges. The teacher must assume the role of investigator, researcher, and advisor. It should guide the student and grant him/her a wide margin of self-control and autonomy (MIZUKAMI, 1986, apud Garbin, 2015, p.6691).

In Distance Education, the teacher trainer must consider its pedagogical, didactic, and scientific competences to present the contents of a given discipline, in a way that respects the particularities of the Distance Education student. Therefore, he/she must be in a continuous process of reflection on his/her practice.

However, what is seen in teaching practices in Distance Education is that, in many situations, this model is "imported" from face-to-face teaching without undergoing modifications that consider the distinct nature of Distance Education. According to García (2002), the face-to-face teaching is very important for overcoming misunderstandings in the practice of Distance Education, since one can foresee situations that constitute didactic obstacles to students. Even so, the practice of face-to-face teaching should not be adapted for teachers in Distance Education, since they have particularities that are not common to both.

The teacher must be an unbalancing agent, that is, one allows the construction and reconstruction of knowledge by students. According

to Mill, Oliveira, and Ribeiro (2010), in addition to the aforementioned characteristics, Distance Education teachers must understand and mobilize such knowledge using Digital Information and Communication Technologies, be able to deal with the unique knowledge of the discipline worked, as well as aspects pedagogical aspects regarding the use of teaching materials for the teaching and learning process of students.

Hence, teachers training must include the particularities of this modality of teaching, providing techniques other than those from the traditional model. But, more than that, teachers must understand that knowledge of distinct natures (logical-mathematical, physical and social) cannot be worked in a similar way in the classroom. It would be incoherent for a Biology teacher to deliver content without offering an efficient practical part (which should also be provided in Distance Education), just as it would not make sense for a Physics teacher to teach based only on the context of facts.

Methodology

Considering the assumptions of a scientific activity, the objective of this research was to identify if the teaching practices in *online* Distance Education course in the areas of Biology, Physics, and History, consistent with the epistemological nature of each of these areas of knowledge. To achieve this goal, video analyses, web conferences, didactic materials, and semi-structured interviews were carried out.

This research was carried out with nine professors of undergraduate courses in the modality of Distance Education at the State University of Maringá (UEM), a public higher education institution in the northwestern part of the state of Paraná, three from the Biological Sciences course, three from the Physics course, and three from the History course in the 2016 school year. The teachers who collaborated with the research taught, at the time of the research, classes both in face-to-face teaching, and in distance education. To represent each teacher, the initials B, F and H were used, which represent the letters of their respective courses, with a number from 1 to 3.

The choice of these courses was made considering, in particular, the nature of each knowledge, namely knowledge of Biology, which is physical, knowledge of Physics, which is halfway between physical and logical-mathematical, and knowledge of history, whose nature is extremely social (ASSIS, 2003).

In addition, in this work, twenty-seven video lectures and nine web conferences of the Center of Distance Education (NEAD) of the aforementioned HEI were analyzed, divided into nine video lectures for each course, three of each professor collaborating in the research, and three web conferences of each course, of which a web conference of each participant of the research. In addition, semi-structured interviews were conducted with each of the nine participants of this investigation. We also considered the didactic materials provided for the disciplines, such as "handwritten" annotations that were posted in video lectures and didactic books made or not by the teaching professors of the disciplines and articles.

Due to the objective of this article to be closely linked to the analysis of the contents of the video lectures of the teachers, course materials made available in the disciplines of Distance Education mode and interviews that were carried out with them, the Content Analysis of Bardin (1977) was adopted.

To recognize the categories of data analysis, it was necessary to define registry units that were intended to contribute to the process of identification and significance of the contents analyzed. Next, Table 1, which lists the categories and the registration units in this work, is presented. These registration units were listed according to the different materials adopted for the analysis of the data of this work.

Table 1: Relationship of categories with registration units

CATEGORIES	REGISTRATION UNIT
The object in teaching conception	The object is constructed respecting the different natures of scientific knowledge proposed by Piaget (1981).
Teaching practice in Distance Education	Characteristics that indicate how the teacher acts in Distance Education, relating them to the characteristics of the nature of scientific knowledge.

Source: The author.

Results and Discussion

1.1. Category 1: The object in teaching conception

With the analysis of answers to interviews of Physics, Biology, and History teachers, regarding the manner they consider the object of their respective areas, a diversity of aspects that point to a lower understanding was observed, identified in Physics teachers, to a greater understanding, seen in Biology and History teachers.

Considering that, to build Physics knowledge, the principle of reasoning is in the action of the subject on the object (physical knowledge), but an action that is not limited to perceptual observations, but they need, in equal intensity of the same type of abstraction observed in Mathematics knowledge, that is to say, in which aspects of logical-mathematical thinking are evidenced (Piaget, 1979).

However, these two fundamental characteristics were not identified in the pedagogical practice of teachers of this area, allowing to infer that they do not consider the nature of Physics knowledge when they teach classes in Distance Education. Their practices were based on the exposition of a content in which the action of the students in an experimental investigative activity was not present. Students had to observe the presented contents, solve exercises proposed by the teachers or included in the textbook, similar to those presented in the video lectures.

Although F2 and F3 started from situations-problems to present content to students, the investigative nature of the activities was not verified. The situations proposed by these teachers were aimed at proving theory with visualization of the experiment and, from the presentation of a situation, the student verified that the experiment reflected the theory previously given.

To sum up, it is possible to infer that the Physics teachers participating in the research do not consider the construction of physical knowledge when acting in Distance Education, considering that their students are not conceived as agents facing unbalancing situations-problems.

When analyzing the construction of Biology knowledge, it is possible to observe that the experimental activity is highlighted to the detriment of the deductive activity of the subject. This means that a biology researcher does not build this knowledge without the presence of concrete objects for their study, analysis, and classification. Evidencing a consideration for these assumptions, both practices in video lectures and statements of Biology teachers were based on a conception in which the object is necessary for a teacher to build the knowledge of this area.

While physics teachers approached their contents through Laws and theories that developed halfway between experimental demonstrative activities and deductive reasoning, Biology teachers argue that without a real object for the presentation of the content, knowledge would not be constructed. In addition, they considered the use of experimental activities for the presentation of contents more important than situations-problems that would ground the principles of the area in the subject's deductive activity.

Thus, it is considered that the Biology teachers are based on the conception that, without a real object for exposition and comprehension of the subjects addressed in their video classes, Biology knowledge cannot be constructed - what allows to infer that the teacher making of these teachers is based on the primacy of the object in relation to the subject. This assertion is based on the video lectures of the collaborating professors of the investigation, in which they proceeded from an object such as a corpse, in the case of B1, or illustrations on slides, such as B2, to then perform the presentation of the contents.

As the practice of video lectures in Distance Education is carried out physically away from the students, Biology teachers have elaborated situations in which their students could have the objects of their disciplines at hand. This is the case, for example, of B1, when it suggests the making of a bovine femur for study; of B2, when he instructed students to remove vegetables from their daily lives that could be analyzed, and from B3, when he sent kits with lenses to be used in investigative activities by students.

In this way, Biology teachers' awareness of the need for laboratories and experimentation to build their respective subjects' knowledge, led them to effectively devise strategies so that their students, even physically distant, could understand everything the process of structuring the knowledge of this area, which was not observed among Physics teachers.

In short, it can be inferred that Biology teachers considered the process of knowledge construction when acting in Distance Education, since they conceived the primacy of the object when approaching the contents of their disciplines. More than that, they understood that experimental activity is a fundamental factor in this area and, therefore, they devised strategies allowing their students to have contact with the concrete object and, consequently, carry out experimental activities in their houses or centers.

Building History knowledge has a character that other previously analyzed knowledge do not: subjectivity. This is what guarantees that a historical fact can be analyzed according to different theories. For example, to identify the factors that led to the end of slavery in Brazil, B1 presents several approaches, each investigating factors that have interfered in society at that historical moment. In this sense, the narrative role of this science is abandoned, assuring its investigating and analyzing character of the facts.

In the interpretation of the discourses of these teachers, we identified that all presented very close conceptions regarding the construction of the knowledge of History. In the semi-structured interview, while H1 highlighted the idea that a same historical fact can be interpreted according to different theoretical lenses and H2 emphasized man as a social object of study, H3 presented the conception that a historian should not be attached to the narration of facts, but rather to the analysis of the different bibliographic sources to construct an interpretation of the investigated situation.

Lectures and practices of History teachers are consistent with Granger's (1994) statements, for whom the historian's role is not to describe historical facts as a narration of a text, but to perform an analysis

of facts according to the context to which they are inserted, such as society, politics and economics.

In short, teachers of this area consider that man is a historical and social being, and that, therefore, all knowledge is amenable to an analysis free of judgments and value judgments.

Category 2: Teaching practice in Distance Education

In the context of the teaching practice in Distance Education, it was observed that, while physics teachers did not consider students of this modality when lecturing, Biology and History professionals presented oscillating behaviors with regard to the peculiarities of their students. While B1, B2 and H3 did not conceive the specificities of Distance Education students, teachers B3, H1 and H2 performed practices that demonstrate their understanding of the construction of knowledge in their respective areas.

At the beginning of the discussion about the teaching practice in Distance Education, we highlight the behavior of physics professionals, who perform their teaching without considering the assumptions of Piaget (1981), which establishes that this branch of knowledge rests on experience, requiring a start from a practical experimental activity, so that, through deductive reasoning, it is possible to generalize the data analyzed.

However, when analyzing videoconferences, web conferences and semi-structured interviews, it is possible to observe that while F2 and F3 considered demonstrative problem situations as the principle of their video lectures, F1 started from the theory and then performed the largest amount exercises and examples of a certain content.

Thus, these teachers did not understand that, for the construction of Physics knowledge, it is fundamental to start from an investigative experimental practice, whose proposed problem is provided by the teacher, in such a way as to instill their students in an investigation of the proposed situation. When considering the distance modality, when proposing an experimental investigative practice, the teacher can seek the solution of the problem with the student, based on questions presented.

The model of teaching practice presented by the Physics teachers considered the student as the one who reproduces exercises performed in the classroom or the one that resolves tasks presented in textbooks whose nature of them is based on the verificationism of the theory approached. Experimental investigative practices that instigate critical and creative spirit of students were not part of the practices of these teachers.

However, when analyzing the teaching practice of biology teachers, we could identify that these teachers understand, in part, the nature of the knowledge of their area. This is due to the fact that B1 and B2, even conceiving the primacy of the object in the construction of this knowledge, misunderstand the concept of experimental activity, considering it to be synonymous with experimental practices that prevail for the verification of the contents already presented.

Unlike B1 and B2, B3 practices seemed to take into account the particularities of EaD students, as they performed them in a variety of environments, such as laboratories or gardens. In addition, students were offered investigative experimental activities that could be carried out at the centers to which they were attached.

Another relevant aspect of the practice of these teachers refers to the exposed in their interviews, that all seemed to consider previous knowledge of students. In fact, when analyzing the interview of Biology teachers, a concern was identified about the concepts that students bring from High School to then present a practice that considers their previous knowledge. However, when analyzing this teaching, we could observe a dichotomous discourse in front of what was done in the video lectures. There were no moments during the classes by these teachers when the previous knowledge of the students were considered. Moreover, videotapes were performed according to an exposition of the contents, in which it was up to the student to observe the slides or the experimental activities carried out in HEI laboratories.

History teachers presented a different behavior. These explained in interviews that they considered the previous knowledge of the students when in their lectures in Distance Education. When analyzing how the video lectures of these teachers were presented, H1 and H2 performed

them as stated during the interviews. Both were based on questions asked the students to then discuss the contents related to the discipline taught. It was, therefore, a practice that surpassed exposition of contents, prioritizing discussions and debates with students about historical facts that present a multiplicity of interpretations.

Thus, video lectures of Biology and H3 teachers did not consider the previous knowledge of the students of Distance Education, besides that, with the exception of B3, the other Biology teachers did not even propose situations that considered the distinct nature of the teaching modality. Consistent with this characteristic, the statements presented by B1 and B2 during the semi-structured interview were based on their experiences with face-to-face teaching. Like physics teachers, the answers presented by B1 and B2 did not seem to consider Distance Education students, always providing examples of their practices and concerns in face-to-face teaching.

Differently from these behaviors, B3 seemed to consider the students of this modality, since, in addition to performing experimental practices in different environments, it sent to centers a large quantity of slides, materials, and reagents, so that they could carry out the experiments proposed in investigative scripts. This is another distinguishing characteristic of this teacher in relation to the others, since, while B1 and B2 presented practices with descriptive scripts, B3 provided all the material, as well as opportunizing scripts for the experiments that abandoned the verificationist appeal.

With regard to History teachers, from video lectures, web conferences and semi-structured interviews carried out with them, it was possible to observe different behaviors, in relation to the practice in Distance Education. While H1 and H2 considered the nature of knowledge in this area, understanding it as the one that allows interpretations of historical facts, contradicting the lines of common sense, whose belief is based on the narration of events, H3 grounded its teaching in exposing ready and finished content, presenting the conception that its speech was the absolute truth about the subject.

Therefore, both H1 and H2 considered the particularities of Distance Education students. This is due to the fact that they formulate questions

that, although physically distant, allowed students to construct knowledge from proposed investigations and concerns. This is, therefore, the main awareness that a teacher in Distance Education must possess.

Consider that the student of this modality must be autonomous, builders of themselves, as the one who is the main actor of the construction of knowledge. The same behavior is not observed in H3, since, in spite of claiming to consider the knowledge that the students bring when they practice, what is identified, in fact, is an exposition of facts in which they are not considered worries and doubts that the students have. In this sense, what happens in the speech and practice of H3 is the occurrence of a disparity between its principles.

Another interesting aspect in the analysis of teachers of this area refers to their statements regarding the difficulties in teaching in Distance Education, due to the lack of specific training to act in Distance Education. Factors such as the difficulty in dealing with DICT or feedback from students in this modality were the most common factors observed in the discourses of these teachers.

Because they do not have a specific teaching training to work in Distance Education, Physics, Biology, and History teachers, collaborators in this research, base their practice on their experiential knowledge of face-to-face teaching. The conception that acting in face-to-face teaching enables quality video lectures in Distance Education cannot be understood as a rule.

Final Considerations

With video lectures, web conferences, semi-structured interviews, didactic materials provided by NEAD, and teachers of the Biology, Physics and History courses, it was evident that the character related to experimental practice needs to be understood, in addition to that restricted to the display of expository activities. Practices that allow the construction of a critical spirit of the students should be considered by the teachers of Distance Education. For this, an epistemological study about the construction of the knowledge of their respective areas is necessary for the professionals who work in this modality.

Although they did not present specific training to act in Distance Education, it was possible to observe behaviors such as those of B3 and H2, which surpassed an expository content practice, either by providing didactic material for students to carry out research activities at their centers (B3) questionnaires to subsidize the planning of their classes, considering the previous knowledge of the students (H2) and, thus, due to the experiential knowledge of the teachers, observing behaviors that surpass the expositive practice.

The other Biology teachers and all of Physics teachers were based on examples and affirmations, considering essentially face-to-face teaching, neglecting aspects related to Distance Education. The analysis of the pedagogical trajectory of these teachers demonstrates that their practices are presented as a copy of face-to-face teaching, not considering the peculiarities of the teaching and learning process of this type of teaching.

In view of this scenario, it is possible to infer that the lack of training and understanding of a teacher who works in Distance Education brings consequences to the teaching and learning process of the students, materializing in a fragmented, decontextualized, and, sometimes, too difficult. Thus, the deep understanding of the nature of scientific knowledge is fundamental for the organization and structuring of the theoretical and methodological content and teaching practice for teaching, especially the Distance Education.

However, this understanding alone does not guarantee teaching based on the specificities necessary for distance education. The complexity involved in Distance Education requires the subjects involved in the teaching and learning process of this modality particularities. From the teacher trainer, our object of study requires both the understanding of the nature of knowledge and a training that conceives the specificities of this teaching modality.

Thus, it is emphasized that a teaching practice that goes beyond the mere exposition of the contents for its later reproduction is possible, even in Distance Education. The teacher makes it possible, through the discussion forums, to identify and understand the doubts of his

students. From this point, it must consider situations-problems that allow the creative and thinking act of the student.

Through this article, the difficulties for the changes in practices involving Distance education and the conceptions of the teaching and learning process based on the experience with face-to-face teaching are clear. The necessary transformations present great challenges, mainly because it involves changes of conceptions that require a great effort of the teacher trainer, since it involves the construction and reconstruction of knowledge, besides the understanding and extension of the teacher/student relationship.

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