

Chapter 10

Unifying Instructional and Game Design

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ABSTRACT

Games have impacted education, research, and industry in multiple ways, altering notions of interaction. Traditionally, instructional design and educational research have dominated academic studies of pedagogy, teaching, and training. There are many parallels between the fields of game design and education, as both draw inspiration from the study of engagement, interaction, and motivation. State-of-the-art research and trends show great potential to cross-pollinate and uplift each area. This chapter synthesizes instructional and game design concepts based on current research, comparing and contrasting key elements. Towards the goal of providing a road map for readers, the chapter demonstrates three active case studies that illustrate how both fields greatly influence each other, leading to positive outcomes. These cases demonstrate that many concepts in both fields have direct parallels. The chapter concludes with a discussion of potential future directions and trends.

INTRODUCTION

Angelo and Cross (1993) indicate two main questions regarding education:

1. How well do students learn?
2. How effectively do teachers teach?

Instructional design matters heavily in answering both of these questions, but first, we give a few definitions. Gagné, Briggs, & Wager (1992) refer to instruction to encompass the multitude of ways a person learns. Instructional design is the “systematic and reflective process of translating plans” for the variety of material used for learning and teaching (Smith & Ragan, 2005). Thus,

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instead of teaching, we tend to focus on learning, which we define more formally later. To motivate the focus on learning, consider that significant learning experiences entail process and outcomes (Fink, 2003):

- Process hopefully involves student engagement and “high-class energy.”
- Outcomes hopefully provide significant and lasting change for the students. Ideally, the course somehow enhances the lives of students through individual life enhancement, preparation for participation in multiple communities, or work preparation.

Games often provide significant learning experiences in a similar manner. Time magazine ran an article on “The Future of Work” that included the World of Warcraft© massively multiplayer online game as an example of the future of how people will work:

Rob Carter, chief information officer at FedEx, thinks the best training for anyone who wants to succeed in 10 years is the online game World of Warcraft. Carter says WoW, as its 10 million devotees worldwide call it, offers a peek into the workplace of the future. Each team faces a fast-paced, complicated series of obstacles called quests, and each player, via his online avatar, must contribute to resolving them or else lose his place on the team. The player who contributes most gets to lead the team — until someone else contributes more. (Goldberg et al., 2009)

This sort of comparison is not an accident, as many of formalisms found in games also affect our lives—we follow rules, seek goals, and attempt to overcome challenges, just as in education. In the above example, the article claims individuals obtain significant learning experiences both in terms of work preparation and preparation for participation in the communities of the future. Continuing the comparison, note that games have

numerous benefits over “reality.” For example, unlike real life, a game may be restarted and played again, often encouraging the player to try new ideas, which helps motivate the study presented in this chapter.

Hypothesis

Given the established commonality and relationships of learning and game environments, game design warrants study as a mechanism for influencing instructional design (Bayliss & Schwartz, 2009). To increase learning and motivation in the classroom, cross-pollination between the two areas is promising. In this chapter, we demonstrate explicit connections between the two areas, forming the hypothesis that instructional and game design share common approaches and can elevate each other’s implementation. For example, what happens when the classroom becomes a questing place and a game becomes an achievement system?

Three examples of recent research projects will frame and test the hypothesis:

1. Current research on perceptual learning through action video games.
2. Development of an active learning introductory programming pedagogy that uses games as a context for learning.
3. Game design applied to game theory to teach the ethics of sustainability.

These projects cover a relatively complete range of forms of games and learning, starting from perceptual learning and leading to higher levels of cognitive activities. The common elements of these projects are discussed along with practical advice on instructional design from the perspective of game design. The chapter concludes with a discussion of future areas that remain open problems, with a suggestion of various targeted projects.

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