

Designing instrument to measure STEM teaching practices of Malaysian teachers

ABSTRACT

The remarkable upsurge in the attention for STEM education globally has inspired many countries including Malaysia to formulate STEM education policies to reform the existing segmented teaching of the four STEM subjects towards integrated teaching. One of the Malaysian government's initiatives include establishing a framework as a guide for teachers to practise STEM teaching. This exploratory, mixed methods study aimed to explore Malaysian science and mathematics teachers' perceptions to practise STEM teaching and develop a questionnaire to measure factors that explain their teaching practices. The interview findings identified teachers' knowledge of interdisciplinary and related pedagogical strategies, challenges encountered in STEM teaching practices, and teachers' self-efficacy beliefs to perform STEM teaching as factors that explain STEM teaching practices. Following that, a 33- item questionnaire was developed based on the qualitative findings. The results of exploratory factor analysis produced four distinct factors echoing the qualitative findings with 29 items, which were then validated using confirmatory composite analysis (CCA). CCA results in retaining all four factors and removing six items with lower loading values. Thus, the final version of the questionnaire consists of 23 items. The findings of this study were expected to benefit STEM advocates and educators globally. Additionally, the developed questionnaire would allow collective measurement of the factors that explain STEM teaching practices.