

# TRADITIONAL AND CONSTRUCTIVE NATURAL SCIENCE EDUCATION PARALLELS

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In recent years attention to natural science education is not decreasing. In various information sources we can find a constantly expressed position that natural science – technological literacy of young generation is not only insufficient but also very often inadequate to the time requirements. We can claim with confidence, that the whole last decade (2000-2010) in one way or another was devoted to the discussion of the mentioned problem in various aspects. What is really important today and especially in perspective?

The answers to natural science technological education problem questions are not easy at all. The so-called public opinion of giving priority to social sciences has a particularly negative influence. The process when a great majority of youth choose social science field programmes for their studies and significantly smaller part chooses natural science – technological profile studies, has already been observed for the second decade. The motives are various here. First of all, it is groundlessly thought that social sciences are easier to study than natural science subjects. There is a part of truth in this. However, we feel the absence of government's clear strategic standpoint. Isn't it, that physicists, chemists, biologists, engineers and so on are not necessary in Lithuania any more? We can mention, that similar tendencies are observed in the other countries as well. Secondly, representatives of social sciences (these are also representatives of education, educologists) rather often groundlessly ignore natural science - technological education and its importance to a man. Even the official discourse analyzes children's rights, bullying, adaptation, motivation, social integration and other rather trendy questions more often than the second ones – guaranteeing natural science – technological education. There happen to be not rare cases when education communities do not acknowledge the researchers analysing natural science education problems, consider them to be “a substance”, “polluting” pedagogics. In Western literature such a phenomenon is called “Science war” from social scientists. Basically, we can ask – whether this war is progressive or reactionary?!

We can say that common European policy is opposite. In 2004 European Commission confirmed the declaration claiming that Europe needs more scientists (Europe Needs..., 2004). The same year a wide ranging international Rose research was started (Relevance of Science Education, 2004). The latter research basically revealed 15-year old population negative attitudes towards natural science education at school. Such negative tendencies were especially characteristic to so – called developed countries. Significant differences were established between developed and developing country students' attitudes. ROSE research was repeated in some countries in 2008. The same tendencies were noticed. Currently a new international research has been started to implement, which in a way prolongs ROSE research. This is so-called IRIS research (Interests and Recruitment in Science: Factors influencing recruitment, retention and gender equity in science, technology and mathematics higher education, 2010). The main attention is drawn to how stimulate the youth choose natural science –technological profile studies, how to encourage them choose the scientist's (researcher's) way. The situation is no better talking about adult society members either. The newest research (EUROBAROMETER, 2010) shows that European citizens are poorly interested in natural science – technological

questions. It is paradoxical, that Europeans feel less informed than their needs and interests. Moreover, they feel less informed comparing with the situation in 2005. Also people are prone not to believe in scientists, because the latter are more and more dependent on business world. Various companies using finance flows manipulate the scientists. We can mention here a lot of urgent spheres such as GMO (genetically modified food), food additives, supplements and so on. This is a great challenge for the whole European community.

How is this connected with constructivist education approach? The answer to that question is not easy. The amount of introductory article is not sufficient to carry out exhaustive analysis, in other words, such analysis would require various wide range discussions. Therefore, it remains only to invite the readers join this discussion, presenting the articles for the journal. It is worth to mention some aspects. First of all, pupils from different countries emphasize that natural science subjects at school are slightly interesting and of little importance to them. Such position has a rational explanation. On the other hand, natural science – technological information is more difficult to be mastered, it requires great efforts. Seeking to make natural science – technological education more attractive, constructivist - technological approach has become intensively spoken about. Very soon all this action is moved into educational practice. The learners are aimed to become constructivist learners. Traditional teaching is criticized constantly, trying to prove that such approach is absolutely not perspective. It is asserted, that traditional teaching separates completely teaching subjects, does not form conditions for their integration. However, the person knowing at least a little about integrated education problems could not claim like this because traditional teaching/learning doesn't contradict subject integration or integrated learning. On the other hand, constructivism is not a specific kind of pedagogics, is not a panacea for overcoming education hardships or making teaching process more effective. This is first of all, psychological theory, postulating that people construct knowledge and senses referring to their own personal experience. This cannot be denied as well as cannot be denied the fact that knowledge or senses being constructed on personal experience are not necessarily right. After all, is the information that a concrete child possesses substantial for the true world cognition? After all, doesn't this require much more time for such "created" knowledge verification? Acting constructively, the acquired knowledge is considered your own, more important. One might understand that if the knowledge is acquired differently, it is already not important. It is absolutely not true. Who can deny that traditional teaching/learning is unsuitable? After all, what does traditional mean? Teaching/learning theories alter, are constantly supplemented, some of them are refused of at all. If we assert that constructivism theory is based on critical thinking educational methodology, in the same way we can claim that traditional teaching is based on realism philosophy ideas and this is not bad. What the child learns and what the teacher teaches him has to be true from the very beginning. This is a cornerstone idea. Any kind of later "re-teaching" when mistakes are being corrected, wrongly formed images and concepts are being destroyed is in principle, harmful and unwanted. Not in vain all of us know classical axiom – repetition is the mother of science. The more we repeat (practice), the better we memorise. In this way our mind works. From this point of view we can express the main criticism on traditional teaching, when too little attention is devoted to practical aspects, teaching is theorised too much, then it becomes "lifeless", not urgent for the learner. However, this does not deny the essence of so – called traditional teaching. At last, as R. Mayer (2004) notices, constructivist approach being prevalent, the learner's active behaviour component is made a big thing, basically forgetting how it is important to be active in cognitive sense. We can give you such at first sight weightless argument. In Lithuanian schools constructive teaching approach has been applied in one way or another for more than a decade, however, natural science – technological literacy changes very little, in fact. Practically there are no essential changes. After all, we have to perceive that every theory, no matter how good it is, has its own limiting factors, is limited. There are no universal theories. Being in

constructivist teaching environment, the learner gets minimalistic teaching recommendations and minimalistic support. The empiric researches, having been carried out for a rather long time, confirm that such an approach is not effective (Kirschner, Sweller, Clark, 2006). The statement that constructivist approach is identical to modern pedagogics is hardly true.

Thus, we can claim, that constructivist approach teaching natural science subjects is not the only one that is true. It is necessary to search for clear complex, mixed approaches based on systemic thinking and activity. From this point of view, applying of different strategies in teaching activity is an important and desirable thing. However, only good wishes aren't enough for this. Broadly speaking, a suitable educational environment is necessary; secure working conditions have to be created for teachers and so on. After all, every educational situation is unique. Teacher's professional skills become a cornerstone and integrating element of the whole educational process.

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