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ICT-Mediated STEM for the Inclusive Education of Migrants and Refugees Children

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Abstract

Science, Technology, Engineering, and Mathematics (STEM) is an approach that integrates science and mathematics education through the development of scientific practices, technology, engineering design, and mathematical analysis. Although governments in North American and European countries have invested in promoting the study of STEM disciplines, educational programs for migrants have been offered for adults, and very few programs for children, which are invisible, downplaying the effects of migration on the educational process of children. Educational interventions are needed at early ages, focusing on the funds of knowledge from the children's informal learning during their migratory trajectories, such as the United States and Israel, as host countries that have historically reaped the benefits of immigration. Inclusive education requires ICTs to overcome the social, economic, and cultural barriers presented by migrant children. However, transnational education studies focus on the effects of migration on children's identity and academic success, but there is a gap in the literature on empirical studies on the role of ICT-mediated STEM education in migrant and refugee children. For this reason, a systematic literature review was developed in Web of Science, which aims to close the gap in the literature and show that STEM education develops skills that allow migrant families access to economic and social benefits and promote social innovation processes in destination countries. The search algorithm that linked STEM education research and its relationship with ICT, in conjunction with the target population of migrant and refugee children. This algorithm was refined for publications written in Spanish and English between 2000 and 2023 yielding 70445 publications. These publications were evaluated by 5 criteria: the prestige of the journal/publisher and author, consistency, thematic appropriateness, and relevance of the results. This resulted in 338 publications that were classified into contribution levels according to the score obtained in the evaluation criteria. Finally, 48 publications were selected for their high level of contribution to 8 major themes that were developed i) the disciplines of STEM education, ii) the delimited definition of STEM education, iii) the benefits of STEM education, iv) STEM learning for migrant and refugee children, v) Computational thinking at K-12 STEM education, vi) STEM education for innovation, vii) STEM integration cases, and viii) STEM in the inclusive learning spaces. It is concluded that ICT-mediated STEM promotes inclusive learning spaces in which diversity is valued and quality education for all is guaranteed. While it is demystified that migrants and refugees do not have electronic devices, children should be guaranteed full access to the ICT-mediated learning environment during their migrant journey. Finally, it is proposed to deepen the literature on the development of computational thinking skills in children, as it is considered the basis of STEM disciplines for the design of activities that integrate these disciplines and are adapted to the educational needs of migrant and refugee children. © American Society for Engineering Education, 2023.

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