Abstract

Development of model to improve contents, methods and evaluation of STEAM education for mathematics and other subjects in middle school

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The purpose of this study is to investigate the theoretical background of STEAM education and seek the class model, contents of class and evaluation methods appropriate for STEAM education. More specifically, we developed other subjects fusion materials based on mathematics which meet the curriculum of mathematics for freshmen in middle school with consideration of cognitive and affective characteristics of freshmen in middle school.

The contents and results of this study are as follows. First, as theoretical basis, we studied domestic and international research trends for STEAM education, and investigated the class model which could be utilized in the STEAM education in order to present the class model and class methods appropriate for fusion education. In addition, we summarized the studies on various evaluation methods utilized for STEAM education in addition to paper-based evaluation.

Main purpose of this study is to develop the class model and practical materials to give the STEAM education in schools. Thus, we proposed appropriate class model based on literature research, and developed and presented materials based on 2009 revised mathematics curriculum. Developed materials included six areas presented in curriculum

such as numbers and calculations, characters and equations, functions, probability and statistics and geometry area. We presented teaching and learning materials, teaching contents, student activity sheets, reference materials for teachers and exemplary answers for activity sheets, respectively. In addition, in order to propose evaluation methods appropriate for learning activities, the proposals of self and colleague evaluation, interview evaluation, oral evaluation, performance and observation evaluation and descriptive and essay type evaluation were suggested.