

# 1 Slash 100%: gamification of mathematics with hybrid QR-based card game

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## ABSTRACT

Mathematics is vital in our life and society. However, gamification of mathematics is rare for topics such as fractions and decimals. This paper presents the development of an educational mathematics game called *one slash one hundred percent (1 Slash 100%)*. It is the hybridization of the conventional card game and quick response (QR). This research aims to study how the respondents explore the card game to master decimal, fraction and percentage. The testing was conducted among secondary school students in Kuching, Sarawak, Malaysia (n=12; age=14). The respondents were asked to answer a set of questions in pre-test and post-test question. The results are promising where the analysis showed a significant difference between pre-test (M=14.3, SD=2.103) and post-test scores (M=17.6, SD=2.234). Thus, gamification of mathematics using the hybrid card game increases their mastery of decimal, fraction and percentage.

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## 1. INTRODUCTION

Mathematics is an important subject and critical skill to master for us to function in a society [1]. It involves cognitive activities such as logical and reasoning through calculation [2]. The subject of mathematics is related to quantity, numbers, measurement and other related concepts. However, gamification of the mathematics subject is still rare, especially for topics such as Linear Algebra and fractions [3]. Thus, learning institutions such as schools should tap the power of mobile-learning to fulfil the current learning needs of the new millennial learners [4]. This paper presents the development of an educational mathematics game called one slash one hundred percent (1 Slash 100%). It combines the concepts of card games and quick response (QR) technology. It intends to help students to master fractions and decimal, based on the curriculum and assessment standards document (DSKP) produced by the ministry of education (MOE), Malaysia.

We intend to make it easier to form 3 students to understand and master the concept within a short amount of time. As fraction is one of the toughest syllabi for students [5], our main research question is to find methods that could combine both the conventional card game and QR to improve learning further. This paper is structured as follows: Section 2 discusses a brief literature review and related works. Section 3 describes the process of designing the QR card game. Meanwhile, section 4 presents the methodology of the evaluation method. Section 5 explains the results of the game testing process. Section 6 discusses the main challenges in designing our mathematics card game. Finally, Section 7 summarizes the project and presents future research opportunities.