Chapter 12
Different Strokes for Different Folks:
Tapping Into the Hidden Potential of Serious Games

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ABSTRACT

Digital game-based learning experiences are typically presented to a captive audience that has to play, as opposed to entertainment games that players can select themselves and choose to play. The captive nature of learning games introduces an interesting issue: Not everyone may be familiar with the genre of the game they have to play or be motivated to play it. Students have individual differences that may make a learning game particularly ineffective, uninteresting, or inappropriate for some learners. The authors present work that frames important differences between students in terms of their game literacy, motivation, goal orientation, and mind-set. This understanding leads us to envision game design variations to serve specific combinations of particular individual differences at the intersection of learning and gaming. The authors present their initial work on identifying and automatically accommodating these differences within a single digital game-based learning experience.

INTRODUCTION

Computer games for entertainment are purchased from stores, played online at certain Web sites, or borrowed from friends as part of a selective, free market culture of choice. Game players decide what games they want to play, when and where they will play them, etc. In other words, playing games for fun is a voluntary and highly selective experience. Games for learning, on the other hand, can be quite the opposite. There are informal learning games, mainly distributed on the Web, that players can...
voluntarily choose to play, however there are many other learning games that are presented within the context of a school or training curriculum. Serious games played within a military training context, as part of a high school curriculum, or used in corporate training are relatively involuntary mandatory learning experiences that are equivalent to assigned lab experiments, interactive training videos, simulation exercises, etc.

Games for learning face a much more diverse player audience than players of entertainment games, because the audience is not self-selected. A learning game’s audience may include those who rarely play any kind of game (i.e., “non-gamers”) and those who dislike and normally avoid playing the genre used by that particular learning game. The ramifications of this are obvious, although surprisingly overlooked in the digital game-based learning community at present: while certain games may be fun for many people (e.g., the best-selling Civilization series of games which are widely used for education; Squire, 2005), they may not be “fun,” “engaging,” and “motivating” for an entire class. Even the most wonderful learning games will undoubtedly fail to reach all members of the target audience.

If the only consequence of using a learning game with non-gamers were a lack of fun, there would be little cause for concern. However, unfamiliarity with gaming in general or with a particular learning game genre can present barriers to achieving learning goals. A player must effectively master how to play a learning game in order to experience the desired learning content. From the perspective of cognitive load, we might infer that mental attention devoted to trying to figure out how to play is attention not devoted to the intended learning (Low, Jin, & Sweller, this volume; Mayer, 2005a; Mayer, 2005b). Non-gamers need to exert much more effort figuring out how to play most games than do experienced gamers. Furthermore, feeling lost and incompetent trying to play a learning game introduces negative thoughts that can create performance deficits by diverting cognitive load (Cadinu, Maass, Rosabianca & Kiesner, 2005; Croizet et al., 2004), with negative consequences for learning (Covington, Omelich, & Schwarzer, 1986; Thomas et al., 2006). Other students may have extensive gaming experience but may find playing a particular learning game uninteresting or even unpleasant, regardless of their interest in the subject matter the game is designed to teach. In other words, using games for learning as a one-size-fits-all educational approach leaves some students unmotivated and presents others with a distinctly unfamiliar and potentially inscrutable experience.

**Individual Differences**

This inherent disparity in the effectiveness of even well-designed serious games is a problem that needs to be addressed by recognizing important individual differences amongst students and by changing our game design and development practices to accommodate those differences. The authors contend that four key obstacles to digital game-based learning should be considered in this respect: gaming literacy, gaming motivation, gaming mindset, and the congruence of student’s goal orientation with the game design. This is in contrast to Low (in press), who states that goals, intrinsic vs. extrinsic motivation, interest, and self-schema are the main motivational principles.

**Gaming Literacy**

K-6 education teaches reading, writing, and oral language, carefully preparing students to learn from books and other forms of writing (ACEI, 2007). K-12 education does not teach gaming. Gaming literacy is acquired (or not) outside of school, through voluntary leisure activities. In order to learn from a game, players must learn how to play and they must experience the intended learning content by playing. Salen (2007, p. 10) points out that “learning about games and learning with games take place simultaneously.” Players
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