Nykyporets S. S.,

Senior Lecturer at the Department of Foreign Languages,
Vinnytsia National Technical University,
Vinnytsia, Ukraine

THE INFLUENCE OF EMERGING TECHNOLOGIES ON THE ENHANCEMENT OF CRITICAL THINKING AND PROBLEM-SOLVING ABILITIES OF TECHNICAL MASTER'S STUDENTS

This article addresses the dynamic interplay between technological advancements and cognitive skill development, particularly focusing on critical thinking and problem-solving abilities of technical students. This investigation is predicated on the premise that as the digital landscape evolves, so too does the potential for educational tools and environments to shape the intellectual capabilities of technical master's students. The core of this problem revolves around identifying the extent to which emerging technologies can be harnessed to not only convey information but also to fundamentally enhance the cognitive processes underlying critical thinking and problem-solving.

This inquiry is connected to significant scientific and practical tasks for several reasons. Scientifically, it engages with interdisciplinary fields such as cognitive psychology, educational technology, and neuroscience, to understand the mechanisms through which technology interacts with cognitive development. Practically, it addresses the urgent need for educational systems to adapt to the digital age, ensuring that learners are equipped with the necessary skills to navigate complex information landscapes, solve problems creatively, and think critically about the multitude of challenges facing contemporary society.

The urgency and importance of this problem stem from the rapidly changing technological environment and its ubiquitous presence in educational and professional settings. As technologies such as artificial intelligence, virtual and augmented reality, and digital collaboration platforms become more integrated into learning environments, it is crucial to understand how these tools can be designed and implemented to maximize cognitive growth. This understanding is vital for developing educational strategies that leverage technology to foster a generation of critical thinkers and problem solvers, thereby addressing both current and future challenges in a world increasingly reliant on technology-driven solutions.

Recent contributions in the field have been made by scholars like Greenfield [1], who explored the cognitive impacts of digital media on brain development, and Jenkins [2], whose work on participatory culture and digital learning environments highlighted the potential for technology to foster collaborative problem-solving skills. Additionally, research by Zhou and Brown [3] on the application of virtual reality in education demonstrated significant improvements in critical thinking skills among students engaged in immersive learning experiences.

The core of this study revolves around a comprehensive investigation into how digital tools and platforms can be effectively utilized to bolster these essential cognitive skills. The research methodology integrates quantitative and qualitative analyses, involving controlled experiments, case studies, and meta-analyses of

existing literature. Through this multifaceted approach, the study aims to dissect the intricate relationship between technology use and cognitive skill enhancement, providing a nuanced understanding of the factors that contribute to successful outcomes.

A series of controlled experiments were conducted to assess the impact of specific technologies such as educational video games, virtual reality simulations, and online collaborative platforms on students' critical thinking and problem-solving abilities. For example, one experiment involved students engaging with a virtual reality (VR) simulation of historical events, where they were tasked with analysing primary sources and constructing arguments based on their findings. The results indicated a statistically significant improvement in critical thinking skills, as measured by pre- and post-tests, among students who participated in the VR simulations compared to those in a control group who received traditional instruction.

The study also includes case studies from various educational contexts, including K-12 schools, higher education, and professional development programs. One case study highlights a project-based learning approach in a high school setting, where students used digital fabrication tools to design solutions to community problems. [4] This approach fostered a learning environment that emphasized iterative design, feedback, and problem-solving, leading to observable enhancements in students' ability to think critically and solve complex problems.

Complementing the primary research, a meta-analysis of recent literature on the topic was conducted to aggregate findings from across the field. This analysis reinforced the hypothesis that technology, when integrated with pedagogical strategies that encourage active learning and critical engagement, can significantly enhance critical thinking and problem-solving skills. [5]

The obtained results are justified through a combination of statistical analysis, comparative studies, and theoretical frameworks that elucidate how technological interventions can enhance cognitive processes. The improvement in

critical thinking and problem-solving abilities observed in experimental and case study participants is supported by data analysis techniques such as effect size calculation and regression analysis, demonstrating the positive impact of technology-integrated learning environments. [6]

Furthermore, the findings are grounded in cognitive theory, particularly the Constructivist theory of learning, which posits that learners construct knowledge through experiences and interactions with their environment. The integration of technologies that promote active engagement, collaboration, and problem-based learning aligns with these principles, offering a theoretical justification for the observed enhancements in cognitive skills. [7]

In conclusion, his study contributes to the body of knowledge on the role of emerging technologies in education by providing empirical evidence and theoretical insights into how digital tools can be leveraged to develop critical thinking and problem-solving skills of technical students. By highlighting effective practices and identifying areas for further research, the findings aim to guide educators, policymakers, and technology developers in creating and implementing technologies that foster essential cognitive abilities for navigating the complexities of the modern world.

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