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EDUCATION AS A CRITICAL INFRASTRUCTURE

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Abstract*: Education is generally considered only a social process. Complexity, importance, flexibility and social security are strong arguments in defining education as a critical infrastructure. The educational system as a formal part of education is the one analyzed and the result fully gives education the status of critical infrastructure.*

Keywords*: education; critical infrastructure; educational system; professor; student; criteria.*

Education has been, is and always will be the characteristic and essential element of human society. Through education, man becomes a creative and transformative personality of the social and physical environment. In this sense, Ioan Botoş defines education as "the socio-human phenomenon that ensures the transmission of theoretical knowledge (information) and practical knowledge (skills), obtained by mankind throughout the historical and social development, for the development of the young generation in particular, of man in general, in order to form their personality and prepare them for life, for their integration in socially useful activities, as well as for the development of society"[1].

From this definition it follows that education is necessary, objective and permanently accompanies the human species, and these characteristics make us affirm that it is a critical infrastructure.

As an argument, the authors of the work "Critical Infrastructures" consider that critical infrastructures are "those infrastructures on which the stability, safety and security of systems and processes depend on..." and have "an important role in ensuring security in the functioning of systems and in economic, social, political, information and military processes"[2].

It follows that education, viewed systemically, is essential for the functioning of society as a whole.

From a systemic perspective, education includes both the theories and methods of analysis and educational action, as well as the educational practice.

The multitude of educational theories and methods contains concepts such as: educability, the purpose and ideals of education, learning and educational methods, laws and principles of education, etc. These theories give meaning to the educational process and give it applicability in all areas of the social life, including the military.

However, like any science, education is not just done for the sake of knowledge. Education without a practical purpose is a nonsense, so the system through which education becomes useful to society is its applicative part.

This system, in most societies and throughout history, is defined and analyzed as the educational system. To argue the theory of education as a critical infrastructure it is important to list and analyze its main elements.

The educational system as a subsystem of the global social system consists of the following elements:

- the formal educational subsystem;
- the non-formal educational subsystem;
- the informal education subsystem.

[1] Ioan Botoş, *Pedagogie*, Editura ALL, Bucureşti, 1994, p. 16.
[2] *Ibidem*, p. 7.

The subsystems of non-formal and informal education are the oldest elements of the educational system and have been the basis for the transmission of knowledge in human society, being also the first and oldest critical infrastructure of mankind.

The complexity of the modern world, as well as the rise of science and technology lead to the emergence of formal, institutionalized education, known as the educational system, and implicitly the third critical infrastructure of mankind.

In today's human society, critical infrastructures are not simply declared critical, but are subject to a scientific and methodological analysis. Thus, education, as part of the global social system, and the formal educational system, as a subsystem of the educational system, are subject to validation analysis in order to confirm their status as critical infrastructures.

In order to be able to say that it is a critical infrastructure, education and implicitly the formal educational system must contribute essentially to the functioning of all the component systems of the global social system.

The process of identifying and evaluating the criticality of education is based on clearly defined, specific criteria such as:

- functional criterion;
- security criterion;
- physical criterion;
- flexibility criterion;
- unpredictability criterion[3].

The social role of education, as well as the functionality of society as a result of educational processes, which are essential for humanity, are the key elements in validating the criticality of education in terms of functional criterion.

Nothing can be done without education, and a poor education has negative economic and social consequences. So, the security of the global social system is deeply affected and implicitly it results that education also meets the security criterion.

The physical criterion refers to the place of education in relation to the other critical infrastructures. Education underlies the training of human resources in all areas, including the training of staff from the critical infrastructure domain. So, it occupies a central and very important role, it has a considerable size, it is scattered throughout the territory of a state and it is a process of endurance. It follows that all these arguments are favorable for the validation of education as a critical infrastructure.

In terms of flexibility, education always relates to the progress needs of society, but unlike other infrastructures, it does not lose its role of critical infrastructure.

The educational system, as a fundamental subsystem of education, analyzed from a critical perspective, contains the following elements:

- the actors of the teaching-learning process (teachers-students);
- the form of organization of the educational system (preschool, school, gymnasium, high school, university, postgraduate, etc.);
- the knowledge assessment system (current verifications, theses, exams, admission competitions, job competitions, capacity exams, baccalaureate, bachelor degree, master degree, PhD thesis, etc.);
- the teaching infrastructure (buildings, laboratories, workshops, courses, textbooks, libraries, school transport, etc.);
- the education management (boards of directors, ministries, inspectorates, rectors, directorates, councils, senates, etc.);
- the content of education (the curriculum);
- the beneficiaries of the educational process.

[3] *Ibidem*, p. 8.

The actors in the educational process are those who give meaning to education and are mainly the teachers and the students. However, we must not forget the auxiliary teaching staff, who ensure that the didactic logistics involved in the teaching-learning activity becomes functional.

The quality of the didactic act is the characteristic of the stability and efficiency of the educational process. It is wrong to consider a quality teaching act only by the teacher's performance, which may be exceptional, but the knowledge and skills formed could be below the acceptance level.

The evaluation of the didactic act, from the perspective of the concept of critical infrastructure, means first of all the evaluation of the results, in the form of the knowledge and skills accumulated by the students and not from the point of view of the quality of the didactic discourse.

This evaluation is currently carried out by:

- the results obtained by the students at the periodic and end evaluations of the program or study cycle;
- the results obtained by the graduates at the admission exams in a new educational cycle (high school, university, post-graduate);
- the employment of graduates and the satisfaction of beneficiaries regarding the professional skills of graduates;
- the yearly evaluation performed by students of teachers and the teaching-learning process;
- the analysis of the results of the controls of the educational process performed by the management structures of the management system.

In addition to those existing and listed above, in order to strengthen the status of critical infrastructure, I propose that the evaluation to be also done by:

- real-time analysis of the didactic act of teaching-learning through progress evaluations (ideally it would be after each session) and the correction of the curriculum so as to respond to the real training needs of the students;
- data collection, analysis and evaluation of the psychological, social and professional skills of the teachers based on a coherent and real-time system, so that the teaching performance is in full accordance with the needs of graduates and beneficiaries;
- identification and analysis of the socio-psycho-professional skills of the students and distribution by classes (groups) according to them;
- the use of psycho-pedagogical scientific research to increase the quality of the evaluation of the teaching-learning process;
- the analysis of the work results of the graduates after one, two and three years of work or during the internship.

The didactic infrastructure is the material part of the education system and its foundation. Without schools, laboratories, workshops, teaching materials, computers, etc. learning would be inefficient and the practical characteristic would be impossible to achieve. It is the visible part when we refer to school as a component of education.

Impairing the functionality of the teaching infrastructure produces major effects in the educational process. In this sense, we can recall the situation generated by the COVID-19 pandemic, in which classical logistics was replaced by computerized logistics, through which knowledge was transmitted, but less social skills, abilities and behaviors were formed.

In the medium and long term, an educational process of the kind has serious social consequences because:

- the skills and abilities necessary for the work process are no longer formed and developed;
- the social behaviors transmitted in schools, through which students learn to function properly in society, can no longer be achieved, generating, in the medium and long term, major social unrest;

- the performance of evaluations decreases, and therefore the professional competencies certified by the study documents also decrease.

It follows that the teaching infrastructure is also a key element in the process of validating education as a critical infrastructure.

The management of education is a complex process that manifests itself on three levels: at general level, at school level and at the level of study programs (classes, years, in pre-university education).

The management of the education system and implicitly of the education process implies the overall management of the formal education through ministries, central directorates, inspectorates, etc. This type of management is important for the coherence of education in society and is an element that renders education once again, the status of critical infrastructure.

The other levels of management, at the level of school, university, curriculum, etc. are relevant for education as a critical infrastructure only if we look at them together and in interaction (as elements of the system).

In conclusion, the approach to education from this perspective is correct because human society cannot exist without education, and the current, technologically developed human society is based on the educated and competent man at work.

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