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# Metal Ship and Robotic Car: A Hands-On Activity to Develop Scientific and Engineering Skills for High School Students

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**Abstract :** Metal Ship and Robotic Car is one of the hands-on activities in the course, the Fundamental of Engineering that can be divided into three parts. The first part, the metal ships, was made by using engineering drawings, physics and mathematics knowledge. The second part is where the students learned how to construct a robotic car and control it using computer programming. In the last part, the students had to combine the workings of these two objects in the final testing. This aim of study was to investigate the effectiveness of hands-on activity by integrating Science, Technology, Engineering and Mathematics (STEM) concepts to develop scientific and engineering skills. The results showed that the majority of students felt this hands-on activity lead to an increased confidence level in the integration of STEM. Moreover, 48% of all students engaged well with the STEM concepts. Students could obtain the knowledge of STEM through hands-on activities with the topics science and mathematics, engineering drawing, engineering workshop and computer programming; most students agree and strongly agree with this learning process. This indicated that the hands-on activity: “Metal Ship and Robotic Car” is a useful tool to integrate each aspect of STEM. Furthermore, hands-on activities positively influence a student’s interest which leads to increased learning achievement and also in developing scientific and engineering skills.

**Keywords :** hands-on activity, STEM education, computer programming, metal work
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