



AN INNOVATIVE INTERDISCIPLINARY INTERPRETATION OF EDUCATION'S ROLE IN SUSTAINABILITY

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HIGHLIGHTS

- “Образование” in Russian means both “education” and “formation”, highlighting a unique perspective.
- Education shapes worldviews, while training focuses on job-specific skills.
- Education instils values and systemic understanding beyond immediate skills.
- Hands-on methods, seen in animals and traditional practices, remain effective.
- AI impacts teaching and learning but does not replace education’s core function.
- Education supports long-term career and personal growth.

GRAPHICAL ABSTRACT



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ABSTRACT

The concept of “education” varies across cultures and languages, with the Russian term “образование”, encompassing both “education” and “formation”. This dual meaning reflects different approaches to understand education’s purpose. While education often implies the development of curiosity and a broad worldview, training is oriented toward acquiring practical, job-specific skills. These differences underscore the importance of distinguishing between the two concepts, as they serve complementary but distinct roles. Education involves not only teaching and learning but also instilling values and shaping an individual’s perspective on the world. Unlike training, which focuses on immediate applicability, education fosters a deeper understanding of systems and relationships, preparing individuals for lifelong growth. Observations of natural learning processes in animals and traditional learning techniques in human cultures highlight the value of hands-on and experiential methods, often overshadowed by contemporary practices. Despite the growing influence

of technology on teaching and learning processes, the essence of education as a means of shaping worldviews remains unchanged. While students may prioritise career-oriented training, education provides a foundation for long-term personal and professional development, ultimately enriching both individual lives and society as a whole.

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Introduction

A recent article in Nature Publishing Group's Humanities and Social Sciences Communications cites a United Nations Educational, Scientific and Cultural Organisation (UNESCO) report stating that "Education is crucial for the achievement of sustainable development" (Romulo *et al.*, 2024). According to last year's article in Scientific Reports, higher educational levels are associated with an increase in specific environmentally friendly behaviours and sustainable energy consumption practices (Piao & Managi, 2023).

The word "education" translates into Russian as "образование". The word "образование" is polysemic in Russian and the other meaning it bears is "formation". Hence, when a Russian person hears the word "education" without any context, it is impossible to say whether the talk is about education or formation. In Russian language, education and formation sound identical. In order to describe the crystal growth and the resulting single crystal, a Russian person would use a verb derived from "образование", despite the fact that the crystal is obviously not learning anything.

According to Lawrence Cremin, "Education is the deliberate, systematic, and sustained effort to transmit, provoke, or acquire knowledge, values, attitudes, skills, or sensibilities as well as any learning that results from the effort" (Cremin, 1976). However, from a Russian-speaking perspective, if one thinks of a person's

education in terms of a person's formation, then the traditional definitions of education might not serve very well. Andrei Volkov (academic policy adviser at the Moscow School of Management SKOLKOVO, Russia) argues that education is in fact installation of the worldview. Thanks to education, its beneficiary understands the cause-and-effect manner in which system components interrelate.

Seeking higher education, people go to universities. Or do they? Anya Skatova and Eamonn Ferguson (2014) have shown that "Engineering students strive for good career opportunities and regard intrinsic interest in the subject as an unimportant factor in the choice of degree". This seeming contradiction does arise from the way we understand education. Those engineering students, in contrast to having a worldview installed, crave being prepared for a specific job, which is training, not education (Volkov, 2023). While education is curiosity-driven and implies exposure to different worlds, training is focused on procedures and operations.

Having stressed the difference between education and training, Andrei Volkov continues to distinguish in his workshops the concepts of teaching/learning and upbringing. While the result of teaching and learning is the ability to demonstrate various literacies, the long-term effect of upbringing is having values impregnated.

Unfortunately, it is very common for the terms "education" and "teaching/learning" to be used interchangeably. For example,

Cambridge Dictionary (Education, 2024) states that “Education is the process of teaching or learning, especially in a school or college, or the knowledge that you get from this”. However, it is crucial to distinguish between those terms.

Will Artificial Intelligence (AI) destroy education? (Vardi, 2022). The question arose long before the advent of ChatGPT. A news feature published in *Nature* (Extance, 2023) gives us an idea how Large Language Models (LLMs) could transform education. AI learning partner integrates the LLM with external, focused corpuses of knowledge—such as a textbook or a set of scientific articles—that have been rigorously verified. We can see that education and learning are used here interchangeably. While AI will probably indeed transform learning (and teaching), we can be rest assured that education, in the context of the installation of worldview will remain the same. According to a recent review article in *Sustainable Development*, adaptive learning technologies and AI will contribute to achieve a sustainable future (Strielkowski *et al.*, 2024).

One possible way to reveal the intricacies of learning is to observe it in nature. Thanks to Tchernichovski and Conley (2019), we know that the teaching/learning success of songbirds relies on the genetic compatibility of pupils and tutors. According to Koprina (2022), “The move towards recognising animal personhood in education promises to signify a return to a non-anthropocentric ethic that characterises the most transformative forms of education for environmental sustainability”. De Waal (2019) has shed light on the way young monkeys learn from their elders. The secret lies in mirror neurons (Acharya & Shukla, 2012) which represent a distinctive class of neurons that discharge both when an individual executes a motor act and when he observes another individual performing the same or a similar motor act. In the wild, primates remove seeds from a fruit the way their mother does. Hence, by design monkeys

employ native (i.e., natural, normal) teaching/learning techniques. For instance, Whiten and van de Waal (2017) have emphasised the role for the mirror neuron system in social learning and sustaining traditions for both monkeys and apes.

However, learning by repetition does not exist only among primates. According to Oxford and Burry-Stock (1995), Chinese and Japanese are concrete-sequential learners, who use a variety of strategies such as among others, memorisation, and sequenced repetition. It gives us valuable insights into paying proper attention to traditional learning techniques that involve physical or hands-on learning experiences.

Conclusions

In conclusion, education and training are not, of course, mutually exclusive. Therefore, it is not surprising that students prioritise career prospects over education. However, education is the intrinsic quality that will boost an individual’s career at any stage. Hitka *et al.* (2021) have demonstrated that an employee’s career is significantly influenced by his or her level of education.

A recent original research article in *Frontiers in Education* encourages higher education institutions to explore integrating sustainability ideas in all academic disciplines (Abdullahi *et al.*, 2024). In order for the integration to achieve success, educational stakeholders and industry partners are to collaborate closely, working out a systematic strategy and action plan (Abo-Khalil, 2024).

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Conflict of Interest Statement

The author declares no conflict of interest.

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