Effects of an automated programming assessment system on the learning performances of experienced and novice learners

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Abstract

Programming ability is the core ability of this era and can be obtained and improved through practice. In this paper, an Automated Programming Assessment system based on Mastery learning and Peer competition (APAMP) was proposed and developed. APAMP allows students to practice repeatedly by providing immediate feedback after their programs are submitted. It also presents an analytical dashboard as a competition mechanism for students to visualize their learning performance and compare their performance with peers. By incorporating APAMP into programming courses, students can master programming skills through repeated practice, and their enthusiasm for learning programming can also be encouraged by peer competition. To evaluate the effects of APAMP on the learning performance of students with programming language learning and novice students, a quasi-experiment was conducted in a high school. The experimental results showed that the learning achievement of the two groups of students improved significantly. Moreover, the learning attitude of students in the experienced group improved significantly, with the experienced students benefiting more from the system than the novice students. In fact, the novice students showed a significant decline in learning attitude and learning motivation, which was contrary to our intuition.

Keyword: Programming instruction; Automated Programming Assessment Systems; Mastery learning; Peer competition; Learning performance