

Integration of STEM Education in Quebec, Canada - Challenges and Opportunities

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Abstract : STEM education is promoted by many scholars and curricula around the world, but it is not yet well established in the province of Quebec in Canada. In addition, effective instructional STEM activities and design methods are required to ensure that students and teachers' needs are being met. One potential method is the Engineering Design Process (EDP), a methodology that emphasizes the importance of creativity and collaboration in problem-solving strategies. This article reports on a case study that focused on using the EDP to develop instructional materials by means of making a technological artifact to teach mathematical variables and functions at the secondary level. The five iterative stages of the EDP (design, make, test, infer, and iterate) were integrated into the development of the course materials. Data was collected from different sources: pre- and post-questionnaires, as well as a working document dealing with pupils' understanding based on designing, making, testing, and simulating. Twenty-four grade seven (13 years old) students in Northern Quebec participated in the study. The findings of this study indicate that STEM activities have a positive impact not only on students' engagement in classroom activities but also on learning new mathematical concepts. Furthermore, STEM-focused activities have a significant effect on problem-solving skills development in an interdisciplinary approach. Based on the study's results, we can conclude, inter alia, that teachers should integrate STEM activities into their teaching practices to increase learning outcomes and attach more importance to STEM-focused activities to develop students' reflective thinking and hands-on skills.

Keywords : engineering design process, motivation, stem, integration, variables, functions

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