Ecosystem approach to the development of young educators' "future skills"

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Abstract. The development of skills most in demand in the professional sphere and for achieving personal well-being in the near future is one of the urgent tasks of innovative education. This task can be solved with a framework ecosystem approach in education, relevant to the uncertainty of the future. The aim of the study: to justify an ecosystem approach in education for the development of "future skills". Materials and research methods: Expert reports from the World Economic Forum (2020, 2023), stakeholder approach, philosophical (conceptual) analysis, framework, critical analysis. Research results: The skills most in demand for employees in the field of education were systematised according to the following clusters. Cognitive skills, Self-efficacy, Working with others, Technology skills, Engagement skills, Management skills; the essential characteristics of the framework approach in education relevant to the uncertainty of the future were revealed; the main principles of the ecosystem approach in education (holism, coeducation, flexibility, pragmatism) were formulated; the general conditions for their implementation were established as framework, well-being of actors, multi-stakeholderism of actors, network model of interaction, and networking. The ecosystem approach in education realises the anti-hierarchical interaction of multi-stakeholders, which can ensure the satisfaction of students' demands with the synergy of education and professional development, contributing to the development of "future skills" of young teachers. Limitations of the study were identified.

1 Introduction

The development of skills most in demand in the near future is necessary for well-being and prosperity in the new reality. In a broad sense, "future skills" are cross-functional skills that are most in demand in the future in the professional sphere in various sectors of the economy and for achieving personal well-being. "Rebooting" skills relevantly to the situation is one of the urgent tasks of innovation education. In Industry 4.0, the effectiveness of innovative pedagogy is defined by the educational ecosystem, meaning "interplay between multiple learning environment components", it is a collective system of learner-centred learning and sustainability of student learning, which requires comprehension of the dynamic, diversified and interactive nature of interaction between educational institutions and activities using

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digital technologies [1]. It should be taken into account that ecosystem actors interact based on the principles of self-organisation and mutually beneficial distribution of resources [2]. The development of skills most in demand in the near future requires understanding the context of their use. In the context of future uncertainty in a world of rapid change VUCA: volatility, uncertainty, complexity, ambiguity [3], "age of chaos" BANI: Brittle, Anxiety, Non-linear, Incomprehensible (J. Cascio) [4], it is advisable to apply a framework approach.

Aim of the study: to justify an ecosystem approach in education for the development of "future skills".

Objectives:

1) to systematise the most demanded "future skills" for workers in Education,

2) to identify the essential characteristics of the framework approach in education,

3) formulate the main principles of the framework ecosystem approach relevant to education,

4) to compile a framework of the ecosystem approach to the development of "future skills".

2 Materials and Methods

The materials of the study were the reports of the World Economic Forum experts on the projects "The Future of Jobs. Report 2020", "Future of Jobs Report 2023".

The stakeholder approach is necessary to take into account the positions of various stakeholders in the development of "future skills". Philosophical (conceptual) analysis allowed us to identify the essential characteristics of the framework approach and formulate the basic principles of the framework ecosystem approach relevant to education. The framework method was applied to build a correlation between the principles of the ecosystem approach in education and the conditions of its implementation for the development of "future skills" clusters. Critical analysis allowed us to identify the limitations of the study.

3 Results

3.1 The most in-demand skills for employees in Education

Experts from the World Economic Forum (Davos: 2020, 2023) highlight the skills most in demand by employers in different industries and occupations over the next five years. According to employers' estimates, the most in-demand skills for employees in the education sector in the near future are cognitive skills (Systems thinking, Creative thinking, Analytical thinking, Critical thinking and analysis, Active learning and learning strategies, Emotional intelligence, Complex problem-solving, Reasoning, problem-solving and ideation). This trend "reflects the increasing importance of complex problem-solving in the workplace" [5, p. 39].

Table 1 systematises the top 10 skills most in demand for employees in the field of education according to the reports of the World Economic Forum experts ("The Future of Jobs. Report 2020", "Future of Jobs Report 2023"). Skills according to "The Future of Jobs. Report 2020" are listed as the most demanded in the organisation in descending order [6, p. 130]. According to "The Future of Jobs Report 2023" the importance of skills for employees of organisations is indicated in % ("Net difference between the shares of organisations which consider skills to be increasing and decreasing in importance to their workers from 2023 to 2027 (%)") [5, p. 80].

Table 1. Top 10 skills most in demand for workers in the field of Education according to the reports of World Economic Forum experts (2020, 2023)

The most in-demand skills for workers in education	
«The Future of Jobs. Report 2020»	**«Future of Jobs Report 2023»**
1. Creativity, originality and initiative. 2. Active learning and learning strategies. 3. Technology design and programming. 4. Emotional intelligence. 5. Critical thinking and analysis. 6. Complex problem-solving. 7. Analytical thinking and innovation. 8. Reasoning, problem-solving and ideation. 9. Service orientation. 10. Resilience, stress tolerance and flexibility.	1. Systems thinking (77 %). 2. Creative thinking (76 %). 3. Curiosity and lifelong learning (76 %). 4. Analytical thinking (75 %). 5. Resilience, flexibility and agility (73 %). 6. Empathy and active listening (72 %). 7. Teaching and mentoring (72 %). 8. Talent management (72 %). 9. Technological literacy (72 %). 10. AI and bigdata (68 %).

Thus, the skills most in demand in Education correspond to following skills clusters:

1)Cognitive skills (Analytical thinking, Analytical thinking and innovation, Critical thinking and analysis, Complex problem-solving, Reasoning, problem-solving and ideation, Creative thinking, Creativity, originality and initiative),

2)Self-efficacy (Resilience, flexibility and agility, Resilience, stress tolerance and flexibility, Active learning and learning strategies, Curiosity and lifelong learning),

3)Working with others (Emotional intelligence, Empathy and active listening, Teaching and mentoring),

4)Technology skills (Technology design and programming, Technological literacy, AI and big data),

5)Engagement skills (Service orientation),

6)Management skills (Talent management).

3.2 Essential characteristics of the framework approach in education

Based on the definition of the concepts "frame", "framework" [7; 8], the essential characteristics of the framework approach are:

- conceptual guidance, a set of principles in building the basis of the design - a framework containing a basic set of elements, allowing to avoid its development from scratch for each interaction,
- flexibility, allowing to make changes in the processes, to adapt to changes due to the fundamental completability of the framework,
- transparency for co-operation, expressed by the fit together and unified elements that make up the framework structure,
- logically structured approach to problem solving.

Framework approach in education will allow to realise an open anti-hierarchical interaction of multiple stakeholders interested in meeting the needs of learners while combining human resources and technologies and creating flexible and self-developing systems. Frame of interaction can be completed by involving new stakeholders in education and supplementing the processes of joint learning and development depending on the problem being solved.

3.3 Principles of the Ecosystem Approach Framework in Education

The integrity and multifaceted nature of the framework approach realises the ecosystem approach - a global trend in various spheres of activity, including education. Ecosystem in education is a living social organism - an open system, the essential elements of which are "multifaceted, co-created, purposeful" [9, p. 46].

Taking into account the Principles for the Ecosystem Approach and modern research [10-14], let us formulate the main principles of the ecosystem approach relevant to education and the conditions for their realisation.

1) The principle of holism, which means the priority of the whole in relation to its parts, the irreducibility of the whole to its parts:

- Framework - conservation of ecosystem structure and functioning, understanding of the role of stakeholder-actors as components of the ecosystem: their anti-hierarchical interconnectedness, co-operation, synergy of resource exchange, problem solving in education;
- Actors' well-being: meaningfulness of learning for work and life, mentoring / facilitation, development of potential: intellectual, emotional, physical, creative, spiritual, social.

2) The principle of co-education - co-education, co-operation, realised in conditions of:

- multi-stakeholderism of actors from different sectors of the economy and scientific disciplines: teachers, students, parents, employers, government, investors, local communities and other stakeholders;
- network model of collaborative learning and development;
- community of practice (combining participants of the educational process into hybrid teams that develop as a single unit of involved talents).

3) The principle of flexibility (adaptability, pre-adaptability) of education as a response to the inevitability of changes (environmental, political, economic, social and cultural), forecasting of possible crises and preparation for variability of future development. The realisation of this principle is facilitated by:

- Personalisation in education taking into account different forms of information (including scientific and indigenous and local knowledge, innovations and practices) in a hybrid environment including a combination of online and offline formats, communities (learning, partner, end-user), spaces (classroom, "field" (school, college, enterprise), VR/AR); constant Upgrade in educational content management; formation and development of lifelong learning culture;
- inclusion (inclusive pedagogy for the development of professional identity of young teachers [15], Workplace inclusion [16].

4) The principle of pragmatism as a tool of practical action is realised under the conditions of:

- expediency (collaboration, dialogue, long-term goal setting),
- usefulness (understanding of the ecosystem in an economic context, recognition of potential benefits by education stakeholders),
- practicality (application of education results in practice: development and implementation of projects).

Framework for an ecosystem approach to developing 'future skills' The application of the ecosystem approach in education to the development of young teachers' "future skills" is shown in Table 2.

Table 2. Framework of the ecosystem approach in education to the development of "future skills"

Principle	Conditions for implementing the principles				Clusters of "future skills"
Holism	Framework	Stakeholders - actors	Anti-hierarchy of interconnection		Cognitive skills Working with others Self-efficacy
			Cooperation	Exchange of resources: "1+1=3"	Working with others Self-efficacy
		Problem solving			Cognitive skills
	Actors' well-being	Meaningful learning	For work		Cognitive skills Self-efficacy
			For life		
		Mentoring / facilitation			Working with others Engagement skills
		Capacity development	Intelligence Emotions Physical Creativity Spirituality Sociality		Self-efficacy Cognitive skills Self-efficacy
Co-education	Multi-stakeholder actors	Educators Students Parents Employers Investors Local communities, etc.			Cognitive skills Working with others Engagement skills Self-efficacy Technology skills
	Network model of interaction	Training			Self-efficacy Cognitive skills Management skills Working with others
		Development			
	Team	Hybrid, cross functional			Working with others Self-efficacy Technology skills
		Talents	Engagement		Management skills Working with others Self-efficacy
Flexibility	Personalisation in education	Educational design environment: hybrid	Format: Online + offline		Technology skills Self-efficacy Working with others
			Communities	Tutorials	Working with others Self-efficacy Engagement skills
				Partnerships	
				With end users	
			Space	Training room	Technology skills Self-efficacy Working with others
				Field	
				VR / AR	
			Educational content management	Permanent Upgrade	Technology skills Cognitive skills
		Lifelong learning			Self-efficacy Cognitive skills
	Inclusion	Inclusive pedagogy			Engagement skills Working with others Self-efficacy

		Workplace inclusion		Engagement skills Working with others Management skills
Pragmatism	Expediency	Collaboration		Cognitive skills Working with others
		Dialogue		
		Durability		
	Usefulness	Economic context	Actor benefits	Cognitive skills
	Functionality	Project development		Cognitive skills Technology skills
		Project implementation		Engagement skills Technology skills Self-efficacy

4 Conclusions

Thus, the ecosystem approach in education is a framework approach that is relevant to the uncertainty of the future and realises an antihierarchical interaction of multistakeholders interested in meeting the needs of learners, with synergy between education and professional development. The ecosystem approach in education is based on the principles of holism, co-education, flexibility and pragmatism; the general conditions for the implementation of these principles are framework, well-being of actors, multistakeholderism of actors, network model of interaction, team, personalisation in education, inclusion, expediency, usefulness, practicality. This approach allows young educators to develop various "future skills" corresponding to the clusters. Cognitive skills, Self-efficacy, Working with others, Technology skills, Engagement skills, Management skills.

The study is consistent with the idea that the skills ecosystem approach attempts to provide "a strong synergy between education, training, and workforce development and living in a variety of production settings, both at high-skill and at more foundational levels" [17].

The analytical assessment of the ecosystem approach in education to the development of "future skills" of young educators is based on the demand for these skills in the field of education and may be volatile due to the uncertainty of the future. This determines the limitations of the study.

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