



SYSTEMOLOGY OF EDUCATION: SOME THOUGHTS ON THE CONCEPT AND DEVELOPMENT

Vincentas Lamanauskas

Vilnius University, Lithuania

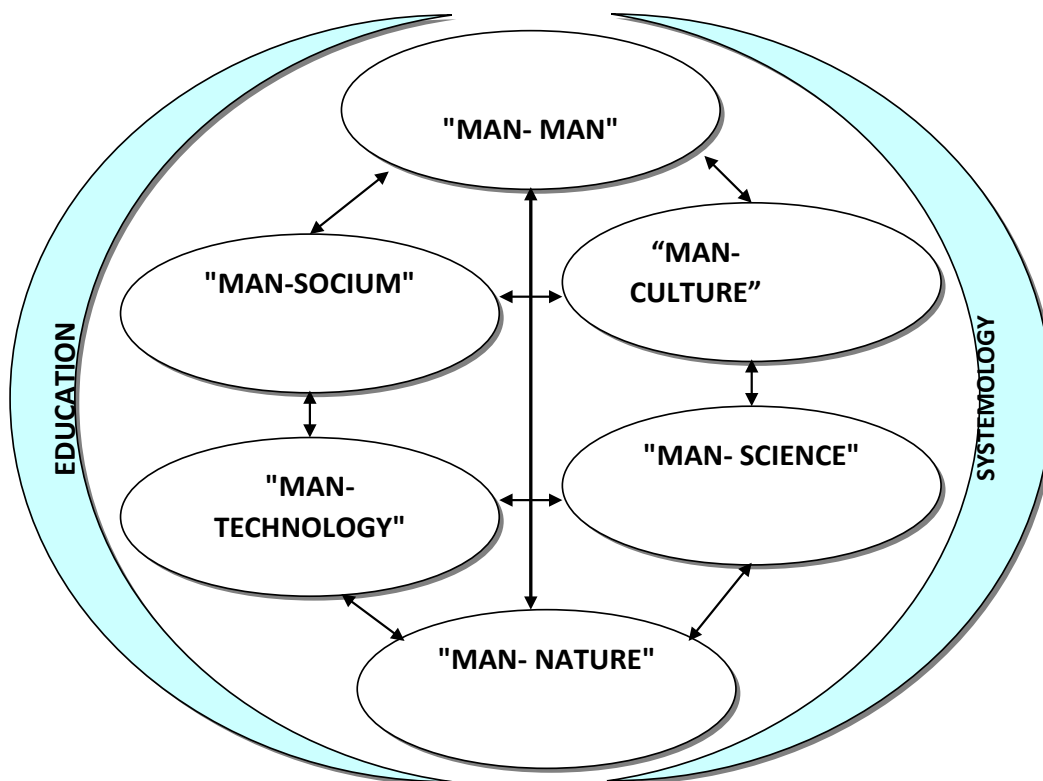
E-mail: vincentas.lamanauskas@sa.vu.lt

Systemology of education is the field of general systemology. On the other hand, systemology of education can reasonably be considered a structural part of contemporary education. There are many different arguments to substantiate such a position. For example, during the last two decades, educational (pedagogical) terminology has changed extremely rapidly. Education science has become more diverse than ever. Such branches as cooperation pedagogy, nonviolence pedagogy, pedagogy of the oppressed, peace pedagogy, success pedagogy, career pedagogy, theatre pedagogy and many others have appeared in educational scientific literature, not to mention the level of education. On the one hand, we do not deny the existence of these branches, on the other hand, the question arises about the scientific system in education in general (Lamanauskas, 2012). It is obvious that the development of education is characterised by two opposite trends – differentiation and integration. In such an abundance of currents, branches, directions, etc., it is not only easy to get lost, but it is even easier to lose the ability to identify mutual relations and define the place of each of them in the common stem of education science. It is firstly. Secondly, the need to integrate education and other sciences becomes even more evident. It is reasonable to think that the time has come to systematise all this. As Vaitkevičius rightly noticed, today's didactics has been flooded by a large number of pedagogic theorists (and even more imitating them) and teacher practitioners, looking for answers to partial teaching/learning organisation questions and creating a partial theory of didactics mostly in an empirical way (Vaitkevičius, 1998). The situation of the time is obvious – no one dares to create comprehensive theories, systems, or at least try to conceptualize educational ideas. Still hope remains. According to Vaitkevičius, it is necessary to believe that these extensive searches in the field of didactics will sooner or later bear the expected fruits and the modern-day Comenius will be born, classical didactics of the modern times will be formed, reflecting the personality of today's student, giving a complete picture of his/her teaching, training, upbringing in the teaching/learning process (Vaitkevičius, 1998). According to Broks (2001) systemology is applied philosophy and psychology, general theory about putting the world in order. Broks treats education as the spiritual and physical arrangement of a man (Broks, 2016).

It is understandable that the interaction between human and the surrounding environment is very complex and multifaceted. It can be said that the educational effect (impact) affects a person in the most diverse systems. The process of impact and the result of impact are two important objects of systemology of education.

Figure 1

Systemology of Education is the Arrangement of Various Effects on a Person in Various Systems



In addition, each of these six systems consists of the most diverse level subsystems, in which educational impact is different (in terms of process and result).

Systemology of education operates with such concepts as *system*, *systemics*, *systemic*, *systematization* and even *systemtechnics*. The terms *systemic planning*, *method of systemic analysis*, *systemic orientation*, etc., are also used. Sometimes the method of systemic analysis is equated with systemic access (Tidikis, 2003), however such equalisation is not justified. It can be said that many concepts of general systems theory permeate the language of education. The term *system approach* is often noticed in education (Bhaskar & Lajwanti, 2019; Dunn et al., 2007; Dunst et al., 1987; Herrold, 1974).

On the other hand, systemology of education can also be treated as a field of social systemology because education is not only a socio cultural, cultural historical, anthropological phenomenon, but also a system and a social institute. The term *pedagogical systemology* is quite widely used (Prikot, 1995, 2001). It is obvious that in foreign scientific literature both general (Brim, 1975; Laszlo, 1972), and systemology of education questions (Broks, 2001; Faye, 1999; Fend, 1981; Knight, 2002; Kron, 1991; Stones, 1986; Rowley, 2002) are thoroughly analysed. Lithuanian scientists have also analysed one or the other issues of educational systemology (Laužackas, 1999; Šermukšnytė, 1996; Targamadžė, 1996; Vaitkevičius, 1968, 1975), however, it is necessary to note that research in this field is not abundant. Vaitkevičius paid a lot of attention to analysing the issues of students' knowledge systematization. In the book "Deepening students' knowledge in the teaching process" (1968) Vaitkevičius analysed the issues of systematisation of knowledge in detail. According to Vaitkevičius, the systematisation of knowledge, as a process, requires the knowledge imparted to students and assimilated by them to be combined

into systems according to the affinity of this knowledge, i.e., to classify them on the chosen basis (Vaitkevičius, 1968, p. 9). And this has to be sought because "the system of knowledge allows a deeper knowledge of reality, its objects, phenomena, their essence, and reasons" (p. 9).

"A human's system of knowledge about reality also determines the system of his relations with the environment, regulates his mental and practical activity. A human's personality is formed in his conscious activity, which is determined by the entire system of knowledge" (Vaitkevičius, 1968).

In his later works Vaitkevičius consistently developed the issue of knowledge systematisation. According to the professor, in the absence of organic connections between individual images and facts, students are presented with local knowledge in the topic, facts that never form a system in the child's consciousness, and do not rise to the level of theory (Vaitkevičius, 1979, p. 17). Education science history knows many examples, reflecting the desire to systematise knowledge, to know the reality systematically. Comenius, the pioneer of classical pedagogy, created a unified philosophy, which he called *pansophy*. According to Comenius, "everyone has an innate desire to have the whole thing rather than its individual pieces, to not tolerate narrow boundaries and to always strive for the whole rather than the part (Komenskis, 1986, p. 377). The ideal of a harmonious personality was raised by Pestalozzi. Although Pestalozzi considered observations to be the basis of students' mental development, however he understood that the knowledge gained in this way is not clear until it is organised. Pestalozzi asserted that it is necessary to "learn to organise your observations and finish what is simple" (Pestalocis, 1989, p. 105). It is safe to say that the idea of knowledge systematisation is one of the essential elements of his elementary teaching theory.

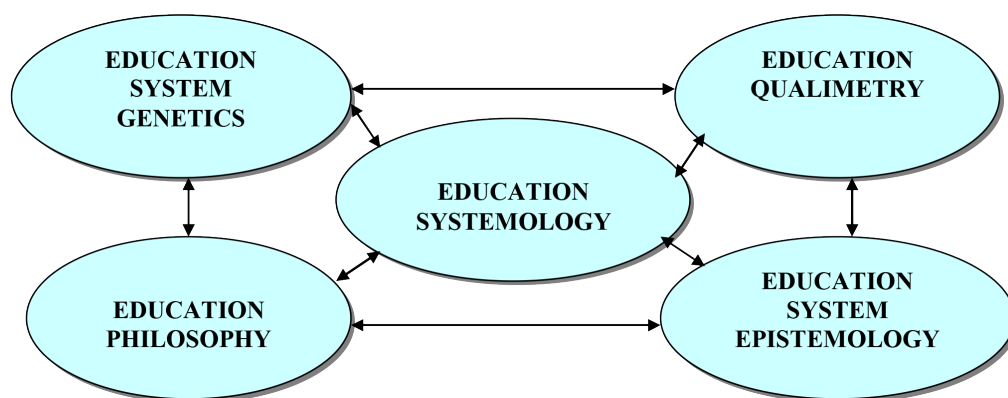
Since the beginning of the 20th century, scientists try to systemise (combine) subject knowledge, by applying the principle of systemic approach. However, one can state that in the first half of this century such attempts were more of mechanical nature (the methods of one science were "transferred" to other sciences). And only from the middle of the 21st century, the attempts to apply systemic approach are much more fruitful. Two different approaches are forming – *natural science* and *humanitarian*. This was also influenced by the rapid development of other sciences such as psychology, philosophy, anthropology, hermeneutics, and others. From this point of view, systemology is a relatively young science. It is worth reminding that the idea of creating a general theory of systems belongs to naturalists – the Austrian biologist Ludwig Von Bertalanffy (1901-1972). At the beginning of the 20th century and especially after 1930, systems become the research object of mathematicians. Mathematical theory of systems, cybernetics, control theory, artificial intelligence and other theories are being formed. So, it is not surprising that the question about a general theory that examines systems arose. According to L. von Bertalanffy (1969), one of the most important ideas is interdisciplinary *General System Theory (GST)*.

Nevertheless, it can reasonably be stated that the creation of general system theory was one of the greatest achievements of the 20th century (Mina Favez, 2004). An interesting fact can be mentioned that the physicists at the conference held in 1987, in Rome /Italy/ were not able to agree on the definitions "simple system", "*complex system*". Therefore, the terms *systemology*, *systemic analysis*, *systemosophy* are often used. For example, there are those who argue that general systems theory is the same as a systemic approach (Harrell, 1978). According to Langlois, systems theory is very diverse (Langlois, 2004). It should be noted that we often make a lot of mistakes regarding complex systems. On the other hand, a person is able to explain them, systemise, what makes the prerequisites to avoid them. Interesting publications on the issues of general systemology can be found in the "International Journal of General Systems" (ISSN 0308-1079) (<https://www.tandfonline.com/toc/ggen20/current>).

It is also important to emphasize the fact that the issues of teaching individual disciplines

are analysed using a systemic approach, e.g., Systemic Approach in Teaching and Learning Chemistry /SATLC/). In addition, educational modelling is an integral part of educational systemology. Systemology of education is related to all educational disciplines. Systemology of education relations with some other subjects/areas are shown in Figure 2.

Figure 2
Systemology of Education Relations with Other Areas of Education



Without trying to show the entire panorama of educational systemology today, we will mention that at the present time, there exist various directions of this science. For example, in the systemology of education systems, one can distinguish such directions as knowledge systemology, personality culture systemology, pedagogical systems systemology, education fundamentalisation systemology, systemic education anthology, etc. It is also necessary to mention such directions as educational innovation, education system typology, education system management, etc. It is obvious that systemology of education is acquiring a new quality, its significance, interest in it is constantly increasing. Recently, there has been more and more discussion about the development of various fields of education. What is it, a system of various pedagogies or a unified science of education as a system? Researchers emphasize that education science still lacks a clear systematic methodology. Education itself is treated as a systematic and purposeful process of teaching and upbringing, satisfying the interests of a person, society, and the state (Lamanauskas, 2004).

In summary, it can be said that systemology of education is a rapidly developing branch of education. It is worth noting that the low development of this field in Lithuania was caused by 50-year lasting Lithuanian education science separation from Western experience. It can be said that a certain part of people only imitated “doing science” but did not really contribute much to the field of science education. In other words, they were occupied in educational babble (*edu-babble*), empty talk. Therefore, it is safe to say that knowing the ABC of educational systemology is one of the main instruments for effective educational change. On the other hand, systemology of education is not only the knowledge of systems in this field. The design of educational (pedagogical) systems becomes an extremely important issue. It is obvious that the use of the term *systemological education paradigm* becomes justified in the development of science education. On a practical level, that’s the systemology, which allows to holistically explore educational phenomena, objects, and processes.

References

- Bhaskar, V., & Lajwanti, D. (2019). Role of systems approach in education. *Journal of Education and Practice*, 10(23), 104-110. <https://doi.org/10.7176/JEP/10-23-15>
- Bertalanffy, L. Von (Ed). (1969). *General Systems Theory: Foundation, development, applications*. New York.
- Brim, O. (1975). Macro-structural Influences on child development and need for childhood social indicators. *American Journal of Orthopsychiatry*, 45(4), 516-524. <https://doi.org/10.1111/j.1939-0025.1975.tb01182.x>
- Broks, A. (2001). Systemology of education. *Pedagogika*, 52, 68-75.
- Broks, A. (2016). Systems theory of systems thinking: General and particular within modern science and technology education. *Journal of Baltic Science Education*, 15(4), 408-410. <http://doi.org/10.33225/jbse/16.15.408>
- Dunst, C. J., Lesko, J. J., Holbert, K. A., Wilson, L. L., Sharpe, K. L., & Liles, R. F. (1987). A systemic approach to infant intervention. *Topics in Early Childhood Special Education*, 7(2), 19-37. <https://doi.org/10.1177/027112148700700204>
- Dunn, K., Scileppi, J., Aversa, L., Zerillo, V., & Skelding, M. (2007). *The contemporary applications of a systems approach to education*. University Press of America.
- Faye, B. (1999). A systemic approach to sustainable environmental education. *Cambridge Journal of Education*, 29(3), 433-446. <https://doi.org/10.1080/0305764990290311>
- Fend, H. (1981). *Theorie der Schule* [School theory]. 2 Aufl. Munchen-Wien.
- Harrell, A. T. (1978). *New methods in social science research; Policy sciences and futures research*. Praeger Special Studies.
- Herrold, W. G. (1974). The systemic approach to competency-based teacher education. *Paper presented at the Annual Meeting of the International Reading Association* (19th, New Orleans, May 1-4). Louisiana.
- Knight, P. (2002). A systemic approach to professional development: Learning as practice. *Teaching and Teacher Education*, 18(3), 229-241. [https://doi.org/10.1016/S0742-051X\(01\)00066-X](https://doi.org/10.1016/S0742-051X(01)00066-X)
- Komenskis, J. A. (1986). *Pedagoginiai raštai* [Pedagogical writings] /sudaryt. V.Rajeckas/. Šviesa.
- Kron, W. F. (1991). *Grundwissen Padagogik* [Basic knowledge of pedagogy]. UTB Grosse Reihe, Reinhardt-Munchen.
- Lamanauskas, V. (2004). *Ugdymas: aksiomatinis ir sisteminis aspektai* [Education: axiomatic and systematic aspects]. UAB Ciklonas.
- Lamanauskas, V. (2012). Ugdymo sistemologija: sampratos, raidos, struktūros aspektai [Systemology of education: Aspects of concept, development, structure]. In A. Gumuliauskienė (Ed.). *Švietimas ir ugdymas* (pp. 24-50). Šiaulių universiteto leidykla. <https://www.lituanistika.lt/content/91456>
- Langlois, R. N. (2004). *Systems theory, knowledge, and the social sciences*, 581-600. <https://richard-langlois.uconn.edu/wp-content/uploads/sites/1617/2019/09/Machlup-1983-captured.pdf>
- Laszlo, E. (1972). *Introduction to systems philosophy*. New-York.
- Laužackas, R. (1999). *Sistemoteorinės profesinio rengimo kaitos dimensijos* [System-theoretical dimensions of professional training change]. Kaunas.
- Mina Fayez, M. (2004). The role of the systemic approach in the humanistic renaissance in mathematics education. https://www.researchgate.net/publication/255659148_The_Role_of_the_Systemic_Approach_in_the_Humanistic_Renaissance_in_Mathematics_Education
- Pestalocis, J. H. (1989). *Pedagoginiai raštai* [Pedagogical writings] /sudaryt. M.Karčiauskienė/. Šviesa.
- Prikot, O. G. (1995). *Pedagogika otohdestvlenija i pedagogicheskaja sistemologija* [Identification pedagogy and pedagogical systemology]. Sankt-Peterburg.
- Prikot, O. G. (2001). *Izbrannye stat'i po pedagogike* [Selected articles on pedagogy]. Sankt-Peterburg.
- Rowley, W. J., Sink, C. A., & MacDonald, G. (2002). An experiential systemic approach to encourage collaboration and community building. *Professional School Counselling*, 5(5), 360-365. https://digitalcommons.tacoma.uw.edu/education_pub/39
- Stones, E. (1986). Towards a systemic approach to research in teaching: The place of investigative pedagogy. *British Educational Research Journal*, 12(2), 167-181. <https://doi.org/10.1080/0141192860120206>

- Šermukšnytė, L. (1996). Švietimo sistemos funkcijos [Functions of the education system]. Kn. N. Večkienė, Jucevičienė P. ir kt. (Red.), *Švietimo vadybos įvadas* [Introduction to educational management] (pp. 103-107). Kaunas.
- Targamadžė, V. (1996). Švietimo sistemos samprata [Concept of education system]. Kn. N. Večkienė, Jucevičienė, P. ir kt. (Red.), *Švietimo vadybos įvadas* [Introduction to educational management]. Kaunas.
- Tidikis, R. (2003). *Socialinių mokslų tyrimų metodologija* [Social science research methodology]. Vilnius.
- Vaitkevičius, J. (1968). *Mokinių žinių gilinimas mokymo procese* [Deepening students' knowledge in the teaching process]. Vilnius.
- Vaitkevičius, J. (1975). *Mokinių žinių vystymosi problemos* [Problems of students' knowledge development]. Šviesa.
- Vaitkevičius, J. (1979). Žinių sisteminimas, kaip pedagoginė problema [Systematization of knowledge as a pedagogical problem]. *Tarybinė mokykla*, 6, 16-19.
- Vaitkevičius, J. (1988). *Socialinės pedagogikos bruožai* [Features of social pedagogy]. Mokslas.

Received: October 30, 2022

Accepted: November 30, 2022

Cite as: Lamanauskas, V. (2022). Systemology of education: Some thoughts on the concept and development. *Problems of Education in the 21st Century*, 80(6), 744-749. <https://doi.org/10.33225/pec/22.80.744>

Vincentas Lamanauskas

PhD, (HP), Professor, Chief Researcher, Vilnius University Šiauliai Academy, Institute of Education, P. Visinskio Street 25-119, LT-76351 Šiauliai, Lithuania.
E-mail: vincentas.lamanauskas@sa.vu.lt
Website: <http://www.lamanauskas.puslapiai.lt/>;
https://www.researchgate.net/profile/Vincentas_Lamanauskas
ORCID ID: <http://orcid.org/0000-0002-4130-7899>