IS THE NATURAL SCIENCE TEACHER EDUCATION PROGRAM ENOUGH FOR A CONTEMPORARY SOCIETY?

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Considering that Science and Technology are in the present day the greatest factors in changing the way we live. They have also made the world very small so that we are no longer living in the confined world of our town, region or country isolated from what is happening in the rest of the globe (Härnqvist & Burgen, 1997). Every change around the world could be connected with change that really affects everyone. As we can see on the last days how the economic discussions in different countries are affecting the entire globe.

The development of educational systems was connected to the scientific and technological development of countries and also so straight attached to economical and political domain of developed countries. In this case, the scientific and technological education was in evidence for many reasons since from the control of new devices to recruit new talents for science studies.

According to the literature is know that after some years of Natural Science classes students still having some problems to understand Natural Science concepts in general. We have to consider that learning Natural Science is not easy. Another important point is related to the problem of knowing something but when you have to use it you cannot, for example students can solve problems in Natural Science classes but for outside of school it fail in that situation in real world. Is the Natural Science Education really relevant for these students?

Lemke (1990) pointed out the descontextualised, dogmatic and abstract role of Natural Science in the teaching and learning process seems to be responsible for that:

In teaching the content of science curriculum, and the values that often go with it, science education, sometimes unwittingly, also perpetuates a certain harmful mystique of science. That mystique tends to make science seem dogmatic, authoritarian, impersonal, and even inhuman to many students. It also portrays science as being much more difficult than it is, and scientists as being geniuses that students cannot identify with. It alienates students from science.

Natural Science education has become an important prerequisite for a vital economy especially with the emerging global economy. Many industrial nations are seeking to improve the quality of science education because of the vital role science and technology play in a nation's economy and standard of life. In this sense, the role of science teacher seems to have an important player in Natural Science classroom if we remind that the teacher can determine the successful in science education (Nezvalová, 2007).

The problem of educational innovations in Natural Science education might be properly treated by analyzing the complexity on the basis of methodology of teaching. Nowadays pre-service science teacher should have deep knowledge of the objectives on the classes, type of classes, contend of the course, technological knowledge, keep the student's interest in science, preparation of students and other factors, that influence directly and indirectly the results of the

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educational process. The pre-service teacher should know theoretically and practically each one the contemporary methods and to apply them correctly in practice, together with other methods and technologies (Arroio, 2006).

When students feel that they can respect and trust their teacher, they do not only perform better in school but also grow more confident in themselves, the pedagogical agreement seems to be really important between students and teachers and it should be based on communicative process in the social plane of classroom.

However, teachers usually are not aware or are not able to describe or remember what happens in these interactions with their students. Students who have more secure relationships with their teachers are, in turn, more likely to explore their environment and, therefore to have more opportunities to learn, they display higher levels of language development.

Do these science teachers been educated to face these changes in a contemporary society?

Pre-service science teacher bring prior educational experiences and beliefs about teaching, learning and chemical education to their teacher preparation experience. Promote this opportunity to think about beyond this experience could support them to questioning their knowledge, different aspects of teaching or about assumptions.

Human Behavior expresses communication and emotion mainly through nonverbal cues and actions. When observing social interaction, we have to pay attention on the nonverbal language also, because all behaviors that are involved in the transmission of experiences or information from one person to another (Siegman and Feldstein, 1987).

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).

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.

In contemporary democratic societies, lay citizens need to understand the nature of scientific knowledge and practice, in order to participate effectively in policy decisions, and to interpret the meaning of new scientific claims which affect their lives (Sandoval, 2005). Science educators thus seem to agree that relevant, real-life, contexts are important when teaching for scientific literacy (Mork and Jorde, 2004).

As Holbrook (2010) point out:

Education cannot be developed in a vacuum. It needs a context and this context, inevitably in science lessons, involves science content and science conceptual learning. Thus, although science content need not be specified and may be related to a contemporary context, science lessons utilise the acquisition of scientific ideas to aspire to playing their major role in the development of students through an appropriate context.

Knowledge is stored in various discourses, linguistic contexts and acquires meaning and significance only in these contexts. Marková (1996) describes this connection as different social realities provide different experiences.

Nowadays it is necessary to take advantage of the Information and Communication Technologies to support innovative methodologies of teaching natural science. As well, it leads to different ways of seeing the world and consequently leads to different beliefs concerning our comprehension of the world. Expanding the experiences as the augmented reality, it is real now.

PROBLEMS
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So, words and terms which are used acquire meaning in the contexts where they are used. The relevant perspective within a sector is decisive for how a question, a problem, a statement is to be interpreted, what is interesting, pertinent an objective.

According to Schoultz and Hultman (2004), learning and development become ways to learn and they have been developed in a special culture. In this perspective, science can be viewed as a specific culture or indeed a group of sub-cultures, which have developed over a long period of time. Learning science is related to participating in activities, which offer a scientific way of thinking and acting. But this is not easy and perhaps not even possible in a traditional school context because it is expected that students must cross over certain discursive and linguistic borders.

A scientific discourse contextualizes reality in a way which differs from a more everyday way of reasoning and the essential meaning of words and terms. So the distance between the everyday world and the scientific world of the traditional school is often so great that it seems impossible for student to benefit from the teaching (Jakobsson, 2001). Säljö (1996) indicates that language use and the construction of meaning are always social processes, dependent on people who interact. Meaning is always relative to options and constraints that are present in social situations.

Learning in context seems to role an important contribution in students understanding of natural science. Because when students are engaged in context it makes their learning more meaningful.

Dear readers, in this issue it is possible to find new approaches, methodologies, innovations based on researches related to ICT to contribute to the improvement of Natural Science Education.

References

Arroio, A., Giordan, M. (2006). Methodology of teaching: integrating video analysis into the preservice training of chemistry teachers. In: *Research in Didactics of Science*. Pasko, J. R., Nodzynskiej, M. (Eds.). Krakow: Akademia Pedagogczna.

Härnqvist, K., & Burgen, A. (Eds.). (1997). *Growing up with Science: developing early understanding of Science*. London: Jessica Kingsley Publishing.

Holbrook, J. (2010). Education through science as a motivational innovation for education for all. *Science Education International*, 21 (2) 80-91.

Jakobsoon, A. (2001). *Pupil´s interactive learning in problem solving in groups*. Malmö: Institutionen för pedagogic. Lärarhögskolan I Malmö.

Lamanauskas, V. (2003). *Natural Science Education in Contemporary School*. Siauliai: Siauliai University Press, 514 p.

Lemke, J. L. (1990). *Talking Science: Language, learning and Values*. Norwood, NJ: Ablex Publishing.

Marková, I. (1982). *Paradigms, thought and language*. Chichester: Wiley.

Mork, S. M., & Jorde, D. (2004). We Know they Love Computers, but do they Learn Science? Using Information Technology for Teaching about a Socio-scientific Controversy. *Themes in Education*, 5 (1) 69-100.

Nezvalová, D. (2007). *Improving Quality of Science Teacher Training in European Cooperation Constructivist Approach*. Compendium. Palacký University in Olomouc Press.

Säljö, R. (1996). Mental and physical artefacts in cognitive practices. I. P. Reiman & H. Spada (Eds.), *Learning in humans and machines* (284-324). Oxford: Pergamon/Elsevier.

Sandoval, W. A. (2005). Understanding students´ practical epistemologies and their influence on learning through inquiry. *Science Education*, 89, 634-656.

Siegman, A. W., Feldstein, S. (1987) *Nonverbal behavior and communication*. Hillside, NJ: Lawrence Erlbaum Associates.

Schoultz, J., Hultman, G. (2004). Science teaching and the school – when concepts meet context. *Journal of Baltic Science Education*, 2 (6) 22-33.

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