SKYAPP: A TABLET-BASED E-LEARNING DESIGN TOOL FOR MATHEMATICS TEACHERS TO CATER FOR LEARNING DIVERSITY

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Learning diversity is one of the most challenging difficulties encountered by teachers in primary and secondary schools. This project aims at building a design tool for teachers of Mathematics to develop tablet-based e-learning activities and apply different pedagogical actions based on the results of learning analytics. With the analysis of fine grained learners' behaviors in previous activities, such as the handwriting of calculation in solving multi-step questions, number of attempts in answering each question, answering sequence and thinking time, the design tool will be able to generate learning profile of each student, through which the tool can suggest subsequent sets of questions and offer suitable scaffolding supports to individual students. Empowered by the feedback recommendations generated by the tool, teachers can then transform teaching through creating and refining pedagogical practices of e-learning activities.

Despite the rapid adoption of educational mobile apps to support classroom teaching in recent years, there are currently very few tablet-based apps that can keep track of and perform real-time quantitative analytics on the fine-grained data about students' inputs and actions created during tablet-based e-learning activities. Based on the prototype of the design tool called SkyApp (Hui et al., 2015), pilot tests has been performed by the mathematics teachers of two local primary schools. SkyApp is a mobile app written in Objective-C to run in iOS tablets, which has been helping teachers in the pilot tests to develop tablet-based e-learning activities. The pilot tests have demonstrated that (1) SkyApp can reduce the efforts of teachers to create tablet-based e-learning activities by reusing their existing teaching materials; (2) Data of fine grained learners' behaviors can be captured by SkyApp during the delivery of e-learning activities; (3) Classification of students by learning performance and learning motivation can be achieved by off-line learning analytics.

This project proposes to enhance the prototype so that teachers can be empowered to cater for learning diversity. Firstly, learning analytics will be implemented in real-time to allow teachers to revise their pedagogies as soon as they receive the in-depth analysis of learning profiles of students based on the learning records collected throughout the period of tracking. Secondly, with the classification of students due to learning analytics, teachers can introduce specific design element such as gamification elements to address the special needs of a specific group of students. Thirdly, the design tool will assist teachers by suggesting suitable sets of questions and introducing scaffolding supports to students according to their own pace and style of learning.

Learning profiles of students generated by the statistical analysis of SkyApp will not only allow teachers to transform pedagogical practices, they will also help students, teachers, school administrators and parents to have a better understanding regarding the progress of learning of individual students.

References

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