

ENHANCING STUDENTS' COGNITIVE SKILLS IN DIGITAL LEARNING ENVIRONMENTS

Saydakhmedova Barno Batirovna

Independent Researcher Senior Lecturer of

Department of Digital Technologies, Tashkent Perfect University,

batirovna.b88@gmail.com

tel: (94) 617-69-78

Abstract

This study examines the formation and development of students' cognitive competencies in digital education. With the rapid advancement of digital technologies, the integration of e-learning tools into educational processes has become essential. The research investigates methods, models, and pedagogical interventions that enhance students' ability to acquire, process, and apply knowledge effectively. The results demonstrate that targeted e-learning strategies significantly improve cognitive competencies, fostering critical thinking, creativity, and independent learning skills. Recommendations for effective implementation in higher education are discussed.

Keywords: Cognitive skills, digital learning, e-learning, critical thinking, problem-solving, creativity, independent learning, student engagement.

Introduction

The issue of the consequences and conditions for the productivity of digitalization of education is one of the most important, although insufficiently studied.

The specific nature of modern education is determined by the requirement to implement a competency-based approach, the implementation of which presupposes changes to educational programs based on key competencies, including cognitive competencies that form a holistic cognitive competency. Future teachers prepared to work in modern schools, colleges, and universities must not only possess specific knowledge but also be able to apply this knowledge in their professional work, demonstrating creativity, fluidity and flexibility of thought, and the ability to learn and teach — in other words, a comprehensive set of cognitive competencies. Cognitive competence, as a system of such individual competencies (creative understanding of the world, critical or reflexive understanding of oneself and the world, flexibility and fluidity of understanding oneself and the world, the ability to learn and the ability to teach, etc.), is developed within the context of university learning processes in two main ways: spontaneous and targeted. The introduction of digital technologies into the education of young people and adults allows for a significant acceleration of this process, making it more conscious, structured, and effective.

The modernization of the content and forms of modern education through the introduction of a competency-based approach has made it possible to evaluate and identify ways to improve the



quality of graduate training in line with the challenges and demands of the modern world. One of these is related to enhancing people's cognitive competence and overcoming the cognitive "gap" that has arisen as a result of the imbalance between:

1) accumulated human knowledge and skills (competencies), potentially made easily accessible through digital technologies, devices, and programs
 2) the actual needs and abilities of people to utilize this knowledge and skills. This "gap" can and should be overcome through recognizing the need to improve the quality of education, both 1) through the creation of a continuous education system and 2) through the targeted development of students' cognitive competencies at all stages of their education, including and especially through e-learning. Continuity of education in the school-university system and the transformation of general and digital learning formats can help resolve this problem.

Methodology and research methods

The aim of the study is to theoretically and experimentally study the processes of formation and development of students' cognitive competence based on e-learning, to develop and test a structural and substantive model for the formation of students' cognitive competence based on the e-learning system.

The hypothesis of our research to improve the quality of digital learning, including enhancing students' cognitive competencies in the digital learning process, it is necessary to identify components, levels, conditions, criteria, and mechanisms for developing students' cognitive competencies in order to organize their targeted formation and development in the e-learning process.[3]

The targeted development of substantive components (essence, structure and levels, criteria, indicators) of cognitive competence increases the effectiveness (success) of digital learning.

The process of teaching students based on the e-learning system will be successful:

- if in the process of e-learning the concept of “cognitive competence” is clarified and operationalized, including identifying its structural components, levels, conditions, criteria and mechanisms;
- a comprehensive structural and substantive model for the formation and development of students’ cognitive competence based on an e-learning system has been substantiated, developed and implemented into practice;
- if the processes of formation and development of cognitive competence in the process of e-learning will be regulated and assessed by means of a criteria-diagnostic apparatus specially developed for these purposes (based on the structural-content model of formation and development of cognitive competences).

Cognitive competence is an integrated characteristic of knowledge, skills, abilities, and personal experience in working with educational and professional information in the context of e-learning systems and other formats and forms of educational activity.



Results

Cognitive competence is an integral characteristic of knowledge, skills (abilities), abilities and personal experience in working with educational and professional information in the context of the e-learning system and other formats and forms of educational activity.

Cognitive competence is an integrated description of a student's knowledge, skills, abilities, and personal experience related to research (cognitive activity) of educational and professional information (professionally significant knowledge and skills) related to the comprehension of this information in educational and professional situations, including those arising in the context of an e-learning system. Students' cognitive competence includes, as one component, competence related to the use of digital devices, technologies, and programs in learning and self-study processes. It also encompasses the ability to learn and teach, the ability to critically and reflectively understand oneself and the world, the processes and results of education, the ability to creatively process information about oneself and the world, the ability to explore and flexibly understand educational and professional situations and their contents, etc.

The cognitive competence development model (figure 1) is designed to support the systematic formation and enhancement of students' cognitive competencies within digital learning environments. The model is based on a competency-based, student-centered, and activity-oriented approach and reflects the multidimensional and dynamic nature of cognitive development in digital education.

The model conceptualizes cognitive competence as an integrated construct comprising knowledge, skills, abilities, and personal learning experience that enable students to effectively perceive, process, evaluate, and apply educational and professional information. Cognitive competence development occurs through continuous interaction between learners, digital technologies, pedagogical strategies, and educational contexts.

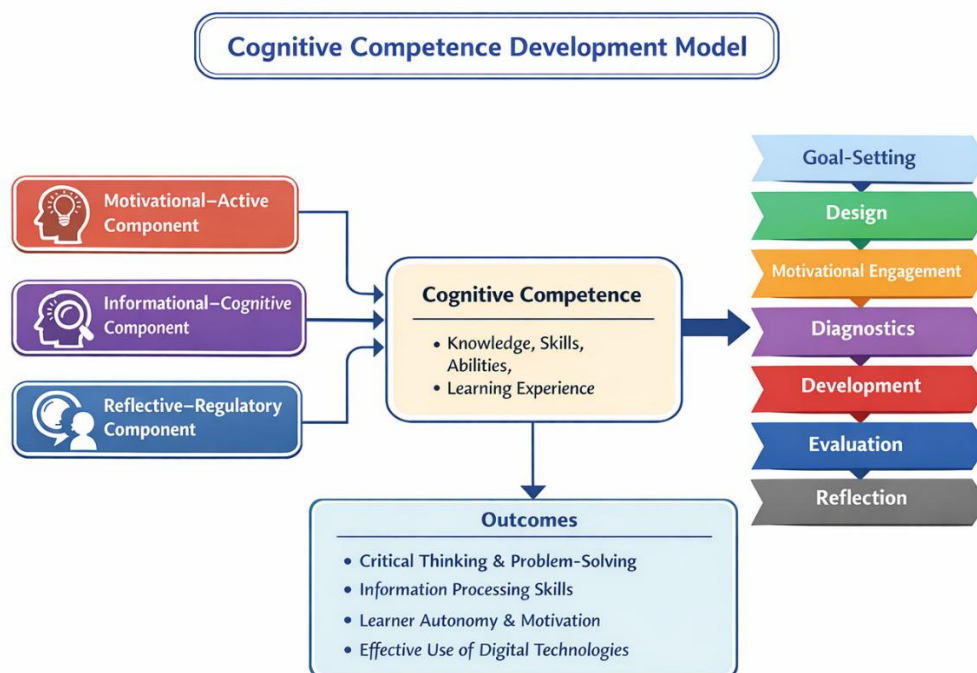


Figure 1. Cognitive competence development model



Conclusion

The impact and productivity of digitalization in education is a critical, yet understudied, issue. Our research confirmed the hypothesis that student learning using an e-learning system will be successful if:

- in the process of e-learning, the concept of “cognitive competence” was operationalized and specified, its components, levels, conditions, criteria, mechanisms of formation and development were defined;
- a structural and substantive model for the formation and development of students’ cognitive competence based on an e-learning system has been substantiated, developed and implemented in practice;
- a criteria-diagnostic apparatus has been formed and is being applied in the practice of e-learning to identify the dynamics and assess the formation (development) of students’ cognitive competence in the context of the e-learning system.

For the successful development of cognitive competence, the following pedagogical conditions were identified:

- motivational: developing students’ motivation to learn using electronic means in the educational process, including motivation to develop cognitive competence using digital teaching aids;
- informational: selection of content, methods and forms of training that ensure the development of cognitive competence, including the organization of the educational process taking into account the requirements of competence-based, personality-oriented, subject-activity-based and systemic approaches to training;
- reflexive: implementation and reflection of the formation and development of cognitive competence based on the developed psychological and pedagogical mechanism.

It's also important to understand the potential and limitations of digital learning, based on various digital technologies, devices, programs, and platforms. Clearly, multimedia programs and hyper-platforms created specifically for educational purposes can be more productive and effective than other, "slightly adapted" or simply used teaching methods. Traditional instant messengers and email programs are even less optimal; they essentially only slightly optimize the process of information exchange between teacher and student in terms of speed and, sometimes, the ability to "reinforce" the teacher's recommendations and information in text form, accessible for repeated rereading and rethinking.

References:

1. Batirovna S. B. Educational Data Mining And Learning Analytics //European Scholar Journal. – 2023. – Т. 4. – №. 5. – С. 61-64.
2. Saydakhmedova B., Makhkamova M., Rakhimova S. Content of innovation and innovative activity of the teacher //International Journal of Advanced Science and Technology. – 2020. – Т. 29. – №. 7. – С. 665-669.
3. Kassymova, G. & Арпентьева, Мариям. (2024). Развитие когнитивных компетенций студентов в цифровом образовании: к проблематике последствий и условий продуктивности цифровизации образования Ergodesign. 2024.



4. Saydakhmedova, B. (2023). TA'LIMDA MA'LUMOTLARNING INTELLEKTUAL TАНLILI. Евразийский журнал математической теории и компьютерных наук, 3(2), 15–19.
5. Сайдахмедова Барно Батировна 2023. ОСОБЕННОСТИ ИСПОЛЬЗОВАНИЯ ДИСТАНЦИОННЫХ ТЕХНОЛОГИЙ В ОБУЧЕНИИ . Journal of new century innovations. 30, 2 (Jun. 2023), 142–145.

