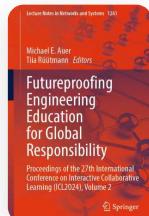


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Examining the Pedagogical Abilities and Needs of Kazak Physics Teachers to Implement STEM Education

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Futureproofing Engineering Education for Global Responsibility
(ICL 2024)

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Abstract

A key objective of STEM education globally is to cultivate leading experts in Science, Technology, Engineering, and Mathematics. However, despite the focus of professional development programs on strong leadership, enhancing teacher capacity, and offering

educational guidance, STEM teachers often encounter challenges adapting to transdisciplinary integration reforms in their classrooms. Hence, there is an urgent need for high-quality professional development programs that can effectively prepare teachers for implementing STEM education. To address this issue, this examines physics teachers' pedagogical needs regarding STEM education. The article aims to show teachers' experiences with STEM education across various school types and geographical locations in Kazakhstan. For this purpose, we have conducted a qualitative study, surveying 164 physics teachers in Almaty, one of Kazakhstan's biggest cities. As the study results showed, 104 teachers indicated having only a slight knowledge of STEM education, while 46 teachers reported that do not acquire any knowledge of STEM education, and 14 teachers claimed to possess expert knowledge. Furthermore, it was determined that 43.9% of the participants expressed the need for specific professional development programs to effectively implement STEM education in their classes. This study underscores the urgent necessity for targeted interventions to enhance teacher capacity in integrating STEM principles into their classrooms effectively.

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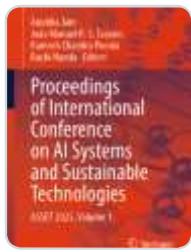
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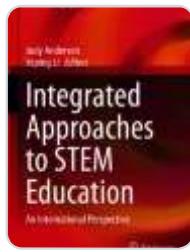
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