

Chapter 8

Teacher–Designed Games: A New Era in Education?

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ABSTRACT

Video games play an important role in education; however, the idea of teachers as designers of digital classroom games to support student learning has not been widely embraced. The purpose of this study was to gain a deeper understanding of why and how teachers used and designed games in teaching differently with various gaming background. This mixed-method case study involved a group of teachers who used and/or designed games for students. The four unique case groups were grounded in three regions and four school districts in Alberta, Canada. First and second cycle data coding and analyses were used to answer 1) what factors influenced the types of games teachers used and designed in teaching and 2) what factors influenced how and why teachers integrated game-based learning in teaching.

INTRODUCTION

Digital games have been playing a more and more important role in K-12 education for decades because they promote student curiosity, engagement, and inner motivation in various academic subjects (Fu, Su, & Yu, 2009; Papastergiou, 2009; Sung, Hwang, Lin, & Hong, 2017); they stimulate student higher thinking skills (i.e., problem-solving skills, critical thinking skills) (Gee, 2005; Hwang & Chen, 2017; McDonald, 2017); they encourage collaborative learning among learners (Antle, Bevens, Tanenbaum, Seaborn, & Wang, 2010; Sung & Hwang, 2013); and they provide personalized learning opportunities (Hwang, Sung, Hung, Huang, & Tsai, 2012; Lin, Yeh, Hung, & Chang, 2013).

Because of the increasing application of games in K-12 school settings, researchers have been reinforcing the importance of teacher's role in integrating this innovative approach into teaching and learning (Kangas, Koskinen, & Krokfors, 2017). For instance, games cannot guarantee the success and effectiveness of learning but teacher's pedagogical capacities, knowledge, and skills towards games/game-based learning approach (Kangas, Siklander, Randolph, & Ruokamo, 2017; Shah & Foster, 2015).

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Additionally, commercial or educational games may not be designed for designated audiences (Liu & Li, 2011; Van Eck, 2006). That means they may not be able to meet student's learning requirements or align with the learning objectives based on the curriculum (Popescu, Earp, Moreno-Ger, & Roceanu, 2013; Squire, 2005). However, the nature of teacher's role allows them to be the expert of their student's learning needs and styles, content, and curriculum. Therefore, the idea of teachers as designers of digital classroom games to support student learning has been gradually advocated (Annetta, Cheng, & Holmes, 2010; Molin, 2017) but not yet widely embraced.

The purpose of this chapter is threefold. First, the need for teacher-designed games to support student's learning will be explored. Second, findings from five teachers in four case groups regarding how and why they used and/or designed certain games to support teaching and enhance student's learning will be examined and shared. Third, implications for practices and directions for future research based on the literature and data analysis from the study will be discussed and identified.

Specific research questions include:

- 1) What factors influenced the types of games teachers used and designed in teaching?
- 2) What factors influenced how and why teachers integrated game-based learning in teaching?

THEORETICAL FRAMEWORK

The basic premise underlying this research was that teacher-designed games work as a teaching and learning tool in a constructivist learning environment, in that teacher- designed games help to construct a practical combination of interactive classroom structure and engaging learning tasks through teachers' application on their understanding of content, pedagogy, and technology. To provide the theoretical foundation to guide this research study, three perspectives of theoretical concepts were described. First, constructivism was used to provide the epistemological stance of the research. Second, a social constructivism perspective supplied the rationale for learning and development as a social and collaborative activity since school-based learning should occur in a meaningful context and not be separated from the outside world (Vygotsky, 1963). In addition, teacher-designed games involve the incorporation of feedback from students in order to address their particular learning needs. Third, the technological, pedagogical, and content knowledge framework supported the notion of teacher- designed games by providing a theoretical foundation in terms of a teacher's work as a combination of a subject matter expert, a game designer, and an instructor.

Constructivism. Constructivists believe that knowledge is not discovered but is instead actively constructed (Guba & Lincoln, 1994; Jonassen, 1999). In other words, learners construct their own knowledge instead of merely copying it from books or teachers (Kanselaar, De Jong, Andriessen, & Goodyear, 2000). This worldview includes a belief that a learner's individual and social experiences act as a filter through which new meaning and knowledge are constructed. A basic assumption of teaching based on the constructivist learning method is that knowledge cannot be simply transferred from teachers to students; rather, students must be engaged in building their own knowledge in order to become the owner of that knowledge (von Glaserfeld, 1987). Learning in the constructivist environment is perceived as an ongoing process where learners construct and reconstruct their knowledge when they encounter new information and experiences (Marlowe & Page, 1998; Piaget, 1985).

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