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THE IMPACT OF ARTIFICIAL INTELLIGENCE AND DIGITIZATION ON THE EDUCATIONAL SERVICES MARKET FOR THE PROTECTION OF HUMAN RIGHTS AND THE HUMAN CAPITAL FORMATION OF THE NATIONAL ECONOMY

O IMPACTO DA INTELIGÊNCIA ARTIFICIAL E DA DIGITALIZAÇÃO NO MERCADO DE SERVIÇOS EDUCACIONAIS PARA A PROTEÇÃO DOS DIREITOS HUMANOS E A FORMAÇÃO DE CAPITAL HUMANO DA ECONOMIA NACIONAL

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Abstract

Scientific study substantiates urgency using digital technologies in higher education, analyzes main areas of their application, modern challenges in education and the impact on the protection of human rights and the formation of intellectual capital of the national economy. The purpose of this article is to analyze modern trends in the higher education development in the context of introduction of innovative digital technologies and its impact on the protection of human rights and the intellectual capital formation of the national economy. Current practices and prospects of digital transformation of higher education are considered, which outline new principles of the educational process in higher education. Introduction of artificial intelligence and other digital technologies into the educational process creates advantages in terms of student-centered learning, formation of constant feedback and flexible infrastructure of the institution, use of constructive coordination in development of courses, which significantly affects the protection of human rights and the intellectual capital formation of the national economy. The most common digital technologies used in teaching and learning in higher education institutions are considered (learning management system, synchronous technologies, multimedia software, collaborative programs, cloud technologies, new technologies, artificial intelligence). Given the speed of implementation of digital technologies in the educational process, it is proposed to diversify forms of student learning (in classrooms using technology, hybrid/blended, asynchronous online, synchronous online, bichronous online, HyFlex). It is also important to organize learning, to equip educational buildings, and to create opportunities for teachers to acquire digital competencies. To develop high-quality digital learning, higher education institutions should use potential of various partnerships: with other universities, with professional organizations that are leaders in digital learning, with employers, which will contribute to the protection of human rights and the human capital formation of the national economy.

Keywords: Higher Education. Protection of Human Rights. Artificial Intelligence. Digital Technologies. Digitalization. Educational Services Market. University. Human Capital. National Economy. Sustainable Development.

Resumo

Estudo científico comprova a urgência do uso de tecnologias digitais no ensino superior, analisa as principais áreas de sua aplicação, os desafios modernos na educação e o impacto na proteção dos direitos humanos e na formação do capital intelectual da economia nacional. O objetivo deste artigo é analisar as tendências modernas no desenvolvimento do ensino superior no contexto da introdução de tecnologias digitais inovadoras e seu impacto na proteção dos direitos humanos e na formação do capital intelectual da economia nacional. São consideradas as práticas e perspectivas atuais da transformação digital do ensino superior, que delineiam novos princípios do processo educacional no ensino superior. A introdução da inteligência artificial e de outras tecnologias digitais no processo educacional cria vantagens em termos de aprendizagem centrada no aluno, formação de feedback constante e infraestrutura flexível da instituição, uso de coordenação construtiva no desenvolvimento de cursos, o que afeta significativamente a proteção dos direitos humanos e a formação do capital intelectual da economia nacional. São consideradas as tecnologias digitais mais comuns utilizadas no ensino e na aprendizagem em instituições de ensino superior (sistema de gestão da aprendizagem, tecnologias síncronas, software multimídia, programas colaborativos, tecnologias em nuvem, novas tecnologias, inteligência artificial). Dada a velocidade de implementação das tecnologias digitais no processo educacional, propõe-se diversificar as formas de aprendizagem dos alunos (em salas de aula com tecnologia, híbridas/mistas, online assíncronas, online síncronas, online bicrônicas, HyFlex). Também é importante organizar a aprendizagem, equipar os edifícios educacionais e criar oportunidades para que os professores adquiram competências digitais. Para desenvolver uma aprendizagem digital de alta qualidade, as instituições de ensino superior devem utilizar o potencial de diversas parcerias: com outras universidades, com organizações profissionais líderes em aprendizagem digital, com empregadores, o que contribuirá para a proteção dos direitos humanos e a formação de capital humano da economia nacional.

Palavras-chave: *Ensino Superior. Proteção dos Direitos Humanos. Inteligência Artificial. Tecnologias Digitais. Digitalização. Mercado de Serviços Educacionais. Universidade. Capital Humano. Economia Nacional. Desenvolvimento Sustentável.*

1 INTRODUCTION

Artificial intelligence and digitalization of the educational services market are significantly changing approaches to learning and the human capital development. Digital technologies open up new opportunities to improve educational processes, improving access to knowledge and quality of education. Digitalization of the educational services market contributes to development of innovative teaching methods, such as online courses, webinars, blended learning and virtual laboratories, which contributes to expanding opportunities for research and development of new ideas, as well as increasing economic efficiency of the national economy. It is also worth noting that digital platforms facilitate closer interaction between universities and businesses, contributing to development of the lifelong learning concept, where professionals can constantly update their knowledge and skills through online courses and certification programs, which is important in the context of rapid changes in the labor market. Therefore, digital technologies both increase accessibility and quality of education, and contribute to development of new skills, innovation and lifelong learning. Due to this, the national economy receives more prepared and competitive workforce, which is the key factor for its sustainable development.

2 LITERATURE REVIEW

The ideas of transformation of higher education in the context of modern challenges and trends are the object of research of many Ukrainian and foreign scientists. Scientists claim that digital technologies have become the savior of education in a critical time. Advanced pedagogical experience in the field of application of digital technologies is systematized into innovative practices, which have become the basis for the development of key characteristics of higher education by foreign researchers.

Leading scientists devoted their attention to various aspects of the development of universities and the education system in the context of digitalization.

The study (Labadan S.B. et al., 2025) analyzed the specifics of human capital management. The authors recommended focusing on maximizing the use of internal resources, promoting employee engagement, and enhancing organizational justice to support faculty well-being and promote institutional success, which will contribute to the

effective formation of intellectual capital.

The authors (Cruz-Romero R. et al., 2025; Djakona A. et al., 2021; Safonov Yu. et al., 2021) emphasize the importance of education and argue that the lack of continuity affects the coherence of educational programs, which leads to specialists having outdated skills and limiting employment opportunities in accordance with their education. The results of the study demonstrate the relationship between the quality of higher education, the formation of human capital and regional and national development.

Article (Zhang Y. et al., 2025) addresses the issue of human capital development and argues for its crucial role in harnessing digital opportunities. According to the authors, investment in education weakens the leveling effect, pointing to a potential mismatch between current educational resources and digital skills requirements.

Research results (Ma Lianfeng et al., 2025; Lavrov R. et al., 2020; Cosmulese C.G. et al., 2019) prove that investments in higher education significantly enhance comprehensive development, and this effect is enhanced in regions with greater accumulation of human capital. The authors emphasize the importance of regionally differentiated approaches to investments in education and the development of human capital of the national economy.

Scholars (Leoni S., 2025; Filippov V. et al., 2022; Filyppova S. et al., 2024) are convinced that the human capital theory is the dominant theory of education in the national economy. The authors analyze the role of education as a driving force for improving personal lives and avoiding poverty.

The aim of the study (Wu Limeng et al., 2024) is to assess the impact of higher education on a company's human capital investment based on the upper echelons theory. The results of the analysis demonstrate a positive correlation: the level of higher education among managers leads to an increase in human capital investment.

Taking into account the above developments, it is advisable to focus on analyzing the impact of artificial intelligence and digitalization of the educational services market on the formation of human capital of the national economy.

The purpose of the article is to analyze current trends in the development of higher education in the context of the introduction of digital technologies and its impact on the formation of intellectual capital of the national economy.

3 RESULTS

One of the fundamental Sustainable Development Goals of Ukraine by 2030 (President of Ukraine, 2019) is quality education. It aims to ensure inclusive and equitable quality education for all. Digital technologies have become the important tool to achieve this goal. They have demonstrated powerful impact on the education system. The recent COVID-19 pandemic has further institutionalized the use of digital technologies in education. Digital technologies have changed the paradigm of the entire education system: it is not only a provider of knowledge, but also a co-creator of information, a mentor, an evaluator, and a guarantor of human rights protection. Technological improvements in education have made life easier for students. Instead of using pen and paper, students today use variety of software and tools to create presentations and projects.

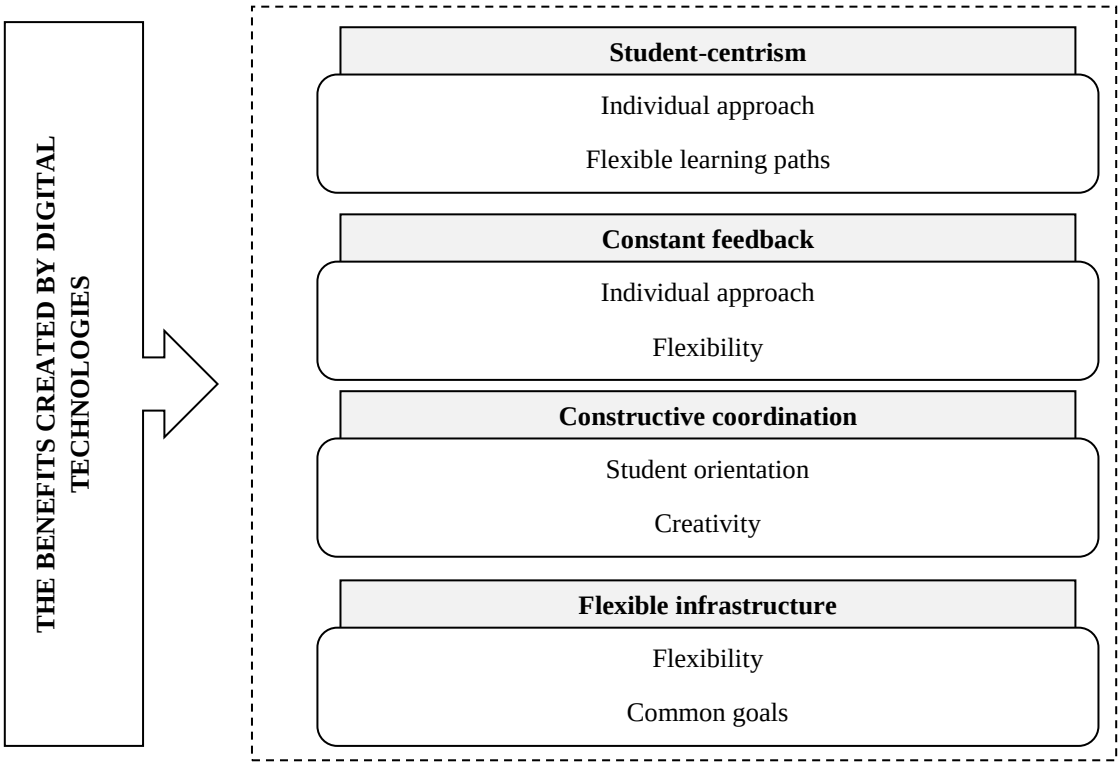
As a result, higher education has entered the era of digital transformation. Artificial intelligence and other digital technologies and platforms are fundamentally necessary for teaching and learning.

Digital technologies are changing society, providing personalized, flexible, student-centered learning. However, widespread use of innovative digital technologies in the educational process is a controversial concept. Despite high ambitions, digital technologies are mainly used to support existing, traditional educational practices.

The change in the higher education system during the era of digital transformation has outlined new principles of the educational process in universities. Advantages of using digital technologies in the educational process are presented in Fig. 1.

Figure 1.

Advantages of introducing digital technologies into the educational process of universities



Source: developed by the authors

Student-centeredness is the multidimensional concept that encompasses student participation in making decisions about selection of subjects (including the choice of content and assessment methods), in development of professional skills and in formation of the role of the teacher. The concept of student-centered learning is associated with flexible, experimental and self-directed learning, which is clearly correlated with the desired learning outcomes, ensures demand for graduates in the labor market, high employability, which are achieved through implementation of digital technologies in universities. Student-centered learning creates the environment that provides students with the opportunity to act in accordance with their needs, intentions and interests. To achieve this, students must interact with teachers and work on meaningful tasks and projects. Digital technologies offer these personalized opportunities for collaboration.

Feedback is any response to a student's work from instructor, external expert, or peer. However, feedback can often be a difficult and sometimes unpleasant process that, if poorly formulated, can contribute to conflict. In addition to in-person feedback, digital technologies offer unique opportunities for instant feedback integrated into software. In

addition to these technological capabilities, collaborative learning environments can offer the opportunity to provide ongoing feedback.

"Constructive alignment is an integrative learning scheme that emphasizes alignment between intended learning outcomes, teaching-learning activities, and assessment tasks."

Constructive alignment involves ensuring close connection between three components of learning:

1. Learning objectives and outcomes.
2. Educational activities.
3. Evaluation and feedback.

Constructive alignment is only achieved by ensuring alignment between learning outcomes, teaching methods, and assessment methods. Constructive alignment focuses on the learning process of students, rather than on the topic covered by the teacher. Active learning activities allow students to create new knowledge. The important element of developing the educational discipline is designing the system for assessing students' learning achievements using digital technologies. The defining element of the educational achievement assessment system is a question bank, which should be created first. The question bank provides an easy way to organize and manage questions so that they can be accessed for future use. It also allows for the use of random questions, as well as reusing questions in subsequent tests.

The educational process should take place in physical context that promotes social interaction, variation, and (almost) unlimited digital access.

Therefore, flexible infrastructure is another recommendation for implementation of educational activities. It is essential that universities take the holistic approach to the quality of education and the learning environment in buildings. The design, maintenance and reconstruction of learning spaces are often the responsibility of individual university departments. Learning spaces that meet basic technological requirements (e.g. wall-mounted monitors, wireless Internet access and laptop sockets, etc.) can offer better solutions than conventional classrooms. Pilot digital learning spaces that meet these requirements have become extremely popular among teachers and students.

Flexible infrastructure in the university educational process can effectively contribute to the protection of human rights, particularly the right to education, through the following opportunities:

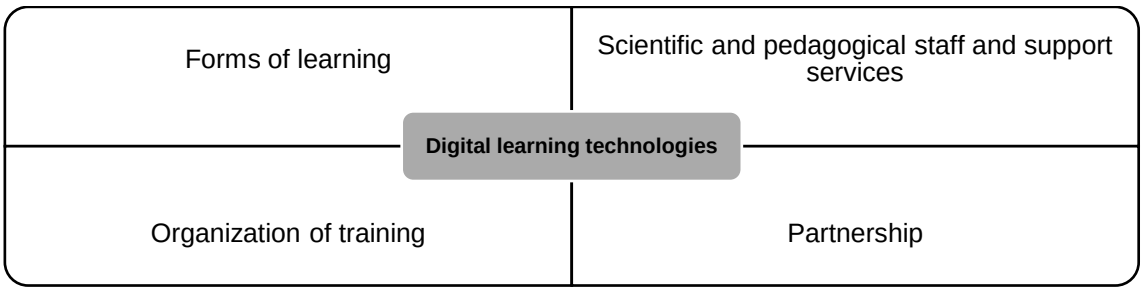
1. Accessibility – Creating conditions for learning regardless of the student's location or physical abilities (e.g., online platforms, distance learning, adaptive classrooms for people with disabilities).
2. Inclusion – Addressing the needs of diverse social groups: students with special educational needs, those from temporarily occupied territories, internally displaced persons, or individuals who work and study simultaneously.
3. Flexible schedules and learning formats – Enabling the realization of the right to education at a convenient time (e.g., evening/modular courses, asynchronous learning), which is crucial for people balancing education with work or family responsibilities.
4. Safety and resilience in times of crisis – Flexible infrastructure allows universities to swiftly adapt to emergencies (such as war or pandemics), ensuring students' uninterrupted right to education.
5. Expanded educational opportunities – Providing access to modern digital resources, inter-university courses, and international programs, thus fulfilling the right to quality education.

Digital technologies can be used in various forms of student learning. Teachers can use these technologies to create interesting digital solutions in teaching and learning. However, effective digital teaching and learning in higher education institutions requires significant improvements in the infrastructure to support these technologies.

Transformation of higher education for broad involvement of innovative digital technologies in the educational process should be carried out in the following directions (Figure 2).

Figure 2.

Directions of the higher education transformation due to introduction of digital Technologies



Source: developed by the authors

The most common digital technologies used in the educational process are:

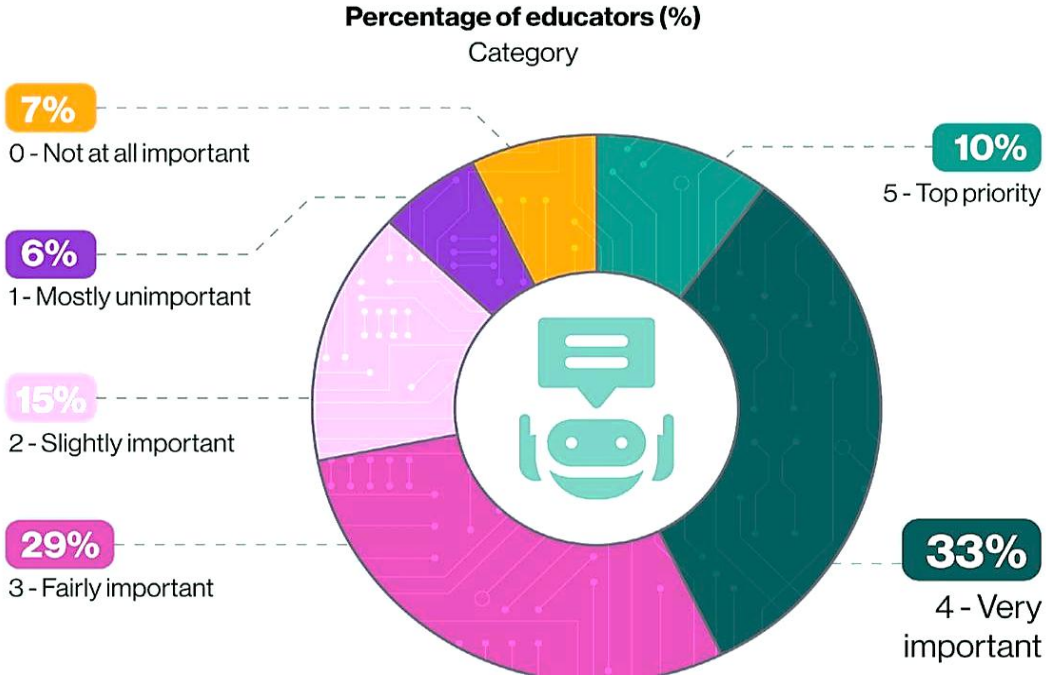
1. Learning Management Systems. Learning Management Systems are used to host all course materials, modules, and assignments. The teacher can post announcements, participate in discussions, develop and grade assignments, and maintain an online grade journal in the learning management system.
2. Synchronous technologies. Synchronous technologies are used to conduct online meetings in real time. Synchronous technologies include various features such as audio and video, text/chat, screen sharing, polls, whiteboards, and separate rooms for small group discussion. These features can help instructors maintain interactivity in online classes.
3. Multimedia software can be used to record lectures, demonstrations, orientations, etc. Some multimedia programs are available in the open source. More robust programs must be purchased. Some multimedia programs can also be embedded in the learning management system for easy access and use.
4. Collaboration applications. Web-based or cloud-based word processing, presentation, collaboration, and whiteboarding applications allow students to collaborate online with their peers and instructors.
5. Cloud technologies. Higher education institutions rely on various cloud applications. Some faculty use cloud applications to store files so they can access them from anywhere in the world, not limited to office computers.
6. New technologies. Artificial intelligence (AI), augmented reality (AR), virtual reality (VR), analytics, and other new technologies can enable more innovative and engaging teaching and learning methods.

This is not an exhaustive list of technologies that can be used for digital teaching and learning. University leaders should evaluate performance of each technology and weigh its quality and cost before purchasing it for their institutions, and analyze their technology infrastructure to ensure it meets needs of digital teaching and learning.

Research shows that students want to know more about artificial intelligence. The survey shows that nine out of ten respondents say they are interested in learning about artificial intelligence and its uses (Fig. 3).

Figure 3.

Results of the survey on interest in features of using artificial intelligence in education and work



Source: AIPRM (2024)

Educational services can be provided in different formats. When the university offers multiple formats of study or courses in multiple formats, students can enroll in the format that best suits them. Below is a list of common formats of study:

1. In technology-enabled classrooms. In this case, teaching and learning take place in person, and digital technologies are used to enhance teaching.
2. Hybrid/Blended: This format combines in-person and online learning to give students flexibility of in-person and online learning.
3. Asynchronous online. In this case, the educational process takes place online without any real-time meetings.
4. Synchronous online – learning takes place online in real time.
5. Bisynchronous online – combines asynchronous and synchronous online learning. Students participate in asynchronous classes at the time and place convenient for them, and in synchronous classes – in real time.
6. HyFlex. This format offers the most flexibility. It combines in-person and online students in the same class. HyFlex learning is similar to hybrid/blended learning, but allows students to choose the learning format that best suits their needs and

daily circumstances.

All of these forms have elements of digital learning, although technologically enhanced courses taught physically in classrooms have minimal technological integration.

With more universities and educational programs offering online courses, students have more options. Students can now choose courses and/or educational programs at any time and from any location.

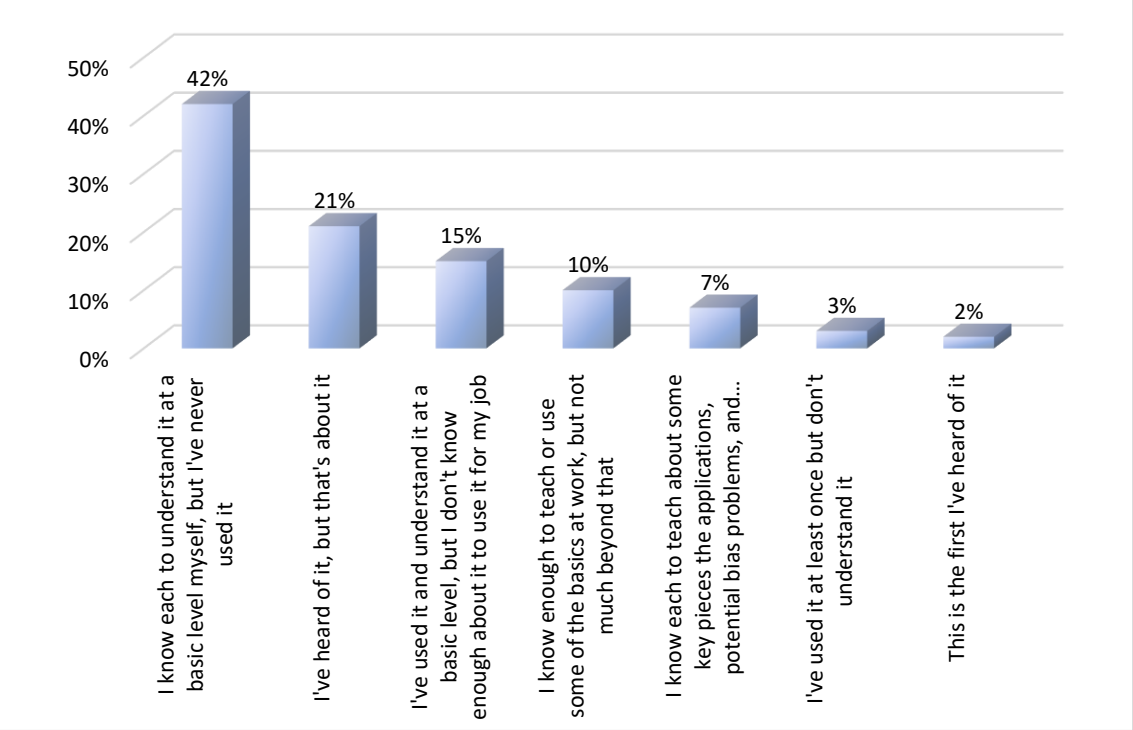
It is worth noting that according to results of the survey of teachers on the relevance of the issue of using artificial intelligence, a third of teachers (33%) believe that studying features of using AI is important aspect in teaching modern students, while 13% of teachers believe that teaching students about artificial intelligence technologies is mostly unimportant (Fig. 4).

Growing prevalence of digital learning in various forms of education requires additional investments in support services and academic staff. The following personnel and support services are necessary for successful digital transformation in the educational space:

1. Curriculum designers: Universities are hiring more curriculum developers and technology specialists than in years past. Curriculum designers work with educators to develop effective courses for the variety of learning styles.

Figure 4.

The breakdown of how knowledgeable educators feel about Al



Source: AIPRM (2024)

2. Technology Support Specialists. As the university expands its digital learning offerings, it will need more staff to support networks and technology. While technology support is already available on most campuses, the increase in digital learning has led to the need for 24/7 technology support for students and faculty.

3. Academic and student support services. Academic support is necessary to ensure that students have access to library resources and centers for writing research papers. Student support services (registration, academic advising) are also necessary for digital learning. Similarly, students with special needs should have access to services that can help them with digital learning.

4. Incentives. Teachers should be encouraged and rewarded for their innovation in digital teaching. Financial incentives and course development time give teachers the opportunity and time to explore and integrate digital innovations into their courses. Support, services, and incentives motivate teachers to adopt innovative digital teaching methods.

In any digital learning effort, administrators must be prepared to lead initiatives to leverage digital technologies in education and support traditional learning across

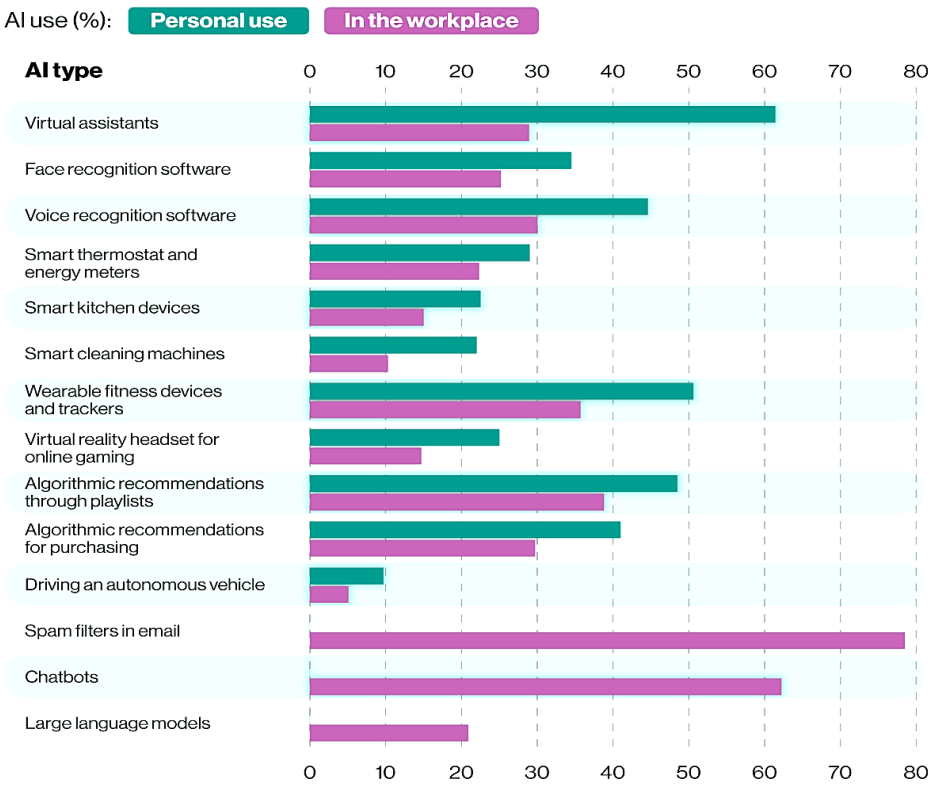
subject areas. Leaders must continue to use evidence-based practices in decision-making and value innovation in digital teaching and learning, including tenure and career advancement. Leaders must develop funding models for different learning formats. Online courses offer the opportunity to offer differentiated tuition rates because students do not need to be on campus or pay for on-campus resources.

Inequalities in student access to technology have become apparent during the pandemic. Universities must provide students with hardware, software, and internet access they need to participate in online courses. Courses must also be accessible to students with cognitive and physical disabilities. University leaders must also rethink any potential inequities associated with digital learning, including funding, staffing, technology, and existing policies.

A survey was conducted in December 2023 to find out how familiar and used AI is in education, work and beyond. The survey results show that the most common uses of AI in the workplace were the use of email spam filters (78.5%), followed by the use of chatbots to answer customer service questions (62.2%) (Fig. 5).

Figure 5.

The breakdown of most common used of AL in the workplace at home



Source: AIPRM (2024)

The pandemic has highlighted the potential of using various partnerships to develop quality digital learning:

1. Collaboration with other universities. Universities that have already implemented digital learning have offered training and workshops to support faculty from other universities. Expanding such collaborations on the global scale could strengthen digital learning worldwide.
2. Collaboration with professional organizations. Professional organizations that are leaders in digital learning support universities by offering training, workshops, and resources.
3. Collaboration with employers: In some countries, non-higher education sectors are collaborating with universities to provide access to the Internet and electronic devices. Partnering with employers allows for faster implementation of digital innovations in the educational process.

When the pandemic began, teachers who were just starting to teach online had to adapt quickly. Many needed to participate in professional development activities for digital learning. As the digital transformation progresses, learning opportunities and resources for teacher development must evolve in line with teachers' needs. These resources aim to improve teachers' pedagogical and technological skills and their knowledge of accessibility, intellectual property, and best practices for online teaching.

Figure 6 presents features of the digital education development as a factor in the protection of human rights and the formation of intellectual capital of the national economy.

Digital education is an important tool for building intellectual capital of the national economy, as it provides access to knowledge, promotes skills development, and stimulates innovation. Let's consider the main aspects of the digital education development that contribute to the protection of human rights and the intellectual capital formation.

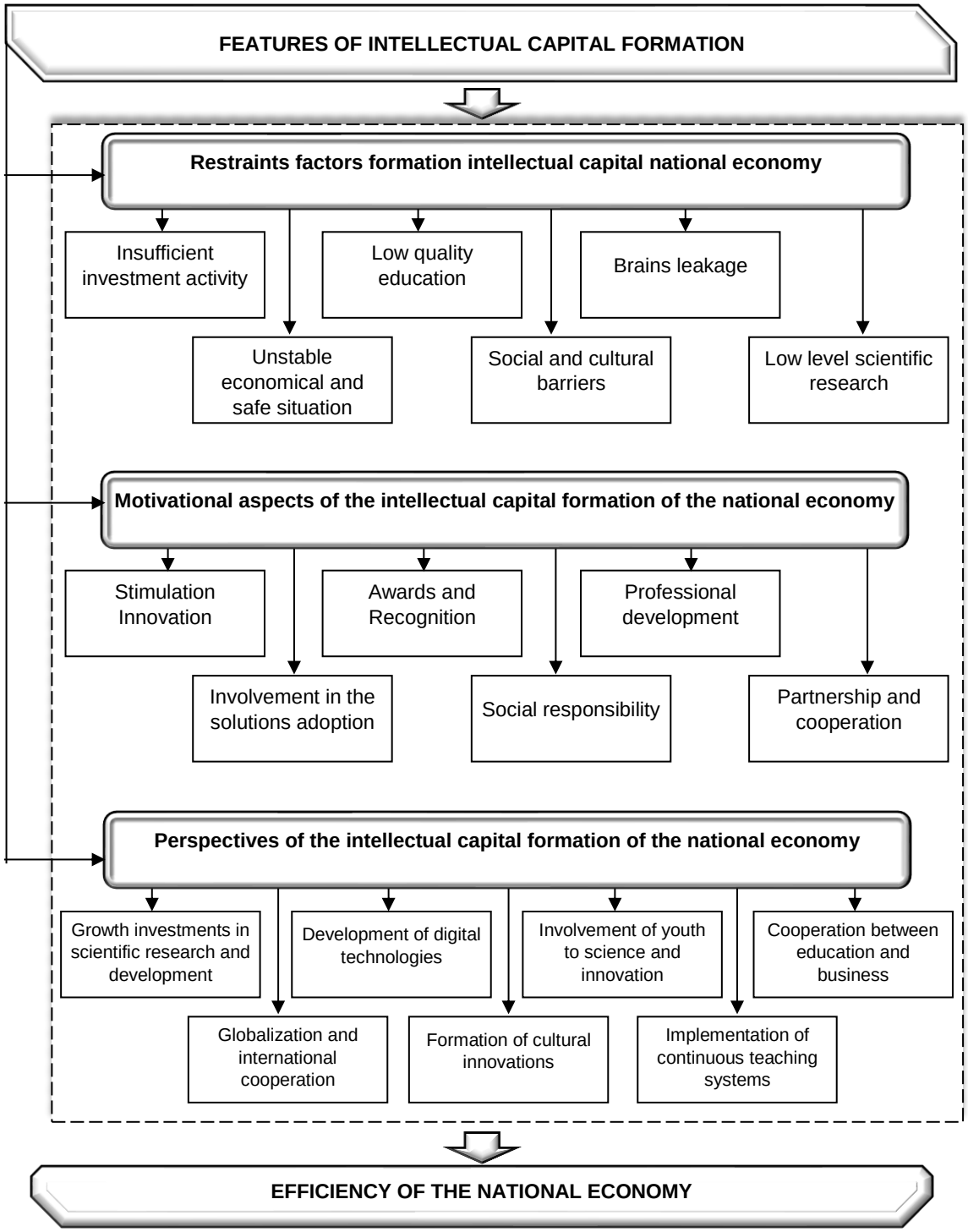
Accessibility and inclusion, implies equal access to education: and development of programs that take into account learning characteristics of different categories of students, including those with disabilities.

Relevance and quality of content involves creation and updating of educational programs in accordance with the latest trends in science and technology, ensuring their relevance and compliance with requirements of the labor market with involvement of

qualified specialists.

Figure 6.

Features of the intellectual capital formation in the national economy



Source: developed by the authors

Interactivity and engagement, involves introduction of interactive teaching

methods, as well as encouragement of group work, project-based learning, and knowledge sharing between students to develop critical thinking and team skills.

Continuity teaching directed renewal knowledge and skills in response to changes in technology and market demands, as well as ensuring opportunities for independent training and adaptation of educational routes to individual needs of students.

Using artificial intelligence, virtual reality and big data to create new forms of learning and improvement educational process.

Partnership between education and business, which will contribute to creation of common programs, academic mobility and projects that meet needs of the labor market, as well as integration of practical cases in educational programs to ensure communication theory with practice.

Constant monitoring of qualities of educational services that will contribute to assessment of efficient educational programs and introduction of relevant changes.

4 DISCUSSION

Supporting the authors (Albairmani Ali Mahdi Abbas et al., 2024), it is appropriate to draw attention to the fact that education is an important aspect of economic sustainability. The authors examined educational and economic indicators to indicate the urgent need to improve the level of education in order to increase economic sustainability. The researchers recommended focusing on improving the quality of education, promoting lifelong learning, and using digital technologies to improve educational outcomes and human capital.

Of practical importance is the paper (Alexander W.R.J. et al., 2024), which argues that in an increasingly transactional environment where education providers are strongly motivated by financial considerations, the use of AI has the potential to make learning more effective. The authors analyze how AI can affect the development of the education system and the formation of intellectual capital.

The article (Akbari T.T. et al., 2024) presents research on the empowerment of human resources through higher education and its impact on ensuring the efficiency of the national economy. The authors believe that by prioritizing human capital development, Indonesian universities can have a significant impact on shaping the future employment landscape, which will contribute to the development of the national

economy.

Of practical relevance is the study (Najla Tharman Almutairi, 2024), the authors of which, using a distributed lag autoregression model and three indicators of educational human capital, prove the relationship between the gross enrolment ratio in higher education and economic growth. They analyze the impact of investment in education on economic growth. Also of practical importance are the articles (Kholiavko N. et al., 2024; Popelo O. et al., 2023; Marhasova V. et al., 2023), which highlight current global trends in the digitalization of the education system in the context of sustainable development.

5 CONCLUSIONS

The protection of human rights and the intellectual capital formation is important aspect for the national economy development, as it determines the country's ability to innovate, increase labor productivity and overall economic growth. Intellectual capital ensures sustainable economic development of the country. With development of advanced digital technologies, initiatives for introduction of innovative digital technologies by universities into the educational process will become commonplace. Digital technologies in education provide flexibility and accessibility for students and prepare them to solve problems in the digital world.

Artificial intelligence technologies allow educational platforms to adapt curricula to individual needs of students, which allows each student to receive materials that match their level of knowledge and pace of learning, which contributes to deeper assimilation of information and development of skills. Digitalization of education provides access to educational resources regardless of geographical location, which is extremely important for students living in remote or rural areas where physical access to universities may be limited. Efforts for digital transformation of higher education will continue to shape new norms and practices so that education adapts and develops in parallel with society.

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Authors' Contribution

Both authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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