Chapter LXVI

Instructional Game Design
Using Cognitive Load Theory

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ABSTRACT

This chapter proposes an instructional game design framework based on the 4C/ID-model and cognitive load theory, its associated theoretical foundation. The proposed systematic design framework serves as the processing link to connect games’ powerful characteristics in enhancing learning experience with desired learning outcomes. In this chapter we focus on the cognitive aspect of learning outcome: the development of transferable schema. This chapter introduces design guidelines to attain specific game characteristic by prioritizing the design components in 4C/ID-model. Each game characteristic consists of three levels of design emphasis: preliminary, secondary, and tertiary. The ultimate goal of this chapter is to initiate a series of dialogue between cognitive learning outcome, systematic instructional design, and instructional game design thereby seeking to improve the overall game design and instructional efficiency.

INTRODUCTION

In recent years, the use of games for teaching and learning has grown significantly in the training industry and K-16 educational settings. There is, however, a lack of understanding between what games readily provide (i.e., games’ characteristics) and what the learners need from games (i.e., learning outcome). Such deficiency makes it difficult for instructional designers to systematically apply a
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A game is a context in which individual and teamed players, bounded by rules and principles, compete in attaining identified game objectives. There is a series of decision-making processes are required by the game players. Elliot Avedon and Brian Sutton-Smith (1971) explained that game playing is a voluntary exercise of controlling a system (i.e., the game) intended for a state of disequilibrium. In other words, game players continuously try out new methodologies and strategies during the game-playing process based on the system’s feedback until they achieve the game objectives or the equilibrium state. The following section explains several game components that include:

- Games create experiences
- Rules and interactions in games
- Games are complex
- Games are models

Games Create Experiences

Games are known for their capabilities to promote collaborative and active learning (Downes, 2004; Klabbers, 2006; Vygotsky, 1978). Game players learn from their success and mistakes in order to improve their gaming skills and playing strategies. Players learn about the games and how to win the games from playing games and reflecting on...