Effects of Game-Based Teaching on Primary Students’ Dance Learning: The Application of the Personal Active Choreographer

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ABSTRACT
The article explored the effects of game-based teaching on primary student dance teaching and learning. Two semesters of dance teaching and learning conducted by the same teacher were analyzed. In the first semester, the teacher taught dance in a traditional way. In the second semester, the teacher taught dance with a serious game in the teaching design and implementation. Results indicated that the use of the serious game improved teacher and students co-engagement in the teaching activities. It enhanced classroom interactions and student learning satisfaction, as well as the teacher’s serious game acceptance. Results supported that the serious game was helpful to primary student dance teaching and learning.

KEYWORDS
Classroom Interactions, Dance Learning, Dance Serious Game, Game Acceptance, Game-Based Teaching, Learning Satisfaction, Primary Students, Teaching Design

INTRODUCTION
Serious games are becoming more and more popular in modern lives. Different types of serious games are frequently used in people’s mobile phones, tablets, and personal computers (Praet & Desoete, 2014). In China, more than 4.42 billion people play games, accounting 57.2% of all the internet users (Center, 2013). The growing popularity of serious games led educators to conclude that serious games need to be integrated into education (Rooney, 2012). Studies have supported that learners could relax themselves and get required knowledge through interacting with serious games for the authentic, engaging and appealing learning activities (Annetta & Bronack, 2011; Slimani, Sbert, Boada, Elouaai, & Bouhorma, 2016). Serious games have become widely accepted for games can provide motivational content to connect with players more deeply than linear forms of media. The serious game can improve learners’ immersion into learning, motivate their learning interest and facilitate deep learning. The interactivity and challenges of serious games can not only improve
students’ learning efficiency but can also stimulate their imagination and creativity (Prensky, 2005; Rystedt & Sjöblom, 2012). More importantly, serious games can present players with scenarios in which students are challenged (rather than forced) to perform better.

Dance is essential in people’s lives. It is a way of exercising, expressing feelings and a carrier of cultural heritage. Dance is a good way for students to express their stress (Wright & Hernandez, 2014). Larsson and Redelius (2008) found that many young boys and girls think school dance class is boring and even threatening for them. It will be useful to combine the advantage of serious games to students’ dance classes to motivate their interest in dancing.

Studies on dance serious games mainly concentrated on two aspects. One is about the technology of dance moves capture (Chan, Leung, Tang, & Komura, 2011; Großhauser, Bläzing, Spieth, & Hermann, 2012; Wei, Yan, Bie, Wang, & Sun, 2014). The other is about the development of dance serious game (Anderson, Grossman, Matejka, & Fitzmaurice, 2013; Grammatikopoulou, Laraba, Sahbenderoglu, Dimitropoulos, & Grammalidis, 2017). Combining serious games into dance teaching demands the teacher to act as a designer of how the game is applied in teaching (Almqvist & Östman, 2006). Gibbs, Quennerstedt, and Larsson (2017) proposed that dance serious games can be taken as teaching resources, the dance teachers need to reflect on the mechanism of a game to students’ dance learning. Höchsmann et al. (2017) proposed that the application of serious games in teaching can affect the effects of the game. Although studies proposed methods for designing technology supported teaching, few focused on the application process and effects of serious game in dance teaching and learning (Holmes, Thurmond, Annetta, & Sears, 2012; Lim & Chai, 2008). The dance serious game, Personal Active Choreographer (PAC) was developed by the authors and the dance teacher in a primary school was encouraged to apply it in her teaching. In the first semester, the teacher did not use the game. In the second semester, the instructor was encouraged to use game in her teaching. Then the effect of the game-based teaching was explored through comparing the teaching and learning in the two semesters. In the no-game semester, the teacher was asked to teach dance according to her experience. In the game-based learning semester, the teacher was encouraged to design game-based teaching activities according to the advantages of the game. The classroom interactions, students’ learning satisfaction, and teacher’s game acceptance were scaled to explore the effects of serious game on primary students’ dance learning.

**BACKGROUND**

**Serious Games**

Serious games are not just for entertainment. On a practical level, there are many applications of serious games for physical training, such as physical fitness, health care (Wattanasoontorn, Hernández, & Sbert, 2014), and rehabilitation (Dehem et al., 2017). Miller et al. (2014) identified the positive effects of serious games to students’ physical education using a comparative experiment. Chuang, Hung, Huang, Chang, and Hung (2015) supported that the game Dance Dance Revolution is effective to elderly women’s physical fitness. These studies demonstrated the effectiveness of the human-game interaction to physical training. On a theoretical level, researchers focused on the explicit mechanism of game-based learning that push players to reach just beyond their current competence levels and how to fuses typical educational experiences into the game design to improve students’ learning efficiency (Koster, 2013; Mehrrota, San Chee, & Ong, 2014). Kebritchi, Hirumi, and Bai (2008) proposed that behavioral learning theory can be used to explain the mechanism of game-based learning. It is supported that knowledge can be conceptualized as an abstract decontextualized “substance”. The repetition of stimulus-response patterns in drill and practice can strengthen observable behaviors (Ormrod, 1999). Adcock (2008) proposed that game-based learning can engage students in learning activities with high attention, motivation, and activation level in a relatively long time. The serious game can be used to construct an environment in which students engage themselves in a cycle of
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