

Chapter 9

Design of Fantasy and Their Effect on Learning and Engagement in a Serious Game

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ABSTRACT

Researchers are interested in exploring the use of fantasy design in educational games to promote learning. This chapter first reviewed the literature on fantasy designs and relevant principles along with the studies examining the use of fantasy designs to enhance learning. An experiment was then conducted, in which two sets of fantasy designs were implemented in a serious game, to examine the effect of different types of fantasy (portrayal fantasy vs creative fantasy designs) on learning and game engagement. The results using multiple regressions showed that portrayal fantasy design was more effective both for enhancing learning and engagement. Students who used portrayal fantasy models showed better improvement in their content knowledge and scored better on game engagement. Visualization analysis showed the portrayal fantasy group spent more time in using the tool containing all fantasy designs than the creative group. Findings and future research directions are discussed.

INTRODUCTION

Fantasy is defined as an environment that “evokes mental images of physical or social situations that are not actually presented” (Malone & Lepper, 1987, p. 240). Asgari and Kaufman (2010) defined it as “creations of the imaginative faculty and mental images which are unrealistic or improbable, and not actually present” (p. 95). A broader definition of fantasy can be defined as “any departure from consensus reality” (Hume, 1984, p. 21) including everything around us for cultural development and expansions of knowledge and further. It is the byproducts of human imagination (Vygotsky, 2004).

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Research on using fantasy in educational settings suggests that fantasy can be beneficial. For example, research showed that the utilization of fantasy promoted intellectual and emotional improvements (Cook, 2002; Richert, 2003; Richert, Shawber, Hoffman, & Taylor, 2009; Richert & Smith, 2011). Students were more likely to be engaged in learning tasks and were better at problem solving when the tasks were applied in a fantasy context (Cook, 2002). Research also showed the use of fantasy in educational contexts stimulated curiosity and imagination, and promoted creative thinking because fantasy as a medium can create a novel condition which is inconceivable in the real life (Cook, 2002; Wilson et al., 2009).

While the previous research has mainly focused on the educational benefits of fantasy itself, there is little discussion on the fantasy designs that are appropriate for serious games. Research has shown that while the use of fantasy is generally beneficial for engagement and memory of visual information, certain types of fantasy can cause a disconnect of one's cognitive processing as one's deep involvement in fantasy can interrupt the relevance to a learner's background knowledge in game playing (Aleman & De Haan, 2004; Cook, 2002; Richert, 2003).

We are interested in examining what types of fantasy designs can contribute to learning and engagement for students of 11 to 12 years old when they are interacting with a serious game. We will first review the literature on fantasy use in education and fantasy related design strategies. We then conducted an experiment testing different fantasy types designed according to the literature to examine the effect of different fantasy types on learning and engagement.

BACKGROUND

Research About Effects of Fantasy on Learning and Engagement

Fantasy is defined both as a psychological construct and a creative byproduct of human imagination. Research has been conducted to examine the benefits of fantasy for educational uses. Malone and Lepper (1987) discussed the important sources of intrinsic motivation such as challenge, curiosity, control, and fantasy. They argued that incorporating these factors in a learning environment can engage students intrinsically and promote their motivation to learn (Lepper, 1985; Malone, 1980; Malone & Lepper, 1987). Other researchers also viewed fantasy as a vital ingredient in designing an educational environment for enhancing academic performance and motivation (Cook, 2002; Cordova & Lepper, 1996; Malone, 1980; Parker & Lepper, 1992; Richert et al., 2009; Richert & Smith, 2011; Richert, 2003; Wiest, 2001; Wilson et al., 2009).

Parker and Lepper (1992) examined two related topics of fantasy in a LOGO environment: 1) the impact of fantasy on student interest in learning, and 2) the effect of different kinds of fantasy in the learning environment. Three different versions of fantasy designs (detective, pirate, space) were implemented in a LOGO environment along with a no-fantasy control group. Third- and fourth- graders were the participants of the study. The results showed all fantasy groups that were assigned three different types of fantasy performed better than the no-fantasy group. When given a chance, the participants were more likely to choose any of the fantasy versions rather than the no-fantasy materials. The fantasy groups also performed significantly better in understanding general geometric concepts relevant to programming in LOGO in the delayed post-test as well as showed greater interest in learning than no-fantasy group.

Cordova and Lepper (1996) conducted a series of experiments on the effect of fantasy in an elementary school setting using a mathematics game. Seventy-two children were assigned to one of five conditions:

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