Why do Players Keep Playing? A Formative Analysis of the Motivational Qualities of Video Games and their Relation to Critical Success

Carolyn Lauckner, John Lauckner, Michigan State University, East Lansing, MI
Email: carolyn.lauckner@gmail.com, johnlauckner@gmail.com

Abstract: This study examined the use of motivational strategies within video game instructions. A coding scheme based on the ARCS model was used to examine 5 highly-rated (HR) and 5 low-rated (LR) games. Results showed that games are indeed using ARCS strategies, and suggest that HR use more than LR games.

Introduction

Video games have become a fixture within popular culture, and the field of serious games has led to explorations of the use of this medium to bring about positive outcomes. Scholars have especially been enthusiastic about the use of video games to facilitate education, and research has demonstrated positive effects on student motivation (Tüzün, Yılmaz-Soylu, Karakuş, İnal, & Kızılkaya, 2009), engagement (Annetta, Minogue, Holmes, & Cheng, 2009), and learning (Papastergiou, 2009). Because of these outcomes, it would be valuable to identify game factors that may contribute to engagement and subsequent positive player effects. One factor that has deserves research attention is how games teach players the skills that they need to play, as this often requires significant learning.

An ideal place to start from when examining this phenomenon is the ARCS model (Keller, 1987). ARCS describes strategies for designing motivational educational materials that are grouped into four categories: *attention, relevance, confidence,* and *satisfaction*. This study is a preliminary content analysis based on ARCS that examines the instructional materials contained within highly-rated (HR) and low-rated (LR) entertainment video games of 2010. The following research questions are posed:

RQ1: How do video games' instructional materials encourage attention in players?
RQ2: How do video games' instructional materials establish relevance for players?
RQ3: How do video games' instructional materials encourage player confidence?
RQ4: How do video games' instructional materials facilitate player satisfaction?
RQ5: Is there a relationship between the presence of motivational elements within instructions and the critical ratings of video games?

Methods

This study utilized content analysis to examine in-game instructions. The inclusion criteria, intended to keep design factors constant across games, were as follows: XBOX360, disc-based, and narrative-based games. Games with prequels released within five years were excluded, as sequels may rely on skills taught in previous games. Ten games (see Table 1) were chosen by selecting the first five and last five games that met the criteria from the ranked list of 2010 games on Metacritic.com (CBS Interactive, Inc., 2012). The coding scheme was based on motivational techniques that foster the four ARCS components: attention, relevance, confidence, and satisfaction (Keller, 1987). Simultaneously, to ensure the same gameplay was observed, two coders coded the first 45 minutes of the games for the presence of such techniques. Reliability was assessed on the whole sample, and percent agreement was calculated because the small number and yes/no questions inhibited the calculation of more rigorous assessments. The final questions included in the coding scheme had 80% or higher agreement. Differences between coders' responses were addressed by choosing one coder's response at random in order to avoid potential bias. After the games were coded, frequencies were assessed and the number of observed motivational techniques were added up to calculate each games' motivational score, which had a maximum of 17 and a minimum of -1 (due to reverse coding).

Results

Overall, the only *attention* strategy (RQ1) used often by games was varying the format of instruction, such as using both text and graphics, which occurred in 70% of the sample. Two attention strategies were used by only one game each: using humor, and encouraging further inquiry or problem solving. In terms of encouraging *relevance* (RQ2), all of the games stated the intrinsic value of a new skill by explaining its present value without referring to future goals. Additionally, 70% of games stated the future usefulness of a particular skill, while another 70% met achievement striving needs by allowing players to master new skills in low-risk environments. The relevance strategy used least frequently

(20%) was providing choices for players in terms of how they learned skills. Many games facilitated *confidence* (RQ3) by communicating learning requirements (70%) and making positive player attributions for success (70%). However, only one game managed players' expectations for success by stating the likelihood of succeeding given a certain amount of effort. In terms of *satisfaction* (RQ4), 80% of the games utilized the following strategies: allowing players to see the consequences of their actions in a natural setting, providing frequent reinforcements for new tasks, providing intermittent reinforcements for already-learned tasks, and avoiding the use of threats. None of the games provided unexpected rewards for learning.

On average, HR games had higher motivational scores than LR games (see Table 1). Certain strategies were used markedly more often in HR games than in LR games, such as providing concrete examples for new skills (80% vs. 20%), employing modeling in teaching new skills (60% vs. 20%), providing frequent reinforcement for new tasks (100% vs. 60%), and providing intermittent reinforcements for already-learned tasks (100% vs. 60%).

Game title		**Motivational Score**	
Highly-rated games	Red Dead Redemption	11	
	Bayonetta	10	
	Alan Wake	8	*Average:* 10
	Vanquish	13	
	Darksiders	8	
Low-rated games	MegaMind	10	
	MorphX	5	
	Prison Break: The Conspiracy	8	*Average:* 7.4
	Quantum Theory	8	
	Naval Assault	6	

***Table 1*: Games analyzed and associated scores**

Discussion and Conclusion

Overall, these results demonstrate that games are taking advantage of motivational strategies, particularly in terms of relevance and satisfaction, in teaching players how to play. Additionally, they suggest that HR games use more motivational strategies than LR games. This implies that games that emphasize helping players to learn skills are seen as more appealing and, consequently, may garner more playing time. Yet, these results must be interpreted with caution. This study was formative, using a small sample with descriptive statistics. It was also focused only on short-term motivation, and did not capture potential long-term effects. However, the results, especially the differences found between HR and LR games, suggest that a study with a larger sample would yield valuable information regarding the relationship between motivating players to learn game skills and games' critical appeal. This has important implications for the development of serious games, which presumably can only bring about positive outcomes if players are engaged and motivated. This study suggests that the ARCS model may help developers to reach that goal.

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Game Design and Social Media in a Middle School Classroom

Laura Minnigerode, World Wide Workshop, Austin, Texas, laura@worldwideworkshop.org

Abstract: Game design programs are becoming more common in middle and high schools. The Globaloria program, which combines game content research and media literacy with computer programming and game design in a social media setting, is used by thousands of students in several states. This paper presents qualitative and survey data from students at one charter middle school where all students participate in the program daily. Early results from a longitudinal study show some promising increases in student self-efficacy with regard to their ability to solve technological problems in the Globaloria classroom.

Research Methods and Procedures

The presenter is an educational researcher who is based at a charter middle school that primarily serves low-income, minority students. All students at the school are enrolled in Globaloria, a game design and media exploration course that is both a social media platform and a game design-learning curriculum. This longitudinal research project follows cohorts of 6th graders, who will continue to take the Globaloria course daily each school year through 12th grade. The research question explored here is 'Does engaging in the Globaloria program increase students' self-efficacy with regard to solving technological problems?' The participants were two cohorts of students, (a) 6th grade students who are in their first year at the charter school and in the Globaloria course and (b) 7th grade students who are in their second year at the school and in the Globaloria course, were administered a self-efficacy survey four times over the course of the 2010-2011 school year. The research-based 11-item survey (Bandura, 2005), was designed to measure three dimensions of students' self-efficacy in the Globaloria classroom: (a) academic/technology, (b) social support for learning, and (c) self-regulation for learning. For each item, students rate their level of efficacy on scale from 0-100. Students also participated in one-on-one interviews about their work, ongoing classroom observations, and reflections about their game-design work on a blog, the results of which offer qualitative insight into the growth of technological self-efficacy, pre- and post-program surveys, school attendance and state assessment data. A literature review of middle school student self-efficacy in relation to career and educational aspirations will be available at worldwideworkshop.org/reports (Minnigerode, in press)

Results with Discussion

Table 1 presents the average change in student reported self-efficacy on the technological subscale from the beginning of the year (Time 1) to the end of the year (Time 4) by grade level cohort and gender. Although all students showed increases in almost every aspect of technology self-efficacy, the students in their first year of the program (the 6th grade cohort) reported less change from the beginning of the year to the end of the year that did students who were in their second year of the program (the 7th grade cohort). The researcher hypothesizes that this is because 6th grade students, who are new to the Globaloria class, may overestimate their ability to solve technological problems in comparison to students who already have been in the course for a full year.

	6th grade girls (N=44)			6th grade boys (N=45)			7th grade girls (N=44)			7th grade boys (N=42)		
How confident are you that you can…	T1	T4	change	T1	T4	change	T1	T4	change	T1	T4	change
figure out new things about editing the wiki	75.3	78.1	+2.8	82.4	77.6	-4.8	72.8	87.4	+14.6	74.6	80.6	+6.0
put your thoughts and ideas into words that are easy for people to understand on your blog	83.5	84.0	+0.5	72.3	79.7	+7.4	72.7	84.8	+12.1	75.8	84.0	+8.2
figure out what to do when you get stuck on something doing Flash	71.4	79.1	+7.7	73.3	77.0	+3.7	61.5	83.8	+22.3	65.0	80.6	+15.6
search on the Internet to find help when you get stuck on	77.0	74.9	-2.1	81.8	87.3	+5.5	74.9	84.8	+9.9	75.7	84.0	+8.3

something												
Overall change			+2.2			+3.0			+14.7			+9.5

***Table 4*: Average change in technological self-efficacy items from the beginning of the school year (T1) to the end of the school year (T4).**

Students also discuss their self-efficacy in written narratives. Table 2, below, summarizes student blog entries about their confidence as game programmers. Each of these comments has to do with students' experiences using Flash.

Sixth grade boy:
The hardest thing about the game design was the codes I had no idea where to put most of them. I'm proud that I finished this game and I made it fun. May 16, 2011
Seventh grade boy:
I have learned how to use flash very well so far but not a master. I can improve a lot this year in many ways like learning how to use the jumping code on flash because that thing confuses me! May 23, 2011
***Sixth grade girl**:*
It was so hard getting the game to work and finding the codes to make it work. Even when talking with the group and choosing what we wanted in the game. I learned that my way is not always the right way. May 16, 2011
Seventh grade girl:
I have learned to put almost every code in flash perfectly without struggle. May 23, 2011

***Table 5*. Student blog entries about programming in Flash.**

Evaluation of student work, classroom observation and interviews provide further rich detail about student experience as programmers. (See Figures 1 and 2 below). Research to align these sources is ongoing and publication of a more complete synthesis is forthcoming.

***Figure 17*: Student prototype**

***Figure 2*: Student interview "There is a whole lot of different things I am doing in Flash…."**

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Playing Nice: Social and Ethical Reasoning Across In- and Out-of-Game Contexts

Amanda Ochsner, Constance Steinkuehler, University of Wisconsin-Madison, 225 N Mills St., Madison WI 53706
Amanda.Ochsner@gmail.com, Constances@gmail.com

Abstract: This study examines whether adolescent videogame players maintain the same values and ethical priorities in game spaces compared to their home lives. We presented a group of adolescent *World of Warcraft* players, a MMO game in which the participants play together to accomplish shared goals, with ethics-based scenarios to determine whether there is a difference in their values in game play compared to out-of-game. Our results indicate that adolescent players are more willing to abdicate control to authority in the context of the game, whereas they are more assertive about their personal rights in a home-based context.

Online Game Play and Social Interaction

In MMO games, participants inhabit a designed, virtual world that contains both non-player characters created by the game designers and avatars controlled by other players. This creates a *mangle of play*, which Steinkuehler describes as the mangling of designer and player intentions (2006). Thus, much of the climate and culture of each of these games is shaped by the people who inhabit the world. Additionally, players may join with other groups of players to form alliances where they work collaboratively on tasks that are too difficult for any individual player. These groups, called guilds, often develop and negotiate their own group rules, which members of the guild must adhere to in order to participate. The culture of guild groups is participatory (Jenkins, 2006) and multiple intelligences (Gardner, 1999) are valued in these spaces, coalescing into a group-wide collective intelligence (Levy, 1999).

We are particularly interested in adolescents and how the social interaction that players experience through online play in these games shapes how they develop ethical and social reasoning skills. Though research has shown that these spaces teem with ethical norms where guidelines of behavior are emergent (Taylor, 2006) and are determined by the affinity group, we know little about how adolescents think and reason about ethical issues as they engage in online play. Participation in social games means negotiating between game rules and norms from other contexts including home and school. How is teenagers' reasoning about such issues similar or different across the two contexts? Does context matter in teenagers' ethical decision-making?

Study Overview

This paper details a pilot study examining whether teen players of *WoW*, maintain the same values and ethical priorities in the context of the game as they do in their home lives. Our study seeks to better understand how adolescents think about ethical concerns in terms of competing priorities, including duty to authority, personal rights, promises, and personal relationships. We presented 14 participants with two separate scenarios, one about a home-based context and the other about a game-based context, and then examined their responses on a set of questions to infer their ethical values across the two contexts. One scenario, the out-of-game scenario, was adapted from a standardized scenario used on the Defining Issues Test, Version 2 (DIT2) measure of developmental ethics (Rest, 1979; Rest, Navaez, Thoma, & Bebeau, 1999) derived from Kohlberg's approach to morality (Kohlberg, 1976; Colby et al., 1987). The other scenario, the in-game scenario, we crafted to be structurally similar to the first but contextualized within the game world. Quantitative and qualitative analyses of their responses reveal differences in ethical reasoning across the two contexts.

Methods

The Casual Learning Lab

This study was conducted as part of a larger, two-year line of inquiry exploring the impact of a game-based casual learning lab on adolescent boys' literacy and learning. All participants were male and between the ages of 13 to 18, coming from both urban and rural communities. The goal of the afterschool program was to leverage the boys' existing interest in videogames to strengthen their

interest in literacy as a tool for problem solving, researching online information resources, and synthesizing in-game and out-of-game information.

The Social-Ethical Reasoning Study

The questionnaire form, adapted from the standardized work on developmental ethics (Kohlberg, 1976; Colby et al., 1987) for each scenario was based on the DIT2 measure (Rest, 1979; Rest, Navaez, Thoma, & Bebeau, 1999) and designed to elicit information about participants' priorities regarding the ethical situations presented. Each item on the questionnaire asked participants to rank the relative importance of one of several competing interests in the scenario on a standard 5-point Likert scale and to give a short written explanation for each ranking. Questions for the two scenarios were parallel, allowing for comparison of relative rankings and rationale across the two contexts. The qualitative data, derived from the written explanations that the participants provided about their rankings, was coded for relevance to four identified ethical issues likely to be encountered by youth on a daily basis: duty to authority, personal rights, promises, and personal relationships.

Results

Paired *t*-test comparisons revealed significant differences between the in- and out-of-game scenarios in terms of how the participants ranked the importance of authority and personal rights. Respecting the wishes of an authoritative figure was significantly more important to participants in the context of the game scenario (M = 4.14, SD = 1.17) compared to the real world scenario (M = 2.36, SD = 1.01), with $t(14) = 4.69$, $p = <.001$. Likewise, the issue of one's own personal rights was significantly less important to participants in the context of the game scenario (M = 2.64, SD = 1.28) than in the real world scenario (M= 4.21, SD = 1.21), with $t(14) = 2.96$, $p = .01$. Qualitative analysis of participants' written explanations corroborated the quantitative findings.

Discussion

Our findings suggest that, in the context of MMOs, adolescents have different priorities in reasoning through social ethical dilemmas than they do in real world scenarios. Specifically, in-game contexts, teenagers appear more willing to abdicate control to an authority and are less committed to declarations of personal rights. Together, these findings suggest a pattern in which it appears that individuals are more willing to suspend personal rights and follow, at least temporarily, a designated authority than they are in out-of-game scenarios. The pattern is evocative of Jenkins' (2006) work on participatory cultures and Levy's (1997) theory of collective intelligence in that the suspension of individual rights in exchange for participation in the group collective, guided by the authority of an individual or goal or the group itself, is indeed a prerequisite of sorts to collective social movements. Such findings make sense: MMOs like *WoW* are based on a group mechanic in which individual players join collaborative groups of various sizes and agree to play by certain rules and norms.

Jenkins (2006) notes that feelings of empowerment among youth come from making meaningful decisions within a real civic context. We argue that one of the reasons why our participants showed a greater willingness to abdicate control and make sacrifices to individual achievement in favor of the best interests of the group is that in game contexts, players are active participants in the creation of group rules and norms. At home, parents are the authority figures and do not need to consult their teens about the household rules. The agency afforded to players in game contexts renders decisions meaningful and fosters critical ethical reasoning and reflection (Simkins & Steinkuehler, 2008). Having an active role in the negotiation of ethical norms would seem to support a willingness among adolescents to put the interests of the group ahead of individual rights and wishes.

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