

Chapter 15

Game Network Analysis: For Teaching with Games

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ABSTRACT

Teachers report experiencing frustrating issues in using games for instructional purposes. Teachers' inability to use games is further compounded by the lack of teacher education or professional development programs that focus on developing teacher competence in adopting game-based learning, particularly at the pre-service level. Thus, in this chapter, the Game Network Analysis (GaNA) framework is presented as a methodological approach developed to aid teachers in teaching and learning with games in educational contexts. The application of GaNA is highlighted through case studies with pre-service and in-service teachers. The case studies illustrate how GaNA, through a focus on game analysis, game integration, and ecological conditions impacting game use, can empower teachers to adopt game-based learning in a systematic, but adaptive manner. The chapter concludes with a discussion of future directions for teacher educators and educational researchers who are interested in developing teachers' knowledge and skills in game-based learning.

INTRODUCTION

It is difficult to overlook the deep penetration of digital games in our society today. Therefore, it is not surprising that educational research in game-based learning continues to expand, focusing on the cognitive, motivational, embodied, and affective

dimensions of learning with games (Steinkuehler & Squire, In Press; Young, Slota, Cutter, Jalette, Mullin, Lai, Yukhymenko, 2012). However, researchers have argued that educators' interest in adopting game-based learning is juxtaposed with their inability to systematically incorporate digital games in their practice (Kenny & Gunter,

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2011; Millstone, 2012). In addition, research has indicated that skilled teacher intervention can augment the impact games can have on student learning (Eastwood & Sadler, 2013; Silseth, 2012). Nevertheless, this requires a comprehensive approach to sustain teachers' interest and cultivate the competence to adopt game-based learning, starting at the pre-service teacher education level (Li, 2013).

This chapter begins with a brief focus on the shifting trends in educational gaming that underscore the need to pay attention to teachers— an underrepresented group that has the potential to catalyze learning in games. This is followed by a discussion of the significance of the factors affecting teachers' decision and effectiveness at adopting game-based learning. These factors include teachers' ability to analyze games, integrate them, and navigate complex classroom conditions in the process of adopting game-based learning. Next, the current status of teacher education in game-based learning at the pre-service level is highlighted. In addition, the importance of developing teacher candidates' expertise proactively in the areas in-service teachers report feeling less competent in is discussed. This is followed by an introduction to the Game Network Analysis (GaNA) as one framework for developing teachers' competence in game-based learning. The authors then describe the application of GaNA via case studies involving in-service and pre-service teachers. The concluding sections discuss the significance of the Game Network Analysis framework in overcoming the recurring issues teachers' experience and empowering them in adopting game-based learning.

SHIFTING TRENDS IN EDUCATIONAL GAMING

Researchers agree that current approaches being taken to study the effect of games on student learning and motivation are limited. As such, only slim evidence in support of game-based learning has

been found. Specifically, they argue that current approaches are based on the assumption that the effectiveness of game-based learning on student academic achievement and motivation is solely due to the effect of a game (Tobias & Fletcher, 2012; Young et al., 2012). Not surprisingly, the field of game-based learning is undergoing transformation with more researchers arguing for the need of an 'ecological' approach. Specifically, what has been advocated for the advancement of the field is an approach where the effect of games on learning and motivation is studied while paying equal attention to the teachers' roles in game-based classrooms, the process of game integration, and the context in which the game is integrated (Klopfer, 2010; Steinkuehler & Squire, In Press). We believe this is the direction in which to move forward as well, because games are becoming more interdisciplinary, immersive, and interactive. Furthermore, we argue that empowering teachers in the methods of game-based learning can facilitate systematic practices in adopting game-based learning in school contexts. Doing so is important for at least three reasons; teachers are traditionally an underrepresented group in the game-based learning literature (Hwang & Wu, 2012); teachers' competence in using games can facilitate meaningful learning experiences for students (Silseth, 2012); and pre-service and in-service teachers are interested in using games for instructional practices, but teacher education in game-based learning is in its infancy and needs comprehensive approaches to develop teachers' competence (Franklin & Annetta, 2011; Li, 2013; Takeuchi & Vaala, 2014).

Factors Affecting Teachers' Use of Games

Teachers often report not using games in their routine practice despite being interested in doing so (Millstone, 2012; Włodarczyk, 2011). Survey studies have found that in-service teachers report feeling inadequately prepared to incorporate

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