Blogging for Facilitating Understanding: A Study of Video Game Education

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Abstract

We analyze the deployment of an online blogging environment designed to support reflective practices among university students learning video game theory and game design. Blogging offers possibilities for collaborative learning by allowing learners to share knowledge and experiences with one another. This aligns with the notion that people learn better through building personally meaningful artifacts and sharing them with others. The blogging environment we designed was used by 56 students as part of the regular curriculum in two university-level game classes. Our analysis indicates that students perceived blogging about games to be a positive experience for three reasons. First, it improved their enjoyment of video games. Second, it provided a vehicle for expression, communication, and collaboration. Third, it facilitated a deeper understanding of video games. Students found that by reflecting on their game-play experiences they began to step back from their traditional role of "gamers" or "fans" and engaged in critical, analytical reasoning about the games they were studying. Our analysis of the students' blog entries supports the students' perceptions. We identified six common styles of blog entries: overview, narrative, comparative analysis, plan/hypothesis, investigation, and insight/analysis. These styles align with practices necessary for supporting learning and understanding. Blogging, a reflective writing activity, can help to lay the foundations on which further learning and understanding can happen. We also provide guidelines for the integration of blogging as a learning activity in educational settings.

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Introduction

Video games are becoming an increasingly important part of people's lives (Byron 2008). Among some groups, such as college students, video gaming is ubiquitous (Jones 2003). According to the Entertainment Software Association (ESA), 75 percent of heads of households in the United States play video games, and the average game player (not buyer) is 30 years old (ESA 2005). These statistics are strikingly similar in other countries; for example, in Great Britain 59 percent of the population between 6 and 65 years of age are gamers (Pratchett 2005). Video games are undeniably affecting our culture, the way we socialize and communicate, and how we think about the world.

The increasing interest in video games has been accompanied by an explosion in the number of universities and colleges teaching "game courses" and offering game-related degrees. Colleges and universities are not only teaching classes in game analysis, design, and development; they are also wrestling with how best to do so. For instance, in many game classes, students are asked to think critically about games as they play and analyze them, something they find challenging (Zagal and Bruckman 2007). Students often confuse being insightful about a game with being successful at playing it.

Given these issues, how can we support learners in developing a deeper understanding of video games? In this article we do three things. First, we provide a definition of what it means to understand games. The definition is phrased in terms of what a person who understands games should be able to do. Second, we propose blogging as a means for helping novices leverage knowledge from their personal experiences with video games in order to achieve a deeper understanding of video games. Third, we report on the use of GameLog, an online blogging environment, in two university-level game-related classes. The purpose of our study is to explore whether, and how, blogging can scaffold the reflective practices that are important for creating deeper understanding. How can we help novices leverage knowledge from their personal experiences with video games to create abstract and deeper knowledge about the medium of video games, and what may we generalize from that process?

Background

Understanding Games

What does it mean to "understand" games, and how can we support learners in developing that understanding? Gee (2003) argues that literacy, as a way of understanding and producing meaning, needs to be situated in the context of a semiotic domain. Gee defines semiotic domains as any set of practices that recruit one or more modalities (e.g., oral or written language, images, equations, symbols, sounds, gestures, artifacts) to communicate distinctive types of meanings. Video games can be considered a semiotic domain, so understanding games requires having the ability to understand meanings with respect to games. We define the ability to understand games as the ability to explain, discuss, describe, frame, situate, interpret, and/or position games

1. in the *context of human culture* (games as cultural artifacts)—first context;
2. in the *context of other games* (comparing games to other games, genres)—second context;
3. in the *context of the technological platform* on which they are executed—third context; and
4. by *deconstructing them and understanding their components*, how they interact, and how they facilitate certain experiences in players—fourth context.

Each of these parts of the definition is a "context" for games understanding. Thus, understanding games in the context of human culture is the first context of games understanding, understanding games in the context of other games is the second, and so on. The goal is for students to be able to engage all the contexts of understanding games (i.e., those contexts we describe in the article but possibly others as well).

Understanding a game means understanding its relationship, and the role it plays, within culture in general (first context). A game is an artifact that occupies a place in a broader cultural context that includes other artifacts that are not games. The meaning one can make from a game depends on understanding the relationship that exists between games and other media, between games and certain media genres and/or artistic movements, and between games and

certain cultures or subcultures in a broader sense. For example, understanding a game such as *Peter Jackson's King Kong* would probably require explicating the relationship the game has with *King Kong*, the movie directed by Peter Jackson, and, in turn, the relationship with the earlier movies released under the same name. Similarly, understanding the historical simulation game *Civilization* implies realizing the relationship between what the game models and represents as a particular understanding of history—in particular, that of the Western world. *Civilization* can be described as a historical simulation where the player chooses to control one of a series of authentic civilizations (e.g., Aztecs, Indians, Romans). However, the game assumes a Western (Eurocentric) perspective on history. For example, the game requires that "in order to pass from the Ancient to Middle Ages, you must develop monotheism, monarchy, and the alphabet—whether you're China or England" (Chen 2003). Regardless of the civilization he or she controls, the player is forced to follow a linear progression of developments similar to those of the nations of the Western world.

Understanding a game also means understanding its relationship to, and the role it plays within, the landscape of other games (second context). In addition to video games, one can find a wealth of board games, card games, collectible card games, strategy games, war games, role-playing games, sports, and so on. Many modern video games are influenced by or derive from non–video games. Some obvious examples include remediated traditional board and card games like chess, poker, and solitaire. However, with some video games the non–video game legacy is less apparent. For example, the genre of video games known as real-time strategy (RTS) games came from strategy video games, which in turn owe much to strategy board games and their brethren, war games (Dunnigan 1992; Crawford 2003). To understand a game in this context, one needs to understand its relation to other games as well as to gaming conventions and mechanics that might be common across multiple games.

Understanding a game in the context of the technology and platform on which it is executed (third context) means situating the game in the context of the platform on which it is played and understanding the role that platform might have had on the design and play of the game. Technological platforms both limit and afford the implementation of certain kinds of applications. The case of video games is no different, and the restrictions imposed by, among other things, limited memory, bandwidth, processor power, and storage capacity have shaped and determined the kinds of games that are created. For example, the video hardware of the Atari 2600 allowed for only two bitmapped sprites (two-dimensional images that are integrated or composited onto a larger scene). Although programmers were able to squeeze extra performance through clever technical tricks, the end result was video hardware that still severely limited what Atari 2600 games could look like. The resulting visual style of these games, in particular the "stripe-colored" sprites, became a trademark of Atari 2600 games (Bogost and Montfort 2007).

Understanding the structure of games (fourth context) is akin to being able to identify the different components that make up a game and how they interact with one another; that is, recognizing and understanding the principles, patterns, and procedures involved in the construction of games. What are the underlying models? What choices and actions does the player have available to him or her? What are the basic patterns of the game, and how are they combined or recombined? In addition to being able to pick out elements of a game's design, one needs to understand how the interaction between these elements helps create a certain experience for the player. Toru Iwatani, designer of *Pac-Man*, describes how the artificial intelligence (AI) routines for each of the enemy ghosts that chase Pac Man were designed so that they would get closer to Pac Man in a natural way that would not leave players discouraged (i.e., feeling like they are constantly under attack) (Mateas 2003). Additionally, the ghosts alternate between chasing the player and dispersing, allowing the player room to breathe and providing an experience of greater tension when the ghosts "attack" more frequently.

Leveraging Experience through Blogging for Learning

Prior experience plays an important and valuable role in learning (Lave and Wenger 1991; Schank, Berman, and Macpherson 1999; Bransford, Brown, and Cocking 2000). This is particularly so when the learner has personally meaningful connections with what is to be learned, because the learner will then engage more attentively (Papert 1980). Thus, we believe students' extensive personal histories with video games

can be an asset in learning about games. But helping learners leverage their experiences and personal gaming histories to achieve deeper understanding is not a straightforward process. Research has suggested strategies for leveraging experiences, such as encouraging reflection and providing new contexts where knowledge from experience can be applied (for a review, see Bransford, Brown, and Cocking 2000). Additionally, writing can empower learners to reflect on what they know and to integrate existing knowledge with new knowledge (Britton et al. 1975; Emig 1977; Bereiter and Scardamalia 1987). Blogging, or writing in an online journal, can provide an opportunity for this sort of reflection to take place. We designed GameLog to support productive reflection by providing learners with opportunities to articulate and describe their experiences with games, compare their experiences with those of other people, and compare their own experiences across time and across multiple video games.

In creating environments for supporting learning, two major design principles are especially important: design to promote personal connections and design to promote epistemological connections (Resnick, Bruckman, and Martin 1996). Supporting personal connections means that the activities of these environments should connect to learners' interests, passions, and experiences. When activities involve objects and actions that are familiar, learners can leverage their previous knowledge and connect new ideas to preexisting intuitions (Resnick, Bruckman, and Martin 1996). This notion suggests the importance of helping learners use their passion for games and their game-playing practices as a valuable resource. Supporting epistemological connections means that activities should connect to important domains of knowledge and encourage new ways of thinking. By promoting reflection on students' game-playing experiences, we can help them begin to think about their play more deeply and approach it in new ways. In designing GameLog, we hoped that its use would help students think about games as game designers or game scholars, rather than simply as players or fans. In what ways can blogging facilitate this transition?

Constructivism posits that learning is a process of building and refining knowledge structures. Knowledge cannot simply be transmitted; rather, it is constructed or created by learners as they build their own cognitive structures or mental models (Piaget 1972). Writing can be a powerful tool for constructing new knowledge (Forte and Bruckman 2006). Research has long suggested that writing can empower learners to reflect on what they know and integrate existing knowledge with new knowledge (Britton et al. 1975; Emig 1977; Bereiter and Scardamalia 1987).

Many writing activities can be used for learning. However, we are particularly interested in the learning log. Learning logs are written responses to learning. In them students reflect on their understanding, thoughts, and ideas about their study (Baker 2003). Learning logs are used to stimulate metacognitive awareness in learners (metacognition is itself a challenging skill that must be learned and practiced) (Barron et al. 1998; Bransford, Brown, and Cocking 2000). However, by keeping learning logs, students can assume responsibility for and take command of their learning (Commander and Smith 1996). Traditionally, learning logs are paper based. However, educators have begun experimenting with online learning logs in the form of blogs (Stiler and Philleo 2003; Reagin 2004; Wiltse 2004; Du and Wagner 2005). Wiltse (2004), for example, studied journalism students who used a blog to summarize and reflect on the daily student presentations they observed in class. Student blog entries were supposed to include a summary of the topic and the student's reaction to it—for example, whether they learned something new or surprising.

A blog is a user-generated website where entries are made in journal style and displayed in reverse chronological order. They are generally publicly readable and, by allowing visitors to post comments, allow for limited asynchronous interaction. Research has shown that, among other things, people are motivated to write blogs in order to express themselves and foster community and because blogs are both an outlet for thoughts and feelings and a way to think by writing (Nardi et al. 2004).

In a learning context, blogging offers, in addition to the effects associated with paper-based learning logs, possibilities for collaborative learning by allowing learners to share knowledge and experience with one another. Additionally, learners can be exposed to a diversity of perspectives and interact with one another in constructive ways. The personal yet public nature of a blog aligns with the idea that people learn better through building personally meaningful artifacts and sharing them with others (Papert 1991). Some authors (e.g., Walker 2005) have proposed that

the public nature of blogging can also help students understand that writing is a social and collaborative process rather than the act of a solitary individual.

GameLog is a custom-developed online blogging environment designed to help learners reflect on their game-playing activities. GameLog helps people think about their experiences with games, achieve a deeper understanding of games, establish connections across games, identify structural game-play elements in multiple games, understand how game play can evolve and change over the course of a game, and articulate the emotional and personally meaningful experiences they have while playing.

GameLog

GameLog (available at http://www.gamelog.cl) is a publicly accessible online community where people keep track of the video games they are playing as well as those they have played. GameLog's primary feature is to allow registered users to write a blog of their game-playing experience for each game they play. Thus, it differs from traditional blogging environments because each user maintains multiple parallel blogs. Each GameLog (the term refers both to the site and to the individual blogs) is devoted to a particular game. When a user starts playing a new game, he or she creates a GameLog for that game and can then write his or her thoughts and feelings about it. When done playing, the user can "close" his or her GameLog and indicate the reason(s) for closing it. Figure 1 shows a few GameLogs created by a user. The "Finished" status indicates that the user's GameLog for *The Sims* is closed. The user's GameLogs for *Grand Theft Auto—San Andreas* and *Legend of Zelda: The Wind Waker* are also closed, but the user has indicated more information about why he is no longer playing them. Despite being closed, all three GameLogs are still available for public reading. The GameLog for *The Sims 2* is marked as "Playing," indicating that it is an active, or open, GameLog.

's GameLogs

has been with GameLog for **0** years, **4** months, and **5** days

	Game	Status / Read GameLog
1	Grand Theft Auto - San Andreas (PS2)	Stopped playing - Something better came along
2	The Sims (PC)	Finished playing
3	The Sims 2 (PC)	Playing
4	Zelda: Windwaker (GC)	Stopped playing - Technical problems

Figure 1 List of GameLogs written by one study participant.

Table 1 GameLog Excerpt (*Legend of Zelda: The Wind Waker*)

November 19, 2006 10:20:48 AM
I went exploring again in Wind Waker, mainly to fill in some of the spots on Link's map. After a while, I came across one of the huge whirlwinds and fought the critter on a cloud inside of it. Even though it made it rather hard to aim at the critter properly, I really like the fact that the winds from the tornado affected the arrows Link shot off. Really, wind seems to be implemented better/more in this game than most others . . . which is appropriate, considering its theme. I just wish more games with weather effects -had- actually effects from the weather, not just pretty graphics. (Not that I object to pretty graphics.)
After beating the cloud-guy . . .

The owner of each open GameLog can write an unlimited number of individual posts or entries. Each entry indicates the date and time written, when it was last edited, and the number of edits made since it was first posted. GameLog entries are displayed in reverse chronological order. Users, including the owner of the GameLog, are allowed to write follow-up comments to each post. Table 1 shows a fragment of one post written for a GameLog about the game *Legend of Zelda: The Wind Waker*. Whenever someone writes a comment on an entry, the owner of the GameLog is notified via email and provided with a link to reply. GameLog's homepage features the most recent entries, direct links to the most recent comments and GameLogs, and a blog entry randomly chosen from among older entries. The site also offers basic search and browsing functionality to allow users to find GameLogs written for particular games or by particular users. These features were designed to allow users to easily see and access one another's posts.

Study and Methods

In fall 2006, GameLog was used as part of the regular curriculum in two game classes taught by the same instructor at a local university. The first class (U-class) was an undergraduate lecture-style class of 35 students (25 male). In this class students explored and analyzed key developments in the history of digital media. All the students were from 18 to 21 years of age and, on average, had 12 years of experience playing video games. Fifty-two percent of the students reported that they played video games on a daily basis,

and 88 percent played at least once a week. While video games were a significant part of the curriculum, students also learned about virtual environments, interactive television, the World Wide Web, and artificial intelligence for interactive characters.

The second class (G-class) was a mixed graduate and undergraduate discussion-based class of 21 students (17 male). The undergraduate students (4) were 18–21 years old, and the graduate students (17) were 22–35 years old. On average, the students in the second class reported 17 years of experience playing video games. Forty percent of the students reported that they played video games on a daily basis, and 90 percent played at least once a week. Students debated and engaged with issues of game design and analysis as a cultural practice. Students also explored game genres and their representational goals.

In both classes, students were required, as part of their regular coursework, to play and design games, read scholarly articles, and turn in written assignments. As part of their regular coursework, students were also asked to keep a GameLog and write about their experiences playing a game chosen from a list of games assigned for that class. Students in the U-class had to choose one game, and students in the G-class had to choose three games. In both classes students were asked to play each game on at least three different occasions for at least 30 minutes each time. For each time they played the game, they were asked to write a GameLog entry. The assignment directed them to write about the experience they had while playing the game, including their thoughts on the characters, narrative, and game play (for the U-class, characters and story only). In the U-class, students were also asked to submit a short response summarizing their experience with GameLog. These responses were collected and analyzed. The students' GameLog entries were not graded in the U-class. Students were, however, assessed on the quality of the short responses they submitted. In the G-class, students were graded on their completion of the assignment, not on the content of their written GameLog entries. The duration of the assignment was officially one week, although students were encouraged to begin their GameLog activities sooner.

Our data for this study consist of observations, field notes, interview transcripts, and student assignments (GameLog entries and, in the case of the U-class, written responses to the assignment). We collected 137 GameLogs written by 35 students (24 U-class, 11 G-class). The average entry was 235 words long with a standard deviation of 119 words. The shortest entry was 17 words; the longest was 773 words. We conducted eight in-depth interviews once both classes had concluded. Three interviewees were chosen from the U-class and four from the G-class. The eighth interview was with the course instructor. As per recommendations for qualitative research (Glaser and Strauss 1967), we employed theoretical sampling in which cases were chosen, based on theoretical categories developed prior to the study, specifically to provide polar types rather than to ensure statistical generalizability to a larger population (Eisenhardt 1989). Our interview subjects were selected based on their academic level (undergraduate, graduate), level of interest displayed during class (engaged, not engaged), and participation on GameLog (minimum required, active participation). The interviews were conducted in person and by telephone, averaging 46 minutes and ranging from 22 to 82 minutes in length. In addition to questions about students' experience using GameLog, the interview protocol included questions about the potential challenges of learning about games. The interview protocol also included open-ended questions about the students' expectations regarding the course and changes they would make to the assignments. Interviews were semistructured to ensure that all participants were asked certain questions while still allowing them to raise issues they felt were relevant to the research. In the interviews with U-class students, we were able to use their written responses as prompts for additional questions and topics of interest.

For this study we used a naturalistic form of inquiry to help us understand students' use of GameLog and the role it played in their educational experience. The goal of our research was to develop a rich account of the experience of using the system we had developed (Geertz 1983). We were not involved in teaching the courses we studied, nor were we involved in grading or assessing the students' assignments. We examined student assignments, observed class lectures and discussions, and interviewed students and the course instructor. Our data were used to develop what Geertz (1983) calls an "experience-near" perspective. Rather than impose our own hypotheses on the data, our interpretations are grounded in the data and systematically worked out in relation to the data. Through this process the data and our emergent hypotheses and themes interact in a dialectic fashion, reciprocally

informing and being informed by the other (Glaser and Strauss 1967; Lather 1986). For instance, our interview data helped contextualize students' GameLog entries by providing insight about how students went about writing their GameLog entries, why they chose to write what they wrote, what role they felt their peers played in this process, and so on.

For our analysis we coded, analyzed, and sorted our data based on emerging categories. Our analysis used open coding to bring themes to the surface from deep inside the data (Neuman 2000). Open coding refers to a process in which data are broken down and grouped by similarities into categories of related phenomena. For instance, for our interview data we assigned codes or labels to each interview answer. These codes or labels often overlapped, and individual interview answers were often assigned more than one code or label. If an interview response was especially lengthy, we divided it into shorter fragments and assigned codes to the different parts. As we analyzed each interview, new codes emerged and existing ones were modified. This process continued until no further codes emerged. A similar process was used for the student assignments and GameLog entries. In the next step of our analysis, axial coding, we began to combine the categories that had emerged during our open coding in order to identify category characteristics, develop notions about connections between categories, and identify the central phenomenon or core category. The process of identifying consistencies between codes (codes with similar meanings or pointing to the same basic idea) began to reveal themes.

The aim of our methods and report is descriptive. This is in contrast to discourse analysis methods where one uses multiple raters, reports inter-rater reliability, and claims to "prove" assertions. Our descriptive approach has its roots in anthropology and is particularly well suited to characterizing the rich complexity of real world learning situations.

When creating environments for supporting learning, one must promote personal as well as epistemological connections (Resnick, Bruckman, and Martin 1996). Thus, we present our results in two parts. In the first part we describe the impressions students had of the GameLog assignment and what role they felt the assignment played in the context of their learning. Our primary data sources in this section are our interviews and field notes. Our analysis here explores the role that blogging can have in supporting personal connections. For instance, might blogging about game-playing activity have a negative effect on the experience of playing games? In the second part, we discuss the students' blog entries. Our primary data sources in this section are the student's GameLog entries. Our analysis here focuses on the promotion of epistemological connections. For instance, would we find evidence that students were beginning to think about, and play, games differently? In particular, we wondered whether we would find evidence of students thinking about games as game designers or game scholars rather than simply as players or fans. In both parts we show how blogging, in particular blogging about games, can be a useful activity for supporting learning about games and understanding games in the contexts of human culture, other games, technological platforms, and each game's own structure.

Student Impressions

We were interested in understanding what impressions students had of the GameLog assignment and what role they felt the assignment played in their learning. Would students find the assignment meaningful and useful? If so, in what ways? Would they find that it detracted from their experience of playing games (i.e., did it turn the experience of playing games from "fun" into "an academic chore")?

We found that students generally responded favorably to the GameLog assignment. This contradicted the feedback the instructor reported receiving prior to the completion of the assignment. He noted that "the students complained. Not all of them, but some of them. . . . I think that the complaint had to do with the feeling that there was an exercise that they were performing whose value they could not immediately judge. Why am I doing this?" Our data show that once the assignment had ended students perceived writing GameLogs as a positive learning experience. They reported the experience as interesting and enjoyable and remarked on its educational utility. Aaron felt that "this written assignment is the best one so far," while Benjamin commented that it was "an interesting and productive experience." Cynthia summarized the general impression of the students: "I found that writing journal entries about my game play was quite fun." Students attributed their positive impression of the experience of blogging about their game-play experiences to three reasons:

1. improves enjoyment of video games;
2. provides a vehicle for expression, communication, and collaboration;
3. facilitates deeper understanding of video games.

Improved Enjoyment of Video Games

For the most part, students in both the G-class and the U-class had extensive personal experience with video games, which are an important part of their everyday lives. Video games are a medium they enjoy and one with which are familiar. This corroborates the results of an earlier study that found that among college students "gaming is virtually commonplace. Computer, video and online games are woven into the fabric of everyday life for college students" (Jones 2003). Many students commented on how the experience of writing about the games they played improved their enjoyment of games in general. (For reasons of privacy, student names and usernames have been replaced with pseudonyms.)

Dominic noted, "[W]riting my GameLog allowed me to work through my gaming experience. . . . I was able to get a deeper appreciation for the game that I was playing." Ellen, who does not consider herself a gamer, wrote about a game she had never played before. Like others, she noted,

> I thought it [writing the GameLog] was an interesting way to approach playing video games because this helped me understand how I was playing and what I was doing. I think that now, when I actually play games, if I approach the game a different way, maybe I would enjoy playing games more, or I would have a better time.

During their experience with GameLog, students begin to realize that engaging with the medium of video games is an active process requiring more than "merely" playing. In addition to playing, they reflected on how they were playing, what their expectations were, and what they felt when playing. They also began to change the way they played games. Thus, they began to understand how a game-playing experience depends not only on the particular game played but on how the game is approached.

Writing GameLogs helps highlight the tension between playing games "for fun" and for deeper understanding and analysis. Frank noted, "I don't believe it made me play the game any better than I normally would have." Playing a game with an eye for analysis requires a different approach. This surprised some students, such as George, who commented that the assignment "took away from the experience of playing the game. It was like reading a really good book and stopping and taking notes. It's just not the same as reading it for pleasure all the way through with no interruption." Harrison even felt that games like *Grand Theft Auto* are "meant to be played and enjoyed, not to be thought out or analyzed."

When faced with an assignment that required using their experience as a resource for analysis and understanding, students may begin to wrestle with the notion that games are more than "consumer media goods" and can be engaged as cultural artifacts with embedded meanings and ideas. In this way, students can begin to approach, play, and understand video games differently and thus become better prepared to study and learn about them. Isabel noted,

> I came to analyze the way that I was playing, the way that I was actually using the games, and my experiences doing that. You never really think about that. I guess most people don't really think about what they're doing when they're playing games or how they're playing the games.

Expression and Collaboration

Students described writing GameLogs as a positive learning experience because the assignment allowed them to express themselves, share opinions, articulate ideas they have difficulty communicating, and, to a lesser degree, collaborate in creating a shared understanding of a game. Patricia said, "I thought I knew the characters, but trying to explain their personalities and habits was quite hard until I really sat down and did the GameLog." For Orianna, writing a GameLog provided a different opportunity:

> It was interesting to see whether other people thought the same things about the game that I did. I was playing an abstract game and was curious to see if they had the same notion of it as I did. Or, was I completely off base? It was hard for me to know what should be interpreted and what not. And so, it helped to read what other people think.

In both of the classes we studied, students were asked to write about their experience with a game from a relatively small list. Because GameLogs are public, the students could access the wealth of opinions, thoughts, and experiences their peers were sharing about the games they were playing and studying. As Orianna mentioned, reading one another's GameLogs allowed students additional opportunities for reflection. Orianna's comment also shows her reflections on how other people experience the game she played. The students were not explicitly asked to read one another's work, but most chose to do so. By reading their peers' thoughts and reflections, students began to understand how different people experience games differently (moving away from a naive understanding of games), saw what their peers chose to focus on, and learned about aspects of a game that they may not have noticed or cared to think about. Such experiences can help deepen one's understanding of games. They can also prompt one to consider the reasons and motives another person might have for playing games one might not care for. As Quentin explained,

> I've never understood why people play *The Sims*. So here I was playing it and trying to get into those reasons. And so, it was interesting to read other people's thoughts and then think about it, because I didn't feel the game that way. What actually grabbed them was something that I didn't care for, but now I had a sense of what it was. To me, that was totally unexpected.

Some students also took advantage of the GameLog site feature that allowed them to comment on other users' GameLog entries. Posted comments were generally supportive and friendly. We observed no incidents of deviant behavior such as personal attacks or inappropriate comments. This might be explained by the students' prior knowledge of one another. Raphael's comment highlights how an appreciative audience can positively affect the experience of writing and reflecting:

> I liked the feedback. It made me feel less worried that I was a horrible video game player and concentrate more on my experience. I don't necessarily want tips on how to play the game, but commenting on my blog makes the blog experience better. Why have a blog in the first place if nobody else is going to read it?

Some students, aware that they were going to write about their experience and that their posts would be read by others, chose to change the way they played the game in order to communicate or demonstrate something to the potential readers. Jackson explained,

> Generally I just play a game for a quick 30 minutes, and then I can then get up and leave. But this time, I know it's going to happen beforehand [referring to playing *The Sims*], so I'm thinking how can I play it so I can write about it and share the experience rather than just sitting with the *The Sims* and just doing just random things for an hour or so.

The quality of the student writing was another issue raised during the course of our study. Students perceived writing for a blog to be less formal and more relaxed than a traditional class writing assignment. Their entries were commonly riddled with grammatical and orthographical errors that would be considered inappropriate for a formal assignment (for a review of similar issues of quality in journalistic blogs, see Seipp 2002). However, the students perceived the informality as liberating. In taking a more relaxed approach, students reported that they could express themselves more freely and were able to come up with insights more readily. Heather said,

> [I]f [the instructor] had told us to play these games and write an essay about our experience, I wouldn't have seen the way that I played the game, the way that I wrote about it in the journals. My journal logs are more personal. I cheated [in the game]! I wouldn't have written about that in an essay. I wouldn't have talked about my experiences in the same way, in the same fashion.

Because their writing occurred closer to the actual experience, students could capture information, impressions, insight, and feelings that were more personal and concrete. The course instructor also perceived the value in this kind of assignment, noting,

> [M]aybe this is something I should change. Part of this is because my courses were focused on this end result. I have this sort of old-school

> insistence on synthetic research output—a term paper. Maybe it's not always the best demonstration of a particular kind of mastery. Maybe if I taught the undergrads again I would have them write a bunch of little things, and that would be the right answer.

In the same way that a researcher's field notes of his or her observations are the initial step in the process of writing an academic research paper, a student's GameLog entries help lay the foundations on which learning and understanding can happen.

Facilitating Deeper Understanding

Students reported that the reflective writing activity, in addition to changing the way they related to video games as a medium, helped them achieve a deeper understanding of the games they were studying. "It helped me understand a bit more. When you play through, you're kind of in it, so it's hard to have an insight. Writing afterward is like looking in from the outside. It helps you put on a different perspective," Jeremy said. Like many of his classmates, he found that writing on multiple occasions about different sessions of game play helped him understand a particular game in different ways and helped him focus on specific elements or aspects of a game that he previously might not have noticed. Kathy described her experience with *Façade*, an interactive drama game in which the player witnesses, and tries to mediate, the marital crisis of the nonplayer characters Trip and Grace:

> I begin connecting any little action I executed in the game to any response that the interacting characters gave. For example, two of the three times I played, Trip recounted several things I had said throughout the evening, and I begin to connect that somehow he thought I said such-and-such when I had actually meant something totally different. Looking back over the conversation as I was journaling, I began to realize how the characters interpreted different comments depending on their mood at the moment. For example, when Grace was angry because of a previous comment by Trip, she always interpreted my comments as invading on the territory of the marriage.

We also found evidence supporting the idea that students were engaging with the four contexts of understanding games. For example, Isabel said,

> I began to realize that you can't describe a game like a movie. Well, except for the pregame movie-like clip [referring to cut scenes, (generally) noninteractive interludes in a game]. In describing a game, you have to get into different details than movies, even though when you look at someone playing a game, they can look very similar.

Isabel's reflection shows her contextualizing games with respect to other cultural forms—in this case, movies (first context).

Similarly, Neil began to understand the relationship that a game such as *The Sims* has with virtual-pet games such as *Tamagotchi*. He realized that the core game play of both games is the same and that both rely on a particular human motivation (to nurture). Thus, he came to understand aspects of *The Sims* in the context of other games (second context):

> The characters in The Sims reminded me of Tamagotchi pets. The Sims' characters had the same addictive feeling of caring as the Tamagotchi pets. My thought while playing was that the characters were more like children, or a pet, the player has to take care of. The user has to feed them, make them shower, and do other basic human functions. When it gets down to the bare requirements that a Sims character needs for fulfillment, they are the same needs that a pet dog would have.

Orianna's experience as she began to explore the similarities and differences between two games that are part of *The Legend of Zelda* series (second context) was similar to Neil's. She also wondered about the role that different generations of hardware play in shaping the experience of playing each game (third context):

> I played Zelda [*Wind Waker*] and writing about it made me think about its game play in comparison to other games I had played. I hadn't really played Zelda since the NES. It was really interesting for me to think about the one I was playing on the Gamecube, compared to the original NES version, because they are two completely different types of game now. The hardware systems are totally different, what you can do is totally different, and so on. However, it was still strangely familiar.

Harrison commented on the fact that "when you analyze the game you can't help but notice the many shortcomings in the game. [These issues] can be easily ignored if you're just playing, but when you write about it you can't help but think about it." Harrison's comment illustrates another issue the students were beginning to come to terms with: distinguishing the "parts" of a game and how they function from the impact they have on the game and the experience of playing it as a whole (fourth context). A comment from Jeremy further illustrates the point: "I noticed that looking in from the outside, the game maybe is pretty simple and even flawed, but when I played it, the game was much better. It was like understanding how the whole was greater than each of its parts."

Students such as Dominic noted that by reflecting on their game-playing activity they were "able to see that there were more things to the game then just following the missions." The reflective process helped the students realize certain nonobvious insights as they began to identify components of games and began to see how those components interact and create certain experiences. For example, Meredith noticed that feedback from nonplayer characters serves as a reward in *Harvest Moon*, while Louis had an insight into the effect the character creation system has on the narrative in games such as *Oblivion* and *Knights of the Old Republic*. Nigel debated how the voice of Carl, the player-controlled character in *Grand Theft Auto: San Andreas*, helped to create a less-immersive experience than that of *Grand Theft Auto III*, despite the similarities in their game play. In addition to understanding games from the perspective of the fourth context, Nigel and Louis showed they were also considering the second context. Even Jessica, who felt the GameLog experience detracted from her enjoyment of the game, remarked, "I did understand the game more than I did before." By writing GameLogs, students in the study began to understand the role certain elements play in the experience or design of a game. They also began to relate these elements to one another and to see how sometimes the same elements appear in multiple games, playing different roles.

Understanding a particular game, however, can mean more than being able to deconstruct it or view it holistically. Maurice noted that writing a GameLog "helps me get in tune with what I just did and keep track of what's going on over the long term. Journaling gets me to think of the game outside of playing the game itself." Maurice began to make sense of his experience and could understand the game in a broader context. Orianna summarized the experience as having helped her to

> start thinking about more than just the game play, but also the physical aspects of sitting down and playing a game, analyzing them culturally, and how do they relate to other practices. How do games relate to our experiences, not just with games, but with other people and the world, how have they changed? It's about trying to think about games as a much broader subject.

Students generally reported that the experience of writing about their game play helped them achieve a deeper understanding of video games. Although we are encouraged by these findings, further studies and analysis will be needed to confirm them.

Shifting Modes of Play

Instructors of game studies classes often find that students have difficulty stepping back from their role as "gamers" or "fans" (Zagal and Bruckman 2007). One of the challenges students in these classes face is that of confusing playing games for fun and entertainment with playing them for critical analysis. While we did not study, or observe, students playing games, we did find evidence that students began to play and approach games differently because of their experiences with GameLog. For example, Nate described how he began paying more attention to details because "keeping a GameLog forced me to come up with content to write about, and the only way to bring forth quality content was to examine the game through a critical eye and notice all of the extra details." Jarrod, in reflecting on his experience with *Grand Theft Auto III*, described his interactions with characters in the game. He noticed that his insights came from the fact that he was playing the game differently:

> This was a very interesting experience, because when you play a game like Grand theft auto, you don't really think about how the players are interacting, you just play. It was neat to really think about why it was necessary for the characters to interact the way they did, and it really makes you think about how limited certain possibilities for interaction really are. Yet at the same time you can see that

> there are still a ton of other ways to interact with the characters.

Jarrod's impressions were mirrored by Zoey, who described some of the ways that writing a GameLog can influence how games are played:

> Depending on the gamer and the game, the idea of game logs can influence the playing of a game. By using such a log, gamers can keep track of what has happened in their game. They can help decide on new strategies that would not otherwise be thought of. Also, it helps to keep track of what the gamer has tried or would like to try in the game. In addition, the player may get new ideas from just writing one.

In what ways can blogging about game-play experiences support the process of shifting modes of play? The students in our study found that blogging about their game-play experiences changed the way they played games. In particular, they began to

- pay greater attention to details (notice things that would otherwise have gone undetected);
- plan ahead (keep track of what they would like to try in a game);
- play games with broader issues or questions in mind; and
- try out new actions and in-game activities.

GameLog Participation

We were interested in getting a sense of the kinds of things students wrote about on their GameLogs and how they wrote about them. Would they tell stories about what happened when they played the game, or would they write about the difficulties they encountered while playing? Would they approach the assignment as a chance to analyze specific aspects of the game, or would they try to convince the reader of the game's merits (or lack thereof)? From our analysis, we were able to identify common patterns across GameLog entries. From these patterns, we determined six prototypical styles of GameLog entry: overview, narrative, comparative analysis, plan/hypothesis, investigation, and insight/analysis (see table 2). The diversity of styles illustrates the multiplicity of ways students approached the task of reflecting on their game-play experiences. Not all students approached the task in the same way, and students often changed their approach from one GameLog entry to another. Some students even wrote entries that used multiple approaches and mixed styles in the same entry. This was common in longer entries.

Table 2 GameLog Entry Styles

Style	Brief Definition
Overview	General description of the game.
Narrative	Description of what the player did and what happened during the game session.
Comparative Analysis	Description and comparison of specific elements of a game with another game.
Plan/Hypothesis	Description of goals or questions the player wants answered, followed by a plan for achieving them.
Investigation	Description of an investigation or experiment performed during the game-play session.
Insight/Analysis	Description of a specific insight into or analysis of an element or aspect of the game.

Table 3 shows the frequency distribution of the different styles used by the students in each class. For example, by the end of the assignment, 41.7 percent of the students in the U-class had written using three of the styles. Not all of the students who used three styles wrote using the same combination of styles. So one student might have written an overview, a narrative, and an investigation, while another wrote an overview, a narrative, and a comparative analysis. Also, the frequencies in table 3 are divided by class type because students in the U-class wrote fewer entries (an average of 3.1 entries per student) than did those in the G-class (an average of 5.4 entries per student). The assignment for each class also differed in the number of games students were asked to play and write about (one or three games). Despite the differences in the number of entries written, table 3 shows no significant differences in the variety of styles used by the students in each class. This table also shows

Table 3 Distribution of Frequency of Styles Used by Participants

Number of Styles Used	U-class	G-class	Combined
1	8.3%	9.1%	8.6%
2	16.7%	18.2%	17%
3	41.7%	18.2%	34.3%
4	25%	36.3%	28.6%
5	8.3%	9.1%	8.6%
6	0%	9.1%	2.9%

that most students did not strongly favor only one style, with only 8.6 percent of the students in both classes using one style for all entries.

Overview Style

The overview style consists of a general description written for a reader who is assumed to be unfamiliar with the game in question. Entries written in this style generally attempt to provide some sort of context about the game being played. For example, they might refer to earlier games in a series or to games that may be similar. Additionally, they might refer to circumstances illustrating why the author decided to play a particular game or demonstrating the author's prior history with the game. Entries written in the overview style are often accompanied by criticism or praise for certain aspects of the game.

In the following example, Zach describes how *Boundish* is part of a broader series of games. Although Zach's overview does not provide much in the way of detail, he does present *Boundish* as a tribute to early video games, placing it in the context of other games (an example of second context). (All GameLogs excerpts are reproduced verbatim.)

> Boundish is part of Nintendo's Bit Generation series. The complete series includes Soundvoyager, Orbital, Coloris, Boundish, Digidrive, Dotstream, and Dialhex. I just ordered the complete series from eBay, and I can't wait for them to arrive.
>
> Of the five games on the cart, I've spent most of my time tonight playing Box Juggling and Human League. Both of these games are best described as Pong variants and tributes to early moments in videogames.

Emily begins her first entry for John Conway's *Life* by describing the rules by which the game operates:

> To begin with, here are the "rules" of the game:
>
> For a space that is "populated": Each cell with one or no neighbors dies, as if by loneliness. Each cell with four or more neighbors dies, as if by overpopulation. Each cell with two or three neighbors survives. For a space that is "empty" or "unpopulated" each cell with three neighbors becomes populated.

To write an overview, the student must reflect on the game and consider how it should be presented to someone who might not be familiar with it. Writing an overview is an exercise in contextualizing the game for an uninformed reader and requires that the student deal with questions such as, What are the important features? What is the core game play? What does the reader need to know in order to get a feeling for what this game is like? Additionally, writing an overview can be an exercise in reflecting on one's prior experience with and knowledge of the game in question. For example, students might have to recollect what they have heard about a particular game or reflect on their preconceived notions of the game. What kind of experience do they think they will have? How will their experience account for what they have heard about the game? In the case of writing about games they might have played previously, students might also feel prompted to recall their prior experiences. Did they enjoy the game? For what reasons? How do they think this new experience might differ? What memories does the game bring back? Sixty-three percent of the participants wrote at least one overview entry, and 21 percent of all entries were written in this style. Additionally, 75 percent of the entries written as an overview were the initial (earliest) entry written for a game.

Narrative Style

An entry written in the narrative style consists of a description, generally written in first person, of what the player did and what happened during the game session. Such entries are usually accompanied by descriptions of relevant or necessary parts of the game and are interspersed with minor insights and observations made by the player.

Here Samuel describes his goals and impressions of *Grand Theft Auto III* while describing his activities within the game:

> After that, I decided to do Joey's last mission as well: The Getaway. This mission was ridiculously easy compared to his previous one. I had to be the driver for a bank robbery. After the robbery, I had three stars, but immediately dropped one by picking up a police bribe in an alley. I then drove to a Pay 'n Spray to get rid of the remaining two.

In the next example Susan describes her interactions with some of the characters in *Animal Crossing*. She is starting to figure out how she can learn more about the other characters in the game but has not yet decided to investigate whether her notion is correct or not. With her entry, Susan begins to consider how characters "work" in *Animal Crossing*. In this way, she begins to understand the game in the context of its components and how they interact (fourth context).

> The past couple of days I have been pestering Sable, the girl at the sewing machine. She just gets pissy and tells me to ask the clerk for help or tells me that she is very busy. Today, Derwin, one of my townsfolk, asked me to take a personality quiz. After answering a couple of questions, it told me that I was most like Pelly, the lovable pelican at the town center post office. Derwin went on to tell me more about Pelly's trustworthy attitude and personality. I guess if I answered the quiz differently I could learn about the personality of other characters.

The narrative style is well suited to describing general game play. When students write in this style, they revisit their experience and can begin to understand the relationships between their actions in the game and the results, or effects, of those actions. By recounting the events of their game-play session, students can also begin to formulate questions and ideas that might be the focus of attention in later game-play sessions. The narrative style was the most common style observed in the study; it comprised 42 percent of all essays and was used at least once by 69 percent of study participants.

Comparative Analysis Style

Entries written in the comparative analysis style describe specific elements of a game and compare them with a similar game, usually another game in the same series. The comparative analysis usually includes recommendations to the reader or opinions regarding the differences noted. This style of entry is often the result of reflecting on the second context for understanding games.

Richard comments on the differences in tone and humor between *Grand Theft Auto 2* (GTA2) and its sequel, *Grand Theft Auto III* (GTA3). He finds that although the general game play is the same in both games, the integration of presentation and game play works better in the prequel.

> I was and still am a big fan of Grand Theft Auto 2. And here is where the problem arises for me, every time I play any of its successors I find traces of the old game lurking beneath each element that they tout. I feel that if one were to write down the formal rules of both the games down on paper, they wouldn't be significantly different. However, the execution of the latter games ruined something for me. GTA2 had a very tongue-in-cheek and comical approach to its presentation, the mob bosses jabbered in nonsensical tongue, the voiceovers were hilarious, even some of the missions had a wry sense of humour about them. All of which made the actual gameplay (essentially killing people) seem somewhat dissonant and eerily syncopated.
>
> GTA3 has these activities more or less as a matter of fact, and it takes a bit of fun out of it. I'm not a big fan of realism.

Occasionally, entries in the comparative analysis style compare a game with the conventions of certain game genres, such as role-playing games (second context). When playing *The Sims*, Mark notes how the process for designing characters might mirror that of role-playing games such as the paper-and-pencil game *Dungeons & Dragons* (D&D).

> The first thing I noticed in the create character screen was that the personality selector was similar to RPGs in the sense that you are given a set amount of resources to allot to certain kinds of traits such as niceness, playfulness, etc. Could these traits match up to D&D's abilities? Outgoing = Charisma. Active = Dexterity. Not much else works. Oh well. If only it mapped up one to one, then we could have your typical Sims player rolling d10s for Niceness and so forth.

When writing a comparative analysis, students focus their attention on the differences and similarities between two games. They can begin to develop a deeper understanding of games by identifying elements common to both games, exploring how these elements play different roles in games, and

considering how the resulting game experience might be similar or different (thus supporting the fourth context for understanding games). Entries in the comparative analysis style were usually written by students who had extensive prior experience with games related to the game about which they were writing. This style of entry was the least common, accounting for only 11 percent of entries. However, 31 percent of the students wrote at least one entry in this style.

Plan/Hypothesis Style

Entries in the plan/hypothesis style consist of a description of goals or questions the player wants to achieve in or answer about the game. This is followed by a plan or strategy. The plan is often accompanied by hypotheses about how the game works. The results of the plan are usually referred to in later GameLog entries.

In the following example, Cynthia outlines some of the things she would like to find out about *The Sims 2*. She also describes how she plans to set herself up in the game in order to explore her questions. Many of Cynthia's questions have to do with understanding how the game works and how the parts of the game interact (fourth context).

> I decided to start a new family. I chose a premade brother and sister to run a much more hands-off business. Now this is the coolest thing ever. Basically what I'm going to do is buy neat stuff and make other sims pay just to come onto my lot. Sweet! (I'm still planning to start off with a little extra money, this way I can figure things out. It's rough when they're uber poor and you don't even know what you're trying to do.)
>
> Some things I'm curious to find out:
>
> 1) Will I be able to make enough money for them to survive? (naturally)
> 2) Can the business still grow when I'm not actually trying to sell things?
> 3) Can the business stay open when they're both at work??

Cynthia also describes how she intends to "cheat" and start the game with more resources than she would generally be allowed. In later entries, Cynthia describes how she used a special code that allowed her characters to receive extra cash, thus enabling her to be in a position in the game where she could experiment and try things out without the fear of losing. By the end of the assignment, her understanding of how the game "works" had increased. She writes, "I think I'm ready to start a new game now. I want to start from the beginning, no cheating."

In another example, Dominic describes some of the issues he has had with *Façade*. He expresses frustration at his perceived lack of agency controlling the direction of the conversation he has with the other characters in the game. He wonders whether this has to do with the way he is approaching the experience (as a game, rather than a real situation) and hopes that with further practice he will be able to "get the hang of it."

> I still don't feel like I really know how to communicate with the two. There is the obvious "hello," "how are you doing?" stuff that has minimal impact, but I don't seem to get any further. The two begin yelling at each other and all I can do is take sides with my responses. I don't really feel that I grasp the range of responses that are available to me. I am thinking of this like a game, and I think they want me to think of it as a real situation and try what I would in real life. I am having problems transitioning to that way of thinking, maybe next time I will get the hang of it and start controlling [the] conversation more.

Thinking ahead, formulating questions, and developing hypotheses are important for fostering learning and understanding (Bransford, Brown, and Cocking 2000). By writing a plan/hypothesis, students can reflect on their understanding of a game and come up with a way to correct or improve it. Plan/hypothesis entries were often followed by entries written in the investigation style. The plan/hypothesis style was used in 23 percent of entries, and 57 percent of the students used it in at least one entry.

Investigation Style

Entries written in the investigation style describe an investigation or experiment performed during the game-play session. The objective of or reason for the investigation is described and then followed by an explanation of how the goal was pursued. The outcome is then recounted, along with a description of any

insight that resulted from the investigation. Evidence for the insight usually comes from the results of the investigation itself.

In the following example, Thomas describes his interest in understanding how the player-controlled character CJ, a young African American man, is characterized in the game *Grand Theft Auto: San Andreas*. The game is set in late 1992 in the fictional state of San Andreas (based on sections of California and Nevada). Thomas's example shows that students did not limit themselves to investigating aspects of game play or functionality but also chose to explore other issues, such as representation and characterization. Although he does not mention it in his GameLog, in a follow-up interview he described his interest in comparing the representation of characters in the game with the characterizations one might see in "hood" films set in the same time period. (Hood films are a genre that features aspects of primarily African American urban culture such as street gangs, racial discrimination, and the problems of young black men coming of age.) In this way, Thomas was seeking to better understand the game by contextualizing it with respect to a particular film genre (first context).

> I didn't want to simply run around the world, completely defining the main character, CJ. I wanted to catch a glimpse of a few cutscenes to see how the developer's characterize CJ. In order to get this done, I have to attempt a few missions. Not only do these cutscenes develop the characters, but they advance the storyline. This particular mission has me picking up women for a rapper's party. When OG Loc, the rapper, is giving me my instructions he comes off as a lame, overly ambitious rapper with delusions of granduer. The whole time CJ is completely cool, understanding that Loc has less musical talent than Milli and Vanilli, but still playing along like he's the second coming of the Dr. Dre. In this cutscene we have humor, character development and a small suggestion that the player is somehow "cool." We see an imbecile like OG Loc and can relate to CJ's feeling of superiority.

Charlotte describes how she, upon discovering additional modes of interaction in *Façade*, began to investigate what would happen in the game if she ignored its primary mode of interaction: typing written text. In doing so, she was not attempting to subvert, or break, the game. Rather, by ensuring that her interactions, while nontextual, were appropriate to the situations in the game, she was investigating the range of options available and thus exploring the structural components of the game and how they interact (fourth context for understanding games).

> For this time, I tried not saying anything the entire time. Instead, I found out that if you moved close enough to either of the characters, the cursor would change into one of three others. The others included the options to hug, comfort, or kiss the character in front of you. So, I changed my strategy slightly once again to see what the characters would do if I didn't say a word the entire time but I would hug, comfort, or kiss them depending on the situation and the previous comments and would pick up random objects in the room. Needless to say I got a lot of interesting comments.

From a learning perspective, using the investigation style is pedagogically similar to using the plan/hypothesis style. Both show that the student is actively engaging his or her knowledge and understanding of a game by formulating questions and planning courses of action to resolve those questions. When using the investigation style, students additionally describe the execution of their plans of action and then comment on the results of those actions. This style was used in 13 percent of the entries written, and 37 percent of the students used it in at least one entry.

Insight/Analysis Style

The insight/analysis style consists of a description of a specific insight that happened while playing, or an analysis of a specific element or aspect of the game. The analysis is usually accompanied by supporting evidence from the game-play session. Occasionally, it includes commentary on the effects or meaning of the insight.

In the following example, Victor describes how he came to realize that the first playable area in *Legend of Zelda: The Wind Waker* was designed to implicitly introduce players to the basic skills they need in the rest of the game. Many games have areas labeled "tutorials" that are separate from the rest of the game. Victor notes that the designers of *Wind Waker*

chose instead to carefully design the first area, Outset Island, to support their "explanation" of the game by ensuring that all relevant skills necessary for success in the game were covered (fourth context for understanding games).

> Outset Island and its inhabitants exist less as people and more as a tutorial for novice players to learn the particular game-isms of The Legend of Zelda series. It's actually interesting to note the various ways the landscape of the island, the NPCs living there, and even the small sidetasks are all explicitly designed to acclimate players to the basic controller functions that will be necessary to play the rest of the game. The simplest concepts: the necessity to collect rupees to buy things (reinforced in multiple ways), the basic combat system, and even the item collection/buying/button assignment mechanics are all explained at this juncture.

Timothy's entry describes some of the challenges of designing games that give players freedom to navigate large environments (often referred to as open-world games). He notes how *Okami*'s open environments can sometimes be at odds with the objectives the player is tasked with completing, particularly when the player is unsure of where these objectives should be met. Like Victor, Timothy shows the beginnings of an understanding of the components of games and how they interact (fourth context).

> One mission I encountered involved trying to rescue a boys dog. This mission was extremely frustrating because due to the open world nature it took me a long time to figure out where I was supposed to go. Eventually I ended up finding how to enter a cave and completed a Zelda-like dungeon "level" to rescue the dog. . . . This type of game-design is interesting to me. It creates discrete "levels" but places them within an open world environement as to simulate non-linearity. In reality the game is fairly linear, but provides for a lot of exploration within the world. Often times exploration is necessary for progression of the game. In trying to find the dog I searched all the areas that I had previously explored and came up empty until I finally found the correct cave. This is an issue I believe open world games can cause. If direction and focus is not clear then it may become difficult to locate objectives. Sometimes it can just be frustrating to have to run all over the game's world to find what you are looking for. Both of these problems were present when I was trying to find the dog.

Students writing entries in the insight/analysis style are practicing analytical skills that are important for learning. Writing in this style can help students explore aspects of a game in a deeper way than they may be used to. Additionally, and especially when considering multiple entries for the same game, students can analyze different aspects of the same game. This style was used in 26 percent of the entries, and 63 percent of the students used it in at least one entry.

Discussion

We designed GameLog as an online environment to support blogging of game-play experiences, as well as reflective game playing and thus a deeper understanding of video games. We hoped that the personally meaningful connections students had with video games could be leveraged to help them engage more attentively (Papert 1980) and provide them with a new context in which to use their knowledge. One concern we had was whether blogging could promote the personal and epistemological connections that are important for supporting learning (Resnick, Bruckman, and Martin 1996). Although some evidence indicates that computer-supported learning environments may help change students' epistemological beliefs (Chan 1999; Elen and Clarebout 2001), researchers and instructors still need to be aware of the sociocognitive and sociocultural factors, including student beliefs and attitudes, that may influence the success of these kinds of learning experiences (Chan and Van Aalst 2003). Would blogging about game-play experiences negatively interfere with students' game-play activities and perceptions of games? Also, might the informal nature of blog writing prove counterproductive to the kinds of reflective practices that are necessary for creating deep understanding?

Our analysis found that blogging about game-play experiences can enhance the personally meaningful connections students have with games by

- providing an enjoyable experience that extends that of playing video games;
- fostering a deeper appreciation for games; and
- affording personal expression, communication, and collaboration with other students, because students share opinions and see what others think.

We also found evidence that blogging can support the creation of new epistemological connections, of new ways of thinking about games. Writing about games provided students with a new context for sharing their experience and knowledge of games with others. By describing their experiences with games, comparing them with those of other people, and comparing them across time and across multiple video games, students began to contextualize their understanding of video games more broadly. We found that blogging can enhance the creation of new epistemological connections by

- affording the exploration of multiple perspectives and viewpoints; and
- affording the development of an inquiry of game play where students can begin to formulate questions, plans, hypotheses, and investigations that they can pursue during their game-play sessions.

Our results also showed that students' self-reported impressions of the educational value of the GameLog assignment align with our analysis of what they wrote, and how they wrote, in their GameLog assignments. We found that blogging about game play affords a deeper understanding of games with respect to the four contexts we identified prior to the study: human culture, other games, the technological platform, and deconstructing them and understanding their components. We also found that each of the blog entry styles can play an important pedagogical role. For instance, the plan/hypothesis, investigation, and insight/analysis styles are related to creating a deeper understanding of a particular game. The ability to pose questions, create a plan in order to achieve some understanding, execute the plan, and finally reflect on its results are skills one needs to achieve a deep understanding of a subject (Edelson, Gordin, and Pea 1999).

Not all of the students adopted all prototype styles, though most students adopted different styles as they wrote their entries. Whether students should be provided with additional guidance on how to write their GameLog entries is an open question. Should certain styles be favored over others? Can we assume that students are prepared to write in all the styles we observed? Course instructors might want to scaffold the adoption of certain styles based on students' individual learning goals. For example, courses with a strong emphasis on player experience might want to encourage the narrative style, while a course on game history might prefer comparative analyses. Another open question: How useful was each style for each student? Were some styles better suited to certain students? Did some styles—for example, narrative and overview—serve as "fallbacks" for students who did not know what to write about or did not have anything particular to say? Finally, do students shift toward more-reflective styles as their understanding of and experience with a game increases? Our study hints that this might be the case: 62 percent of students' final entries for a particular game were in a more reflective style (i.e., plan/hypothesis, investigation, or insight/analysis). However, further investigation is required.

The structure of the assignment significantly affected how students wrote about their game-play experience. Students were asked to write three entries for each game they played (U-class students had to choose one game; G-class students chose three), one entry for each game-play session. This kind of assignment is unusual in traditional learning environments where students are not expected to revisit and write about the same topic multiple times. Students whose first GameLog entry was written in the overview style found that they had to write something different for their latter entries. This guided them into focusing their game-play sessions so that they could analyze and write about specific issues, compare aspects of the game with other games, or start posing questions they could investigate in future game-play sessions. Thus, they began to plan ahead and think about what they wanted to explore or understand in future game sessions in order to have something to write about. The structure of the assignment also helped them begin to adjust the way they approached playing a game. Instead of focusing on "just having fun," they opted to train their eye on specific aspects of the game, or they devised plans and experiments to test ideas. The structure of the assignment was thus important in promoting skills and practices that are important for the serious understanding of games. In traditional

learning environments, students get only one chance to "get it right" before they move on to the next assignment. Writing on multiple occasions about the same game incorporates iterative practices that have shown useful, positive learning benefits in other contexts, such as science learning (Kolodner et al. 1998).

The quality of the student writing was an issue raised during the course of our study. The course instructor noted that his emphasis on the term paper as a means of demonstrating expertise might be misplaced. However, the broader issue might not be the term-paper requirement per se. Rather, the issue might be whether the students are prepared and possess the skills needed to adequately synthesize their knowledge and understanding in the form of a formal written argument (the term paper). Although the students' entries generally exhibited poor grammar and orthography, they were valuable because they allowed students to practice the kinds of analytical and synthetic skills they will need later in life. In the same way that a researcher's field notes are the initial step in the process of writing an academic research paper, a students' GameLog entries help lay the foundations on which learning and understanding can be built.

One of our goals with this research was to explore how we can help students leverage the knowledge they have gained through their experiences with games to create deeper and more-abstract knowledge. Blogging *can* be used to support reflective game play and thus a deeper understanding of games; it can also help students adopt new modes of game play, in particular helping them shift from playing "for fun" toward an inquiry-based style of game play that can be useful for insight or analysis.

Conclusions

What does it mean to "understand" games, and how can we support learners in developing that understanding? The medium of games is developing at a rapid pace. Many of the games currently available on the market would have been inconceivable, technically and creatively, 10 years ago. Developing a deep understanding of video games can be likened to chasing a moving target: ideas and notions of what games are and what meanings they can convey are continually being challenged and negotiated. One new game can radically change our understanding of the possibility space of the medium as a whole. Games that create new genres and explore novel game-play ideas are designed, developed, and released at a rate that many would consider surprising. These issues highlight the importance of looking for solutions that, for the most part, do not focus on supporting learning about games as they are currently understood. Rather, we should explore ways of helping students make sense of games as they are currently understood while also preparing students to make sense of the games that are yet to be invented. To do this, we must determine how we can better help students use their understanding of *what is* to envision and create *what could be*.

Blogging can support learning and deeper understanding in other domains as well. GameLog shows how blogging can be used to help students reflect on and gain insight from their experiences as well as begin to approach future experiences from new perspectives. Blogs, as a discoursive medium, can facilitate the creation of connections between experiences and abstract concepts or ideas that students may be learning about in a classroom environment. The informality of the medium can prove liberating to students who may feel more comfortable expressing their thoughts, impressions, and feelings online than, say, aloud in class. The relative brevity of blog entries can encourage learners to focus on specific points of importance without feeling that they have to "cover all the bases." The practice of continually writing entries allows learners to explore ideas from different perspectives and to revise and refine their prior ideas under new guises. Finally, by reading one another's blogs, students can gain insight into their peers' thoughts and impressions, comparing them with their own. In this way, blogging can facilitate reflection and the creation of the kinds of personally meaningful connections that have been shown to be so important in creating deep understanding.

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