

# SCIENCE EDUCATION AS LIFE EXPERIENCE FOR LIFE

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## Abstract

Systems approach has been adopted and philosophical as well as psychological background was studied in order to develop modern structure of Science Education for general education programs. **The principal core structure of human's educatedness in general and particularly for Science Education as life experience (knowledge, skills, attitudes) for life (cognition, consideration and behavior) has been developed.** The state of knowledge's cult as the main characteristic of the *developmental crisis* in our modern life and education is discussed. Finally two wings of Science Education are noted in order to answer the question “what science education for what life?” This article is a compact overview of author's developed ideas in English.

Key words : science education, systemology of education, content of education, curriculum development, crisis of science education.

## Introduction: Education and Life

*Education and life* are two fundamentally interconnected phenomena; accordingly, the general definition of *education* follows.

**Education is a specially organized gaining of life experience for life.** Organization of such an action always entails the unity of goal (expected result), process and result (attained goal) of corresponding activities, and it involves purposeful action by a person and by a society as a whole (individual and public activity). Systems approach is a powerful tool to develop systemology of education – systems approach in education (Broks, 1999; Broks, 2001).

## The structure of human's life experience

There are three general components of our educatedness as main characteristics of human's life experience: *knowledge, skills and attitudes*. These components characterize intellectual (knowledge and skills) and moral (attitudes and skills) aspects of our educatedness.

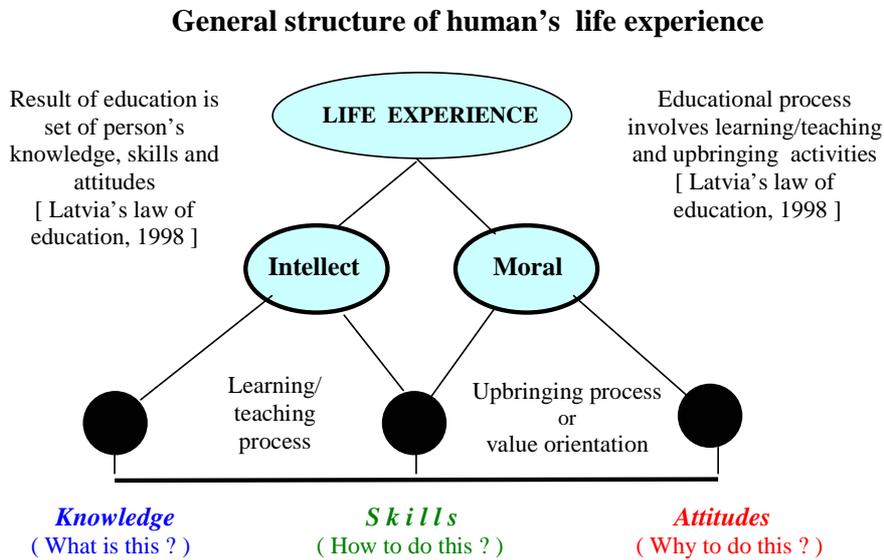
**Knowledge** – the result of human's cognitive activities, providing human with knowledge of separate facts and causality relations for existence and propulsion in his/her life.

**Attitudes** – the result of consideration, when evaluating diverse needs of human's life. Positive attitude shows human's positive value orientation, what defines goal and organizes his/her behavior to realize it.

**Skills** – obtained during realization of definite human's actions and providing successful realization of them (cognition, consideration and behavior). Skills mean practical realization of human's abilities (will and power).

Skills (especially critical thinking skills) and balance of intellect and moral – the main goals and results for curriculum planning, evaluation of educational achievements, confirmation of human’s creative abilities to perform real actions in his/her as well as society’s life (Broks, 2003a).

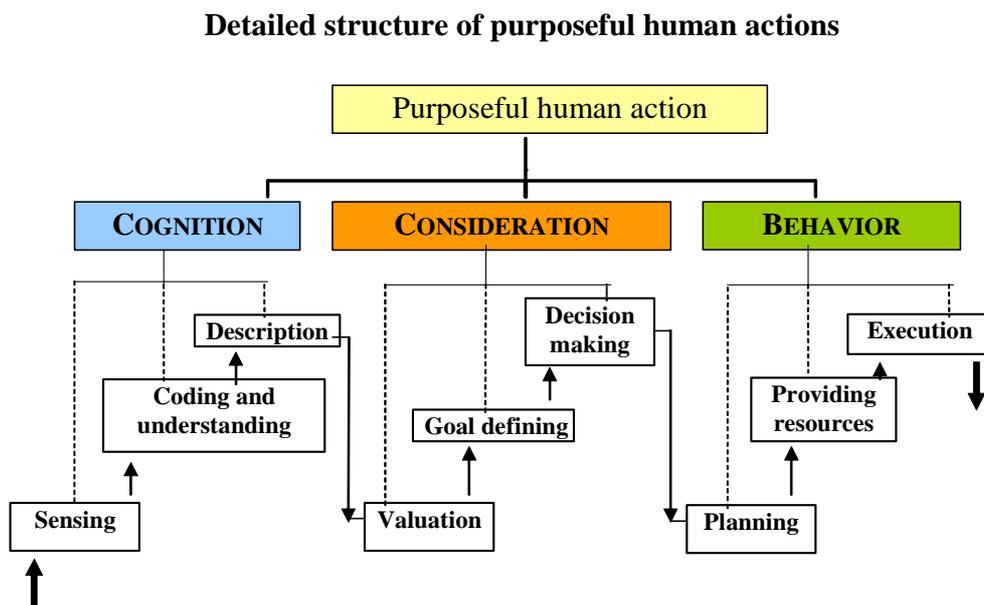
Figure 1



**The structure of human’s life processes as purposeful actions**

Human’s life is the set of his/her diverse actions and many of them are purposeful actions. Like the functional structure of educational systems or other social and technical systems, each human’s purposeful action is related to the surrounding or external medium in three ways: *needs, resources and satisfaction of needs* are the three principal characteristics of an action as a whole. With respect to systems approach, this is a macroscopic view on the purposeful actions of humans (Broks, 2005).

Figure 2



For understanding (system analysis) and targeted construction (system synthesis) of our particular conscious actions, we need to develop a microscopic structure of the purposeful actions of humans. Notice that each action of human life consist of three fundamental components: *cognition, consideration and behavior*. Humans gain life experience part by part, comparing and connecting these parts: *cognition* is the background for *consideration*, which, in turn, is the basis for purposeful *behavior*. These three components correspond to the first level of the microstructure of human’s purposeful actions.

Each component of the first-level microstructure can again be presented as a system, and thus we get the second-level microstructure of human purposeful actions.

### Development of the modern structure of humans’ educatedness as life experience for life

The following table demonstrates the principal **systemic** content and structure of our educatedness as life experience for life..

Nine corresponding matrix elements demonstrate interconnections between the main components of life experience (*knowledge, skills, attitudes*) and life processes (*cognition, consideration, behavior*). There are tree basic – diagonal elements of the matrix that are of special interest in relation to educational problem solving

Table 1

**The principal core structure of humans’ educatedness -**  
life experience (*knowledge, attitudes, skills*) for life (*cognition, consideration, behavior*)

	<b>COGNITION</b> (sensations, coding, description)	<b>CONSIDERATION</b> (valuation, goal defining, decision making)	<b>BEHAVIOR</b> (planning, providing resources, execution)
<b>SKILLS</b> - realization of abilities	<b>S k i l l s</b> of gaining information and its’ analysis and synthesis	Evaluation, goal defining and decision making <b>s k i l l s</b>	<b>S k i l l s of planning, providing resources and execution</b>
<b>ATTITUDES</b> - value orientation	Cognition of values (creation of sample values - what is good?)	<b>Development of attitudes</b>	Practical realization of attitudes
<b>KNOWLEDGE</b> - facts and causality relations	<b>Obtaining knowledge (what is it and why is it so ?)</b>	Processing of knowledge (critical thinking)	Use of knowledge in practice

During the revolution in science and technology, step by step we have gained a tremendous amount of knowledge. As the result of this increase of information, we have also reached the state of *knowledge cult*, and that *is a main characteristic of the developmental crisis in our life and education today*.

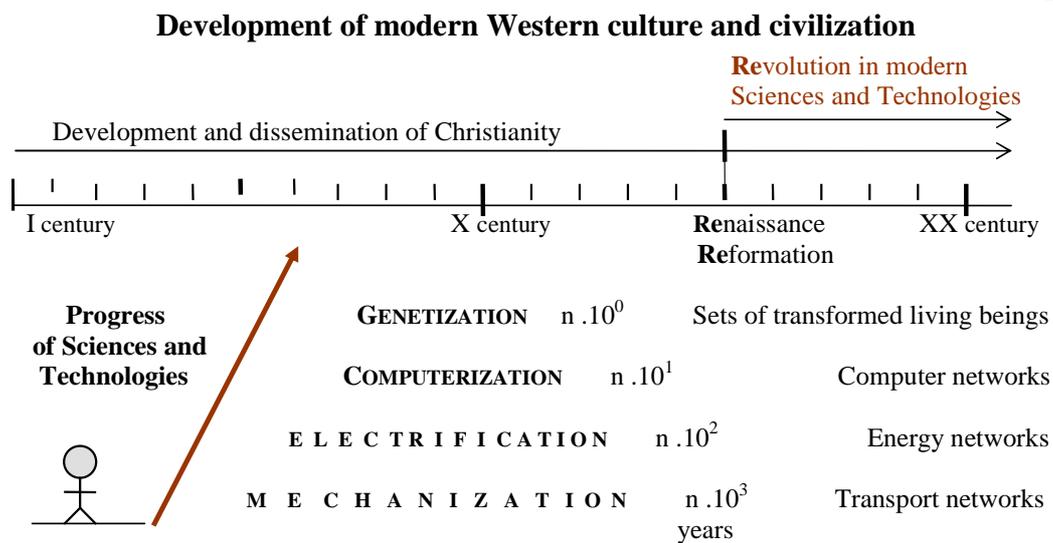
### Crisis of life and education in the beginning of 21-st century

During former period of the development of Christianity nothing more than revolution in science and technologies has very seriously influenced the life of World’s society. The scientific and technological revolution has materialized in the form of global transportation, energy and information networks, and it has devoted far too little attention to the nurturing of human values and orientations [Broks, 2002]. *The technocratization of human lifestyle*, which is characterized by a distinct emphasis on the sciences and technologies under

conditions of market economics and liberalism, *has developed much more quickly than human attitudes have changed*. Environmental protection problems are discussed often and are very important, but in fact we are talking about the attitude of humans toward other humans here.

More technologies, more services, more consumers, less producers, more possibilities, more differences, more artificial, less natural in our life today. If education is life experience for life, the only fundamental question always rises: *what education for what life?*

Figure 3



What about our responsibility of keeping balance between our civilization and culture, intellect and moral? *Talking about humanistic education, do we have humanistic life?*

Following the development of revolution in sciences and technologies, step by step we have gained tremendous amount of mankind's knowledge today and the situation is characterized as an explosion of scientific knowledge or information (Broks, 2003c).

As the result of this rise of information we have also reached the state of *knowledge's cult*, what is main characteristic of the *developmental crisis* in our life and education today. In an attempt to deal with this crisis, emphasis is clearly being shifted these days from the need to learn a great deal of knowledge (cognition) to the need to be able to work with that knowledge (consideration and behavior). Do we understand the basic structures of our actions which connect not only knowledge, skills and attitudes, but also cognition, consideration and behavior?

At the same time, however, we must deal with the ancient problem of separating those things and processes which must be learned with full understanding and those which can simply be memorized. The modern illiterate not only fails to be able to read and write, he also cannot press the appropriate buttons. Are we sure that we will be protected against senseless pushing buttons in this time of technological superiority?

### What Science Education for what life?

Scientific and technical literacy for all and high quality science and technologies education for coming new generation of specialists - main task for the corresponding development of general as well as professional modern science and technologies education. There are two fundamental wings of Science Education today :

- Professional Science Education for development of Science and Technologies;
  - General Science Education for scientific understanding of material world's phenomena.
- Healthy human's life - healthy spirit and healthy body in healthy living environment - main direction for modern Science Education and Human's Life development (Broks, 2002).

### Conclusion

*The one who changes* in accordance with the development of things and processes in the world today *will survive*. If education means life experience for life, the only remaining question is this: *what education for what life?* Let's start from our modern life - what do we need today and then organize our Education as a *s y s t e m* to satisfy these needs. It's not enough to have only reforms today, we need qualitative changes or transformations (Broks, 2003b; Broks, 2006). We need *o n t o d i d a c t i c s* as theory and development of new step up and forward in our modern education as a whole and in Science Education particularly (Broks, Voitkans, 2006, 2007).

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**8.04.2007**

Hello, dear colleagues!

There is my contribution to IOSTE symposium in June 17-21, 2007 – Siauliai.:

**SCIENCE EDUCATION AS LIFE EXPERIENCE FOR LIFE**

It's my personal overview of ideas, we have already discussed in many our local meetings and tried to introduce them in our practice.

Now I have taken it all together in English to explain these simple systemic educational ideas and developments to our Western as well as other post-soviet colleagues in Eastern Europe. So it's not a typical research paper with corresponding formal structure. **IT IS A SET OF STRUCTURES WE CAN THINK ABOUT AND USE THEM IN OUR EDUCATIONAL PRACTICE**, when constructing and building modern Science Education programs to fight crisis in our Life and Education. I think they are effective for general orientation today because so **MANY PEOPLE HAVE LOST THEIR CLEAR ORIENTATION IN OUR LIFE AND EDUCATION TODAY and have started to prefer or at least to accept chaos as well as ugly following outdated ideas.**

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