The Comparative Analysis of Integrating of ICT in Stem Education: Problems and Positive Aspects – A Complex Review

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Abstract:

ICTs play a key role in modernizing STEM education, ensuring active student participation and creating conditions for the development of 21st century skills such as critical thinking, creativity and collaboration. However, the introduction of ICT faces a number of challenges, including lack of infrastructure, insufficient teacher training and limited access to digital resources, especially in developing countries. ICT in STEM education can potentially significantly improve the quality of education, but for this it is necessary to solve existing problems and ensure equal access to technologies and their effective use.

ICT integration in STEM education offers numerous benefits but also presents challenges. By the way, implementing ICT in STEM education requires a systemic approach, including sustainable network design, quality e-learning resources, and teacher training. However, effective integration depends on teachers' Technological Pedagogical Content Knowledge (TPACK) and self-efficacy.

The purpose of this review article is a comprehensive study is the investigation the dual impact of ICT in STEM, emphasizing its role in enhancing accessibility, as well as exploring both the benefits and the potential negative consequences of using ICT, such as problems with data security and lack of interpersonal interaction, and analyze the impact of unequal access to technology on educational outcomes.