

Chapter 8

Evaluating Video Game Design and Interactivity

Matthew J. Sharritt
Situated Research, LLC, USA

ABSTRACT

An emergent, bottom-up construction of video game interaction is presented, drawing from influences in ethnomethodology (Garfinkel, 1967), grounded theory (Glaser & Strauss, 1967), and activity theory (Cole & Engeström, 1993; Kaptelinin & Nardi, 2006; Vygotsky, 1978). Following, a qualitative case study highlights the use of affordances, or potentials for action, during video game player interaction among peers and the game interface. Relationships among affordances and levels of activity are presented, which broaden the concept of affordances to include motivations. Additionally, activity theory will complement analysis by introducing the mediational triangle (Cole & Engeström, 1993), providing a guide with which to analyze game player interactions and motives. The mediational triangle sheds light on the motivated activity itself, the tools available to complete the activity, and peer relationships (such as role specialization and rules of interaction) to evaluate game designs and their ability to fulfill serious purposes with meaningful outcomes.

INTRODUCTION

Research shows that video games can provide a rich experience while providing game players the ability to navigate a virtual world, in which complex decision making and the management of complex issues might resemble the cognitive processes that they would employ in the real world (Ducheneaut,

Yee, Nickell, & Moore, 2006; Federation of American Scientists, 2006; Squire, 2005; Stokes, 2005). Literature suggests that games provide a rich learning context in which gamer strategizing and the management of complex problems can foster creative thinking skills and show players how their decisions have dynamic outcomes (Squire, 2005; Stokes, 2005; Zyda, 2005). Additionally, gamers can experience social learning through group membership and leadership situations in order to

DOI: 10.4018/978-1-61520-719-0.ch008

achieve goals within a game (Foreman et al., 2004; Socially Intelligent Agents at CARTE, 2006; Zyda, 2005).

Flow (Csikszentmihalyi, 1990) can be used to describe a feeling of captivation and immersion in a game. However, negative flow can be experienced by a disturbance in the environment or a disturbance to one's concentration caused by a poorly designed interface (errors, lack of feedback, etc.), in line with Norman's (1988) idea of technological affordances and good interface design. In line with the concept of representational guidance (Suthers, 2001; Suthers & Hundhausen, 2003), a game interface can serve to both constrain and promote particular game player actions. The research presented in this chapter will examine ways in which game interface designs can affect game player motivation and create the potential for discussion among peers that lead to instances of learning. By studying these interactions, patterns in game use can assist in the design and evaluation of games by providing both a method for analysis and a frame to approach game player interaction, by taking an open-ended look at what happens as games are played.

Game designers have the burden of creating valuable gaming experiences through their designs. Serious games adds additional complexity to game design, requiring that some sort of serious outcome be served by playing the game, with intended outcomes serving purposes such as learning, civics, business, military, or health rehabilitation. Focusing analysis on patterns of interaction with game representations could aid game designers by evaluating what is most effective in serving those serious goals. Serious game design involves many tradeoffs such as balancing fidelity with fun, balancing story with action, and balancing learning with motivation.

This descriptive analysis of the use of video games in educational contexts can inform both game design and sound pedagogy by improving the game content and interface, as well as by aiding in the design of instructional content

and learning curricula. Kirriemuir & McFarlane (2004) discuss the need for further research that investigates collaborative learning in the use of gaming environments to support learning:

The value of collaborative learning and the role of computers in promoting such activity have been thoroughly researched.... How this collaboration translates into a multiplayer gaming environment and how these environments might be used to support learning, remain some of the most interesting areas for potential further research and development. (Kirriemuir & McFarlane, 2004, p. 27)

This chapter will present an emergent, bottom-up, descriptive methodology to the qualitative analysis of video game interaction. This approach can inform serious game design by providing a detailed description of game player interaction, which can show the effectiveness of designed in-game representations such as icons, behaviors, and activities that serve to either assist or hinder action and goal formation. First, literature relevant to the method will be described, drawing from ethnomethodology (Clayman & Maynard, 1995; Garfinkel, 1967), grounded theory (Charmaz, 2006; Glaser & Strauss, 1967), and activity theory (Kaptelinin & Nardi, 2006; Leontiev, 1978; Vygotsky, 1978). Second, an interaction analysis of game player interaction will be presented through a case study, providing a deep analysis of game player interaction among peers and the game interface. This emergent analysis will use the concept of affordances, or potentials for action, as a common abstract concept for approaching game player activity, looking at both cognitive and social interactions. Following, activity theory (Cole & Engeström, 1993; Kaptelinin & Nardi, 2006; Leontiev, 1978; Vygotsky, 1978, 1979, 1981) will be described and applied to the case study to illustrate its power in analyzing video game play and used to further compare findings (this is done following the inductive phase in order to avoid biasing the prior bottom-up, emergent analysis).

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