

## SCIENCE EDUCATION: REGARDING TRENDS AND MAIN PRINCIPLES

All art is quite useless  
(Oscar Wilde. *The Picture of Dorian Gray*)

*Dear Readers!*

When the authors propose the article for publication they are on the top stair after having planned and providing their research projects. On the initial stage it's very important to choose the relevant topic and methodology. Discussing trends and main principle of Education we can model constituents which include Institutional, Socio-cultural and Psychological and finally, Disciplinary categories. The first and the latter are of great importance both for practicing teachers and education explorers. And both are of special interest of JBSE editorial policy.

Institutional category can be presented as three-dimensional matrix with the core plane consist of lines presenting different points of horizontal and vertical diversification, and complementary third-dimension lines presenting variation in each point.

University is a keystone of all the system of Education. It provides the new upper level of knowledge, gives professional skills including those to teach the others, sustains scientific researches and makes educational advancement both for secondary and higher schools. Thus elaborating the system of University education one contributes greatly to the improvement not only the latter but other levels as well. At the same time Secondary and High School Education creates the background for the development of the individuals, and thus seems to be determinative for upper level. The traditional system of Education with all steps functioning separately and independently from each other (even in foretime reality only the theoretical model) has been growing out to advance in contemporary practice the so called continuous Education (In this point we agree with (Gavrilova, 2004), strengthening the idea Universities are the core institution for the development of the latter).

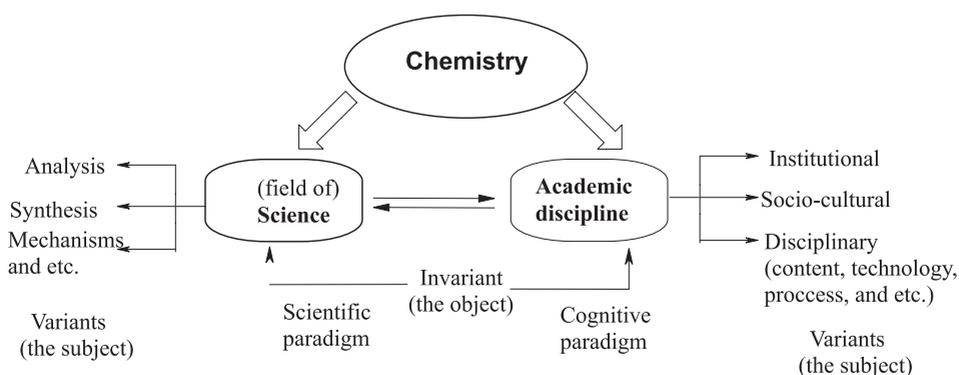
There are many traditions of high and higher education throughout the world. The every tradition differs in structure, internal and external regulations, discipline priority, professional dedication and etc. The main principles of organization in higher education more or less similar in spite of institution specialization depending more on government and self regulation in every country. More differences we could found before the implementation of the Bologna principles. For example German (Frackmann, 1991) and Finnish (Seppo, 1997) higher education system were traditionally homogeneous as well as Dutch system (Seppo, 1997, p. 72). The French and traditional British (Becher, 1992) systems possessed hierarchical structure but lack diversity. Asian countries (Seppo, 1997, p. 40, Yuchiro, 2003) and Israel are characterized by more complexity, which increases further and climaxing for the USA with its high diversity and differentiation depending on state and other regulations. CIS (Former USSR countries) system of higher Education recently was based on former Russian academic tradition with the dashes of ideologically oriented hierarchy in structure including high level Universities and professionally oriented Institutes. Nowadays there are two contrary trends in these countries (Капранова, 2007): unification by means of transformation of former "institutes" (pedagogical, polytechnic, medical and others) to Universities and the creation of new types of institutions providing the lower levels of higher education (higher colleges). The same process has been taking place in high (secondary) school and includes the



vertical (different levels) and horizontal (different lines for high school level) diversification. The ideal scheme corresponds to the so called University complex consist of different types of pre-University school, the University itself with undergraduate graduate and postgraduate programmes. In all the cases implementation of the Bologna principles in the Educational policy changed greatly the institutional organisation of Science Education almost in all the counties.

Thus as we can see the politicians have done their job in the field of Education. But besides the institutional dimension we can evaluate the disciplinary category which defines the process of education as acquisition of knowledge, culture, skills and more through devolving of knowledge from a teacher to a student within the framework of discipline. Every discipline possesses its own paradigm. And the latter differentiate the matter and methodology of a subject both in research and education. Social and humanitarian issues are more dependent on ideology and external regulations. At the same time SCIENCE and its constituents, including Biology, Chemistry, Environmental studies and Physics, is **ideologically free**. And it's a great privileges granted to a chosen few. And those chosen supposed to be WE – all the Science Educators. At the very same time Science and Science Education are dependent on social and ecological aspects (Bilek, 2008) and thus susceptible to changes taking place when new theories, methods of investigation and techniques issue the educational arena. Thus methodology of Science Education as well as methods and techniques of research education are supposed to be the same in all the countries (how it differs from Human and Social Studies). Still if we are facing such differences in the aspect of Disciplinary category it is are mainly based on prejudices and conservatism (or for less developed nation) but never on national tradition. Just now there are many challenges in methodology and technology of Science Education. They are research education, computation, use of modern methods and techniques in academic process, format changes, distance education, industry and science oriented education and more. According to the conception of transformation of higher school all the above mentioned issues are elaborated by our authors both theoretically and in practice.

One more specific problem is how to distinguish two different meanings when saying about any branch of human knowledge and Sciences particularly: **Field of science**, and **Academic discipline**. For these two divergent, but interdependent categories we propose the short-cut scheme (just it can be different for various fields of knowledge, and the latter presents the case of Chemistry) which reflects the simplified interconnection between both categories based on general basic invariant (object) and variable subject units, the latter having its own ramified system.



Just for Journal investigating the issues of Educational Science we drop basically the other units but hit the high spots of Disciplinary Category. At present it is common place the Institutional and Socio-cultural background requires the continuity in all subunits of the Educational system and discussing the Content and Structure of discipline we presume its continuity as well as the continuity for Educational technology and teaching methods. Still at present there is a great gap between university and school systems of priorities concerning induction-deduction model of inference. School course is mostly oriented on deductive method with priori reasoning. But the ampliative inference (inductive method) corresponds the high plane of high school students' intelligence as well as the principle of continuity



and higher productivity of cognition process.

The other problem discussed is the role of the subject and societal oriented teaching, and as the result main trends in educational researches. The subject focusing researches are contrasted with the societal thrust being considered in other research studies. The latter are concerned about teaching emphasis and student learning climate, and thus demanding to reduce subject-related content in favour of context oriented studies. But we can teach nothing about when have no a subject. Just it's a rationale even more important when we say about Science Education. We need Subject-oriented studies, which show us the relevance of disciplinary category in promoting the teaching-learning process. We need to investigate the relevance of content to know better what context we need to motivate students (and educators as well!).

Science is integrative force and Science Education can help to understand the changing world. Science Education does so and there are many examples strengthening the point. It is one more and may be the most exciting issue demonstrating the unity of knowledge and necessity for cooperation. The latter can help to develop the core model for more effective Education based on all traditions and contemporary trends.

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