Recognizing New Literacies: Teachers and Students Negotiating the Creation of Video Games in School

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ABSTRACT
Designing and creating video games in a high school classroom is fantasy for some students, but a reality in computer classes at a large sized Western Canadian high school. Classes of Information Technology and Programming have been engaging in video games as the entry point into learning programming skills. Powerful learning and teaching practises are apparent and through observations, interviews, and video recordings coupled with students' articulation of their process we have been carrying out the first year of a three year ethnographic research study of the educative value and potential of video games within a school setting.

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Author Keywords
Video game creation, education, learning, teaching, informational technology

INTRODUCTION

In today's society of rapidly increasing information and technological advances, there is a need to reexamine our commonly accepted definitions of literacy that focus on the reading and writing of print-based texts in order to provide educational experiences that enable ongoing learning and engagement. Literacy today encompasses a broader range of texts and of traditional reading and writing skills [13, 14, 21] as children and youth are surrounded by a burgeoning array of technologies that are used for communicating information and ideas (new literacies). Alloway and Gilbert, for example, suggest that "what it means to be 'literate' is constantly being negotiated and renegotiated as we become increasingly affected by technological and informational change" [1]. Youth continually participate in popular media, developing a wide range of skills in understanding and creating texts using alphabetic, visual, and oral semiotic systems in diverse ways. Boys seem to engage more readily and in greater numbers in technological popular media, e.g., video games, computer-based activities, and computer programming, thus developing skill and confidence in navigating digital spaces and new technological tools. This is worrying as we consider the implications for girls in our ever-increasingly technological world. Kress suggests that "it is no longer possible to think about literacy in isolation from a vast array of social, technological and economic factors" [13]. He sees the "dominance of writing being replaced by the dominance of the image; the dominance of the medium of the book to the dominance of the medium of the screen" [13]. Literacy now relates to a much broader set of texts including visual, multi-modal, and digital texts that appear in many forms all around us all the time. Gee reports that "boys are resisting school literacies" where they have repeatedly been unsuccessful, "and instead [are] becoming literate in the semiotic domain of gaming which opens up experiences in different ways of speaking, listening, viewing, and representing" [6]. Gee argues that activities boys are engaging in, such as video games, internet use, chatrooms and blogs, are indeed enhancing their literacy skills. He suggests that videogame creators employ numerous learning principles (e.g., transfer, practice, discovery) and that players (mainly males) are learning a wide array of literacy skills.

As teachers begin to recognize the need to address and offer these literacy opportunities in their classrooms, there exists some negotiations between what the government, post secondary institutions, community, parents, students, school administration and teachers believe is powerful learning and acceptable learning to occur in classrooms. Williamson Shaffer, Squire, Halverson, and Gee question how the power of video games can be incorporated into schools, homes and workplaces and they suggest, we need to examine video games because "they create new social and cultural worlds – worlds that help us learn by integrating thinking, social interaction, and technology, all in service of doing things we care about" [26]. Our previous research examined the powerful learning and literacy practices that occurred in an out-of-school facility where adolescents peer-taught video game design, and now we are engaged in examining in-school classroom spaces where students are creating their own video games. We are interested in students moving from being consumers to producers of literacy and culture [12, 20].

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Theoretical Framework

This research draws on a theoretical framework for literacy learning. As with all learning, literacy learning is affected by our continually changing conceptions of knowledge. As noted by Lyotard [15], in today's postmodern world of intensified digitization, knowledge and learning are undergoing rapid shifts; the learner who has technological knowledge and can access information has an advantage. However, schools have not as yet recognized the impact of technology in adapting their practices. Rather, school practices have been focused increasingly on 'means and techniques for obtaining [optimally] efficient outcomes' [16] and not on aims, values, and ideals. As Kress suggests, four momentous changes related to literacy "are taking place simultaneously: social, economic, communicational and technological" [13]; the combined effects of these are profound. These factors are having a great impact on the nature of literacy in today's society, an impact that has not been acknowledged in schools. Literacy learning is therefore access to technological knowledge, knowledge that enables how we access economic success, communicate and socialize.

This program of research intends to address these factors and develop our understanding of videogame play as it relates to literacy learning. As we embrace videogames as a powerful learning tool [6] we will explore learning in multiple ways, understanding operational, cultural, and critical aspects of literacy [8]; we believe that we *must* find ways to raise critical questions relating to these texts as well as gaining proficiency and technological expertise in videogame play and design. We are looking for ways to disrupt largely unexamined hegemonic attitudes related to power, status, and exclusivity, attitudes that appear in popular videogames and seem to reproduce the status quo in relation to hegemonic beliefs and values.

This research will therefore be based on a critical literacy learning theory that proposes that students are engaging in powerful learning practices while creating video games in a classroom setting. We also examine whether these learning opportunities are transferable to other classroom settings and out of school settings.

Research Purpose

The world of new technologies surrounds us, and it appears that males are more often, at more sophisticated levels, engaging with new technologies. From pre-school age, it is not uncommon for young boys to spend hours playing videogames, trying out new strategies, puzzling their way through engaging and interactive "texts". As we have examined boys' practices with these "texts" [2], it has become evident that literacy skills are being learned through new technologies. Agreeing with Gee [6], Johnson [11] and Williamson Shaffer, Squire, Halverson, and Gee [26], this research presents compelling arguments related to sophisticated learning through engagement with videogames. We see that videogame play can be powerful interactive learning, and we are also aware that it is predominantly boys who engage in these alternative literacy practices. We have a belief that engagement with videogames affects perceptions of the world and of one's place in the world. But, if this is true, we do not know how it happens, and what the effects are. There is, then, a disconnect between the discourse that suggests that boys are failing in learning literacy skills, and the discourse that suggests the highly sophisticated literacy skills being learned through engagement with videogames. This disconnect can affect how boys and girls live out their personal and workplace lives, offering very different opportunities for them based on gendered expectations. We see the inclusion of technologies such as videogames in school-based learning to be important for access of new literacies and new technologies to all learners.

Videogame play is recognized as a powerful immersive experience, [5, 6, 11, 27]. Williamson Shaffer, Squire, Halverson, and Gee argue that video games,

> "have the potential to change the landscape of education as we know it…beyond the traditional academic disciplines – derived from medieval scholarship and constituted within schools developed in the Industrial Revolution – and toward a new model of learning through meaningful activity" [26].

In our current research we explore the types of school-based and out-of-school learning that they are also learning. There is evidence to suggest that videogames are teaching many important literacy skills, but are they also addressing socio-critical literacies? Are videogame players and now creators critiquing and challenging the often highly patriarchal, sexist, and racist world that is presented in the videogame, or are they absorbing a world view that emphasizes hegemonic, Eurocentric patriarchal values of competition, rationality, hierarchy based on power, views that support racist and sexist notions of the world? What world views, then, are being learned by extensive videogame play and how is this learning affecting the players' success in literacy and their interaction in the world of family, school, and community? How can these issues be addressed in informal and formal learning situations with gamers as they play and create videogames?

RESEARCH METHODOLOGY

Research Design

This particular paper focuses on the initial findings of a three year project researching the following questions:

1. What are the literacy skills being learned through videogame play and creation and how do these literacy skills relate to school literacies?

2. What worldview(s) is being learned by extensive videogame play and creation and how is this affecting their understanding of and interaction in the world of family, school, and community?

It is critical that educators and parents develop a greater understanding of the "post-literate culture" in which we live [3] generally, and this form of entertainment/educational tool specifically in order to be able to assess its advantages and detriments, and to respond to widely-held but largely unsubstantiated beliefs about videogame play [9].

During this first year of the research study the powerful learning and literacy practices have been most evident. What we will share in this paper includes a closer look at the dynamics between what teachers and students negotiate and experience as they create video games in the classroom. Our research questions that guided this examination were:

How are teachers approaching video game learning?

How are students taking up video games in a classroom setting?

Context

In a high school with a population of approximately 1300 students, two technology teachers choose to use video games as motivational entry points for students to learn the abstract concepts of computer programming. Paul has been teaching for five years and taught two classes of Information Technology to Grade 9 and 10's this year. Taryn has also been teaching for approximately five years and taught a class of Programming to grade 11 and 12 students, and a class of Information Technology to Grade 9 students.

The Programming 11 and 12 classes used the open source software program called Kid's Programming Language (KPL) that makes programming language more accessible and offers online support [17]. These students created a variety of video games including a lemonade stand simulation game. The Information Technology 9 and 10 classes used the open source software called Game Maker [19] that has built in programming language and students can make a variety of types of video games as well. Many tutorials exist online for Game Maker which makes the software appealing to teachers.

The students ranged in ability and experience with video games and technology. Some students rarely had played video games, while others are considering careers in the video game industry. The majority of students were male in both classes.

Methods

Students sitting individually in front of computer screens posed some data collection complexities and raised some questions about how to best access the learning that the students and teachers believe to be occurring and correlate that learning with what we were observing. Students were initially observed once a week for two months in the Programming class, and for a month in the Information Technology class. Observations included walking around the classroom, observing students clicking away on their mouse, making choices within the program. Extensive notes were taken by two researchers about what students said or did while working in the classroom.

After observing the students for this time and realizing the gap existing with knowing more about the students' background and experiences we interviewed six students from the Programming class and three students from the Information Technology class. The interviews included questions regarding their background with computers, video game play and video game creation. The interviews were beneficial in getting at what the students valued about the video game creation process and how their own video game experiences or lack there of influenced their video game creation process. We also interviewed both teachers in separate in-depth hour and a half sessions.

The interviews did not offer a concrete space for students to express their learning process of creating a video game, so we decided to video tape their process and have them explain this process immediately after filming. Six students in the Information Technology class were video taped for approximately 15 minutes each while working on creating their video game. After being filmed, the film was rewound, the students watched themselves working on the computer, and were then audio taped as they explained what they were doing, why they were doing it, and what they had been thinking while working on their video game. This method of collecting data was most effective in engaging the students in describing their experience of programming.

Data Analysis

Using NVivo text analysis software program the data has been coded into categories, mapped, searched, synthesized and analyzed. Manual coding of themes will be conducted to supplement the computer analysis, and shared with participant students. Major themes that have emerged include programming language acquisition, problem solving processes, social construction of gaming, learning as an individual process, and the role of teacher in the learning process.

FINDINGS

Teachers approaching…students interpreting

The teachers involved in this study originally incorporated video game creation into their classrooms as a motivational strategy, to engage students more easily and enable programming language to be more accessible. Since incorporating video game creation two years ago both Paul and Taryn have found that video games are appealing to students for multiple reasons: they have opportunities to share ideas and problem-solving strategies with others, they feel empowered by creating something important to them, they experience the freedom to create something of their own, the progression of learning can be suited to their own specific needs, and the cultural environment is enhanced for them. The students' interviews revealed that these aspects are indeed important to them.

Sharing with others

Paul and Taryn acknowledged their belief in teaching and learning as a social phenomenon. Video game researchers continue to emphasize the often overlooked and undervalued social and cultural interactions involved in video games [6, 23, 24, 26]. Students often expressed the importance of sharing their video game creation with others, which included friends in or out of this class, a younger sibling, or the teacher. "[G]ames encourage exploration, personalized meaning-making, individual expression, and playful experimentation with social boundaries [26]. One Programming student described his most rewarding experience of making a video game as "When you get your friends to play them and they're like 'ohhh, that's a really awesome game' and stuff like that." Our observations included over and over again experiences where students were playing each others' games. These experiences can first seem like students slacking off, being 'off-task' and yet this social support and feedback was extremely rewarding and beneficial to the video game creator as was noted in the multiple times this occurred and when the students made changes to their games because of peer feedback. Kurt Squire acknowledges the social networking that occurs around video games when he writes,

> "they have their own practice (game playing), language, and socially acceptable was of behaving. Educators could benefit be studying these communities that form around gaming, in order o understand what non-game elements contribute to the engaging activity that is video game playing" [23].

Empowerment

Paul explained how he felt video game creation led to powerful learning: "You want individuals empowered to be able to undertake learning for themselves, to see themselves in that process, to have a kind of meta-cognitive view." Students reiterated the great feelings of satisfaction from creating a product that was so challenging. One student described his experience of creating video games as "the process of getting there…it's like climbing a mountain…once you get to the top, it's all fine." Programming language was often compared to learning a second language and yet this second language allowed the students to create a product that others could play. Another student commented, "Well, once you get it done it's kind of like you have this sense of achievement like you've done something." The completion of a video game was a positive highlight for most of the students interviewed.

Freedom to create

The expectations for the video game component of the Information Technology class were simply to produce a game using Game Maker. With such open criteria the students were able to spend more or less time working on their game. A few students chose to spend 2 months on their games, sometimes working in class and at home. The Programming class had one beginning project to create a video game of their choice. One student explained how this class enabled him to design a game he had planned long before the course. He was a huge fan of the movie *Pirates of the Caribbean* [25] and had played one video game about the movie but was not impressed; he believed he could make a better game one day, which he was able to attempt in this course: "the *Pirates of the Caribbean* thing was my main goal; through the past few years I've been thinking about it."

Providing students with open criteria allowed many possibilities to emerge and students showed how creative and passionate they could be. Students drew on video games they had played in the past, they drew on graphics from the internet, and they checked ideas with peers as they developed their games. Both Jenkins [10] and Gee call for video games to be approached as an art form, "one largely immune to traditional tools developed for the analysis of literature and film, video games will challenge us to develop new analytical tools and will become a new type of 'equipment for living'" [7]. Paul and Taryn recognized how students "reach out for new tools to help them learn themselves, the more they're doing that themselves, the better learners they're going to be in the long run." This process of creating video games supports the many educational mission statements that call for development of life long learners.

Progression

Both the instantaneous feedback from the technology and the philosophical set up of the classroom instruction enabled students to progress at learning video game creation at their own pace. Paul explained how computers in general provide instantaneous feedback through the signals to click again and the next set of instructions that continue to let you know how you are achieving: "you get a thrill out of 'did I solve the problem?' You run it, 'Yes! Done.' You know, you're like okay, I had a theory about what was wrong, I implemented my remedy based on the theory, tested it, and got the desired result." This feedback was apparent during our observations of students staying focused on their screens for long periods at a time.

The philosophy of the classroom was reflected in the absence of the teacher formally beginning the class, the pattern of students walking in at the bell and getting started on their work without waiting for the teacher to instigate a work environment, and the evolving list of names on the front board of students who requested help next, rather than raising their hands. Paul estimated that fifty percent of the time, students had already figured out their problem before he got to them to help them. The role of the teacher then becomes a guide or coach as Taryn and Paul both commented. Paul explained,

> "you lay out a set of tasks for students to undertake, and you only need to step in as required to kind of… hold them up, to show them the crux of the problem or

whatever…it's gratifying as a teacher to be involved in that kind of classroom."

The students also appreciate the uniqueness of the learning environment and learn to negotiate their own learning needs. One students shares how "if you need a kind of lazier day 'cause you're tired or you know, you've been doing too much and you just want to relax a little, then it's fine but then sometimes if you just sort of want to work you can do that." Another student appreciates how his engagement with his work does not end in class: "sometimes I just get caught up in it so I won't leave my room or I just keep programming…and I just lose touch with the real world." Meanwhile, another student explained "I usually just want to get to something and do it, like just right away start doing it instead of having to read all this stuff and then doing it." The philosophy of these teachers towards teaching and learning technology highlights how these students can work at their own pace and still define success for themselves. Kafai also acknowledges the potential of the constructionist approach which provides students "with greater opportunities to construct their own games - and to construct new relationships with knowledge in the process" [12].

Cultural environment

Williamson Shaffer, Squire, Halverson, and Gee explain in reference to video game players that "We learn by becoming part of a community of practice and thus developing that community's ways of knowing, acting, being, and caring – the community's situated understandings, effective social practices, powerful identities, and shared values" [26]. Both Taryn and Paul describe learning to be a social phenomenon and they believe that they can support "kids in a social and individual kind of context, master learning, and those things can be done in this class environment." Newman describes how video game players feel that their "networks were supportive and non-confrontational" [18] and they have learned how to be supportive and non-confrontational through playing video games: "players indicated the ways in which they learned form others, and helped others to learn, by sharing information on strategy and technique through talk and observing of the play of others" [18].

The students also commented on the positives of these particular classroom settings: "you meet a lot of people in the classes – get to know them better – help them out – they help you, yeah. You get to understand each other, the games, the teacher, you get help when it, when you need it." Another student recognized the power of working with others when he said, "talking to people who are learning too, helps 'cause then you can all kind of figure it out together." The social environment might again be perceived to be students off task, and yet on closer examination the students were playing each other's games and providing immediate feedback to the creator about what is fun, cool, or problematic about their game.

Taryn and Paul also acknowledge the learning potential available to students in a lab setting where they can rely on classmates and multiple internet resources: "more than just the internet, now we're talking about more discrete skills, internet-related skills, you know, tapping into a community, tapping into discursion boards, tapping into blogs… it's all out there in an efficient way, to get answers." This reference to community infers support, teamwork, dialoguing, and energy which were apparent in our observations as well.

CAUGHT IN THE SYSTEM - IMPLICATIONS

Video games have been blamed for sucking players into the system and distracting them from 'real life.' As one student is quoted in this paper of how he can escape time while he is creating his own video game. As students move from being simply consumers of video games to producers of video games we can still see the same engagement that we might wish we see adolescents doing with novels, poetry or text books. However, as we begin to value the sophisticated learning occurring with video game creation in a lab setting and the highly complicated literacy practices they embrace in order to complete a product of significance for them, we can begin to question how these learning and literacy practices can be incorporated and supported in other learning environments. The disconnect between school learning and game based learning is addressed by Williamson Shaffer, Squire, Halverson, and Gee:

> Whereas schools largely sequester students from one another and from the outside world, games bring players together – competitively and cooperatively – in the virtual world of the game and in the social community of its players. In schools students largely work alone, with school-sanctioned materials; avid gamers seek out news sites, read and write FAQs, participate in discussion forums, and become critical consumers of information. Classroom work rarely has an impact outside the classroom; its only real audience is the teacher. Game players, in contrast, develop reputations in online communities, cultivate audiences by contributing to discussion forums, and occasionally even take up careers as professional gamers, traders of online commodities, or game designers and modders [26].

We need to consider what students already know about video game texts and build on that knowledge and problem solving critical thinking, encouraging them to engage in socio-political critical thinking. We also need to examine issues of gender, such as why there are a significantly greater number of males than females engaged in video game creation.

Students in this study began to articulate the powerful learning they were engaging in during interviews about their experiences creating video games. The teachers too

expressed appreciation for being able to articulate their own conceptions of learning and reflect on their teaching purposes for these courses. As we explore the potentials of video game creation in the classroom we need to ask ourselves if and how these learning engagements in school are helping our students prepare for life long learning beyond the school years. How closely are school based learning and real-world learning aligned? How can we make the connections more closely linked?

The teachers' first responses to reflecting on duplicating this learning environment in other course such as Math or English were hesitant. Their resistances to allowing this kind of powerful learning to occur in core curriculum courses such as Mathematics, Science, and English, included the understanding that there is specific curriculum expected to be taught usually because of the politically-driven examinations implemented by the provincial government; the texts books are a prime resource that guides the content to be taught and learned and therefore, transmission models of teaching [4] become more acceptable; the absence of internet access in most classrooms also inhibits the opportunity for students to find multiple resources during class time; finally, Taryn acknowledged the pressure teachers feel from parents who often expect to hear and see evidence of traditional modes of teaching. These assumptions about teaching core subjects appear to create serious blockades to giving value and effort into acknowledging and promoting the learning that is occurring in the elective class where students develop video games. As we continue to research and share the powerful learning that takes place in video game contexts we need to remember to keep students, parents and educators involved in recognizing and valuing this learning as well.

Although the incorporation of socio-political critical thinking was not explicitly evident in this initial stage of the research, we agree with Squire that there are fertile spaces in which to practise critical thinking because "children are not just passive consumers of popular culture, but they reappropriate its symbols and forms and integrate it into their own play, as well" [23]. As Paul and Taryn are beginning to recognize, and students have recognized for years, learning of literacy, mathematics, problem-solving, inquiry approaches, and technology are of critical importance to living successful lives in the 21st century. These experiences with technology need to be recognized by educators and parents as valuable and powerful learning tools rather than mindless or dangerous distractions, and educators need these powerful learning opportunities to become incorporated into school-based practices for all learning.

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