Chapter 5.7
Learning by Doing via Game Making

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ABSTRACT

The purpose of this chapter is to explore how learning, by making games, can provide opportunities for higher-order thinking such as problem solving, decision-making, and knowledge construction in children. As the game design process involves students drawing on multiple intelligences, it often provides students who are typically not successful in school with a chance to see themselves as capable members of the classroom learning community. In the classroom, computer-based game-making activities give students the opportunity to create lively interactive simulations for any subject, for any grade level, and can be used by students with a wide variety of learning styles. Game making can be used as an alternative way for students to communicate information and demonstrate their knowledge and understanding.

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INTRODUCTION

New interactive technologies provide opportunities for educators to create interactive learning environments that enable students to explore alternative methods of problem-solving. Children's culture experience is increasingly marked by the advent of information technologies embedded into their toys, games and activities. Video games in particular, perhaps more than any other medium, have brought interactive technologies into children's homes and hearts, and they have been enthusiastically received. These locations

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for and uses of technology are, in a fundamental way, not that different from adult productivity and entertainment technologies, which promote applications of human knowledge to real-world problems. Interactive learning environments are tools for supporting a child's needs to inquire and express. We therefore expect to find that computer technologies for children enhance their productivity as much as word processors, spreadsheets, desktop publishing, and computer-assisted design programs do for adults.

Some questions this perspective raises include how knowledge construction and reproduction within children's literacy and use of appropriate computational tools assists them in producing communications, designing materials, and managing resources. How do these technologies as tools extend a child's functional capabilities, and can the production of games help us form insights about how children learn with technology?

Traditionally, games have been defined as competitive activities that have rules, goals, feedback, interaction and outcomes. Games motivate students via fun, and this is a part of the natural learning process in human development (Bisson & Lucker, 1996). Habgood (2005a) notes for example that making computer games is a creative activity that can bring together logic, music, mathematics, artwork, planning, teamwork and general IT skills into a task that children find genuinely motivating. Not only does such an activity challenge and engage children in all sorts of educationally valid ways, but it also provides new kinds of opportunities for children, who are not normally academically successful, to boost their self-efficacy by excelling at this rewarding and valued activity.

Education professor and author, Margaret Gredler (1996; 2004) defines games and distinguishes them quite clearly from simulations. She places digital games as an evolution of traditional games presented using modern technology. Those portraying a negative view of games (Alessi & Trollip, 2001; Clark, 2007) often cite Gredler's definition, while others, like Kurt Squire (2003) suggest that the accepted definition of game breaks down in light of modern digital games (Parker, Becker & Sawyer, 2008). Elyssebeth Leigh claims that there is little difference between in-class educational simulations and digital ones (Leigh & Kinder, 1999), yet there are some critical differences that place digital simulations, including games as a distinct medium.

A lot of active research about computer games and simulation has been conducted concerning the educational effect and availability of technology and its influence on the entire society, including the play culture of children (Malone, 1981; Prensky, 2001, 2004; Aldrich, 2004; Klofer & Yoon, 2005; Shaffer, 2006; Squire & Klofer, 2007). However, despite the advantages that games have for learning, existing games are limited in actively accommodating a variety of learner's needs (Kafai, 1998, 2006; Habgood et al., 2005b). Few games utilize problem situations based on the child's own experience, or allow the child to modify the functions and objects within the game. They instead typically provide the learners with pre-equipped, thoroughly built-in structure that has been planned with the best of intentions to create an effective medium or environment for learning. This means paradoxically that many so-called educational games focus too much on traditional "instruction" and do not take advantage of play's main property, which guarantees active participation in an experience of complete and unrestricted control of the materials and making meaning during play.

Since learning by making games is meaningful and relevant to individuals, it provides the student with the opportunity to practice and apply skills needed in the real world. Thus, the assessment of the effectiveness of game making as cognitive tools should be focused on how students have experienced "authentic learning" through designing and making game activity rather than how students have memorized many facts like rote traditional assessment method.

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