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Fundamentals of developing students' cognitive abilities in european universities

Fundamentos del Desarrollo de las Habilidades Cognitivas de los Estudiantes en las Universidades Europeas

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Abstract

The purpose of the academic paper is to study the fundamentals of developing students' cognitive abilities in European universities. The methodology included a subject study to describe the fundamentals of developing students' cognitive abilities based on analyzing secondary data and materials of the European Commission, the analysis of the cases of European universities' two alliances: The 4EU+ European University Alliance (2023a) and The Arqus European University

Alliance (2023a). The results indicate the development of quality inclusive education in the EU based on common human values and a partnership approach to cooperation between institutions and communities.

Keywords: cognitive abilities, European universities, European educational space, EU's competence framework.

Resumen

El propósito del trabajo académico es estudiar los fundamentos del desarrollo de las habilidades cognitivas de los estudiantes en las universidades europeas. La metodología incluyó un estudio temático para describir los fundamentos del desarrollo de las capacidades cognitivas de los estudiantes a partir del análisis de datos y materiales secundarios de la Comisión Europea, el análisis de los casos de dos alianzas de universidades europeas: The 4EU+ European University Alliance (2023a) y The Alianza Universitaria Europea Arqus (2023a). Los resultados indican el desarrollo de una educación inclusiva de calidad en la UE basada en valores humanos comunes y un enfoque de asociación para la cooperación entre instituciones y comunidades.

Palabras clave: capacidades cognitivas, universidades europeas, espacio educativo europeo, marco de competencias de la UE.

1. Introduction

Students' cognitive abilities are highly significant for solving complex, unpredictable problem situations in the professional field. Given the increasing level of the external environment's uncertainty and variability, such abilities are especially important for flexible adaptation and creative performance of work assignments. Working with large volumes of data and information also requires the development of cognitive abilities. Within the EU, where the creative economy, the information economy, and the knowledge economy are actively developing, universities are giving increasing significance to such students' competencies as critical thinking, problem-oriented thinking, creativity, etc. The high level of student mobility, the involvement of migrants and students from third countries also requires the formation of the ability to cooperate in a multicultural environment. The policy of creating the EU's educational space is aimed at developing an inclusive educational environment. The above-mentioned tendencies and features actualize the problems of studying the fundamentals of developing students' cognitive abilities in European universities.

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2. Literature Review

Cognitive processes of human consciousness are related to issues of perception, pattern recognition, attention, memory, feelings, information presentation, imagination, logical thinking, speech and decision-making ability. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy while skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, means, tools and instruments) (Cinque, 2016).

European structures of competencies, which include knowledge, skills and abilities, are

developed and updated according to the external environment's challenges, aligned with institutional and contextual requirements in different countries, remaining open to adaptation and updating (Caena & Redecker, 2019).

Cognitive activity is related to acquiring, organizing, and using knowledge. Studying students' cognitive abilities should be based on the axiomatic provisions of cognitive psychology, namely:

- 1) there is a gradual processing of information received from the outside in the human psyche;
- 2) the information processing system has a limited capacity. The cognitive process or the process of cognition operates according to the gnoseological or epistemological principle. It is based on the statement that only the tendency to search for simpler (optimal) solutions is manifested in human thinking and creativity;
- 3) information is encoded in the psyche, that is, the physical world is reflected in the psyche in a special form.

In several scientific studies, students' cognitive abilities are considered and investigated in the context of: a problem-oriented approach to learning (Maskur et al., 2020; Nurkhin & Pramusinto, 2020), an approach to learning based on knowledge (Ristanto et al., 2020), innovative models of learning management (Changwong, Sukkamart & Sisan, 2018; Adnan et al., 2021), various methods and practices of learning (Istiyono et al., 2020; Spaska et al., 2021; Hidajat, 2021; Tabieh et al., 2021), e-learning for improving critical thinking (Supriyatno, Susilawati & Hassan, 2020), strategies for developing students' cognitive abilities, Brečka, P., Valentová, M., & Lančarič, D. (2022). In these studies, such cognitive abilities of students as creative thinking, critical thinking, and analytical thinking are considered.

Chu et al. (2021) have considered in their study innovative educational practices for the formation of students' cognitive abilities, including exploratory thinking, freedom of will, ingenuity and creativity, critical thinking, and non-standard problem solving. The authors claim that the fundamentals of developing cognitive abilities should be as follows: using research projects as an approach to learning; using the relevant methods (joint learning in a team, social constructivist design based on games); using social media and information technologies for communication; project-oriented and problem-oriented approaches to learning; creation of a motivating learning environment based on students' requests and a social-constructivist approach to knowledge formation. The approaches mentioned above and educational methods contribute to the creativity formation and solving problematic situations by students in practice.

The scientific work of Virtanen & Tynjälä (2018) examines how different types of pedagogical practices contribute to developing specific general skills. The authors have revealed that developing skills and abilities does not depend on a specific teaching method and pedagogical practice. The combination of various teaching methods and pedagogical practices contributes more towards developing abilities and skills.

Thus, the scientific literature empirically studies students' cognitive abilities and development using various methods, learning practices, strategies and learning models. At the same time, there are no comprehensive, holistic studies of the fundamentals for developing students' cognitive abilities in European universities at the level of the EU's educational space. In the context of adopting the strategy for developing the EU's educational space and initiatives regarding development of universities, the study of the basic conditions for promoting the formation of cognitive abilities is particularly relevant.

3. Methodology

The academic paper uses the methodology of subject studies to describe the fundamentals of developing students' cognitive abilities in European universities. At the first stage, the authors determine the general development tendencies of the European Education Area (EEA) based on the analysis of secondary data and materials of the European Commission. The authors analyze trends in EEA development strategies and university development strategies, European Universities' initiatives, key competencies for lifelong learning and competency framework (EU Careers, 2023). Within the framework of competencies approved by the European Personnel Selection Office (EPSO), the author has highlighted the key abilities that potential candidates and graduates of the EU universities should possess. EPSO meets the recruitment needs of the EU institutions by selecting talented candidates through specialist competitions.

4. Results

More than 5 000 higher educational institutions (HEIs) operate within the EU countries, in which 17,5 million students study, 1,17 million researchers, and 1,35 million teachers work. The European education system strives to develop high-quality inclusive education based on common human values and a partnership approach to cooperation between institutions and communities (European Commission, 2023a). Students of higher educational institutions (HEIs) receive qualifications through completing modules or short courses, forming the knowledge and skills required in the changing external environment (European Commission, 2023a). Increasing the competence level in order to develop quality, innovative and inclusive education is one of the strategic goals of the European Educational Space (European Commission, 2023b). The EU adopts the system of higher education and students' skills in accordance with the external environment's requirements (digital economy, information economy, green economy, etc.) (European Commission, 2023c). The EU countries strive to ensure the development of a competitive educational space on a global scale. Therefore, the strategy of developing universities lies in creating an innovative research environment. For this purpose, the European Universities Initiative has been developed in the EU to create networks of higher educational institutions, promote student mobility and develop a European identity (European Commission, 2023d). According to the specified strategies for developing the educational space and the goals set, the framework of key competencies, knowledge and basic skills is updated, revised and approved. For instance, the following basic lifelong learning competencies have been approved, namely: literacy, multilingualism, numerical, scientific and engineering skills, digital and technology-based competencies, interpersonal skills, and the ability to adopt new competencies, active citizenship, entrepreneurship, cultural awareness and expression. The above-mentioned list of competencies indicates the need to develop students' cognitive abilities and create conditions for their formation (European Commission, 2023e). Creativity, critical thinking and the ability to work in a team are also highly valued in the EU.

The new EU Competency Framework (EPSO Competency Framework) defines 8 key competencies that graduates must possess when selecting for positions. Within the framework of the specified competencies, the key abilities that a graduate should possess are highlighted (Figure 1).

Within the EU's educational space, 44 European universities are being created, attracting about 340 educational institutions in the capitals and remote regions of the member states (including Norway, Iceland, Turkey and Serbia). These universities cooperate with 1 300 associated

partners: enterprises, non-governmental organizations, regional and local authorities, etc. (European Commission, 2023d). Within the framework of the Erasmus+ 2022 competition, 44 alliances (European universities) united on the following topics were created:

1. Intensification of prior deep institutional transnational cooperation: 4EU+ European University Alliance, Arqus European University, Challenge-Driven, Accessible, Research-based and Mobile European University, The European University of Social Sciences, etc.
2. Development of new deep institutional transnational cooperation: European Dual Studies University, European University alliance for sustainability: responsible GRowth, inclusive Education and ENvironment, The Green European University.

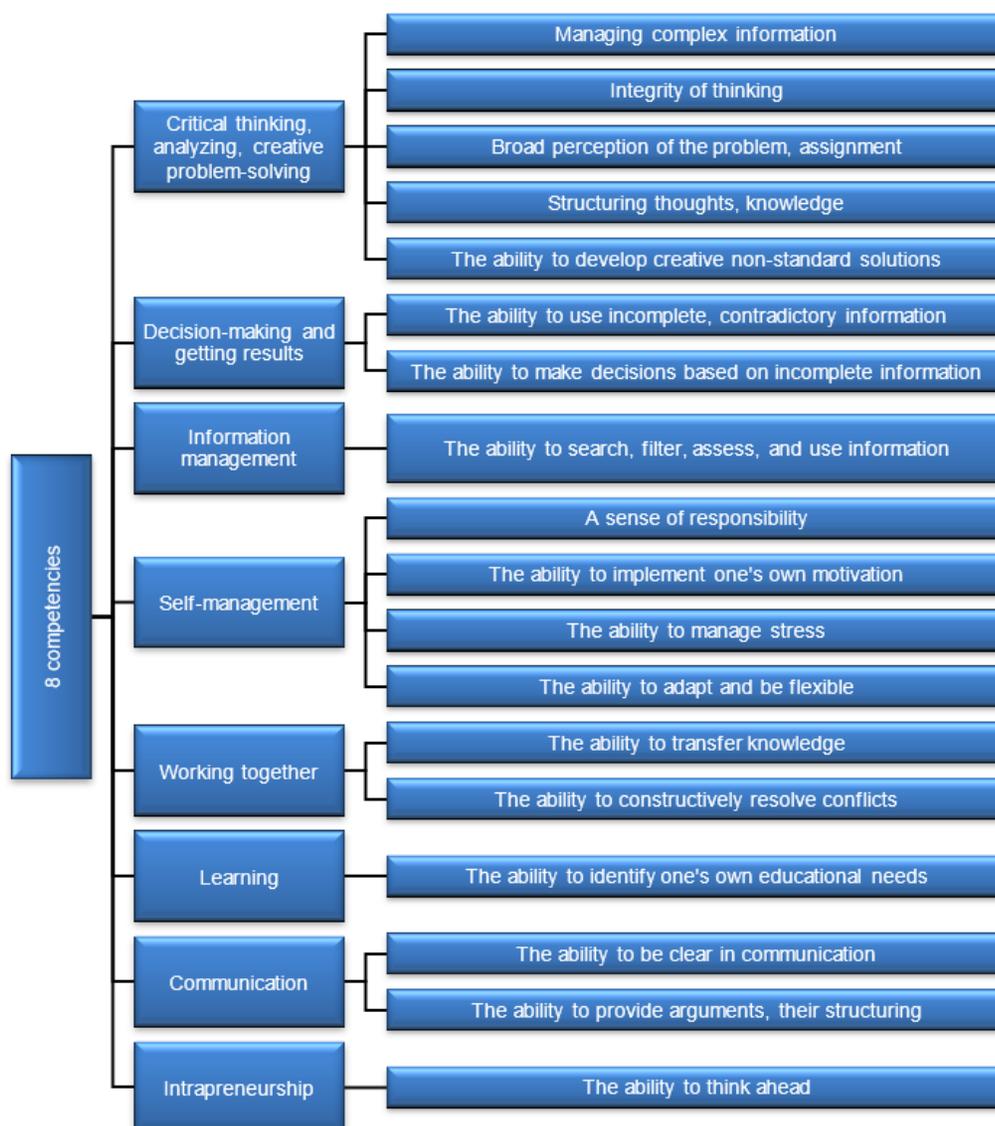


Figure 1. New EPSO Competency Framework: key abilities of graduate students within the defined competencies

Source: compiled by the author based on EPSO's Competency Framework (EU Careers, 2023).

Let's take a closer look at the cognitive abilities within the skills that are formed during the educational process of the 4EU+ European University Alliance. The education of students involves using an interdisciplinary approach and conducting studies in education. The Alliance identifies four key programs that align with the Sustainable Development Goals. The common core curriculum is offered in all 6 universities within the alliance. Students are also offered special courses that are available in person and through blended learning methods. The specified basic programs and special courses are the basis for challenge-based degree programs for which common diploma will be awarded. In addition, such general learning principles are complemented by joint programs, new inter-alliance training programs, joint courses, joint supervision of theses, etc. Thus, students are offered a wide selection of study programs within the alliance. The portfolio of graduates' skills, competencies and values of the 4EU+ alliance involves formation of an open, multilingual, critical-thinking student who possesses multiculturalism, entrepreneurial abilities, pluralistic views, the ability to work with data and information. Such a set of graduates' skills, competencies and values is the basis for a European citizen. The development of "Social engagement" should be noted, providing involving communities in European universities and interaction with them to ensure the development, transfer and use of knowledge (The 4EU+ European University Alliance, 2023a). Thus, the alliance forms students' ability to be responsible for society and its well-being. It is also expedient to note the use of a project approach based on implementing projects between the EU universities. For instance, within the 4EU+ alliance, the Academic Partnership for Innovation in Teaching and Learning (API) has been implemented within the framework of the International Academic Partnership Program. The University of Warsaw, Charles University in Prague, Heidelberg University, and Sorbonne University took part in the project. The project was aimed at achieving the following goals (The 4EU+ European University Alliance, 2023b):

- 1) joint work on developing innovative educational materials, tools and methods to promote the development of a student-centered teaching and learning environment at partner universities;
- 2) developing creative, specialized exchange programs for students and employees (administrative, academic), which contributes to increasing the level of mobility between partner universities;
- 3) formation of graduates' competencies and critical skills necessary for work in a mobile, multicultural, complex, heterogeneous, multilingual and digital environment;
- 4) assistance in the development of the international academic community.

The fundamentals of developing students' cognitive abilities in European universities are changing in accordance with the challenges of the EU educational space (Figure 2). Universities have to create and develop educational space and establish high-quality cooperation in teaching, education, management, research, interaction with communities. The EU universities are democratizing education, implementing a student-oriented approach, an interdisciplinary approach to developing competencies, skills, and abilities. Integrity, openness, creativity, and internationalization are defined as significant values. These primary fundamentals of the EU educational space contribute to developing the following cognitive abilities: critical thinking, non-standard solving of problems and professional tasks, teamwork, etc.



Figure 2. Fundamentals of students' cognitive skills at European universities

Source: systematized by the author based on the 4EU+ European University Alliance (2023a; 2023b)

Similar visions, missions and goals are defined in the activities of the Arqus Alliance of European Universities. The Alliance's vision regarding education development lies in striving to be open, forward-looking, integrated and research-oriented, creating transformational excellence for stakeholders (societies, universities, businesses). The Alliance develops innovative sectoral cooperation. The included universities have a common profile and are located in medium-sized cities. Sustainable development of regions, cooperation between cities and universities are significant components of the Alliance's activities (The Arqus European University Alliance, 2023a).

The mission of Arqus lies in transforming the European system of higher education, innovation and research based on cooperation, integration for sustainable development. Based on the mission outlined, training programs are developed providing for the development of students' critical thinking, abilities for social integration and lifelong learning. Universities form a system of open, challenge-oriented, reflective and innovative knowledge in students. The crucial goals of the activity are defined as follows (The Arqus European University Alliance, 2023a):

1. Effective, unhindered cooperation at all institutional levels to respond to various societal challenges.
2. Collaborative institutional learning based on factual data, the ability to distinguish between true information and data.
3. Involvement and development of interaction between students, scientists, researchers, professionals and graduates in a multi-level environment.
4. Collaborative creation of a flexible academic environment based on analyzing challenges and studies.
5. Joint disciplinary and interdisciplinary investigations, developments, innovations.
6. Development of intercultural competence, global understanding and respect for diversity.

A special feature of the Alliance's activity is the cross-cutting stimulating learning strategies contributing to the development of students' cognitive abilities. The key strategies are as follows (The Arqus European University Alliance, 2023b):

1. Functioning of the laboratory of institutional learning to conduct experiments and develop innovations to ensure the integration of universities and inter-university cooperation. The strategy provides evidence-based institutional training and improves the higher education policy at the national and European levels. Findings will be shared with other universities and networks, as well as the higher education sector as a whole.
2. Mobility strategy and recognition based on traditions and long-standing experience in student mobility at the European and global levels. In addition, mobility of staff and researchers, virtual exchange in various formats is ensured. For instance, structured and integrated mobility is organized in joint training programs. Within the Alliance's framework, intersectoral mobility is offered, during which students are attracted to learning through work, research, services to form their practical experience and skills. In the process of such mobility, entrepreneurial cognitive abilities and social activity, the ability to work in a team are formed.
3. Quality education for students in a diverse, collaborative, flexible academic environment. The Alliance has created joint adaptable programs for three training cycles as well as microcredits to implement out this strategy. Thus, the development of inclusive innovative teaching and learning methodologies is ensured; initiatives are being formed to improve the staff's skills, virtual and hybrid learning formats.
4. Openness of science for citizens and providing access to information due to the high quality of student education. This in turn promotes open communication, multicultural cooperation, and sustained social development. Arqus provides access to educational resources and data for this purpose. The Alliance is committed to increasing diversity through Open Science (OS), ensuring fairness, inclusiveness and the use of scientific knowledge as a public good. OS also aims to promote citizens' understanding of scientific facts, enable innovation and well-being. In this way, Arqus aims to promote OS development, including citizen science, open education, open innovation, and coordinate efforts to increase openness in European universities strategically. OS development takes place through partnership, knowledge sharing and consultation at different institutional levels: regional, national and international.
5. A strategy for implementing a long-term initiative to satisfy the interested parties' interests. Arqus and partners make investments in support of joint activities within the framework of defined financial opportunities. The staff's and students' involvement and participation at all levels of the partner universities in the governance structures and Arqus's work plans contribute to establishing European identity and the development of cooperation in teaching and learning, research, cultural and outreach activities.

5. Conclusions

Within the EU, quality inclusive education is being developed based on common human values and a partnership approach to cooperation between institutions and communities. Inclusive education, research and cooperation involve increasing the various stakeholders' competence levels for developing quality, innovative and inclusive education. A strategy for the development of universities has been adopted within the European Educational Space. It provides establishing an innovative, research environment, the creation of networks of higher educational institutions, the promotion of student mobility and the development of European identity. As a result, European universities are updating, revising and approving the framework of key competencies, knowledge and basic skills. The primary fundamentals of developing students' cognitive abilities in European

universities are defined as follows: establishing high-quality cooperation in teaching, education, management, research, interaction with communities. The universities' main values are the democratization of education, the introduction of a student-oriented approach, an interdisciplinary approach to developing competencies, skills, and abilities. Integrity, openness, creativity, and internationalization are defined as important values. The universities have also identified the key cognitive abilities, namely: critical thinking, creativity, entrepreneurial abilities, non-standard problem solving and professional tasks, social inclusion and teamwork, etc.

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