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EARLY SCIENCE EDUCATION AND ITS RELEVANCE

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This text begins with a concern related to teacher education which will focus on early childhood education, specifically in regards into the sciences and knowledge relating to the axes undertaken to frame the curriculum of the first stage of basic schooling as nature, culture and society. Science for young children should be considered as the foundation of all later development and is clear that it is not understood as it should be. But now, it is being more discussed taking account that these children have their development in a holistic perspective (Johnston, 2009; Johnston & Tunnicliffe, 2008).

It should be noticed that the approach of knowledge related to science in Early Childhood Education, discussed in this text, does not take place in an isolated way, should be developed on a proposal mainly integrating the different fields of knowledge, to explore, in the articulation of knowledge, the wealth of exploitation and appropriating the world by the children.

According to Johnston (2011) science teaching should be encouraged in the early years, aiming at reaching a holistic sense, that is, seeking not only understanding the scientific concepts but also developing attitudes and abilities related to them. Thus, the understanding of scientific concepts is closely related to both the development of knowledge in other areas such as geography, history and mathematics and to the social skills, such as collaboration, cooperation, etc and attitudes such as enthusiasm, initiative, curiosity etc.

It is pointed out that research about emergent science originally comes from two disciplines; early years and science education, but there seems to be a gap in knowledge where the two disciplines overlap. What is important is that we do not make assumptions about young children's early scientific development from our knowledge of older children (BERA, 2003).

Taking on the relevance of the scientific education and understanding the work with the knowledge of the sciences in Early Childhood Education as a first approach to such knowledge, a moment of greatest importance in the mediation among the features of students' primary socialization and secondary socialization events, it is considered that education on this level of education is critical to define the position of the individuals facing the technological and scientific knowledge. Of course, however that this first approach should meet the specific of child development in this stage, bearing in mind the right of being a child and by taking into account all the human dimensions. Therefore, the quality of such the first movement towards may mark the inclusion or exclusion of pupils from school processes and the transmission-acquisition of this knowledge.

Johnston (2011, 2011a) also emphasises the importance of scientific experiences in the early years and highlights that the quality of such experiences is related to their physical, emotional, cognitive, social and linguistic development. Accordingly, the exploration is an important part of the learning process and, it is necessary to provide exploration opportunities from a variety of sources for children, during the meaning making process.

Several authors support the need of discussing the spread view of science in the schools - in particular Cachapuz et al. (2005) - and are unanimous in stating that this renewal should focus primarily on the teachers education courses, and their recommendations relate more

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directly to the education of science teachers. According to the literature it is well known that many science teachers have some misunderstandings related to the nature of science (Abd-El-Khalick and BouJaoude, 1997; Akerson and Abd-El-Khalick, 2003; Blanco and Niaz 1998; Lederman, 1992) and these views of nature of science are quite similar to the student´s views (Blanco and Niaz, 1998; Murcia and Schibeci, 1999), so the teacher education programme should be improved to avoid it (Arroio & Farias, 2011). How should be possible to have a professional without a strong background related to their work, so how a teacher that do not know about natural science could be able to teach about it.

However, considering that the early childhood education teachers take care of it first approach to the scientific knowledge, even without the concern to the systematization of knowledge, with the search for a new kind of observation and questioning of the environment, we can infer the importance undertaken by institutions responsible for the formation of these professionals.

It should be stressed that, from the perspective undertaken in this text, it is considered that teachers of early childhood education should be a person sensitive to proposed actions by the children, being able to provide exchanges and encourage their creativity in search of ways and opportunity of construction of knowledge.

It is worth highlighting that we are not talking only about a renewal of the strategies adopted by the teacher. This is also of a strong background in the case to their available scientific knowledge. Even though teachers of early childhood education does not proceed much in the systematization and the scientific principles in their teaching practices. It is necessary to have a broader view of the phenomena, even so that it can set up to as it can go in order to allow the enlargement of world knowledge according to the cognitive maturity of children.

Science involves besides the understanding of the scientific phenomena, the ability to use this knowledge in discussions and in solving the everyday life issues, with the aim of knowing and understanding the world around us. Therefore, the attribution of scientific meanings develops as the children explore the world around them, experiencing the scientific phenomena through experiences (Johnston, 2005).

An important operation of thought whose development has should be initiated in the early childhood education is the observation. Raths et al. (1973) indicate that the observation:

[...] Is a way of finding information, a part of the process of a significant reaction to the world. [...] Learn to see and realize what we had not noticed before. Develop discrimination, and it is very important that we have an opportunity for development in this area. This leads to maturity (p. 22).

Thus, in Early Childhood Education, starts a work which will spread throughout to basic education, a process that should culminate in the achievement by students in a knowledge approach that involves thinking skills gradually more complex and that begins with the exercise of observation. It is worth noting that, by providing opportunities for the development of observations, one must be aware of the need to involve all forms of sensory perception. Raths et al. (1973) highlight in this sense that "not all the observations need to be visual, some require hearing or touch, smell or taste".

The goal in teacher training is certainly not the accumulation or reinforcing of scientific contents, and yes, capacity development to inquire, make hypotheses, seeking information on several sources by establishing relationships among them, develop ideas, to argue. Furthermore,

we should be concerned in shaping attitudes of curiosity, creativity and criticality on knowledge, enabling children to realize that knowledge is not something ready and that it can rediscover and change the world (Faria & Salles, 2007, p. 94).

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It is important not to forget the reciprocal nature of teaching and learning of young children, namely:

[...] I - adult, who do not know nothing about these children as human beings, while a different one for me (and not as a semi - one where I missing something - adults need to teach because they already know), learn how they are and create new knowledge about childhood, and at the same time, I have to teach is something additional, something bigger, that even she is entitled to learn (Faria, 2002, p. 74).

As stated by Faria (2002), is expressed in academic discussions about the early childhood education some barriers about different possible ways to work along teaching young children. Faced with these different understandings, heightens the concern with teacher education, especially the complexity involved in seeking to ensure that children of early childhood education to begin their process of discovery and critical appropriation of the world they live. So what is assumed here is a favorable position to recognize childhood in their peculiarities, in order to provide opportunities for discoveries and appropriations by the child through the work of a teacher with strong theoretical basement on scientific phenomena in the everyday. As a result, this teacher would be able to provide the best opportunities for young children education.

Cachapuz et al. (2005) indicate that some researchers in the field of science education question the viability and even the validity of educating scientifically the whole population. One of these authors believe that the first discussions on this concept were based on two preconceived notions: (1) a, which is called pragmatic theory, which considers that future citizens will have a better development to acquire a scientific knowledge base, since that societies are increasingly influenced by the ideas and products of science and technology and another, (2) called by the author of democratic theory, which "assumes that science literacy enables citizens to participate in decisions that companies should take around of socio-scientific and socio-technological increasingly complex "(Fensham, 2002, apud Cachapuz et al., 2005, p. 23-24). However, for the author these two theses do not support the defense of a scientific literacy of the population because:

The pragmatic argument [...] does not take into account the fact that most technological products are designed in to encourage users have no need to know the scientific principles as they are based for be able to use. [...] With respect to democratic argument, to think that a scientifically literate society is better off to act rationally in relation to socio-scientific issues, is [...] an illusion that ignores the complexity of the scientific concepts involved, such as, for example, Global Warming. It is absolutely unrealistic to believe that this level of knowledge can be acquired, even in the best schools (Fensham, 2002, apud Cachapuz et al., 2005, p. 24).

However, other authors (Fourez, 1997, Bybee, 1997, De Boer, 2000, Marco, 2000, apud Cachapuz et al., 2005) adopt the democratic argument to defend the idea of a scientific and technological literacy as a basic component of education for citizenship. To these authors, according Cachapuz et al. (2005) rather than a very high knowledge level, the decision making by citizens requires the linking a minimal specific knowledge, it is perfectly accessible to everyone, with comprehensive approaches and ethical considerations that do not require any expertise. From this perspective, scientific literacy is required as an essential dimension of the culture of citizenship.

However, despite the increasing importance of what has been called scientific literacy for personal and social development of citizens, expressed both in the academic research as well as in wording of educational reforms, which many studies have shown it is a process of lack of interest, and even rejection, young people in relation to science education and scientific activity itself (Cachapuz et al., 2005). Underlying this lack of interest might be the fact that:

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The nature of science appears distorted in science education, including university. It presents the need to overcome distorted and impoverished views of science and technology, socially agreed, which affect teachers themselves (Cachapuz et al., 2005, p. 30).

What expression assumes it, that according to research in the field of science education? To Fernández et al. (*apud* Cachapuz et al., 2005), some of misconceptions disseminated in the school are:

1) Decontextualized conception: does not indicate the impact of scientific activity on the natural and social environment or the interests and influences of society in its development;
2) Individualistic and elitist conception: it presents the scientific knowledge as works of genius working on their own;
3) Empirical-inductive-theoretical conception: it argues that observation and experimentation on science is "neutral" and does not give importance to theory accumulated;
4) Rigid and unfailing conception: it presents the "scientific method" as a defined sequence of steps that must be followed rigidly;
5) No problematic and unhistorical: it ignores what were the problems it was intended to address the construction of scientific knowledge, which the evolution of such knowledge, which difficulties found in its preparation.

Such views present natural science as an activity that can be performed by some specially gifted for it and as practice detached from the economical context, social and political context in which it develops. It is not highlighted the roles of conflict and error, nor its character of human construction that responds to the conditions under which enabled it develop. Thus, it seems understandable that the approach to the scientific knowledge that is established in the classrooms in elementary schools will eventually generate strangeness, disregard or rejection on that it are presented.

And what would be the most appropriate conception to diffuse in the school work with the scientific knowledge in order to break this detachment / rejection towards science? Also according to Cachapuz et al. (2005), a renewal in science education necessarily involves consideration of the following features of scientific activity, more coherent with a new epistemology of science:

1) Scientific knowledge is tentative and should never be perceived as truth. It has only a temporary status;
2) The observation isolated does not lead to the scientific knowledge. It makes sense to rely on previous knowledge;
3) The new knowledge in science is produced by creative acts of imagination allied with methods of scientific inquiry;
4) Scientists study the world which comprises, not a world of which they are separated (p. 74).

In this conception, it can highlight the importance of tentative explanations for the phenomena, as well as their provisionality, the appropriateness of research methods to the type of studied problem, the creativity and audacity, and especially the linkage between the scientific activity and socio-economic and political context. Thus addressed, the science is presented as a human practice accessible to everyone as a way of approach to knowledge is constantly evolving.

It is understood that knowledge of natural science to ensure the mastery of tools, thinking skills and concepts that to know the world - in their natural features and the multiple

human interventions on it - to understand, question and mark its position on the discourse of power embedded in social practices in which it appears, moving toward a fairer society. And under such perspective the early years of schooling are an important element for building the foundations for an approach on the quality scientific and technological aspects that so clearly define and guide - as well as, are defined and guided by - many social, economic and political characteristic of modern societies.

This discussion aims to highlight the importance of the type of approach to the science which is available to pupils coming into the first level of education, understood as one instance that, along with other and within its specific features, should provide opportunities to expand understanding of the world. Here it is necessary that the school meets its social role to foster the access to knowledge that would progressive enable composition of explanatory summaries more comprehensive and complex.

Thus, it is highly relevant the inquiry about what teachers should learn that their actions allow the establishment of educational knowledge of a world that actually favors the formation of citizens more autonomous and able to establish a critical position in relation to products the development of science.

Natural science education plays a very important role in broadening students' world outlook. The Natural Science classes should discuss real, concrete things and phenomena, which are a part of students' reality and even everyday life (Lamanauskas, 2003).

According to this discussion, it is clear those teachers who work with young children should be prepared to have a strong knowledge about natural science as they will provide the first approach on scientific perspective for these children to explore and understand the world on their own appropriation. If they do not know about natural science or have naïve and misconception on their own views of science, they will spread this wrong information and will not support the development of young children.

It´s time to recognize that young children have their own thoughts and they need a good teacher to support them to explore the world, to meaning make, to foster their curiosity and creativity.

When you have a good system of teacher education for contemporary world, it is really possible making Natural Science more relevant to students, more easily learned and remembered, and more reflective of the actual practice of science. It is suggested that students need to develop and/or improve skills in dealing with controversial issues as they prepare to participate in a democratic society (Arroio, 2011).

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