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PHILILOGICAL PERSPECTIVES OF DESIGN THINKING AND ARTIFICIAL INTELLIGENCE IN THE EDUCATION 5.0-7.0 ERA

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Abstract. *In the era of modern education, the integration of design thinking and artificial intelligence has emerged as a transformative force, particularly in the context of the Education 5.0-7.0, which has its peculiarities. This paper searches through the intersection of these two concepts through a philological point of view, exploring their implications, synergies, and challenges.*

Design thinking, with its human-centered approach to problem-solving, emphasizes empathy, creativity, and iterative ideation. Artificial intelligence, on the other hand, offers unprecedented opportunities for personalized learning, data-driven decision-making, and adaptive systems. Together, they hold immense potential to revolutionize pedagogy, curriculum development, and educational technologies.

The relevance of this research is determined by investigating the integration of philological perspectives, design thinking, and artificial intelligence (AI) in the evolving educational frameworks of Education 5.0 to 7.0. By combining human-centered design with advanced AI technologies, it aims to create personalized and adaptive learning experiences, enhancing student outcomes and engagement. The study provides valuable insights for policymakers and educators on developing inclusive and effective curricula, preparing students for future challenges and careers. Additionally, it contributes to the academic discourse on educational innovation, supporting global trends towards digital transformation and interdisciplinary approaches in education.

This research introduces a novel interdisciplinary framework that integrates philological insights with design thinking and artificial intelligence (AI) within the context of Education 5.0 to 7.0. It pioneers the examination of linguistic and cultural dimensions in design thinking methodologies enhanced by AI, offering new perspectives on creating personalized, adaptive learning experiences. By bridging the gap between human-centered design and intelligent systems, the study proposes innovative approaches to curriculum development and pedagogy, setting a foundation for future educational innovations and contributing to the evolving academic discourse on educational technology and methodology.

Drawing on insights from philology, the study of language in historical and literary contexts, this paper this article aims to explore how design thinking and artificial intelligence intersect with language acquisition, textual analysis, and cultural interpretation in education. It investigates the role of language in shaping learning environments, communication strategies, and knowledge dissemination processes in the digital age.

Furthermore, it explores the ethical considerations inherent in the use of artificial intelligence in education, particularly regarding data privacy, algorithmic bias, and the preservation of linguistic diversity. It advocates for a nuanced understanding of the cultural and social dimensions of language within educational AI systems, promoting inclusivity, equity, and ethical literacy.

The methodology involves a comprehensive literature review on cognitive differences, contextual elements, and recent innovations in education, academic papers, books, and articles on philology, design thinking, AI in education, and the evolution of Education 5.0 to 7.0. The analysis and practical implementation of the case studies from educational institutions implementing AI and design thinking methodologies. The ultimate

goal is to contribute valuable insights to guide educational institutions in adapting to the 21st-century landscape and fostering inclusive and impactful effective learning environments. Thus, we use such methods of qualitative analysis as thematic analysis for dentifying common themes and insights from literature and case studies regarding the integration of philology, design thinking, and AI in education, content analysis for analyzing curriculum documents and educational artifacts to assess the presence and impact of design thinking and AI elements. Moreover, we use case studies of students who have successfully integrated AI and design thinking while learning foreign language, detailed examination of their implementation processes, challenges, and outcomes.

Through a multidisciplinary approach that bridges education, design, artificial intelligence, and philology, this paper seeks to inform educators, researchers, and policymakers about the transformative potential of integrating design thinking and AI in education. By embracing philological perspectives, it aims to foster critical inquiry, interdisciplinary collaboration, and human-centered innovation in the Education 5.0-7.0 era.

Keywords: *Design thinking, Artificial intelligence, Education 5.0-7.0, foreign language, philological aspects.*

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ФІЛОЛОГІЧНІ ПЕРСПЕКТИВИ ДИЗАЙН-МИСЛЕННЯ ТА ШТУЧНОГО ІНТЕЛЕКТУ В ЕПОХИ ОСВІТИ 5.0–7.0

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Анотація. *В епоху сучасної освіти інтеграція дизайнерського мислення та штучного інтелекту стали трансформаційною силою, зокрема в контексті освіти 5.0-7.0, яка має свої особливості. Стаття досліджує перетин цих двох понять у контексті філології, акцентуючи увагу на їх наслідках, взаємодіях та викликах.*

Дизайн-мислення з людино орієнтованим підходом до вирішення проблем наголошує на емпатії, креативності та повторюваних ідеях в освіті. З іншого боку, штучний інтелект пропонує безпрецедентні можливості для персоналізованого навчання, прийняття рішень на основі даних і адаптивних систем. Разом вони мають величезний потенціал для кардинальних змін в педагогіці, розробці навчальних програм і освітніх технологій.

Актуальність цього дослідження визначається вивченням інтеграції філологічних перспектив, дизайн-мислення та штучного інтелекту (ШІ) у сучасній освіті від 5.0 до 7.0. Поєднуючи людино орієнтований дизайн із передовими технологіями штучного інтелекту, ми прагнемо впровадити персоналізований та адаптивний досвід навчання, підвищуючи результати та залученість студентів. Дослідження надає цінну інформацію для освітніх політиків та безпосередньо викладачів, освітян щодо розробки інклюзивних та ефективних навчальних програм,

підготовки студентів до майбутніх викликів освіти та кар'єри. Крім того, він сприяє академічному дискурсу освітніх інновацій, підтримуючи глобальні освітні тенденції до цифрової трансформації та міждисциплінарні підходи в сучасній освіті.

Ключові слова: *лінгвосинергетика, нелінійність, самоорганізація, емерджентність, флуктуація, біфуркація, концепт, дискурс.*

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Discussion

The integration of design thinking and artificial intelligence (AI) in education, particularly within the Education 5.0-7.0 era, presents both opportunities and challenges. While design thinking emphasizes human-centered approaches to problem-solving and innovation, AI offers capabilities for personalized learning and data-driven decision-making. However, the effective fusion of these methodologies in education requires a deep understanding of their synergies, implications, and ethical considerations.

Moreover, digital technologies facilitate collaboration, communication, and cultural exchange among learners from different linguistic and cultural backgrounds, fostering a sense of global citizenship and intercultural understanding. Virtual reality simulations, for example, allow learners to immerse themselves in authentic language and cultural contexts, providing opportunities for experiential learning and cultural exploration that were previously inaccessible (Chakrabarty, 2024).

To compare connection with important scientific or practical tasks, we can admit that the combination of design thinking and AI can facilitate the development of *adaptive learning environments* that related to individual student needs, thereby improving learning outcomes across diverse populations.

We must admit that the integration of design thinking and AI in education is becoming increasingly pertinent in the modern era, characterized by rapid technological advancements and evolving educational paradigms. As we transition from Education 5.0 to Education 7.0, there is a growing recognition of the need to leverage innovative approaches and technologies to enhance teaching and learning experiences. Understanding the philological dimensions of this integration is crucial for effectively harnessing its potential and addressing associated challenges.

The authors conduct a systematic literature review based on scholarly articles on design thinking, using AI in the context of education 5.0-70.

Each industrial revolution is closely linked to the discovery and utilization of new energy resources (Wang, Winstead, 2016), machinery, techniques, methods, and knowledge. Simultaneously, each revolution strives for greater environmental sustainability and pollution reduction (Chakrabarty, 2024), as seen in the context of the fourth industrial revolution. Despite this focus, a common thread across all industrial revolutions is their significant contribution to industrial growth. Consequently, industrial revolutions generate substantial economic growth in developed countries, to a lesser extent in developing countries, and minimally in least developed countries (LDCs), with a comparatively centralized impact on socio-economic development both domestically and internationally. Each revolution witnesses remarkable increases in productivity (Crafts, 2004) and consumption that transcend geographical borders. Furthermore, the transformation associated with each industrial revolution occurs at a faster and more dynamic pace than in previous eras. Moreover, each industrial revolution influences societal norms, shaping patterns of thought and behavior. The evolution of communication methods and transportation systems significantly alters socialization dynamics, both at the group and individual levels (Ziatdinov, 2023).

As industries evolve with new technologies, the ability to understand and use English becomes crucial for staying updated with technological advancements and participating in continuous learning and upskilling. Ensuring that all individuals, regardless of their background, have access to quality English education can help bridge socio-economic gaps and promote inclusive growth.

Thus, education systems need to incorporate effective English language teaching methodologies and policies to ensure that students develop strong language skills from an early age. Addressing these issues involves integrating English language education into broader educational reforms, ensuring access to quality teaching, and promoting an inclusive approach that benefits all learners (Cheka, 2017).

This study proposes a framework, which identifies individual and organizational context factors, the stages of a typical design thinking process with its underlying principles according to the main purposes of education 5.0 -7.0, and the individual as well as organizational outcomes of a design thinking and AI.

With the advent of networked computers and communications, future law students can avail themselves of educational material without having to leave their respective homes. Currently available options include: the use of the virtual learning environment (VLE), blogs, wikis, and podcasting and e-learning 2.0 and AI assisted robots. The VLE has been the traditional approach to e-learning structured around courses, timetables and testing. This approach is however too often driven by needs of the institution rather than the individual learner **(**Cheka, 2017).

According to Plattner et al. (Plattner et al., 2009), the Design Thinking process consists of six process steps with iteration loops: understanding, observing, defining problems, finding ideas, developing prototypes and testing. The initial three phases, the so-called problem space (Lindberg et al., 2010), describe the problem and its causes: understanding, observing the problem and defining a target group. At the same time in the solution space, we implement step by step the decision, by creating ideas, visualisation or prototyping, reflecting the results (Plattner, Meinel, Weinberg, 2009; Lindberg et al., 2010).

Thus, design thinking represents a holistic, user-centric methodology that systematically employs techniques such as observation, questioning, brainstorming, and various moderation methods across multiple phases within a process, often incorporating numerous iteration loops, like AI and all the tools based on it. They can be used in philological education as well.

The results of the research

According to Education 5.0, which appeared in 2020 as a result of Industrial Revolution 5.0, learning process must be focused on personalized, collaborative, adaptive and analytical learning with technology on its core. Thus, using design thinking is quite helpful for making some creative tasks, which we explain further in the examples (Ziatdinov, 2023). Building on the foundations of the fourth industrial revolution, the fifth educational revolution introduces more sophisticated artificial intelligence models and advanced robotics. It places a strong focus on sustainability of education, equality, integration, involving, soft skills and emotional intelligence development.AI revolutionizes education and business practices, fostering unprecedented interconnectedness between humans and machines in study process (Noble, Mende, Grewal, and Parasuraman, 2022).

In Education 6.0 (2035), technology integration is advanced, leveraging AI, AR, VR, and personalized learning platforms to enhance teaching and learning experiences (Moleka, 2023). *Education 7.0* takes technological integration even further, possibly incorporating highly sophisticated AI-driven learning ecosystems, advanced neuroscience applications, and immersive technologies like holographic displays or brain-computer interfaces (Estrada, 2024).

Building on the renewable energy advancements of the fourth and fifth industrial revolutions, the *sixth industrial revolution* features sophisticated educational storage systems. Its key innovation is the integration of advanced semi-autonomous robotics, significantly

reducing the need for human intervention. This period sees a marked decrease in human involvement in the production process. Simultaneously, language education undergoes a transformation through the use of AI-powered language learning tools and virtual reality environments, enabling immersive and personalized learning experiences that bridge linguistic and cultural gaps (Noble, Mende, Grewal, and Parasuraman, 2022). Other hand, *education 6.0* promotes global collaboration among students and educators through virtual classrooms, online collaboration tools, and global learning networks.

The seventh industrial revolution (2050) focuses on Natural Organic Artificial Intelligence Systems (NOAI-Systems), which involve a sophisticated interplay of sensors, microchips, neural artificial networks, mega-computers, complex intelligent auto-sustainable software systems, and practical applications using advanced programming languages. The complete automation of business and production processes is set to transform the labor market, introducing new challenges in knowledge and social interaction. The primary challenge involves the extensive use of humanoids with highly autonomous, self-regenerating artificial intelligence, potentially replacing humans in production systems and manual jobs (Estrada, 2024). Consequently, the educational market will become highly specialized, with roles requiring creativity, imagination, and social skills taking precedence over those needing memorization or complex problem analysis. Education will need to adapt to emphasize these skills.

Education 7.0 could further facilitate decentralized and peer-to-peer learning networks, leveraging blockchain technology for credentialing and validation, and fostering global citizenship and sustainability on a deeper level (Estrada, 2024).

Simultaneously, Education 7.0 emerges, revolutionizing language education with AI-powered tools and virtual reality environments. These technologies create immersive and personalized learning experiences, bridging linguistic and cultural gaps and preparing individuals for a highly interconnected and automated world (Noble, Mende, Grewal, and Parasuraman, 2022).

The ebbs and flows of language interest and status can be seen over time. Thus, in a global context, language status is related to perceptions of economic might, neighbouring skirmishes, and exchanges of ideas through trade. Uneven language development is due, in part, to the military might such as encroachment on territories or due to economic exchange between neighbours (Wang, Winstead, 2016).

In the context of industrial revolutions, several key issues for education emerge:

- education systems *update curricula* to include new knowledge, skills, and *technologies relevant* to the evolving industrial landscape;
- there is a growing need for a strong emphasis on *Science, Technology, Engineering, and Mathematics (STEM)* education to prepare students for technologically advanced industries;
- continuous professional development and l*ifelong learning opportunities* are essential to help the workforce adapt to rapidly changing industrial environments.
- as digital technologies become more prevalent, *digital literacy* becomes a fundamental skill for both students and educators;
- in addition to technical skills, there is a rising demand for *soft skills* such as critical thinking, problem-solving, collaboration, and adaptability;
- ensuring equitable access to *quality education and training for all individuals*, including marginalized groups, to prevent widening socio-economic disparities;
- providing teachers with ongoing *training and support* to integrate new technologies and teaching methods into their classrooms effectively;
- strengthening partnerships between educational institutions and industries to align educational outcomes with workforce needs and provide practical, hands-on learning experiences;
- governments and policymakers need to *invest in education infrastructure*, resources, and research to support these evolving educational needs.

- preparing students to *compete in a globalized economy by fostering cultural awareness, foreign language proficiency*, and an understanding of global market dynamics.

In this context we can say, that English as a dominant foreign language of international business, science, and technology became extremely important. Proficiency in English enhances global communication and opens opportunities for collaboration across borders, as well as significant portion of the world's knowledge base, including scientific research, technical documentation, and educational resources, is available in English. It allows individuals to access and contribute to this body of knowledge. Moreover, English proficiency is often a prerequisite for many high-paying jobs, especially in multinational corporations and industries such as information technology, finance, and tourism.

It provides students with greater access to educational opportunities worldwide, including scholarships, study abroad programs, and participation in international academic conferences. Learning English facilitates cultural exchange and understanding, helping individuals appreciate diverse perspectives and engage in global dialogues. Also, each revolution brings much of the digital content, including software interfaces, online courses, and social media platforms, which is in English. Understanding English enhances digital literacy and the ability to navigate and utilize online resources effectively (Sabzalieva, Valentini, 2023).

We can implement all these principles of modern educational systems and digital thinking in its core practically nowadays, considering requirements of modern educational and labour markets. While these and other conceptualizations of Digital thinking to some extent differ, most definitions relate that Digital thinking is an innovation-focused, iterative problem-solving process centered on fulfilling the needs and requirements of the user (s) (Plattner, Meinel, Weinberg, 2009). Thus, design thinking and AI can be applied in the realm of legal English during our Legal English classes with the bachelor students of the Faculty of Law to enhance communication, documentation, and overall understanding of legal information (Ziatdinov R., 2023). *Here are some examples of how design thinking principles can be integrated into legal English practices:*

- *conduct interviews* with various stakeholders, including clients, legal professionals, and even laypersons, to understand their perspectives, needs, and challenges when dealing with legal documents or communication;

- *clearly define* the legal issues or concerns that need to be communicated. This could involve distilling complex legal language into more accessible terms without sacrificing accuracy;

- *organize brainstorming sessions* or workshops to encourage legal professionals to explore ways to express legal concepts in plain language. Generate ideas for simplifying complex legal terms and clauses;

- *create prototype versions of legal documents* using plain language and visual aids to test how effectively they convey legal information. This could include infographics or flowcharts explaining legal processes;

- *share simplified legal documents with clients* or non-legal professionals and gather feedback on their comprehension and usability. Use this feedback to refine the language and presentation;

- *implement guidelines* for using plain language in legal communications within the legal practice. Provide training to legal professionals on effective communication strategies;

- *establishing mechanisms* for ongoing feedback from clients and other stakeholders on the clarity and effectiveness of legal communications. Regularly evaluate the impact of plain language initiatives on understanding;

- being open to making continuous improvements based on feedback and evolving legal requirements. Adapt legal communications to changes in laws or regulations while maintaining clarity.

For instance, design thinking can be used to redesign legal contracts, making them more user-friendly and understandable for clients who may not have a legal background. This involves simplifying language, incorporating visual elements, and testing the revised contracts with end-users for comprehension.

Conclusions and prospects

In legal education, design thinking and using AI can be applied to curriculum development, creating materials that engage students in a more interactive and experiential manner. This might involve developing case studies, interactive exercises, or legal simulations that enhance students' understanding and application of legal concepts (Cheka, 2017).

The integration of design thinking, with its emphasis on human-centered problem-solving, and AI, with its capabilities for personalized and adaptive learning, offers significant opportunities to revolutionize education.

The combination of design thinking and AI in education promotes personalized learning experiences, adaptive systems, and data-driven decision-making, enhancing student engagement and outcomes. Thus, incorporating linguistic and cultural dimensions into design thinking methodologies enhanced by AI offers new ways to create personalized learning experiences and improve curriculum development. AI-powered tools and virtual reality environments are transforming language education by providing immersive and personalized learning experiences, bridging linguistic and cultural gaps.

Moreover, the use of AI in education raises ethical concerns, such as data privacy, algorithmic bias, and the preservation of linguistic diversity. Addressing these issues is crucial for promoting inclusivity, equity, and ethical literacy. As AI and automation advance, the labor market will increasingly demand roles requiring creativity, imagination, and social skills, shifting the focus of education to these areas.

The integration of design thinking and AI within Education 5.0-7.0 offers a transformative approach to modern education. By leveraging the strengths of both methodologies, educators can create more personalized, adaptive, and engaging learning environments. The philological perspective provides valuable insights into the linguistic and cultural dimensions of this integration, contributing to the development of more inclusive and effective educational frameworks.

Among future perspectives we can distinguish dynamic curriculum development, that integrate design thinking and AI, emphasizing creativity, critical thinking, and social skills.

Also, establishing ethical frameworks for the use of AI in education is essential to address concerns about data privacy, bias, and linguistic diversity. Constant teacher training and support is needed to effectively incorporate design thinking and AI into teaching practices. And what is importunate, promoting global collaboration through virtual classrooms and online tools can enhance cultural exchange and intercultural understanding among students. As technology continues to evolve, future educational models should explore the use of advanced AI, AR, VR, and other immersive technologies to further enhance learning experiences.

Thus, by applying design thinking and AI to legal English, we can foster creativity, clearer communication, better understanding, adaptive and analytical learning with technology on its core, peer-to-peer learning networks and increased accessibility of legal information for a broader audience, like the it needs to be in the era education 5.0 - 7.0.

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