

Chapter 1

Computational Thinking Self-Efficacy Perception for Progressive Learning in Malaysia: A Study of Validity and Reliability

Wan Nor Ashiqin Wan Ali

Universiti Sains Malaysia, Malaysia & Universiti Malaysia Perlis, Malaysia

Wan Ahmad Jaafar Wan Yahaya

Universiti Sains Malaysia, Malaysia

ABSTRACT

Recently, researchers from various fields have argued that computational thinking (CT) skills are one of the most significant skills to have in 21st-century higher education; thus, this study was conducted to gather empirical data on the reliability and validity of the computational thinking self-efficacy survey (CTSe) in a Malaysian university setting. This study created a self-efficacy perception measurement tool to measure the CT self-efficacy based on the algorithmic thinking. A content validity testing to three CT content experts using content validity index (CVI) and exploratory factor analysis (EFA) were conducted to validate the CTSe items. A total of 127 university students participated in the CTSe survey via an online survey platform. The data gathered from the online survey were analysed for EFA and reliability analysis in order to study the CTSe's validity and internal consistency. Researcher foresees that this study can offer an insight into integrating the CT concepts in designing future learning materials.

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INTRODUCTION

Self-efficacy is defined as individuals' belief of their own competencies to attain a goal or accomplishment. An individual with high sense of self-efficacy is more likely to challenge himself/herself with challenging tasks in order to become motivated. This type of learners is generally known for achieving planned goals without hesitation. However, learners with low self-efficacy believe are perceived to have less chances for progressing in the task tasks and are likely to experience low achievement. According to the social cognitive theory, psychology theorist Bandura (1977) had introduced the Bandura's general self-efficacy scale (GSES) in an attempt to measure individual' degree of self-efficacy. The GSES is intended to assess the perceived self-efficacy for people who are 12 years old and above. According to Bandura (1977), there are four major dimensions of self-efficacy: mastery experiences, psychological responses, social modelling, and social persuasion. Bandura believes that one's sense of self-efficacy can be increased through his/her mastery experience. It means that when someone is successful in performing a task, an increment of his/her self-efficacy is expected, whereas the opposite can be said about those who fail to successfully perform the task. Social modelling means that individuals can increase their self-efficacy when they perceive the success of other people in accomplishing the same task. This is believed to offer intrinsic motivation which help to facilitate individuals' success in a task. The last dimension of self-efficacy is the psychological response which Bandura (1977) directly linked it to the perception of one's self-efficacy.

The above-mentioned dimensions of self-efficacy are likely to affect people's self-belief of their ability to succeed. A study done by Bandura et al. (1996) highlighted that having higher self-efficacy can be one key stimulator of academic achievement. The literature showed several studies on self-efficacy instrument, especially in relation to children, academic, career and many more. Children's self-efficacy can help provide some clues concerning the development of sense of mastery, which is known to strengthen own self-belief. Children with high self-efficacy are likely to work harder to achieve their goals and become more enthusiastic with less anxiety. Hence, children with such self-efficacy characteristics are not only expected to succeed in progressing in their study but also their well-being. The academic self-efficacy scale is important in investigating the relationship between self-efficacy and performance. Students with high self-efficacy may tend to select difficult task and accomplish it while others with low self-efficacy are likely to avoid it.

Computational thinking (CT) can be implemented in education (formal and informal way) through curriculum development and daily activities in fostering the progressive learning. There are several CT core elements that have been discussed in various previous studies (Araujo et al., 2019; Cansu & Cansu, 2019;

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