A Digital Framework for AI Literacy Among Middle School Students

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Abstract

As artificial intelligence (AI) becomes increasingly integral to daily life, equipping school students with appropriate AI competencies is essential for fostering responsible usage and critical thinking. This study conducted a comprehensive literature review of four existing informatics education frameworks—Digital Competencies Framework [1], Informatics Reference Framework for Schools (2022, 2023) [2,3], and the K–12 Computer Science Framework [4]. From these, we mapped a new framework with four core areas: Core Computational Concepts and Skills, Digital Citizenship and Ethical Competence, Impact of Computing on Society, and Digital Competence and Lifelong Learning. Then AI competencies were integrated into this framework to develop a new Enriched Informatics Education Framework. Through comparative analysis, these AI competencies were mapped to their suitable core areas and synthesized to identify those suitable for middle school students—an ideal age group developing critical thinking skills and beginning to understand abstract concepts, making them more receptive to AI literacy [5]. Specific learning outcomes were established for each AI competency, accompanied by relevant tools and practices to achieve these goals. Additionally, assessment methods were designed to evaluate student mastery of each competency. This framework aims to enrich public school curricula with AI education, preparing future generations for an AI-driven world. Future work will focus on piloting these competencies within educational settings to evaluate their effectiveness.

References:

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[4] Computer Science Teachers Association. (2016). *CSTA K-12 Computer Science Standards*. Retrieved from https://www.csteachers.org/page/standards

[5] *Woodruff, A., Voneche, A. S., Thunstrom, K., Jana, R., Hardy, R. L., Aoki, D. R., & Kelley, P. G. (2023). Discover AI in Daily Life: An AI Literacy Lesson for Middle School Students. Retrieved from https://storage.googleapis.com/gweb-research2023-media/pubtools/7321.pdf*