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Research as an Articulatory Means of the Relationship Science, Technology and Society in the School Context: One Proposal for the Initial Years of Fundamental Education

Mariane Eliza Weinert
(Ponta Grossa City Hall, Teaching Group Teaching Language and Cognition (UTFPR Campus Ponta Grossa))

Abstract: This study aimed to highlight the research as a means of intervention in the school context in a CTS approach in the initial years of elementary school. It was tried to emphasize the teaching of sciences as contextualizing means of the student's reality. It was also highlighted the importance of research as a tool for understanding the school environment. Through this study it was possible to perceive that a proposal of teaching involving science, technology and research can yield good results in the intervention of society, even if carried out with students in the first years of school, in order to involve them in understanding the situations of their day to day, seeking possible solutions through the research.

Key words: science teaching, research, early years of elementary education

1. Introduction

Society evolves as the scientific and technological discoveries are present in its daily life. People have become dependent on such artifacts so as not to dispense with their use in the simpler tasks of their day-to-day life.

However, with such evolution, people are faced with the consequences of the misuse of science and technology. The present moment demands reflection on the benefits and harms arising from them. From this perspective comes the CTS teaching, whose objective is: building a "science for people" implies fertilizing scientific knowledge with other knowledge, overcoming the epistemological obstacles that prevent the construction of a new object of knowledge and its necessary interaction with the subject and establishing the appropriate epistemological basis for thinking CTS joints. It requires recognition of the need for science to find a balance between ability to act and ability to predict (Santos, 2005, p. 146).

Given the importance of this approach, some changes in educational terms are necessary to make it effective; after all, the CTS proposal requires the involvement of all education actors in the search for a society more conscious of their attitudes.

And this change must start already in the first years of school, after all it is of the utmost importance that the

Mariane Eliza Weinert, master's degree in science and technology education; Professor of Ponta Grossa City Hall, member of the teaching group Teaching Language and Cognition (UTFPR Campus Ponta Grossa); research areas/interests: education. E-mail: marianeeew@gmail.com.

child recognizes himself within the context in which he is inserted and thus act critically in his reality. After all, it is essential that learning be contextualized.

Facing this, the need to understand some positive or negative situations or phenomena that occur in the students' lives and that are part of the school context related to science and technology is justified. And a proposal for the understanding and possible solutions to these events that indirectly affect the pedagogical practice, is given by the encouragement of research, after all according to Raush Schoeder (2010) "From this, the child creates and recreates the things that surround him, beginning a process of identification of thinking human beings, initiating a process of transformation of their reality."

In order to identify a social problem in the school context due to the unconscious use of science and technology, it is necessary to understand how research in a CTS approach can intervene in the school context in the initial years of elementary education.

Thus, as possible results, this research aims to encourage research in the classroom everyday, as a facilitating means of access to information corresponding to problems in the day to day school, their understanding, as well as possible solutions for them.

2. The Teaching of Sciences as a Means Contextualizer of Student Reality

When it comes to education, many are the peculiarities that exist to make it happen effectively. Faced with such complexity, it is fundamental to adopt methods and didactics that stimulate a learning that is consistent with the daily life of the student, with the purpose of making knowledge valid.

In this challenge of making teaching and learning pleasant moments in a classroom, the teacher plays a fundamental role, because it is up to him to motivate and demonstrate through a consistent planning, that it is possible to exist a correlation between the educational contents and the events of daily life, especially with regard to science teaching.

In teaching science, it is necessary for the educator to be aware of the importance of practical demonstrations in understanding the concepts corresponding to this area. After all the use of experiments allows a more concrete visualization of a certain situation that may be demonstrating a natural phenomenon.

Considering the educational process, it is perceptible that it undergoes changes as science and technology evolve. Faced with such an evolution, it is inconvenient that the pedagogical practice remains based on traditional models, after all is noticeable the need for a new concept of teaching, consistent with the reality of the student. In this perspective, "increasingly, there must be a new school that can accept the challenge of change and meet the needs of training and training on new bases" (Kenski, 2007, p. 51).

And this change occurs from the moment the strategies adopted in the school environment are consistent with contemporaneity. This means that teaching in the actuality means going beyond the mere transmission of content to seek a greater breadth with respect to understanding the world in which we live, recognizing its problems and then seeking possible solutions for them. Considering this need is that the importance of science teaching in this process is recognized, after all: To show Science as a knowledge that contributes to the understanding of the world and its transformations, to recognize man as part of the universe and as an individual, is the goal that is proposed for teaching the area in the elementary school. The appropriation of its concepts and procedures can contribute to the questioning of what is seen and heard, to the expansion of explanations about the phenomena of nature, to understanding and valuing the ways of intervening in nature and using its resources, for understanding of the

technological resources that perform these mediations, to reflect on ethical issues implicit in the relations between Science, Society and Technology (Brasil, 1997, p. 21). In this sense, teaching science in the current context requires a breakdown of paradigms, seeking a new way of educating, that focuses not only on the intellectual aspects, that is, knowledge per se, but on the interconnection of concepts assimilated in school, with life of the learner, in order to enable an effective and true teaching that corresponds to the daily life of the main actors of the educational process: the students. Therefore: It is imperative that the teacher recognize that the student is the subject of his/her learning, that is someone who practices the action, but not any action, learning is built in the interaction of this subject with the world in which he lives (Ramos, 2008, p. 302). And this interaction must occur from the earliest years of teaching. However, it is known that in the case of children the challenge to the stimulation of scientific learning is even more complex, considering the obstacles that do not allow its implementation in an efficient way. However, it is known that: Thus, all individuals should receive a minimal training in the natural sciences for their cultural formation, since scientific knowledge is a constituent part of the culture constructed by humanity (Ovigli, 2009, p. 1597). However in the initial years the focus of teaching is mainly for linguistic and mathematical literacy, which does not allow a prominent focus on the aspects related to science, causing in many cases a lack of stimulation for this area by the teacher. Faced with this problem, it is necessary to be clear that: The encouragement and development of scientific knowledge is necessary because it provides the student with a better understanding of the scientific evolution, of the transformations that occur in the nature and history of man (Carmo, 2007). And this encouragement to the development of scientific knowledge is based on the Law of Guidelines and Bases of Brazilian National Education 9.394/96, in Article 32, when it emphasizes the need of II, “the understanding of the natural and social environment [.. .], technology. The PCNS of Natural Sciences also focus on the essentiality of teaching sciences in the initial grades, when they emphasize that: Science and technology are present in the daily lives of citizens through their impacts and consequences, as well as the products we consume. For those who consider education as an indispensable tool for exclusion not to happen and for students to face the obstacles of illiteracy, basic information becomes essential, since scientific literacy is continuous and runs through school (Brasil, 1997, p. 4). Considering the importance of encouraging the teaching of science as a promising development of scientific knowledge, the essential role of the teacher in the teaching and learning process of this and all areas of knowledge is recognized, and it is regrettable that in many cases he does not to pay due attention to the scientific aspects of his classes, since due to its large dimension, science teaching can be considered as a cultural element: Natural sciences, therefore, need to be understood as an element of culture and also as a human construct, considering that scientific and technological knowledge is developed on a large scale in today’s society. The pedagogical practice, therefore, should make possible, beyond the mere exposition of ideas, the discussion of the causes of the phenomena, the understanding of the processes under study, the analysis about where and how that knowledge presented in the classroom is present in the lives of the subjects and, where possible, the implications of this knowledge in society (Ovigli, 2009, p. 1597). In this cultural perspective, the progress of scientific thought in the initial years must occur according to the abilities and potentialities of the students in relation to their ages and series in which they are inserted. This is not to say that it is not possible to carry out consistent and truly valid activities because: In teaching science to children, we should not be concerned with the precision and systematization of knowledge at levels of the rigorousness of the scientific world, as these children will evolve to reconstruct their concepts and meanings about the phenomena studied. The key in the process is the child being in touch with science, not referring this task to more advanced school levels. The child's contact with the scientific world, even if adapted to its language, can be justified in

terms of the child's need to approach the situations experienced by the child, whose curious and investigative nature allows him to explore natural phenomena as well as artifacts and products derived from the technological world, which are strongly identified with physics (Rosa, 2007, p. 362). The teaching of science for children has its peculiarities especially considering the age group of the students involved, however through some adaptations mainly in terms of language, this can be merely fulfilled. In seeking to overcome these particularities, it is essential that the teacher be clear that science and technology play a fundamental role in people's lives and can contribute to various social aspects. And these contributions can be present in a perceptible way from the first years of elementary school. Therefore, it is worth highlighting the relevance of teaching science to the children, thus promoting the learning of scientific knowledge, as well as the interaction and understanding of the environment in which they live, thus making the student an active and participant in the change of society in which he lives.

3. The Research as a Tool for Understanding the School Environment

Faced with the need to teach science in a current perspective, it is evident the importance of changing the pedagogical practice in the early years of elementary school. After all, in order for the learning to take place effectively, it is important to contextualize the contents taught. And this unfortunately does not fit the reality of the classroom, after all in many cases the pre-established curricular matrix at the national level is followed so inflexibly that it does not consider the particularities of regionalism and also the peculiar situations that affect each neighborhood or school community. The textbooks are used as an exclusive source of knowledge, followed strictly without questioning the information there. If this fact is considered, the formation of the critical and questioning citizen does not happen in a passive perspective in which a sequence is followed and no attempt is made to relate to students' world knowledge and social life. It is in this proposal that the importance of working with research from the earliest years of teaching is recognized. In this proposal, DEMO (2006) states that "Demystifying research, must mean, then, the overcoming of current conditions of overcoming conditions of reproduction of the disciple, commanded by a teacher who never exceeded the condition of the student." And in this paradigm-shifting process, the student is no longer considered merely a receiver of information, but rather an act that is part of the construction of his learning, seeking what he does not know and perfecting the pre-existing knowledge. In this sense, it is fundamental to consider the reality that the student is inserted, so that the learning occurs in a contextualized way. Thus the school is all the time contributing in the incentive to research, after all: It enables us to reconstruct knowledge, to become knowledge-producing beings. It refers us to interests such as curiosity, motivation, participation, questioning, doubt, experiencing in practice the whole process of knowledge production (Raucsh, Schroeder, 2010, p. 317).

Therefore, the student's formation in school becomes more comprehensive from the moment he encourages him to seek the unknown, in order to motivate him to question the reality in which he is inserted. Thus, it is important to identify research as an essential instrument of teaching and learning, since pedagogical practice consists of this link. That is why: Research, therefore, is related to the act of teaching and learning; when both occur, it is because the research was present, both on the part of the student and the teacher, since both ask questions, inquiries and findings during the process (Oligurski, 2010, p. 255). And faced with this proposal of mutual learning between teacher and students, by questioning their reality, it is essential to realize that the search for solution to some inquiry requires an exit from the process of stagnation of the subject in relation to a single

source of information and knowledge. It is necessary to go further, because according to Xavier (2009) "Research is the search for knowledge from various sources, analyzed under different aspects, both to learn and to expand knowledge".

This expansion of information that will be transformed into knowledge through research adds to the world view that the student possesses. Therefore, it is necessary to always consider, initially, the pre-existing concepts of the learner so that research as an instrument of access to knowledge can actually contribute to the passage from common sense to scientific knowledge. Thus, it is possible to perceive that contemporaneity is accompanied by complexity, since it is impossible to consider an area of knowledge alone, without making the due relationship that contextualized education requires. Faced with this, it is necessary to think of education not only the margin of the intellectual aspects of school subjects. It is important that education maintains a link with students' cultural lives Given this need, it is important to be clear that cultural, scientific and technological advancement will only be possible through education. In this way, it is fundamental that everyone is involved in this process, since the transformation of the school is a complex task, when a democratic education is sought. Considering this perspective, it is important to stimulate, to contribute to a more lively and attractive education, beyond the simple imposition of knowledge, contributing to the formation of students who are active in the construction of a more critical society.

4. Final Considerations

Joining a CTS proposal requires change. And this is not restricted to methodologies or didactic resources, that is, it is necessary to change the way of thinking and action in the pedagogical directions, aiming at the reflection of the teaching and learning processes. Facing this need is that the importance of the adequacy of the perspective of basic concepts to be assimilated by the students of the initial years of elementary school, which still remains in old patterns, is not important, focusing science and technology as aspects referring to the reality of all. In addition, another aggravating factor to be considered is the lack of research incentive already in the early school years. It is considered the scientific work of access to information unnecessary due to the young age of the students involved. However, considering the limits of the students, excellent research can be done that can add results mainly to the children's lives. The union of the CTS proposal to work with research stands out essentially for involving students as future scientists in the resolution of situations that affect their lives and that cannot be so easily understood if they are not investigated by those who make up the reality in which they are inserted. So connecting science, technology and research in working with children is a way of transforming society seeking a better world to live.

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