

A FEW POINTS ABOUT AXIOMATICS OF EDUCATION

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Postulates and axioms have been used as a means of knowledge since ancient times. The well-known ancient Greek thinkers Aristotle, Plato, Euclid, and others used this cognitive tool. As an example, we all know – Euclid's postulates. Although mathematicians consider him the pioneer of mathematics, one of the most famous mathematicians, nevertheless, it is more appropriate to consider Euclid as a Greek philosopher, who presented the most important postulates and axioms in his book "Elements". The prevailing opinion is that in essence it is exactly enough to prove all mathematical statements. Even though that the most perfect axiomatics is classical Euclidian geometry, there is an alternative here, i.e., modern non-Euclidean geometry.

Can such an analogy be found in education (pedagogy). Do we have educational alternatives? It turns out it is possible. Most of the educational statements we know can indeed be considered postulates and axioms. It is obvious that this is especially evident in folk pedagogy (ethnopedagogy). It seems to be saturated with postulates and axioms (proverbs, sayings, expressions, etc.). So, it can be said that:

- Most sciences, such as logic, natural sciences widely use postulates and axioms as a cognitive instrument;
- Postulates and axioms of education is a poorly theoretically analysed area;
- Axiomatics of education is a rather spontaneous area of education.

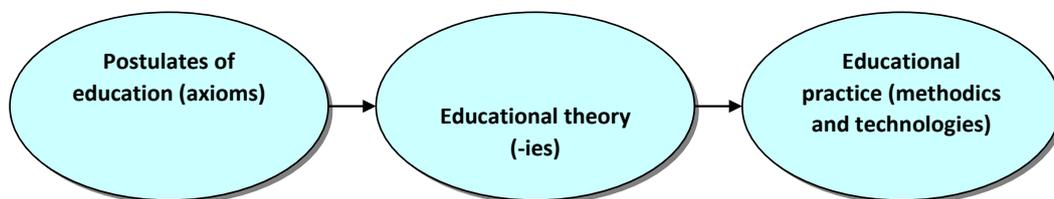
In order to analyse and get to know the axiomatics of education in more detail, first of all, it is necessary to understand the general foundations of postulates and axioms. Four essential points can be mentioned:

- Postulates and axioms do not fundamentally differ at the level of modern understanding. Philosophers and logicians consider these two concepts synonymous. Therefore, in principle, we do not aim here to examine the differences between these concepts. Postulates and axioms have a historically formed context. Modern science understands postulates as initial statements of any theory, which do not need to be proven;
- Postulates (axioms) are treated as obvious, unprovable truths because they are the result of long-term and repeated observations of phenomena;
- Axiomatic method is characterised by precision, strict rules, often formalised language, although it is understood that not always and not everything can be formalised;
- In education, the axiomatic method requires empirical confirmation. In this view, axioms are examined as hypotheses.

The essential task of educational axiomatics can be represented in the following sequence (Figure 1).

Figure 1

Relationship: Educational Axiomatics-Educational Theory-Educational Practice



Ethnopedagogy has accumulated many different postulates, which, by the way, have been verified by the long-term practice of many generations. Therefore, it is an urgent task not only to know them, but to systematise them. When the postulates are presented in a certain system, with a certain consistency, then it helps us to have an excellent methodological basis for any theory of education. From this point of view, *the axiomatics of education* and *systemology of education* are closely related fields determining one another. A cognitive field is developing *systematic axiomatics* (Lamanauskas, 2004). A question may arise as to how postulates (axioms) interact with laws and regularities of education, various rules, and principles of education. It would be wrong to think that they change the laws and regularities. Modern science tends to treat postulates (axioms) as a component supplementing laws and regularities. However, it cannot be denied that it is an important and fundamental methodological basis of education. The most important thing is that postulate (axiom) should perform an essential function – it would form pre-requisites for further conclusions (derived statements, principles, rules, etc.). It is obvious that axioms are the cornerstones of any theory. Of course, a scientific theory can be constructed without axioms, however, in scientific researchers' opinion, such theory will not be of full value. It can be conditionally stated that until now the concepts of educational science have been constructed without "laying" axioms in their foundations. By using the possibilities provided by the computer, it was clearly established the place of axioms in the pedagogical theory structure. It turned out that axioms are not only the basis of scientific theory, but also the result, the level reached (Podlasyj, 1991). It can be said that axioms at the same time crown a scientific theory. Science education is special from this point of view because it has most abundant empirical base (whole "mountains" of facts have been accumulated). How not to get lost in such an abundance of educational information? How to sort out this abundance at least a little (separate the chaff from the grain)? This is where we cannot do without axiomatics. It remains only to wish researchers and educational practitioners to look into these issues much more deeply and in detail than they have so far. It is not so easy to find axioms in the abundance of empirical statements. Not every statement as a matter of fact can be an axiom. For this, it is necessary that the meaning of that statement remains unchanged in any educational context (both in terms of time and space). Only then, it is possible to construct various systems of educational axioms.

When examining the issues of axiomatics of education, the concept of "theorem" is inevitably mentioned (Figure 2). Theorem (gr. *theorema* – teaching, rule) – a theoretical statement, the truth of which can be or is logically proven, based on previously established scientific statements (TŽŽ, 1985).

Figure 2
Theorem of Education as a Postulate Outcome and as a Prerequisite of Rule Formulation



Two examples can be given that illustrate this connection.

The first example

Play – a natural child’s need (*axiom*) → if we create conditions for the child to play, then his development will be effective (*theorem*) → various game methodologies, game practice (*didactic/hodegetic rules, and principles*).

The second example

A child becomes independent by acting practically (*axiom*) → in order to develop the child’s independence, it is necessary to assign specific practical tasks and obligations to children (*theorem*) → various methodologies of independence education, practice of such education (*didactic/hodegetic rules, and principles*).

It is necessary to note that each educational paradigm is based on certain essential postulates. The latter are which basically show the content of a specific paradigm and its coordinates in space and time. As an example, we can examine the postulates of the traditionalist-conservative educational paradigm. As Lатыš (2000) rightly noticed, this paradigm does not go to the past in any way, on the contrary, it often even regains its position in current and maybe in future education. It can be said that this paradigm is resistant to various new educational currents, educational fashions, and political change alternatives.

Postulate 1: education provides students with basic knowledge, abilities and skills (*axiom*) → education is effective when priority is given to mastering the main elements of the teaching instrument (*theorem*) → it is important to teach children to read, write, and count, to provide other most necessary mathematical, natural science skills, and socio-humanitarian knowledge, abilities, skills, which are the basis for mastering any other academic subjects (*didactic goals and tasks*).

Postulate 2: in the productive education process, only important and necessary knowledge is conveyed (*axiom*) → education process is effective when it focuses on the most significant areas of human cognition (*theorem*) → in the education process, it is necessary to distinguish fundamental things from superficial, indisputable things from temporary, passing, etc. (*didactic goals and tasks*).

Postulate 3: eternal human values – the basis of education (*axiom*) → a morally saturated educational process enables the development of a strong, mature personality (*theorem*) → in the educational process, the value component is important, value orientation of the learners, the development of value attitudes and beliefs, all that preserves value and significance not only in the present but also in the future (*didactic goals and tasks*).

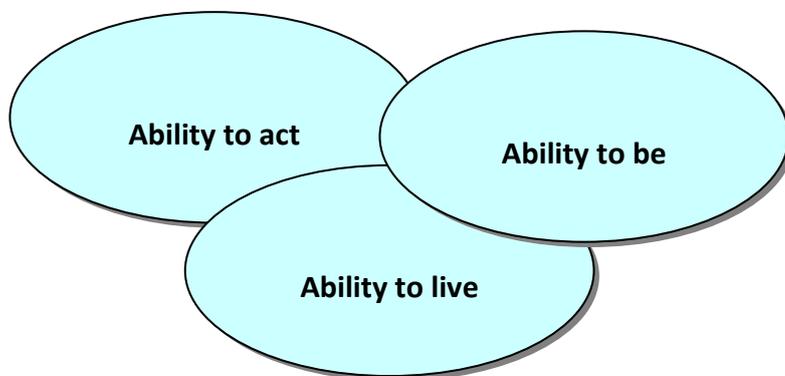
Here we have shown the postulates of only one of the paradigms. It is obvious that many proofs can be presented for each of them (classical didactics, philosophy, etc.).

The 21st century insisted on qualitatively different education. Current global problems require a new educational paradigm. In other words, flexible educational systems require flexible pedagogy (Neimatov, 2002). Rapid changes in education at all levels of the system require not only adequate operation, but first of all, adequate understanding of the ongoing processes. The main axiom – any quick and easy educational achievements are an illusion. Perhaps the most important education law in this aspect is - do not harm.

It is obvious that 21st century requires qualitatively new competencies. The most essential can be represented in the form of a triad (Figure 3).

Figure 3

The Triad of Most Important Competencies



Although 20th century shaped technical progress (a new world view), on the other hand, it caused many undesirable phenomena. It is obvious that the reason lies not in the technique itself or in the technique progress, but in the insufficient understanding of its essence. The human factor of technical progress becomes the central axis. Researchers emphasize that a modern specialist must be both a professional and a humanist (Broks, 2000; Lamanauskas, 2003). However, the man of the 21st century found himself on the boundary between reason and faith, truth and lies, illusions and myths. Therefore, it is understandable why the last decade of the 20th century could be characterised as a period of active search for new educational paradigms. The issue of the reconstruction of education in a humanistic and humanitarian direction (humanitarian and humanistic paradigms of education) is being discussed very actively. This approach to education today may seem to reject teaching and upbringing, which undoubtedly is and will be important. However, as researchers note, the personality-oriented education-communication model in no way ignores the systematic education and training of children, it does not disturb the consistency of the goals of pedagogical activity (Juodaitytė, 2002, p. 32). Basically, all modern searches in education are expressed by three postulates.

Postulate 1: A child is an active subject with individual features, talents, and aspirations unique to him (*axiom*) → it is a personality, discovering and creating the culture of society, living in that society independently and forming himself independently, and becoming a full-fledged and free member of the nation (*theorem*) → it is important to educate the ability of young generation not only to live in a constantly changing world and environment, but also to change living conditions, to improve them, not being satisfied with what has been obtained from previous generations (*didactic goals and tasks*).

Postulate 2: The socialisation of the personality is realised in a polycultural society, characterised by diversity and interdependence (*axiom*) → the classical concept of culture as the process of transmission of values and beliefs from generation to generation through language and other symbol systems is inadequate and insufficient for present and future life (*theorem*) → modern culture is a set of interacting cultures, the space of human existence, for the creation of which it is necessary to train the young generation (in the construction of education goals, content, process, etc.) (*didactic goals and tasks*).

Postulate 3: The most important and primary source of modern education (teaching and upbringing) is real life and direct experience (*axiom*) → education is effective when it is maximally moved nearer (or fully adequate) to modern life, is active and realised through cooperation (*theorem*) → emphasis is placed on active teaching, work in various groups (teams), cooperation in various project and innovative activities (*didactic goals and tasks*).

Thus, it can be said that the axiomatics of education is a significant instrument for the cognition of educational phenomena, processes, and perspectives. Future education can no longer be based on postulates established by directives. It is no doubt that it is useful for educators to constantly remember the axiomatic statement – a mature thought gives birth to a wise action. Education is capable of changing society, just as society is capable of changing education. A fundamental open question is how to transform society through education. Of course, in a positive way. Finally, what changes in education can we expect in the next 20-30 years? Will a revolution take place in education? Predictions say that in the future even in the field of education, robots and machines will work instead of people. Does this mean that educational processes will take place without values and with very little interaction between educators and students. According to Eleyyan (2021), it is important to effectively implement significant changes in teaching/study programmes, learning/study environment, teacher – student roles and other changes, in order to cope with the challenges caused by the industrial revolution (4.0). Axiomatic theory in a general sense, or educational axiomatics, has real predictive power for education systems. This is undoubtedly important in education, where “trial and error” can turn into “trial by fire” for those being educated (Thompson et al., 2009).

References

- Broks, A. (2000). *Izglitibas sistemologija* [Systemology of education]. RaKa.
- Eleyyan, S. (2021). The future of education according to the fourth industrial revolution. *Journal of Educational Technology & Online Learning*, 4(1), 23-30. <http://doi.org/10.31681/jetol.737193>
- Juodaitytė, A. (2002). *Socializacija ir ugdymas vaikystėje* [Socialization and education in childhood]. Petro ofsetas.
- Lamanauskas, V. (2003). *Natural science education in contemporary school*. Siauliai University Press.
- Lamanauskas, V. (2004). *Ugdymas: aksiomatinis ir sisteminis aspektai* [Education: Axiomatic and systemic aspects]. UAB Ciklonas.
- Latysh, N. I. (2000). *Obrazovanie na rubezhe vekov* [Education at the turn of the century]. NIO.
- Nejmatov, Y. M. (2002). *Obrazovanie v XXI veke: tendencii i prognozy* [Education in the 21st century: Trends and predictions]. Algoritm.
- Podlasyj, I. P. (1991). Aksiomy pedagogiki [Axioms of pedagogy]. *Narodnoe obrazovanie*, 1, 19-25.
- Tarptautinių žodžių žodynas (TŽŽ)* [Dictionary of international words](1985). Vyriausioji enciklopedijų redakcija.

Thompson, M. K., Thomas, B. C., & Hopkins, J. B. (2009). Applying axiomatic design to the educational process. In *Proceedings of the fifth international conference on Axiomatic Design (ICAD 2009, Campus de Caparica – March 25-27)* (pp. 93-98). FCT-UNL. https://www.axiomaticdesign.com/wp-content/uploads/icad2009_13.pdf

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