



Design of a Mental Calculation App for Paramedic Students

Key Words

Paramedicine mathematics application design mastery learning gamification

Abstract

Students enrolled in a paramedicine degree need to achieve mastery over drug calculations. They must perform the calculations without the aid of a calculator, with 100% accuracy, while in a time critical, high-pressure environment. Paramedic students, however, are not usually in the habit of maintaining their mental arithmetic skills when they enter their course, and have poorer skill levels than they believe they have (Eastwood, Boyle, Kim, Stam & Williams, 2015). This lack of fundamental skills in mathematics can lead to an increase in anxiety in students and a decrease in the accuracy of the task outcomes. In recent years, digital technologies have been shown to help extend the previously “difficult to scale” pedagogical practice of mastery learning. This generation of “digital native” students is often “time poor” and carries high expectations about the types of educational materials that will engage them. Through a collaboration between two paramedicine lecturers and an academic skills advisor, an MSExcel-based application (app) is under development that will assist students to help identify, maintain and enhance their own mathematical skills. The design borrows some basic elements of gamification (Stott & Neustaedter, 2013) and mastery learning (Bloom, 1968) such as creating a sense of autonomy, lowering risk of failure, rapid feedback and creating a sense of progression (mastery). The content in the app covers a range of mathematic skills, from simple arithmetic through to contextualized problem solving. This paper initially focuses on the design philosophy and the needs analysis behind the app. It then covers the various elements of the current prototype, including user interface, game play, and feedback given by the app. It discusses how these elements can meet the student needs. Some strategies on how to distribute the app to students, and how the app can be applied within a paramedicine course are discussed. It then considers some novel challenges with regard to maintenance and design refinement. Incorporating student feedback into product improvements is considered an important part of the design refinement cycle.

References

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