



Jolanta Wilsz
Akademia im. Jana Długosza w Częstochowie

EDUCATION OF THE FUTURE IN THE CONTEXT OF SYSTEMIC METHODS

In the contemporary world, educational transformations are affected by current civilization transformations. As a result of the transformation from industrial civilization into informational civilization, industrial societies transform into informational ones. Members of informational societies are obliged to perform new functions that require using full repertoire of their intellectual abilities. Memorizing and reconstructing information, so characteristic of behavioural paradigm, are no longer sufficient. The challenge of post-industrial age of knowledge/information is intellectual development, active acquiring and processing of the already existing knowledge and forming new information and, consequently, creative thinking and the best possible solving of problems. Such skills are determined by abilities of human intellect whose development is unable to keep up with the development of science and technology. It is no longer enough for people to adapt to their environment. People should not only develop together with their environment, but also stimulate rational and humanistic changes in their environment.

In the second half of the twentieth century, the development of science and technology was characterised by a systemic approach. This happened because „in the present days technology and society have become so complex that traditional methods are not sufficient. What has become necessary is a holistic (integral) or systemic, generalized or interdisciplinary approach”[4, s. 24]. Systemic research studies have become widely used. Systemic analysis is used more and more widely because it emphasizes analysis of integral properties of a given object, as well as creating images of its structure and different types of couplings.

Systemic approach serves transmission of knowledge, because it provides a conceptual system of reference that helps to organize knowledge in the course of acquiring it, and to memorize and transfer information. Thanks to the principles that facilitate comprehension of complexity, the systemic approach allows locating and arranging a hierarchy of elements, on which decisions are based and, therefore, it helps in taking actions. Systemic thinking facilitates

creativity and invention because it is open to analogy, metaphor, and models. It also serves everything that leads to elimination of „divisions” between different disciplines of knowledge[1, s. 144–145.].

The systemic analysis deserves its widespread use in the humanities because it is a study method supporting people who make decisions in situations characterized by a high degree of uncertainty. It allows recognizing and considering all available variants, and, after comparing their predicted results, it allows choosing the best possible variant.

In the previous stages of civilization transformations, the reality was perceived fragmentarily. Undoubtedly, this was connected with the traditional structure of science, divided into separate, narrow specialities within the confines of which it was only possible to study fragments of reality, while it was impossible to solve complex multi-disciplinary problems occurring in integrated reality. Bases for more effective solving of such problems can be formed by a cybernetic and systemic paradigm, which appears in the present stage of transformation. According to the paradigm, not only the world in which men live but also people themselves are perceived systemically – as an integral entirety. According to the systemic theory, man constitutes one of many different sub-systems of the system called the world. Human relationships with other sub-systems of the world are based on a feedback mechanism and provide a harmonious symbiosis unless one of the sub-systems is pushed aside to the role of an object. Maintenance of the status of a subject by each of the sub-systems should guarantee respecting of their rights and needs. A situation, when man is a subject located at the top of the hierarchical structure, while other sub-systems are subordinated to him and exploited in a way that results in significant disturbance of their functional balance, is unacceptable.

Such outstanding scientists as L. von Bertalanffy, E. Laszlo, and M. Mazur have approached man in terms of systemic methods.

L. von Bertalanffy[4] proposed treating a living organism as an organized entirety possessing dynamic character, as well as the ability to maintain, or even increase, its degree of organization. E. Laszlo[2] focused on natural systems (he used the term „natural” in the opposite meaning to „artificial”), which do not owe their existence to man’s deliberate planning and acting, including man himself and a huge part of multi-personal systems in which people take part as well. For this kind of systems, M. Mazur[3], who called such systems „independent”, or, in his later publications, „autonomous” (such systems possess two basic steering abilities: the steering ability, and the ability to counteract loss of the steering ability – which show that the systems can maintain themselves in functional balance and act „in their own interest”) worked out a strict scientific

theory, the ramifications of which are very wide and refer to man's functioning in all fields of life¹.

The task of the education system is to prepare people for efficient functioning in their future, mainly occupational, life. As the efficiency of people's functioning in their environment increases with their steering abilities, on which their self-steering depends – an education system should increase such abilities in pupils, i.e. fulfil their need to possess the highest possible self-steering ability.

Thanks to their steering abilities that guarantee maintenance of a functional balance, people exist in their environment, in spite of numerous disturbances reaching it from outside, by counteracting those disturbances or by preventing their occurrence. It is to those abilities that people owe their possibility to draw information and energy from their environment, as well as to process them, store them, and to influence the environment.

Possessing high steering abilities is especially important at the time of system transformations. Functional eagerness of man is developing such abilities, because when they increase, effectiveness of people's influence on their environment also increases. As increase in these abilities occurs in the course of people's development, the development should be regarded as one of the most important human needs fulfilled in the process of education.

People's development, involving an increase of organization degree of their structure, results in an increased steering efficiency, and in independence from their environment, i.e. in their degree of autonomy. Good knowledge of changes occurring in the environment facilitates increase in independence from its influence and facilitates selecting the delivered information in terms of „one's own interest”, which should be understood as the most efficient self-steering in one's environment, providing, on one hand, possibly high influence on one's environment, and, on the other hand, the highest possible independence from it. Such independence can also be understood as a possibility to realize goals compatible with one's „own interest”, as well as a chance to prevent realization of environmental goals, incompatible with one's own goals.

I think that human self-steering ability should be treated as a basic criterion when defining tasks of education.

¹ As man meets the definition requirements of an autonomous system, and all functions occurring in such a system, related to both information and energy flow, occur in a human organism, man can be treated as one of special cases of an autonomous system. Then, statements derived from theoretical analysis of such a system can be used in reference to man. Such an approach reveals that all mental processes have their physical interpretation, and difference between people result from individual differences between the processes of drawing from the environment, processing, and emission of information and energy.

According to the systemic theory, efficacy of people's self-steering in their environment depends on the possessed:

- information about the state of the environment man can acquire by means of his or her external receptors²; the more different kinds of receptors³ they possess, the more effective their self-steering is;
- information about one's own inner state, obtained through one's inner receptors; the more such information man possesses, the more effectively he or she can steer themselves;
- energy man can acquire through his/her alimentators⁴; the more energy people possess, the more effectively they can steer themselves;
- repertoire of exerting influence on the environment; the more effectors⁵ people possess, each of which releases a different type of reactions, the greater their possibilities to exert influence on their environment are and, hence – their ability to steer themselves;
- abilities to store and process information; the greater the abilities, resulting from the properties of a human brain are, the more effectively they can steer themselves;
- abilities to store and process energy; the greater the abilities are, the more effective self-steering can be expected.

Summing up all the factors described above, one can say that man's self-steering depends on two groups of factors:

Group I – external factors, including any type of environmental influence exerted on people;

Group II – inner factors, including any self-steering properties man has.

In reference to the first group of factors, school's tasks may involve mainly supporting pupils in learning and understanding problems of their environment. In reference to the second group of factors, the role of the school should involve supporting pupils in the process of self-learning. Pupils need some knowledge of people's steering properties, a skill to identify them, and ramifications of the knowledge on the process of making any kinds of decisions throughout man's life.

The knowledge of human steering properties is the branch of science that deals with steering. From that branch, the theory of autonomous systems, as well as my theory of constant individual traits of personality[9, 10], theoretically justified by the theory of autonomous systems, derive.

From the point of view of the science that deals with steering, human personality is a set of constant and variable steering properties. The environment

² Receptors are devices for drawing information from the environment.

³ Each of receptors allows detecting stimuli that are adequate to it.

⁴ Alimentators are devices for drawing energy from the environment.

⁵ Effectors are devices for exerting influence on the environment.

forms variable properties, dependent on environmental influences. According to the theory of constant individual traits of personality, constant steering properties (i.e. those independent of environmental influences) are constituted by constant individual traits of personality, among which two groups of traits can be distinguished: **the traits connected with intellectual functions** (processibility, reproducibility, and talent), and **the traits connected with interpersonal relationships** (emissivity, tolerance, and flexibility).

When of appropriate magnitude, the traits connected with intellectual functioning, guarantee competent intellectual functioning. As innovative operation with information is basis of development of informational society, such traits are of strategic importance.

Magnitude of processing determines skills of a human being as a „processor“ of information. Processibility determines the number of proper associations. The greater processibility people possess, the greater their ability to associate huge amounts of different types of information is, which results in the possibility to achieve a higher degree of perfection of thinking processes.

Reproducibility determines quick and easy memorizing of all types of information. The greater reproducibility people possess, the greater their ability of memorizing information is, which results in the possibility to achieve a higher degree of perception and memory-related processes.

The greater talent a man possesses in a given field, the quicker and more lastingly he or she memorizes information related to their talent, and the more easily they associate it, which results in the ability to achieve a higher degree of perfection in the field of activity compatible with the talent.

Traits connected with interpersonal relationships determine and affect people's interpersonal skills and relations. Lack of conflict in such relations is much appreciated nowadays and regarded as an especially important feature of future society.

What predominates in the informational society, is obtaining information, and then recording, processing, associating, transferring, selection, implementation, as well as creating one's own information. Information will „spread out“ like an avalanche, its flow and access to it will become more and more free, because, transferring it to others will not result in any loss of it, contrary to matter-energy (on acquiring, producing, processing, trading/transferring of which the functioning of industrial society was based) where transferring part of it to other people meant loss of that part.

Educational tasks required by the changes associated with formation of informational society are:

- teaching pupils methods of active and independent searching for information;

- teaching pupils methods of active evaluation of information, studying of information, analysing, filing, comparing different pieces of information, conceptualisation, associating, using information to solve problems etc.

What does the effect obtained by realisation of those tasks depend on? From the point of view of the systemic theories, the answer is as follows: skills of independent and active searching for information and operating it, obtained by individual pupils, will depend on their constant individual traits of personality connected with intellectual functions, because these traits are determined by the properties of a human brain, being the „tool” allowing processing and creating new information. Because in practice, each man has specific traits connected with intellectual functions (all people possess the same traits, but they are of different magnitude), the best effects will be obtained by pupils endowed with high magnitude of processibility and reproducibility, as well as with a great talent in a given field (or fields), if only pedagogic actions they undergo are appropriate in terms of the traits.

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Jolanta Wilsz

EDUKACJA PRZYSZŁOŚCI W KONTEKŚCIE METOD SYSTEMOWYCH

Streszczenie

Ze względu na bardzo złożony charakter przeobrażeń ekonomicznych oraz społecznych i ich implikacje edukacyjne, przemiany edukacyjne przedstawiono w kategoriach systemowych. Zaprezentowano koncepcję stałych indywidualnych cech osobowości człowieka, pozwalającą na wyróżnienie stałych indywidualnych cech osobowości, które są niezależne od oddziaływań otoczenia i cech osobowości zmiennych, które zależą od oddziaływań otoczenia. Scharakteryzowano tradycyjny system kształcenia w aspekcie tej koncepcji. Przedstawiono też implikacje edukacyjne koncepcji stałych indywidualnych cech osobowości, które stanowią zbiór postulatów adresowanych do twórców przyszłego systemu edukacji, które mogą przyczynić się, by system ten był znacznie bardziej efektywny i humanistyczny od tradycyjnego.