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**SELF-EDUCATION SKILLS AS A MEANS OF EDUCATION FOR  
SUSTAINABLE DEVELOPMENT: MULTIDISCIPLINARY  
STUDIES**

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***Abstract***

Self-education is the essential factor of personal, collective and social stability, the means of education during the whole life. General educational skills are the essential for self-education. The article considers the 12 years multidisciplinary studies of results of general educational skills formation. It describes the experience of complex application of psychological, physiological, medical and sociological methods. Multidisciplinary approach helps to show the connection between the inclusion of general educational skills in requirements of the federal state educational standard and solution of educational problem for sustainable development: rise of education availability for everyone, support of information-psychological safety in global world, formation of skills to think connecting different life sides. Increase in level of all-educational results leads to growth of educational motivation, physiological and psychological resistance to information stress. Feedback connection of the general educational skills level with the frequency of psychosomatic complaints expressed vago- and a sympathicotonia, as well as with the "stuck" profiles of cognitive regulation is revealed. Low level of regulatory universal educational skills increases the informational and psychological risks of training. It was revealed that the effectiveness of the formation of general educational skills is enhanced by using "paired" cognitive strategies in teaching ("cognitive swings"), for example, analysis-synthesis and vice versa.

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**Keywords:** Skill and ability of self-education, multidisciplinary studies, sustainable development, education.



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## **1. Introduction**

Current ecological crisis leads to the creation of sustainable development conception and gives rise to new system-forming vector of global educational process – education for sustainable development. UNECE strategy for ESD (2005), the Roadmap of global Programme of action for ESD, designed as a result of UN Decade for ESD define not only the priority educational topics for sustainable development, but the activity tools of their development (UNECE Strategy). Among them are general educational skills to learn (self-education), to act, to communicate, to work in team, to be (to define oneself), to change oneself and the environment. Russian federal state educational standards of general education (FSES) looks ahead the formation of these skills in requirements to meta-subject results of learning in conditions of problem-oriented education (ESD + TVET).

## **2. Problem Statement**

The theory of developmental learning, rested on works by Rubinshtejn, Leont'ev, Jel'konin, Gal'perin, Davydov, Asmolov, discloses the peculiarities of goals and teaching objectives designing, content, educational methods and tools focused on getting general educational skills. Building on a great amount of psycho-pedagogical experimental validations this theory becomes the foundation of the national standards of general education of second generation and provides the basis for competency approach in higher education didactics not only in our country but abroad.

The formation of generic skills is considered to be essential for any individual to navigate in information environment of global world, to form the holistic individual view of the world and the competences which sustainable or unsustainable development depend on (Whitby, Walker, O'Donnell, 2006; Kolesnikova, Dzyatkovskaya, Dolgih, 2015). According to UNECE strategy for ESD (2005) generic skills are tools required for knowledge about the sustainable development of all people during their life for survival. Taking into account the hopes that education of different countries entrust to general educational skills it is important to realize their potential possibilities for personality and society, using only pedagogical methods of study are not of persuasive value (Kolesnikova, Dzyatkovskaya, Rychkova, 2015). The data of psychology, physiology, medicine and sociology may be important.

## **3. Research Questions**

Despite evident relevance of cross-disciplinary researches of educational issues, this problem cannot be considered to be methodologically solved. The difficulty lies in the development of the true complexity of such studies, allowing to obtain a complete picture of the studied phenomenon, not resulting from the sum of information from different disciplines.

If we take this approach, then instead of hundreds of indicators that could be used to characterize the results of mastering general educational skills, we have several evidence of the impact of such skills on all links of a complex system of self-regulation of the organism and the personality. Homeostatics also determines the criteria for "good" and "bad" self-regulation of a human. We find various forms of application of these criteria in general psychology, psychophysiology, neuropsychology, physiology,

medicine, and even pedagogy. As for the teacher, he can judge self-regulation by the ergonomics of learning, effectiveness of the student's self-help, etc.

A group of scientists and teachers explored the pedagogical, psychological, physiological, medical and sociological effects of the formation of the schoolchild's general educational abilities on the state of the system of human regulation at the level of the vegetative nervous system, emotions, cognitive processes, personality and meta-individuality (socio-cultural level). The studies involved more than 2000 students in grades 3-4 of Moscow, Irkutsk region and Transbaikal (2008-2012). Workbooks of EMCs "Ecology of learning activity", "Learning to learn" recommended by the letter of Ministry of education and science of the Russian Federation No. 03-470 from 09.06.2012 served educational materials in the experimental groups. In the control groups the training was under traditional system.

Physiological and psychological resistance to standard information stress by Khanashvili, M.; profiles of cognitive regulation by Morosanova, in the modification of Dzyatkovskaya; neuropsychological status (Order of the Ministry of Health of the Russian Federation of 28.12.1998 n 383); psychosomatic complaints and initial vegetative tone according to Belokon and Kuberger; sociometry of training groups on the coefficient of optimality of the relationship "Wood with Humans" (Lampen, adaptation of Ponomarenko); level of educational motivation for Luskanova, were studied (Hannaford, 2005).

#### **4. Purpose of the Study**

The hypothesis of the study is that the cross-disciplinary approach to the subject matter in pedagogics can elicit its new sides and provide the wholeness of studies in case the common object of multidisciplinary research would be defined using the «proto-concepts» of aspect sciences (Moiseev, 2001). In developing education, general educational skills have the meaning of regulating activities. At the same time, the regulation category is a key one in cybernetics, the section "Homeostatic", which studies the regulation of self-organizing systems. We made an attempt to prove this statement.

#### **5. Research Methods**

The research of personal data of the studied indicators showed that the increasing level of general educational skills leads to the main aggregated effect as a significant growth of educational motivation of students: high level was observed among almost 80% of secondary school graduates opposite 31% in the control classes. The highest correlation coefficient level of motivation was identified with the indicator of physiological and psychological resistance to information stress (the quality of psychophysiological self-regulation under the conditions of study load). The study replicated the standard information triad, including such factors of tension, as a large amount of information necessary to the processing in a short time at a high level of responsibility (dirty speed test with the exception of possible errors). The fluctuations in blood pressure, heart rate, number of errors made in correction of the samples were measured, autonomic reactions were recorded. Should be noted that in accordance with the steering document "Learning to learn", in the list of formed general educational skills of students from the experimental classes, organizational skills of self-regulation of their functional state command a large part under conditions of school and everyday stress ("I forgot the notebook", "I'm late", "I write slowly", etc.).

A relation between the level of development of general educational skills, the frequency of psychosomatic complaints, and marked vago - and sympathicotonia, prior to the formation of psychosomatic conditions and disorders were identified. The most strong dependence of these parameters was from the "getting stuck" profiles of cognitive regulation. It should be noted that psychosomatic symptoms are an indication of the maturity of the voluntary and involuntary nervous and mental self-regulations of a person. On the basis of the obtained data an important conclusion was drawn that when designing the content of educational material it is appropriate to provide the combined formation of students' "paired" generic skills ("cognitive swing": "how is on the contrary?"), as a condition of improvement and information-psychological security of such content, and its educational potential. This conclusion was supported by a large base of neuropsychological diagnostics of students. The consistent implementation of the approach described above, based on the physiological principle of dual functions regulation, leads to a significant decrease of children's neuropsychological syndromes and psychosomatic reactions (Tricot, Sweller, 20014).

Sociometric studies have not identified the significant differences of the experimental and control classes. Indicators of manners (received by projective methods) were not higher and sometimes lower than in the control classes. The formation of general educational skills, as evidenced by teachers, increased the liberty of students, their critical thinking and the willingness to express their own opinions.

## **6. Findings**

According to our observations, the fascination by competence-based orientation of learning reduced teachers' attention to the tasks of cultural education. Furthermore, these tasks are not required when passing Unified State Examination and their control is of impersonal nature. Longitudinal monitoring of the students of the experimental classes showed not only the importance of educational work, but the necessity to update its methods and forms. It's no coincidence that in education for sustainable development a readiness to self-education (ability to learn and communicate) is associated with the willingness to self-improvement, "to develop oneself", "to be", in other words, to identify oneself in culture and to create a culture of sustainable development in the world around.

The influence of general educational skills on increasing the level of understanding and comprehension of complex categories of education for sustainable development, the ability to establish spatial and temporal relationships of global and local phenomena, of social and personal interests were found out.

During the research it was concluded that multidisciplinary approach considering the general object of study with Pedagogy from different sides (in our case they are regulation of the student's activity through generic skills), can significantly enhance the results of the pedagogic research. It is shown that the achievement of general educational skills contributes to ensuring information-psychological security of a person, reduces the risk of psychosomatic disorders development, raises academic motivation, including basic knowledge capturing in the field of sustainable development. General educational skills increase education availability for all people and contribute to the reduction of the psychophysiological "price" of education. At the same time, the increased attention to general

educational results of learning should not come at the expense of the cultural nature of the educational content, educational work in school and requires modern methods and forms.

Unfortunately, the question of the optimal ratio of the formation of different groups of general educational skills, as well as the ratio of reproductive and developmental tasks for different levels of education, remains open. One of the reasons for this, in our view, is the persistent watershed between pedagogy, psychology and physiology.

Analysis of the FSES implementation in different schools showed that the authors of textbooks, as teachers, pay more attention to cognitive development than to development of generic learning activities. The same tendency is observed in preparing of the control apparatus of textbooks: on average, the control of regulatory skills accounts for less than 1% of questions and tasks at the end of paragraphs. Meanwhile, this group of skills is essential in the content of education for sustainable development. It is essential to teach the culture of control of complex systems without disrupting the mechanisms of regulation.

## 7. Conclusion

The contradiction of control and regulation is crucial for our historical time.

The consequences of control versus regulation conflict are various (the current environmental crisis – the consequences of attempts to "improve" or "to deceive" the nature; didactogenic psychosomatic disorders – the ignoring in training the feedbacks from child's organism etc.). But their essence is the same. Regulatory skills could be attributed to cultural and personal results, important for understanding the worldview and searching personal meaning of life. In addition, the low competence of students in the field of generic management skills, as was shown by us in the experiment is the risk of reducing their information-psychological security in the global world.

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