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Abstract

Science, Technology, Engineering, and Mathematics (STEM) education is crucial to technological innovation and advancement worldwide. This research is a preliminary investigation of learning styles of students studying STEM programmes in Hong Kong. Data from over 200 sample students in multiple cohorts of the two-year STEM programmes is first collected and analysed to identify the learning characteristics of students. A small-scale longitudinal study of representative student cases is then conducted to analyse the academic STEM module results of the students throughout their two-year studies. Preliminary results suggest that the sample students are marginally reflective, predominately sensing, visual, and sequential learners. Findings from the analysed data will not only provide valuable information for teachers to design more effective teaching strategies for STEM modules, but also shed light on the relationship of academic achievements of STEM students and their learning styles.

Blind Paper

Science, Technology, Engineering, and Mathematics (STEM) education is crucial to technological innovation and advancement worldwide. One important objective of STEM education is to nurture young talents who are able to integrate scientific principles and design practical solutions for real-world problems. Undergraduates of STEM-related tertiary curriculums are expected to demonstrate an extensive set of learning outcomes. For example, engineering undergraduates are required to satisfy the graduate attributes as required in international accreditation agreements for academic qualifications such as the Washington Accord and the Sydney Accord. On the other hand, students have a diversity of learning preferences or styles. They have different preferred styles of receiving, processing and internalizing knowledge and skills. If the learning environment is advantageous to the learning styles of the students, there is a higher chance that the students can achieve the intended learning outcomes. Previous research on learning styles of students suggests that the use of learning style models helped teachers design more effective instruction and could help students better understand their own learning preferences. A widely-used learning style model for STEM students categorizes learning preferences into four dimensions, namely, active/reflective, sensing/intuitive, visual/verbal, and sequential/global. After identifying the learning styles of the students, corresponding teaching strategies can then be developed for more effective learning.

This research is a preliminary investigation of learning styles of students studying STEM programmes in Hong Kong. The STEM programmes considered in this study are higher diploma programmes including Civil Engineering and Building Studies offered by Hong Kong Institute of Vocational Education (IVE). The full-time students in the two programmes are required to study a variety of STEM modules in two years including engineering science, mathematics and construction technology. Data from over 200 sample students in multiple cohorts of the two-year STEM programmes is first collected and analysed to identify the learning characteristics of students. A small-scale longitudinal study of representative student cases is then conducted to analyse the academic STEM module results of the students throughout their two-year studies. Preliminary results suggest that the sample IVE students are marginally reflective, predominately sensing, visual, and sequential learners. Given the close relationship between learning styles and teaching styles, it is favourable to minimise the mismatch between the learning styles and the teaching styles. A

variety of teaching strategies can be developed to provide a favourable learning environment for the STEM students to achieve the intended learning outcomes more easily. While the data has been collected, efforts are being made to conduct the longitudinal study for tracking and analysing the relationship between learning styles and the variety of the STEM modules. Findings from the analysed data will not only provide valuable information for teachers to design more effective teaching strategies for STEM modules, but also shed light on the relationship of academic achievements of STEM students and their learning styles.