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TRANSFORMATION OF SOCIAL AND EDUCATIONAL SYSTEMS UNDER THE INFLUENCE OF ARTIFICIAL INTELLIGENCE

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Abstract

Relevance Over the past decade, artificial intelligence (AI) has emerged as a key driver of global socio-economic change, integrating into industry, healthcare, and education at an unprecedented pace. Despite this technological expansion, a significant gap persists between students' interest in intelligent systems and their actual understanding of the complexity of professional pathways in this field. Existing theoretical gaps concern model interpretability and the ethical use of algorithms, while practical challenges relate to labor market transformation and the risks of job displacement due to automation.

Purpose. The study aims to provide a comprehensive analysis of the current state and practical implementation of AI systems in social and educational environments, as well as to verify the functional capabilities of next-generation language models as tools for supporting professional activities and decision-making.

Methods. The methodology is based on a combination of theoretical analysis of scholarly sources and experimental modeling. The research design included: a critical review of interdisciplinary publications; case studies of generative systems (ChatGPT, Bard) using prompt engineering principles; mathematical modeling of linear programming problems in the R programming environment using the lpSolve package; and comparative verification of results.

Results. It was established that modern language models are capable of generating coherent research strategies, acting as intellectual navigators. A practical experiment involving the solution of optimization problems confirmed the ability of AI to accurately transform mathematical descriptions into program code, yielding optimal solutions (in particular, values of X1 = 3.33 and X2 = 1.33 were obtained for the resource model). Comparative analysis revealed the advantages of ChatGPT in maintaining conversational context and Google Bard in handling up-to-date data. At the same time, the phenomenon of "apparent correctness" (AI hallucinations) was identified, along with social risks such as BT Group's plans to reduce 55,000 jobs by 2030 due to automation. Conversely, the implementation of systems such as Surtrac has reduced waiting times in urban traffic congestion by up to 40%.

Conclusions. It is demonstrated that AI functions as an effective enhancer of intellectual activity rather than a replacement for human cognition. The significance of the findings lies in substantiating the need to adapt educational programs to interdisciplinary requirements that integrate cognitive sciences and programming. The practical application of AI requires mandatory expert verification of results and the preservation of users' critical thinking to prevent factual errors.

Keywords: *generative models, labor market transformation, prompt engineering, linear programming, digital competence.*

Introduction. Over the past decade, artificial intelligence (AI) has evolved from a highly specialized research domain into a key driver of global socio-economic transformation. Its integration into everyday human activities is occurring at an unprecedented pace, encompassing industry, services, governance, healthcare, and education (Jordan & Mitchell, 2015). Contemporary algorithmic systems are capable of automating a substantial share of routine operations, ranging from data processing and process monitoring to the generation of analytical reports. At the same time, digital platforms provide intuitive interfaces for interaction, particularly through voice commands and natural language, significantly lowering barriers to entry for users. Thus, AI is gradually becoming not only a tool for enhancing productivity but also a universal medium for human–information interaction (de la Torre-López et al., 2023).

In parallel with the technological expansion of artificial intelligence, a profound transformation of educational systems is taking place. There is a growing interest among pupils and students in fields related to the development of intelligent systems, data analytics, and automation (Kim et al., 2023). However, this interest is not always accompanied by an adequate understanding of the complexity of the corresponding professional trajectories (Zawacki-Richter et al., 2019). The training of AI specialists requires interdisciplinary competence, integrating programming, mathematical modeling, statistics, logic, and the fundamentals of cognitive sciences. An important aspect is also the development of skills in working with large datasets, as well as in model design, validation, and the ethical use of algorithms. In this context, educational institutions must adapt curricula to the evolving demands of the labor market, ensuring a balance between fundamental knowledge and applied skills (Floridi et al., 2018).

The current stage of AI development is characterized by the convergence of diverse scientific domains – from neurobiology and cognitive psychology to computer science and robotics. This convergence opens prospects for the creation of systems capable of advanced sensory processing, learning, and adaptive behavior. Engineering efforts are increasingly focused on the development of autonomous agents that can interact with their environment, make decisions under conditions of uncertainty, and perform creative tasks (Lake et al., 2017). However, such ambitions are accompanied by significant technical and methodological challenges, particularly with regard to model interpretability, reliability of operation, and safety of deployment.

The intensive deployment of artificial intelligence is driving significant changes in employment structures and social relations. The automation of routine processes is reshaping the labor market: some occupations are disappearing or undergoing radical transformation, while others – particularly those related to data analytics, algorithm development, and the management of digital systems – are gaining strategic importance (Acemoglu & Restrepo, 2020). At the same time, the proliferation of chatbots and virtual assistants is altering the nature of communication between individuals and organizations, enabling speed, scalability, and personalization of interaction. However, this also generates a range of risks, including job displacement, information security concerns, data privacy issues, and ethical challenges associated with the use of AI (Brandtzaeg & Følstad, 2017; Pryhodii & Radkevych, 2025).

From a scientific perspective, artificial intelligence is understood as the capability of technical systems to interpret data, learn from experience, and adapt their behavior to achieve defined objectives. As an interdisciplinary field, AI draws upon advances in mathematics, logic, cognitive science, and neurobiology (Kriegeskorte & Douglas, 2018). Key research directions include decision-making under uncertainty, natural language processing, machine learning, computer vision, and the development of expert systems (Jordan & Mitchell, 2015; Ostenda & Nestorenko, 2022). Despite considerable progress, contemporary AI systems remain limited by their lack of full contextual understanding, consciousness, and self-reflection. Forecasts regarding the field's development suggest that achieving a level of general intelligence comparable to human cognition may be possible in the medium term; however, this will be accompanied by complex scientific, ethical, and societal dilemmas (Bender et al., 2021).

Thus, the social and educational context of artificial intelligence development is shaped by the interplay of technological innovation, labor market

transformation, and the evolution of educational models. Understanding these processes is a prerequisite for formulating an effective strategy for integrating AI into society – one that ensures not only economic advancement but also the preservation of humanistic values in the digital age.

Sources. The theoretical foundation of artificial intelligence research is grounded in an interdisciplinary approach that integrates mathematical logic, cognitive psychology, and neurobiology. In the scientific literature, a widely cited definition of AI is provided by Andreas Kaplan and Michael Haenlein, who conceptualize it as the capability of a system to interpret external data, learn from it, and use the acquired knowledge to achieve specific goals through flexible adaptation (Kaplan & Haenlein, 2019).

The history of AI as an academic discipline dates back to 1956. The evolution of chatbot technologies illustrates a transition from simple rule-based systems to advanced language models. A significant milestone occurred in 1966 with the creation of the program Eliza, which simulated a conversation with a psychotherapist (Cordeschi, 2007; Korducki, 2025). Another important stage emerged in the 1990s with the development of the robot Kismet, which demonstrated capabilities in social interaction and emotion recognition. The contemporary phase is characterized by the adoption of the Transformer architecture, developed by Google, which underpins models such as GPT-3 and LaMDA (Vaswani et al., 2017).

The technological stack for developing intelligent systems includes specialized programming languages and libraries. Traditionally, languages such as Lisp and Prolog were used in AI research; however, contemporary studies increasingly rely on frameworks such as TensorFlow and the R programming language. In particular, the lpSolve package in the R environment plays a critical role in solving linear programming problems and optimizing transportation networks (Abadi et al., 2016; Kuhn & Johnson, 2013).

A distinct body of literature focuses on the economic impact of automation (Nestorenko et al., 2024). Studies conducted by companies such as BT Group, along with analytical reports by Bloomberg, confirm the trend toward the substitution of human labor with algorithms in customer support services (Huang & Rust, 2018). At the same time, alternative solutions such as HuggingChat (based on the OASST1 dataset) and Google Bard (powered by the PaLM 2 model) contribute to a competitive landscape that stimulates further improvements in the accuracy and ethical performance of AI systems. The practical value of these technologies is evidenced by the successful implementation of systems such as Surtrac, which utilize AI to optimize urban traffic flows (Li et al., 2013).

Research Aim. This study aims to provide a comprehensive analysis of the current state of development and practical implementation of artificial intelligence systems in social and educational environments. Particular attention is given to examining the functional capabilities of next-generation software, especially products developed by leading technology companies, in terms of their ability to model human-like intelligent behavior, perform analytical data processing, and support decision-making in complex professional contexts. The study also seeks to define the role of AI as a transformative tool influencing educational practices and professional activities.

Achieving this aim involves the implementation of several interrelated research objectives. First, a theoretical analysis of scientific and publicistic sources is conducted to identify current trends in AI development, the scope of its applications, and its impact on the transformation of the labor market and educational standards (Hurzhii & Pryhodii, 2025). This approach enables the establishment of a conceptual framework for the study and the identification of key tendencies in the integration of AI into societal processes.

An important component of the research is the practical verification of the capabilities of contemporary language models, particularly systems such as ChatGPT and Bard, as tools for academic search, informational support, and professional consulting. In this context, the study evaluates the quality of responses, the relevance of the information provided, and the ability of these systems to adapt to user queries.

A separate line of inquiry focuses on technological modeling, which involves the experimental assessment of the effectiveness of AI in solving specialized mathematical problems. In particular, the study examines the application of

algorithmic approaches to linear programming tasks and the optimization of transportation processes using modern programming tools. This makes it possible to evaluate the practical applicability of AI in engineering and analytical domains.

Equally important is the social dimension of the research, which consists in assessing the role of artificial intelligence as an intelligent assistant in professional activities (Radkevych et al., 2025). The analysis addresses both the positive aspects of AI use – such as increased productivity and improved access to knowledge – and potential risks, including the phenomenon of "apparent correctness" of responses, which may lead to erroneous conclusions in the absence of critical thinking on the part of the user.

The expected outcome of the study is to substantiate the role of artificial intelligence as an effective supporting tool in educational and professional contexts. At the same time, the necessity of its responsible use is emphasized, including the verification of outputs, critical evaluation of information, and the preservation of the leading role of humans in decision-making processes.

Methodology. The research methodology is based on a combination of theoretical analysis and experimental modeling, ensuring a comprehensive approach to evaluating the capabilities of artificial intelligence in social and educational contexts (Zawacki-Richter et al., 2019). The chosen research design involves a sequence of interrelated stages, enabling the integration of conceptual understanding with practical validation. This approach enhances the objectivity of the findings and allows for the assessment of AI as a tool for supporting professional activities and learning processes.

The first stage of the study consisted of theoretical reconnaissance and data collection. A critical review of scientific publications and relevant online sources was conducted to determine the current state, development trends, and application domains of artificial intelligence. Particular attention was paid to interdisciplinary aspects, including the connections of AI with cognitive psychology, neurobiology, and mathematical logic. As a result, a theoretical framework for the study was established, along with key criteria for evaluating the effectiveness of intelligent systems.

The second stage involved practical testing of language models using a case study approach. The empirical component included direct interaction with contemporary generative systems based on large language models. The testing methodology comprised platform access procedures, prompt formulation using principles of prompt engineering, and subsequent analysis of generated responses. Prompts were primarily formulated in English to minimize linguistic bias and improve the accuracy of results. The evaluation of responses was conducted according to criteria such as logical consistency, structure, relevance, and practical applicability in research contexts.

The third stage focused on mathematical and computational modeling aimed at assessing the ability of AI to solve specialized analytical problems. The R programming environment and relevant tools for linear programming were employed. This stage involved constructing mathematical models, formalizing constraints and objective functions, and conducting computational experiments to optimize transportation and production processes. The results obtained made it possible to evaluate both the accuracy and practical feasibility of AI applications in solving applied problems.

The final stage of the methodology involved comparative analysis and validation of the results. Outputs generated by different intelligent systems were compared with those obtained through traditional mathematical methods. Particular attention was paid to identifying the phenomenon of "apparent correctness," where a system produces a formally correct but substantively inaccurate result. This approach enabled the determination of the reliability boundaries of artificial intelligence as a decision-support tool.

Overall, the applied combined approach – integrating theoretical analysis, experimental investigation, and comparative validation – provided a holistic understanding of the capabilities and limitations of artificial intelligence (Venkatesh et al., 2013). This forms a solid basis for substantiated conclusions regarding its role in contemporary educational and social environments.

Results and Discussion. The first significant outcome of the study is a comprehensive evaluation of ChatGPT's performance as an intelligent

navigator within large bodies of scientific information. In response to a query regarding the retrieval of specialized literature on transportation optimization, the system generated a structured algorithm consisting of eight logically interconnected stages. Importantly, the proposed sequence extended beyond superficial recommendations, encompassing the full cycle of scholarly inquiry – from the initial formulation of the research query to the in-depth analysis of sources and the construction of an evidence base.

The analysis of this procedure indicates that artificial intelligence performs a function far broader than merely providing lists of references or descriptive responses. In effect, the system formulates a coherent research strategy oriented toward achieving a defined academic objective. In particular, it recommended the use of Google Scholar as a primary platform for academic search, employing Boolean operators (AND, OR, NOT) to significantly enhance the precision and relevance of results (Gusenbauer & Haddaway, 2020). This approach is especially valuable for researchers working with large volumes of information who require efficient data filtering tools.

Furthermore, the system demonstrated the ability to identify key scientific databases and digital libraries, including JSTOR, ScienceDirect, and IEEE Xplore. These recommendations were accompanied by explanations of their roles within the scholarly ecosystem, indicating a contextual understanding of the structure of academic discourse. As a result, the user is provided not only with a search tool but also with a form of "research roadmap" that guides them from general familiarization with a topic to the deep analysis of peer-reviewed publications, including engagement with citation networks, key authors, and emerging research directions.

Additionally, the proposed algorithm incorporated guidance on the iterative refinement of search strategies, aligning with contemporary approaches to scientific inquiry. The AI emphasizes the importance of critically evaluating retrieved sources, assessing their reliability and scholarly value, thereby approximating the role of an experienced research advisor. This is particularly significant in the context of information overload, where the ability to select high-quality information becomes a determining factor in the effectiveness of the research process.

Discussion of the obtained results provides grounds to assert that the use of artificial intelligence significantly transforms traditional approaches to working with scientific information. Whereas navigation of information resources was previously performed by librarians or academic supervisors, these functions are increasingly being assumed by intelligent systems. Their advantage lies in high-speed data processing, the ability to synthesize large volumes of information, and adaptation to individual user queries (Wamba et al., 2017).

At the same time, the results of the study also reveal certain limitations. The effectiveness of AI largely depends on the quality of the formulated query and the user's level of competence. Without adequate skills in formulating research questions and applying critical thinking, there is a risk of obtaining superficial or incomplete results (Zawacki-Richter et al., 2019). Consequently, AI should not be viewed as a full replacement for a scientific expert, but rather as a powerful supportive tool that enhances the intellectual capabilities of the researcher.

The obtained findings confirm that contemporary language models can function as effective digital assistants in academic search, ensuring structured, fast, and flexible interaction with scientific data, while still maintaining the necessity of an active human role in the process of knowledge acquisition.

A key stage in verifying the analytical capabilities of artificial intelligence involved solving applied linear programming problems, which enabled a transition from theoretical considerations to practical validation of its functionality. Using instructions generated by ChatGPT, the configuration of the R programming environment was successfully completed, and the specialized lpSolve package for optimization tasks was installed. This process included the installation of relevant libraries, the formalization of the mathematical model, the specification of objective function parameters, and the construction of constraint systems in the form of matrix representations.

The obtained computational results for the first decision-making model yielded specific

variable values: X1 = 3.33 and X2 = 1.33, corresponding to the optimal allocation of resources under the given constraints. In the second scenario, where input parameters were modified to test the flexibility of the algorithm and the adaptability of the model, the results were X1 = 3 and X2 = 1, representing integer or near-integer solutions. This indicates the correctness of the computational process and the algorithm's ability to identify optimal solutions even under varying problem conditions. Importantly, both outcomes are consistent with the expected theoretical values, thereby confirming the adequacy of the implemented model.

The analysis of the obtained data suggests that artificial intelligence is capable of effectively interpreting mathematical problem statements and transforming them into formalized program code suitable for execution. In essence, the system acts as an intermediary between an abstract mathematical model and its practical implementation in a programming environment. This is particularly significant for users without advanced programming expertise who nevertheless engage with optimization problems in their professional activities.

Discussion of the results (see Fig. 1) demonstrates that the integration of artificial intelligence into the process of mathematical modeling significantly reduces the time required for model development and testing. In particular, the prototyping stage, which traditionally demanded substantial effort and time investment, can be considerably optimized through automated code generation and explanatory support. Moreover, AI is capable of proposing alternative approaches to problem-solving, thereby expanding the analytical capabilities of the researcher (Russell & Norvig, 2021).

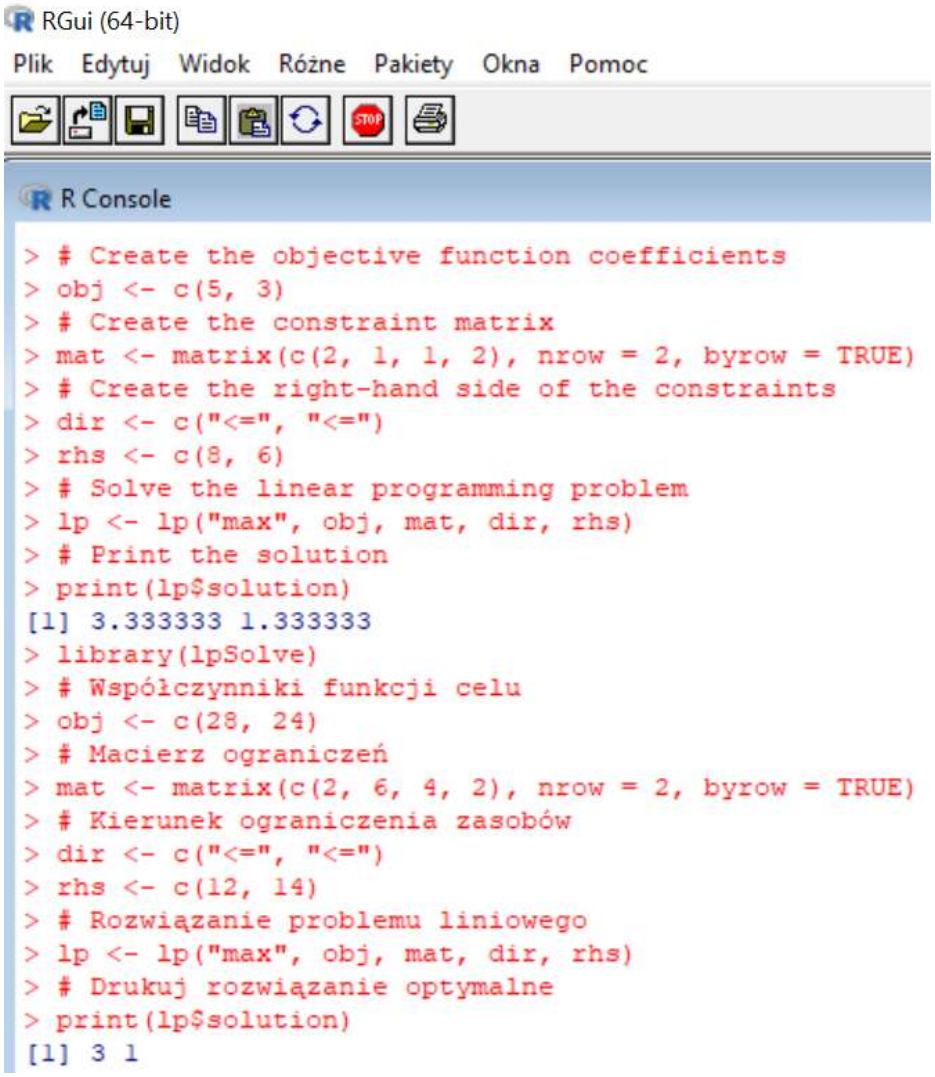

Fig. 1. Examples of formulating two decision-making problems and the obtained solutions using the lpSolve package. Source: own elaboration.

At the same time, the results of the study indicate a strong dependence of computational quality on the accuracy of input data and problem formulation. The so-called prompt engineering approach plays a crucial role in achieving correct outcomes, as even minor inaccuracies in query formulation may lead to erroneous or suboptimal solutions (Liu et al., 2023). This highlights the necessity of maintaining oversight by a qualified specialist, who is responsible not only for formulating problems but also for interpreting results within an appropriate contextual framework.

The obtained findings confirm that artificial intelligence can serve as an effective tool for supporting mathematical modeling and optimization. However, its use must be accompanied by professional expertise and critical analysis, ensuring the reliability and validity of final results in practical applications.

The comparative analysis revealed significant differences in the architecture, operational principles, and practical effectiveness of leading artificial intelligence systems. The results confirm that each platform possesses specific strengths and limitations that determine its suitability for particular tasks in scientific, educational, or professional domains (Kaplan & Haenlein, 2019; Zawacki-Richter et al., 2019; Liu et al., 2023).

In particular, ChatGPT demonstrated a high level of contextual awareness and the ability to sustain long, logically coherent dialogues. Its key advantage lies in effectively summarizing large volumes of textual information, enabling the generation of structured responses, explanations, and analytical conclusions. This makes it particularly useful for educational purposes, academic writing, and advisory tasks. However, a notable limitation is its dependence on training data, which may result in a lack of the most up-to-date information or the need for additional verification of outputs.

In contrast, Google Bard (based on the PaLM 2 model) demonstrated higher efficiency in handling current and real-time data. Due to its integration with search services, it can rapidly incorporate new information streams, making it more suitable for analyzing contemporary events, market dynamics, and rapidly changing processes. This is particularly important in fast-paced information environments where timeliness is a critical factor.

A separate place is occupied by HuggingChat, which represents an example of an open-source software solution. Its operation is based on open datasets and methodological approaches that ensure flexibility in configuration and the ability to adapt to specific research needs. Despite certain limitations compared to commercial alternatives, its performance remains sufficiently high, opening broad prospects for academic and non-commercial projects.

Thus, the comparative results indicate that no single system is universally optimal. The choice of an appropriate tool should be based on a balance between analytical depth, data currency, and technological accessibility, which collectively determine the effectiveness of AI use in specific contexts.

The discussion of the obtained results cannot be complete without considering the broader social context in which artificial intelligence technologies are being implemented. Analysis of empirical data and public reports reveals the presence of contradictory trends that combine both significant risks and substantial benefits for society (Russell, 2019). In particular, research indicates increasing automation in the corporate sector: companies such as BT Group have announced plans to reduce tens of thousands of jobs by 2030, linking this strategy to the widespread implementation of AI-based solutions (British Telecommunications Group, 2023). Similar trends are confirmed by analytical reports from Bloomberg, as well as broader changes in the service market, where chatbots and virtual assistants increasingly perform first-line customer support functions (Bloomberg Intelligence, 2025).

Such developments highlight issues related to labor market transformation, the need for workforce reskilling, and the formation of new professional competencies. At the same time, it is important to emphasize that automation not only displaces traditional occupations but also creates new opportunities in areas related to the development, maintenance, and management of intelligent systems. This indicates a transition

toward a new economic model in which knowledge and digital skills become key resources (World Economic Forum, 2025).

On the other hand, the positive effects of artificial intelligence implementation are particularly evident in infrastructure and urban development projects (McKinsey Global Institute, 2018). In particular, the Surtrac system, deployed in several cities, demonstrates a significant improvement in traffic flow management efficiency (Smith et al., 2013). Empirical data indicate a reduction in intersection waiting times of up to 40%, which not only improves transportation comfort but also contributes to lower emissions of harmful pollutants and overall environmental improvement.

Thus, the results of the study confirm the ambivalent nature of artificial intelligence: on the one hand, it creates challenges for traditional employment structures, while on the other, it opens new opportunities for improving quality of life, enhancing the efficiency of urban systems, and supporting sustainable development.

An important aspect of the discussion is the phenomenon identified in the study as "apparent correctness" (so-called AI hallucinations), which represents one of the key challenges of contemporary intelligent systems (Ji et al., 2023). During experimental interaction with models such as ChatGPT, cases were observed in which the system generated confident, logically structured, and grammatically flawless responses that nonetheless contained factual inaccuracies, incorrect generalizations, or even fabricated bibliographic references. This phenomenon is particularly concerning in educational contexts, where users – especially pupils and students – may perceive AI-generated outputs as reliable and verified information without additional critical evaluation.

This effect is explained by the nature of generative models, which rely on statistical patterns in data rather than real-time verification of factual accuracy. As a result, an illusion of expertise is created, which may lead to erroneous conclusions and a decline in the quality of learning. The discussion of this risk leads to the conclusion that, at the current stage of development, artificial intelligence should be regarded not as an autonomous source of knowledge, but as a tool for supporting intellectual activity. Accordingly, its outputs must be systematically verified using traditional scientific methods, including source checking, data comparison, and critical evaluation of the obtained information (Kasneci et al., 2023).

The results of the educational context analysis convincingly demonstrate a rapid increase in demand for specialists in the field of artificial intelligence, which necessitates a profound transformation of both the content and structure of professional training (World Economic Forum, 2025). Contemporary educational models can no longer be limited to the development of basic digital literacy skills, including the use of tools such as ChatGPT. Instead, they must ensure interdisciplinary preparation that integrates knowledge from computer science, mathematical modeling, cognitive sciences, neurobiology, and econometrics. Particular importance is attached to mastering specialized programming languages and environments such as Lisp, Prolog, and TensorFlow, which constitute the instrumental foundation for developing intelligent systems (Jordan & Mitchell, 2015; Russell & Norvig, 2021).

Such an approach enables a shift from superficial use of ready-made solutions toward a deeper understanding of the underlying principles of artificial intelligence and the development of original algorithmic models. As a result, a new type of specialist is formed – one capable not only of interacting with intelligent systems but also of designing them in accordance with the needs of the real economy, particularly in the management of complex processes (Russell, 2019).

In conclusion, the results of the study demonstrate the substantial potential of artificial intelligence as a tool for enhancing intellectual work efficiency and optimizing professional activities. At the same time, they emphasize the need to establish new ethical, educational, and professional standards that ensure safe, responsible, and critically informed human–algorithm interaction within the context of a digital society.

Conclusions. The conducted study of the social and educational context of artificial intelligence enables the formulation of a set of

conceptual conclusions regarding the current state and future prospects of integrating intelligent systems into human activity.

First, it has been established that artificial intelligence is no longer confined to a purely theoretical discipline but has evolved into a powerful set of practical tools. The rapid adoption of AI technologies by a broad range of users reflects a paradigm shift in human–information interaction. The transition from traditional keyboard-based input to voice control and natural language queries has significantly lowered the entry barrier to high technologies, making complex computational processes accessible to non-specialist users.

Second, in the educational domain, a high level of interest in the field of "Artificial Intelligence" has been observed among young learners. However, a noticeable gap exists between students' expectations and the actual complexity of professional training. A successful career in this field requires not only the ability to use ready-made interfaces but also a deep understanding of mathematical logic, neurobiology, and specialized programming languages such as Lisp, Prolog, and TensorFlow. This necessitates the adaptation of curricula that combine a conceptual understanding of AI with a strong technical foundation.

Third, the practical experiment involving language models such as ChatGPT and Bard confirmed their high effectiveness as intellectual assistants. They can significantly optimize academic research processes and the solution of specialized tasks, for example in linear programming using the R language. However, a key challenge remains the issue of "apparent correctness." AI systems may generate convincing but factually incorrect content, making critical thinking and expert verification essential components of working with such tools.

From a social perspective, the development of AI presents both opportunities and risks. On the one hand, there are successful examples of urban infrastructure optimization (e.g., Surtrac systems) and the automation of routine human tasks. On the other hand, there is a real threat to the labor market, particularly in customer service and administrative support sectors, where chatbots increasingly replace human workers. This necessitates the development of new socio-economic policies to support workforce adaptation in the information society.

In conclusion, artificial intelligence should be regarded not as a substitute for human intelligence but as an intellectual amplifier. Future research should focus on the ethical dimensions of AI use, the improvement of reinforcement learning methods, and the search for a balanced relationship between automation and human control. Today, AI represents a dynamic environment that requires continuous learning and rapid adaptability from both developers and users.

Conflict of Interest

The author certifies that no conflict of interest (financial, professional, or personal) exists that could have influenced the objectivity of the research results or conclusions. The integrity of the double-blind peer review process was ensured through a mandatory declaration of the absence of conflict of interest submitted via the journal's editorial system. This protocol guaranteed complete author anonymity and the independence of the expert evaluation throughout the entire editorial cycle.

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ТРАНСФОРМАЦІЯ СОЦІАЛЬНИХ ТА ОСВІТНІХ СИСТЕМ ПІД УПЛИВОМ ШТУЧНОГО ІНТЕЛЕКТУ

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Реферат:

Актуальність упродовж останнього десятиліття штучний інтелект (ШІ) перетворився на ключовий драйвер глобальних соціально-економічних змін, інтегруючись у виробництво, медицину та освіту з безпрецедентною швидкістю; попри технологічну експансію, існує значний розрив між інтересом студентів до інтелектуальних систем та реальним розумінням складності професійних траєкторій у цій галузі; наявні теоретичні прогалини стосуються інтерпретованості моделей та етичного використання алгоритмів, тоді як практичні виклики пов'язані з трансформацією ринку праці та ризиками втрати робочих місць через автоматизацію.

*Мета***:** дослідження спрямоване на комплексний аналіз сучасного стану та практичного впровадження систем ШІ в соціальному й освітньому середовищах, а також на верифікацію функціональних можливостей мовних моделей нового покоління як інструментів підтримки професійної діяльності та прийняття рішень.

*Методи***.** Методологія базується на поєднанні теоретичного аналізу наукових джерел та експериментального моделювання. Дослідницький дизайн включав: критичний огляд міждисциплінарних публікацій; кейс-стаді генеративних систем (ChatGPT, Bard) із застосуванням принципів prompt engineering; математичне моделювання задач лінійного програмування в середовищі програмування R з використанням пакету lpSolve; а також порівняльну верифікацію результатів.

*Результати***.** Встановлено, що сучасні мовні моделі здатні формувати цілісні стратегії наукового пошуку, виступаючи в ролі інтелектуальних навігаторів. Практичний експеримент із розв'язання оптимізаційних задач підтвердив здатність ШІ коректно трансформувати математичні описи в програмний код, забезпечуючи оптимальні розв'язки (зокрема, отримано значення X1=3,33 та X2=1,33 для ресурсної моделі). Порівняльний аналіз виявив переваги ChatGPT у підтримці контексту діалогу та Google Bard у роботі з актуальними даними. Водночас ідентифіковано феномен «позірної правильності» (AI-галюцинацій) та соціальні ризики, такі як плани BT Group щодо скорочення 55 000 робочих місць до 2030 року через автоматизацію. На противагу цьому, впровадження систем типу Surtrac дозволило скоротити час очікування в міських заторах на 40%.

*Висновки***:** доведено, що ШІ є ефективним підсилювачем інтелектуальної діяльності, а не заміною людському розуму; значущість результатів полягає в обґрунтуванні необхідності адаптації освітніх програм до міждисциплінарних вимог, що поєднують когнітивні науки та програмування; практичне застосування ШІ вимагає обов'язкової фахової верифікації результатів та збереження критичного мислення користувача для запобігання фактичним помилкам.

Ключові слова: *генеративні моделі, трансформація ринку праці, інженерія запитів, лінійне програмування, цифрова компетентність.*

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