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Conceptions of the importance of Science Education in basic education by undergraduates of a Rural Education Degree course

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ABSTRACT. Education seeks to follow scientific and technological changes, in order to provide a critical formation of the subjects. Teaching of Natural Sciences is essential for students to interpret the world and be active citizens in society. Rural students also need this critical training. Thus, our objective is to analyse the conception of the importance of the Teaching of Natural Sciences in Basic Education of undergraduate students of the Course in Education in the Field of the Federal University of Goiás/Regional Catalão. For the integral training of the target audience subjects of rural education, is perceived the need for a differentiated initial training, which guarantees the undergraduate students to become critical subjects. This work starts from a qualitative research that used questionnaires for data collection, being applied to nine undergraduates, about to obtain licensee degree. They believed that Science Education is important for Basic Education, as it provides knowledge that allows the understanding of the world and the responsible and active performance of students in society. During their training, the undergraduate students reported that they had the opportunity to experience the contextualization of scientific knowledge, enabling them, for a quality teaching, in order to also train students in rural education in a critical and contextualized way.

Keywords: Science Education, Rural education, Teacher Training, Criticity.

Concepções da importância do Ensino de Ciências na educação básica por licenciandos de um curso de Educação do Campo

RESUMO. A educação busca acompanhar as mudanças científicas e tecnológicas, de forma a proporcionar uma formação crítica dos sujeitos. O Ensino de Ciências da Natureza é fundamental para os educandos interpretarem o mundo e serem cidadãos ativos na sociedade. Os alunos do campo, também necessitam dessa formação crítica. Assim, objetiva-se analisar a concepção da importância do Ensino de Ciências da Natureza na Educação Básica de graduandos do Curso de Licenciatura em Educação do Campo da Universidade Federal de Goiás/Regional Catalão. Para formação integral dos sujeitos público alvo da Educação do Campo percebe-se a necessidade de uma formação inicial diferenciada que garanta aos licenciandos se tornem sujeitos críticos. Este trabalho parte de uma pesquisa qualitativa que utilizou questionários para a coleta de dados, sendo aplicado a nove licenciandos, prestes a se formarem. Estes acreditavam que o Ensino de Ciências tem importância para a Educação Básica, ao proporcionarem conhecimentos que permitem a compreensão do mundo e a atuação responsável e ativa dos alunos na sociedade. Durante sua formação os licenciandos relataram que tiveram a oportunidade de vivenciar a contextualização do conhecimento científico, habilitando-os, para uma docência de qualidade, de modo a também formarem alunos da Educação do Campo de maneira crítica e contextualizada.

Palavras-chave: Ensino de Ciências, Educação do Campo, Formação docente, Criticidade.

Concepciones de la importancia de la Educación en Ciencias en la educación básica por licenciantes de un curso de Educación Rural

RESUMEN. La educación busca acompañar los cambios científicos y tecnológicos, a fin de proporcionar una formación crítica de los sujetos. La enseñanza de las ciencias naturales es esencial para que los estudiantes interpreten el mundo y sean ciudadanos activos en la sociedad. Los estudiantes rurales también necesitan esta capacitación crítica. Por lo tanto, el objetivo es analizar la concepción de la importancia de la Enseñanza de las Ciencias Naturales en Educación Básica de estudiantes de pregrado del Curso de Educación Rural de la Universidad Federal de Goiás/Regional Catalão. Para la formación integral de las asignaturas destinatarias del público de educación rural se percibe la necesidad de una formación inicial diferenciada que garantice que los estudiantes de pregrado se conviertan en asignaturas críticas. Este trabajo es parte de una investigación cualitativa que utilizó cuestionarios para la recopilación de datos, que se aplicaron a nueve graduados, a punto de graduarse. Estos creían que la educación científica es importante para la educación básica, ya que proporcionan conocimiento que permite la comprensión del mundo y el desempeño responsable y activo de los estudiantes en la sociedad. Durante su capacitación, los estudiantes universitarios informaron que tuvieron la oportunidad de experimentar la contextualización del conocimiento científico, lo que les permitió, para una enseñanza de calidad, con el fin de capacitar también a los estudiantes en educación rural de una manera crítica y contextualizada.

Palabras clave: Enseñanza de la Ciencia, Educación Rural, Formación del Profesorado, La Criticidad.

Introduction

We live in a dynamic world, characterized by constant updates and transformations, where everything is in a constant process of change and improvement. We do not handle with a perspective of absolut and unquestionable knowledge, but one influenced by the globalization, the scientific and technological evolution, besides multimedia and the concept of processes. Everything happens on a space-time tissue and the world is simultaneously informed, interacts and reacts, compatible with its concernments (Silva, 2010). In this transformation process one can find the Education, specially the Science Education, on which day after day, a new discovery is reported: "Science is a complex activity, historically and collectively built, that influences and is influenced by social, technological, cultural, ethical and political reasons". (Andery *et al*., 2004, p. 24).

In this point of view, the teaching-learning process must follow these transformations and knowledge of Natural Sciences is fundamental to interpret our actual world. Facing that, the Science Education would not be useful only to support student to comprehend the world, but also to add other ways to interpret it, so student can handle scientific knowledge and build a critical and collaborative consciousness.

On that sense, in Science Education, one should work with scholar scientific content and its conceptual, interdisciplinary and contextual relationships, always observing student evolution (Vygotsky, 1991). Considering Chassot (2010), Science Education is important for a person into a school training process, among others, by the fact that this knowledge gives to a citizen, basic information and expertise to analyze and judge science and technology, using good arguments, besides ambiental concernment (Chassot, 2010).

Science Education refers to a field of knowledge and a group of activities that offers a scientific view of real world and develops reasoning capabilities even on tender ages ... Elementary schools have the social role to put its children on contact to a knowledge called scientific knowledge. (Arce, Silva & Varotto, 2011, p. 9).

The Common National Curricular Basis (BNCC) (Brasil, 2018) points that learning natural sciences goes beyond to learn conceptual content. BNCC also invokes the discussion of the role of scientific and technological knowledge on social organization, ambiental issues, on human health and cultural construction, in other words to analyze the relationships

between science, technology, society and ambient (CTSA approach). In this sense learning process must prioritize the application of this knowledge into the student's life, directing to a protagonism of the individual, when facing daily issues (Brasil, 2018).

But how to implement Science Education on elementary and high levels, in a way it can permit student to interpret the world in a critical and responsible way, if we do not modify teacher's *praxis.* Bizzo (2009) emphasizes that the crucial point for teaching is to recognize the possibility of understanding scientific knowledge and its importance in the training of our students, once it can effectively contribute to its improvement. So, the scientific knowledge combined to Science Education can construct relations, citizenship, responsible both consumers and technology users (Viecheneski & Carletto, 2012).

In Brazil, the Science Education was influenced by the relations of power stablished between scientific institutions, by the education's role on spreading that knowledge and by the conflict between old and actual careers, "resulting from new job relations raised on contemporary societies, focused on information and consumption". (Marandino, 2005, p. 162). Mandarino (2005) affirm that the scientific knowledge spread is characterized by huge challenges and clashes, especially on polemics regarding Science Education objectives. Considering the National Curricular Parameters – PCN (Brasil, 1997) Science Education is to observe, to experiment and to build. Is to make the student feel yourself and know the world where we live, understanding and respecting the life and executing the received knowledge to preserve the life.

The education offered to countryside citizens, as well as the offered to city citizens, also lacks a critical scientific literacy to students residing the countryside (Marandino, 2005, p. 162). Countryside Education, originated into the social movements struggle, clearly brings the intention of the development of an equalitarian society with social justice (Molina & Freitas, 2011). So, in regard to Science Education into Countryside Education is important that "… the future countryside teachers learn to teach life sciences, based on student's experience and significance context of the community where they live and teach". (Lima, Paula & Santos, 2009, p. 114). But, to teaching-learning process can make sense to students, its need overcome the traditional teaching vision, supported on transmitting and receiving its contents and incite

students to think about societies issues, starting from a scientific knowledge basis.

To Britto (1994), when studying science topics, it is important that the teacher conduct the student, not only to realize changes in nature, but to feel the effects that can influence people's life. Frigotto (2011) points the Countryside Education, due to its origins and specially experiences into MST (a social movement focused on agricultural lands distribution) settlements, is joined to pedagogical practices that "… do not start on school, but on society, and back to itself, where school is a fundamental space" on relations between the knowledge raised by social practices and the scientific knowledge.

To guarantee a change on the way to teach sciences, we must to change the earlier phases of teacher formation, starting from the discussion on methodologies and didactic resources that guarantee teaching-learning process, until discuss Countryside Education specificities. In this sense:

To form teachers of sciences not only for acting at countryside, using it only to contextualize its instruction, but to act on the Countryside Education – effectively considering its principles, specificities and demands – requires a compulsory articulation between the consolidated Education field, the Science Education and the emergent Countryside Education (Brick et. al., 2014, p. 30).

Starting from this reflection, the objective of this work is to present conceptions from undergraduate students of the graduation course on Countryside Education of the Federal University of Goiás, Catalão Campus (EDUCampo/UFG/RC), habilitation in natural sciences, about importance of Science Education on basic education, specially Countryside Education, as well as the need of a unusual initial formation in order to guarantee the countryside students become a critic subject environmentally responsible. Those undergraduate students, as future elementary school science teachers (6º to 9º period) and also biology, physics, and chemistry into high school (1º to 3º period), were led to think/problematizing about the role of this area on the critic and reflective formation of its future students.

The graduation on Countryside Education and Science Education

Graduating on Countryside Education is intended to prepare educators to a "… integral professional practice offering professional conditions on management of teaching learning processes that happens into school and around it" (Lopes & Bizerril, 2014). In this

context, the graduation course of Countryside Education has an important social role, because it arises from decades of struggle fought by social movements:

A struggle that goes beyond agrarian reform, because to have a land reform, it is important to have a reform in education and in the countryside, a portion that has always been excluded from quality public education: people have the right to be educated where it lives; people has the right to access an education thought from their place and with their participation, linked to their culture and their human and social needs (Caldart, 2002, p. 18).

The training by knowledge area, interdisciplinary and alternating between community times and school/university times (pedagogy of alternation) comprise the set of elements that defines the guidelines to graduation in Countryside Education, that refers to the needs of establish reflections and dialogues, about limits and possibilities, of consolidation of these guidelines onto the scope of teacher formation and actions in countryside schools (Britto & Silva, 2015).

In university time (UT) students attend classes and other academic activities on university scope and on community time (CT) they develop works on communities that starts from its diagnosis, approximation between schools, classrooms, until communitarian projects intended to reach the integration between school and community (Brick *et al*., 2014).

In this sense, on 2014, after being selected on PROCAMPO (Support programme to Graduation on Countryside Education), the special academic unit of education of Federal University of Goiás/Catalão (UFG/RC) starts the elaboration of the graduation course on Countryside Education of the institution.

The course's main objective is to promote Teacher's Formation to act on middle and high school, giving to graduate student a licentiate degree on Countryside Education – licensed in natural sciences (Federal University of Goiás, 2017). Also, the course is focused on qualify educators to interdisciplinary teaching, on natural sciences, into countryside schools and management of primary school processes into same institutions.

Thus, Countryside Education is configured in the Brazilian education scenario as a process in constant mutation, in order to consider particularities, present in countryside and consequently permeate the process of teaching and learning of the countryside subjects. In Countryside Education, the Science Education has its specificities when compared to other teaching modalities. According to Lima (2010, p. 45), it is important that "... future

countryside educators learn to teach life and natural sciences based on contexts of experience and meaning of students, on communities in which they live and teach". The culture and relationships these subjects establish with the land, requires that these meanings and signifiers be incorporated into the class planning (Enisweler, Kliemann & Strieder, 2015). This will occur through initial teacher formation that allows them to deal with these specificities present in their training process.

Methodology

This work presents a qualitative research that has in this core questions about Science Education on initial training of the graduation on Countryside Education of the Federal University of Goiás/Catalão Regional (EDUCampo/UFG/RC). This work is a part of a graduation work and was executed at UFG/RC. Participants were students from the first class of the course on its last semester.

Regarding the qualitative nature of this work, Bogdan and Biklen (1994) affirm that a qualitative research aims to analyze the phenomena in all their complexity and in their natural context, concentrating the comprehension from the point of view of the investigated subjects. Martins (2004) also states that qualitative research is important because it allows to collect evidence about the topic addressed in a creative and intuitive way, once there is a proximity between researcher and researched, allowing the understanding of beliefs, traditions, in a maximum intertwining with the object under study.

The instrument used to obtain our data was a questionnaire. It is noteworthy that this tool was applied to the first undergraduate students of the Degree Course in Rural Education (EDUCampo/UFG / RC), who at the time of the research were in the process of graduating, aiming to investigate how Science teaching is been conducted in the early stages of the course. The questionnaire had both open and closed questions. We opted to use this methodology because we believe that it would provide freedom to the subjects to express their opinions about matter in question at the right time for each one, once all the participants were employed during the day and, at night they dedicated themselves to the classes, which would make more difficult to use interviews, which would require common schedules between researcher and subjects.

For Gil (1999, p. 128), questionnaires are investigation instruments that, through a high number of written questions, aims to "the knowledge

of opinions, beliefs, feelings, interests, expectations, experienced situations, etc.". Some advantages of using a questionnaire to collect data includes: a) It implies less expenditure on personnel, once it does not require researchers training; b) Ensures anonymity of responses; c) It allows people to answer it at a convenient moment; and d) It does not expose researchers to the influence of the interviewee's opinions (Gil, 1999).

Nine students among the 10 (ten), who are graduating (students in the last semester of the Course), of the EDUCampo/UFG/RC have answered the questionnaire. The majority (90%) were female and only one (10%) male, aged between 32 and 57 years old. To guarantee the anonymity of the participants, identification codes were created, the letter L followed by numbers ("1", "2", etc.) was adopted to identify the subjects. In order to determine the sequence, it was decided to use the participant names on alphabetical order, thus assigning the codes L1 to L9 to the undergraduates.

The data obtained from the questionnaires were analyzed using Discursive Textual Analysis technique. Discursive Textual Analysis is a data analysis technique that has characteristics of two important techniques of qualitative research analysis, the content analysis and discourse analysis (Moraes & Galliazzi, 2006). A discursive textual analysis is described as a process that starts with unitarization, a stage in which the texts are separated into units of meaning and, then, the articulation of similar meanings used in a process called categorization. Onto categorization, similar units of meaning are gathered, and several levels of analysis categories can be generated. This whole process generates analytical meta-texts that will compose interpretative texts (Moraes & Galiazzi, 2006), reaching the last stage of the analysis, called communication.

After finishing the questionnaires´s tabulation, a reading was carried out allowing to observe which subjects appeared most frequently in the speech of the undergraduates, and, thus, it was possible to gather the units of meanings (excerpts) most close to meaning, then categories were established. This step of Textual Discursive Analysis is called categorization.

The determined categories constitute the organizational elements of the text to be written. Coming from them, the descriptions and interpretations of the understandings that emerged during the analysis will be produced. There are different ways of producing the categories; in the deductive method, categories are determined before unitarization; in the

inductive method, they are produced from the units of meanings obtained in the unitarization stage (Moraes; Galiazzi, 2006). It is worth highlighting that, the inductive method was used, because however we started with initial theoretical assumptions, categories were organized by comparing the units of meaning that emerged during the disassembly of the texts. In this process, one of the categories created was: "Conceptions of the importance of Science Education in Basic Education by undergraduates of a Countryside Education Graduation course", subject of the present work.

Results and discussion

This work presents and discusses results for the conception of the importance of Science Teaching by undergraduates of the first class of Countryside Education Graduation Course at Federal University of Goiás/Catalão (EDUCampo/UFG/RC). For most research subjects (95%), when the graduation course on Countryside Education was chosen, they initially did not seek graduation with a focus on the Teaching of Natural Sciences (Biological Sciences, Physics and Chemistry), they had only the desire (dream) to attend a university. But, during the course, it is assessed that they were able to realize that this area is of great importance for the integral training of subjects and that, based on the knowledge of natural sciences, they could better understand the world around them and become more participative in society, taking this knowledge to their future students in a way they are also trained on a critical perspective for an active performance in society.

For Krasilchik and Marandino (2004, p. 43), "the integration of Science Education elements with other elements from its curriculum, besides leading the analysis of their social implications, gives meaning to the concepts presented, to the values and the necessary skills for rigorous and productive work". It is necessary to recognize that through the Science Education it is possible to problematize actual themes, leading the student to relate scientific knowledge with his/her daily life, especially through interdisciplinarity. In this perspective:

> ... Science Education should contribute to reading and writing proficiency; allow the learning of the basic concepts of natural sciences and its application in daily life; to understand the relationship between science and Society, also mechanisms of production and appropriation of scientific and technological knowledge; guarantee the construction and systematization of knowledge and also regional and local cultures. (Fracalanza, Amaral & Gouveia, 1986, p. 26-27).

The teaching and learning process of Science Education must propose and instruct the student to have a positive attitude towards changes in a reflexive way; get him to think, feel and act for life, in order to discover his world, as well as know it to find out how to value environment around, enabling him to make right decisions to his fellows and nature. In this sense, Cachapuz, Praia and Jorge (2004) state that the best way to predict the future is to help creating it, which can happen through actions that perceive Science and Science Education as a dynamic system, built by and for humanity. Therefore, respondents were asked whether they considered the Science Education important in Basic Education; in response, everyone said that this is very important. According to them, the Science Education are directly linked to the lives of students, and can assist in the construction of critical meanings about this world:

> Excerpt 1- "Yes, it's important. Science is present all around us, and this scientific knowledge allied to student's daily life makes them to become more critic, capable of understanding the world around them" (L3).
> Excerpt 2- "Yes, it is very important for young people to have a critic education; learning science is the way act as a good human and professional being" (L6).
> Excerpt 3- "Yes, because as Chassot says, science teaching must be a basis to the student in order to able him to read the world, so it is important that from early years he starts to access this basis to build up these knowledge" (L8).

Through the words of the undergraduates, one can realize that it is necessary to offer conditions for students to develop more and more knowledge about nature and respect to it, becoming able to understand its phenomena and use natural resources with responsibility and wisdom. The development of this knowledge and these attitudes is undoubtedly related to the contents and procedures of the Science Education field; the teacher is responsible for contributing and creating real conditions for students to develop skills to solve problems and correlate this knowledge to his daily routine.

Thus, undergraduates recognize the need for natural science's knowledge, in order to interpret the world and daily life in a realistic and active way. However, undergraduates have shown a certain concern about the scientific knowledge, built up by them through the course. Once it is a course degree that graduates for interdisciplinary teaching in Biological Sciences, Physics and Chemistry, they demonstrated a feeling that it only addresses these fields in a shallow way. In this context, Brick *et al.* (2014) emphasize that Countryside Education cannot only be understood as a simple knowledge context

of application, already produced over four decades in Science Education investigation, but it must be understood as an Education project that, even being under construction, has reasons, legitimated by social movements that demanded them and they were legally instituted by normative resolutions.

Krasilchik (1987) points out that one of the factors that negatively influences Science Education is the superficial formation of the teachers, thus, the complaints that only referred to the superficiality in methodological areas, were extended covering the professional formation regarding the knowledge of the general subjects themselves, leading them to a insecurity for the class, to low quality of his classes and to the close dependence of textbooks (Krasilchik, l987, p. 48). Therefore, the complaint of EDUCampo/UFG/RC undergraduates is not exclusive to them as shown on other studies. Tardif (2002) states that the relationship of the teachers with the knowledge cannot be reduced to a transmission of constituted knowledge. His practice is the sum of different knowledges, on which the teaching staff maintains different relationships. Teachers' knowledge can be defined as a plural knowledge, constituted by the amalgamation, more or less coherent, of disciplinary, curricular and experiential knowledge.

As teaching in this course must be based on interdisciplinarity "can be considered as a possibility of breaking the rigidity of the compartments in which the disciplines of school curricula are isolated". (Pires, 1998, p. 177). Regarding teacher formation, it is recommended the need of a non-linear and hierarchical structure, in which teachers' knowledge is not reduced to disciplinary knowledge (Fazenda, 2008). The author, therefore, points the need to break with rigid disciplinary barriers, indicating the connection of different, local and global knowledges, which we understand as a *sine qua non* condition for the proposal of countryside Education in the Teachers formation by area of knowledge.

Regarding the contents of Nature Sciences, the students commented that:

> Excerpt 4 - "I think is a short time, a lot of content and short time to go deeper. I just needed more time because I don't feel totally prepared" (L2).
> Excerpt 5 - "The contents of Chemistry and Physics, in my opinion, needed more classes to achieve the necessary knowledge to act in the area" (L9).
> Excerpt 6 - "Four years is short period for the qualification in these three areas [...] so that you have critical knowledge in all of them" (L5).

Thus, students realize the importance of acting critically in their future teaching practice. However, they have identified gaps in their formation, stating that they consider four years a short period for them to build scientific knowledge critically. Hence, on other questions, the students were asked about the experience of contextualized classes or other activities that have provided differentiated methodological experiences. The future teachers, without exception, cited that they experienced contextualization during their initial teacher formation. They also mentioned that the contents of Biological Sciences, Physics and Chemistry were studied in a contextualized way, based on their realities. They also cited the opportunity to experience this contextualization in the disciplines of "Practices of Science Laboratories" 1 and 2, and in the disciplines of Internship (an opportunity to experience the development and implementation of contextualized classes). Therefore, they affirmed that they experienced the contextualization in the disciplines of Sciences attended during the initial formation and put into practice in disciplines both of Internship and Teaching Instrumentation (practical subjects).

Despite the insecurity about their formation, it has provided students with the opportunity to experience the contextualization of knowledge, transcending the traditionalist vision of Higher Education of graduation courses in Nature Sciences based on the transmission of a closed content. Silva (2007) states that performing activities of this nature (contextualized classes) is not easy, mainly due to the fact that frequently, undergraduates experience a formation, both on basic and higher education, focused almost exclusively on the final product of science, described by mathematical expressions.

In this perspective, Wartha and Alário (2005) point out that the process of contextualization aims to incorporate concrete and diversified experiences in the learning process. This should include, in a critical way, the meaning-of students' daily lives. The authors also state that "... contextualizing is creating meanings and these are not neutral, they incorporate values because they explicit the daily life, they promote the comprehension of problems from social and cultural environment, or ease to experience the process of discovery". (Wartha & Alário, 2005, p. 43). In this way, it is believed that the experience of contextualized classes can offer subsidies for future teachers to develop them during their future professional career as well. Undergraduates also cited that the

activities of Community Time also provided the opportunity to contextualize and experience scientific knowledge:

> Excerpt 7 - "... because it is a way to know the experiences, the daily life, culture and reality that we will face as a teacher. Science teaching is also that, relating scientific knowledge to our reality" (L 4).
> Excerpt 8 - "... studying theory in the classroom and then we have the opportunity to go into the field and make the interaction of scientific knowledge with everyday knowledge" (L7).

Once again, despite the normal insecurity, typical of recent graduates, they claim that they had the opportunity to experience the contextualization of scientific content in their initial Teacher Formation. Thus, the results obtained in this work point out that giving graduates the opportunity to join contextualized classes and promote experiences in the development of such strategies, contributes to a solid initial formation, because these future teachers take ownership of the need to promote differentiated learning, to ensure that Science Education creates critical citizens.

Silva (2007) states it is clear that the undergraduate gradually appropriates the educational discourse, which is presented to, in the pedagogical disciplines of the course. However, the learning focused on the use of this knowledge and these skills, comes up against difficulties of different natures. The most significant ones seem to be linked to the fact that the undergraduate still has many difficulties with the conceptual domain of Physics. Moreover, the perspective of contextualizing the specific contents, is not a common practice on other disciplines of the course. In this case, it is possible to say that, at this stage of formation, few undergraduates venture to carry out educational activities that deviate from what they often have contact, within the various disciplines of the undergraduate course (Macedo & Silva, 2014, p. 69).

On words from the interviewed students, they claimed to have experienced contextualized teaching, which can be considered an exception and a prospective of contextualized initial teacher formation. Some examples are the replies of the students who have shown that in their formation they had the opportunity to experience the relationship between Science, Technology, Society and Environment (CTS). According to Santos and Mortimer (2002), all curricula with a Science, Technology and Society approach have as main objective to prepare students for the exercise of citizenship and are characterized by an approach to scientific content in its social context. Thus, when maintaining contact with a CTS approach, they had the opportunity to become

critical, conscious and elucidated citizens as to the scientific and technological problems of the society:

> Excerpt 9 - "Yes, because all the disciplines have contributed to make me a critical citizen and aware of my rights and duties as a human being in this world" (L1).
> Excerpt 10 - "disciplines attended in the Course give us a very good vision about the social, scientific and technological world. Some things I thought in a way, today I think on another way in function of the knowledge acquired in the course. I believe that this is the role of an University, to train a critical citizen, with discernment of ideas and ready to act into classroom" (L6).
> Excerpt 11 - "Before entering the University I was an alienated person, I always agreed with what I heard. Today I can say that I am a critical person, who always to question before arguing" (L8).

These lines demonstrate that the scientific and pedagogical knowledge built up, has contributed to critical Teacher Formation. Therefore, a future critical action is also expected. Furthermore, it is believed that the Science Education in Countryside Education will make sense if it is focused on the specificities of these communities have, i.e., from the daily lives of those involved. Britto (2011) calls attention to the need to consider the challenges of thinking about a Science Education that must be at the service of the Countryside Education project. Carvalho and Gil-Pérez (2011) suggest that Science can be understood as a way of looking critically to complex problems of social importance in each specific context - "and, from this perspective, needs to mobilize available knowledge from specific areas in articulation with knowledge from other areas, on an interdisciplinary sense". (Brick *et al*., 2014, p. 44).

Pinheiro, Silveira and Bazzo (2007) consider that the Science, Technology and Society (CTS) approach, profoundly modifies classroom work, reinforcing topics like the ways of knowledge production of Science and Technology, within social and political responsibility. In that sense, it is believed that the Science Education will be important to countryside students if an approach of teaching based on CTS methodology, which take into account the context in which the students are inserted, is inserted. Corroborating with this, López and Cerezo (1996) affirm that the Curricular Proposal of CTS would correspond to an integration between scientific, technological and social education, in which the contents are studied together with the discussion of its historical, ethical, political and socioeconomic aspects.

Finally, Adams *et al*. (2016) believe that with CTS approach, students can develop knowledge in the cognitive, social and environmental areas, because starting

from this methodology, during a class, students have direct contact with people, learn to work in teams, communicate and accept ideas from others, in short, they experience elements to train themselves as critical citizens, and can also develop changes in attitudes towards the problems studied.

In the questionnaires, besides mentioning that they had the discipline of Science, Technology and Society focused on the discussion of this teaching approach in their training, the students also mentioned that they were able to elaborate and apply a didactic sequence, with a CTS focus, in their Internships. Therefore, once again the opportunity to experience a differentiated teaching formation is emphasized. Despite mentioning their difficulties in the elaboration of this sequence, they had the opportunity to overcome such challenges:

> Excerpt 12 - "Aligning scientific knowledge with social aspects is not an easy task for those who do not have teaching practice. Now that we are teaching, it is being easier" (L3).

This speech, therefore, demonstrates the overcoming of difficulties. Macedo e Silva (2014), in his work "The Processes of Contextualization and the Initial Training of Physics Teachers", which aimed to analyze the understandings that Physics teachers in initial training have about the processes of contextualization, concluded that it is essential that educational processes of contextualized classes can be addressed in a more articulated way during the graduation course. In addition, it is essential that students experience, especially in the earlier stages, concrete examples of these classes, both as students and as teachers in internship. This shows us that the initial formation experienced by the students of the Graduation Course in Countryside Education of UFG/RC is singular, because it ensures they have most diverse experiences, both experienced in scientific disciplines (Biological Sciences, Physics and Chemistry), as in teaching practices (Internships and Instructions for Teaching), which allowed them to acquire a differentiated background, for elaboration of classes that ensure a contextualized process of teaching and learning and also quality to their future professional performance.

Final considerations

The results of this paper show that the undergraduates from the Degree in Countryside Education of the Federal University of Goiás/Catalão Regional, proficiency in Nature Sciences, understand the importance of Science Education to the critical formation of their future students. It is clear that the respondents understand

that Science Education has enormous importance for the development of the student, especially as subject, once with scientific knowledge developed, they may be able to act in their reality with critical and active sense. It is thus believed that, in their future pedagogical practice, they can make use of a contextualized teaching, focused on the countryside student's reality.

In this sense, it is necessary that the school find a different path from the one already outlined and introduces in the classroom truly interactive actions in order that education take place in a meaningful way in individual's life of student, in a form he can better understand the society in which he lives and his relationship with the world, playing his role in the creation of reality and in its own history. So, it is necessary to create strategies to stimulate the student's attention, planning in the curricula the use of technological means, placing them at the service of a creative and more attractive training, in an attempt to be along with the technological evolution.

In regard of the insecurity demonstrated by future teachers, it is believed that this is common among undergraduate students, or recently graduated. It is common that, in these circumstances, they present a level of insecurity. But in case of the professional teacher, it is considered that is inside classroom practice, that he will, truly learn to be a teacher, coming from the daily experiences and the construction of his identity, started in his initial formation, but which continues in his professional performance.

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