Evidence of High School Students' Development of Contemporary Learning Abilities in a Game Design Program in Rural West Virginia

Globaloria Student Case Study Series, **Pilot Year 3**

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Executive Summary

In Pilot Year Three of the Globaloria initiative, from August, 2009 – June 2010, Globaloria was implemented in twenty-two locations throughout the state of West Virginia with 534 students. As students engage together in situated learning in the Globaloria program, we propose that they cultivate 6 contemporary learning abilities that are becoming more and more necessary for successful participation in today's technology-infused work and professional cultures. These abilities are the main learning objectives for the initiative, and are briefly summarized as follows:

1. **Invention, progression, and completion of an original digital project idea** (*e.g., an educational game or simulation in the Globaloria context*)

2. **Project-based learning and project management in wiki-based, networked environment**

3. **Posting, publishing and distributing digital media** (*e.g., creating and uploading digital graphics, interactive designs, videos, notes, prototypes, and games*)

4. **Social media learning, participation, and exchange** (*e.g., forming and sharing ideas, process notes, programming code*)

5. **Information-based learning, research, purposeful search, and exploration** (*e.g., researching the subject domain of a game; exploring design resources*)

6. **Surfing and tinkering with web services and web applications** (*e.g., game examples, wikis, blogs, web apps*)

This study posed two research questions at the outset:

- How are high school student participants in the Globaloria program learning game design, in the context of the co-learning model?
- To what extent did high school students develop new skills and learning abilities through their participation in Globaloria in Pilot Year 3 (2009/2010)?

These questions are addressed in the qualitative case study findings of two LHS students. The case studies were developed using several data sources including wiki activity, student project artifacts, videotaped presentations, and qualitative responses to the pre-, mid-, and post-program surveys.

One case study student, Chelsea, was 17 years old and a senior in high school. The other student, Andrew was a 15-year-old sophomore. The students participated in Globaloria daily for 80 minutes. Mrs. A was the teacher and was in her third year as a Globaloria educator.

Executive Summary of Results

Globaloria-WV case study student Chelsea was a 15 year-old 11th grader at Liberty High School during Pilot Year 3. Like all LHS students, she participated for the entire year.

Chelsea was chosen as one of the two cases for LHS because of her previous experience entering the class, the leadership she took on her videogame design team, the expressiveness of her blog posts that offer significant insight into her learning and team processes, and her team's advanced final project, all of which set her apart from the other students in her class this year and present an exemplar of one type of student who flourishes in Globaloria.

Globaloria-WV case study student Andrew was a 16 year-old 10th grader at Liberty High School during Pilot Year 3. Andrew was chosen as one of the 2 cases for LHS because although he entered the class with little experience in graphic design and similar programs, he was able to parallel what he was learning with his vast knowledge of the mainstream videogame industry. He thus set himself apart, receiving positive evaluations from his teacher, and emerging as a leader within the class despite his social shyness and quiet demeanor. He also discovers a new career interest through his participation that he makes known at the end of the course.

Chelsea's ability to turn out a very thoroughly designed game like "WV Animal Rescue Squad," after ending the semester with only one team mate, and having been concerned at points that she was the only one working hard at their project, shows the strength of Chelsea's performance in this class and success in producing a completed project. Her instructors' evaluations suggest she may have had somewhat of a slow start, but quickly progressed especially in the second semester, to keep up with the various topics covered in the class.

Chelsea emphasizes throughout her participation and maintains at the end that her career goal is to land a job in fashion and/or graphic design. Reynolds (2008) found that younger students who engaged in project-based work centered on an already instantiated individual interest as opposed to a situational interest (Hidi & Renninger, 2006) put forth a greater level of effort in project-based work, and, their final projects evidenced a higher level of complexity. This one individual case of Chelsea at LHS appears to further support this finding.

Entering this class with some experience already in graphic design allowed Chelsea to use this class to launch her toward her lifelong goals. Her team's success in winning the STEM games competition will be a valuable addition to her college portfolio. Further, through the win, Chelsea has been afforded the access at home with her laptop that will allow her to pursue her individual interests on her own time. Overall, Chelsea'cs case serves as a highly positive example of the learning, life and livelihood opportunities that Globaloria offers students who already possess creative talent and potential.

As for Andrew, his only noted experience entering the Globaloria class was as a consumer of video games. Throughout the course, Andrew relied heavily on his knowledge as a consumer to put what he was learning in perspective. Whether he was learning to add sound effects or move characters, Andrew applied lessons from the mainstream games he was already familiar with.

When Andrew began the course, he expressed an interest in being a "video game designer." My the middle of the course he elaborated that his dream job would be to work for Capcom, which was the company that designed his favorite video game, *Mega-Man*. By the end of the course, Andrew indicated in his final survey that he was still interested in a career as a video game designer, but also was now additionally interested in being a teacher.

This additional triggered situational interest (Hidi & Renninger, 2006) appears to have been an outcome of his experience in the class supporting and mentoring other students with his growing game design and programming expertise. This shy student seems to have found a new talent. It appears that the co-learning model and a workshop setting that encourages interaction and teamwork among peers and student role-taking that allowed this new interest and talent to emerge.

The cases of Chelsea and Andrew, while particularly exemplary, indicate that even in the first year of implementation, a school like LHS with a single dedicated educator is able to make great strides towards implementing a cohesive, integrated curriculum in Globaloria. Both of these case study students are active bloggers, as well as active programmers, and consistently keep up with their learning logs. Further, both engage extensively in leadership behaviors, peer mentoring, and support of others. Both enter the program with prior career interests in the creative arts (Chelsea, fashion and Andrew in game design) and for both students, it appears their experience reinforces these interests.

While we need to continue to monitor the progress of the full range of students, the success of Chelsea and Andrew in Pilot Year 3 at LHS indicate that the program is providing supports to educators through the summer and winter trainings that give them a strong basis in the course implementation, even those in their first year. The level of detail the LHS students provide in their reflections, as to the syllabus topics they have completed and their game design process indicates that by following the curriculum closely, first year educators and schools can achieve. Further, it appears that improvements made in Pilot Year 3 to the course wiki, including requiring detailed development plans with very specific question prompts benefited these students' game development process.

While we don't know from a focus on case study students alone that the other LHS students in Pilot Year 3 faired so well, overall, we can say as a baseline that as a first year school, LHS enjoyed some measure of success, given the consistency of students' progress and work across the year, and especially given Chelsea's team's grand prize win

of the Globaloria STEM Games Competition. It will be worthwhile to watch and observe the ongoing involvement of this educator and school, to identify further clues to their success, so they can be shared with other first year locations that we have seen to struggle somewhat more at the start.

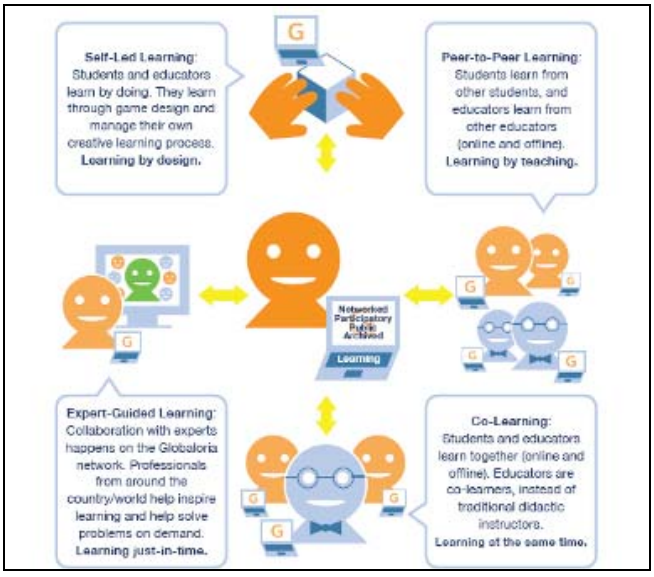
Introduction

In 2006, the World Wide Workshop Foundation in NYC established the Globaloria network. The Globaloria program's broad mission is to help close the digital-literacy and online participation gaps that exist in the United States (and worldwide) by empowering young people in disadvantaged communities to engage in workshop-based game design projects facilitated through the use of a Web 2.0 social learning network and virtual collaboration and support.

In 2007, the World Wide Workshop Foundation partnered with the West Virginia Governor's Office of Technology to establish the Globaloria-West Virginia pilot, as a model for a state-wide network and curriculum to transform public education, especially in its poorest rural locations. The organization has developed a technology platform and a curricular program that is being offered daily in public schools throughout the state as a year-long elective game design course, for credit and a grade.

Figure 1 depicts the Globaloria learning formula, in which teachers and students learn together, using online tutorials and resources for game design and Flash programming, along with live, synchronous virtual and in-person technology trainings and "virtual office hours" provided by leading figures in game design and development. Funding and support is provided by the current office of the WV Governor Joe Manchin, the WV Department of Education, Benedum Foundation, Verizon, the Knight Foundation, and the Caperton Fund. The goal is to increase the number of students in WV to 10,000 in the next few years, and then start replicating the program in other states.

Figure 1. The Globaloria learning formula: Project-based, Student Centered, Social Learning



Globaloria Program Components

Globaloria-West Virginia involves students and educators throughout this state in participation in virtual and in-school design studios where they learn game design using Web 2.0 creative media and resources offered on the organization's web platform, MyGLife.org. West Virginia middle school, high school, and community college students, as well as educators, learn to program interactive web games using Flash Actionscript, following a curriculum provided to all school partners via an online collaborative wiki-learning environment. From Pilot Year Pilot Year 2 (PY2) to Pilot Year 3 (PY3), the number of project participants doubled, to involve 68 educators and 534 students throughout West Virginia. Twenty-two PY3 partner locations have implemented the curriculum as an in-school game design course elective offered to students for credit and a grade during the regular school day.

Considering today's technology advances, Globaloria leverages several Web 2.0 social media capabilities. Specifically, Globaloria actively employs wikis and blogs in the classroom experience, and also facilitates students' use of free and open source online Flash programming tutorial resources. On the wiki, students engage in online collaboration and sharing of programming code and assets, document their in-progress work, and then publish their in-progress and final artifacts. Any visitor to the game galleries at MyGLife.org can play students' final games.

Additionally, in many of the schools where the program is implemented, educators encourage students' choice of a game project topic based on their own particular interests, further enhancing the possibility of meaning-making, project appropriation, and 21st Century skills development (e.g., Joseph & Edelson, 2002; Hidi & Renninger, 2006). Further, at some locations the program encourages students to create games with a social mission – in line with the trend in "Social Issues Gaming" being fostered by organizations such as Games for Change and the Serious Games Initiative. And at other locations, students create games about core curricular topics such as math or science. To-date, students in our program have chosen to create games that reflect topics in the following genres: a) educational games about core curricular topics (e.g., a game about math), b) games that provide a social message (e.g., bearing themes related to health, nutrition or global warming–often educational, too), or c) games that could be classified as entertainment (for example, a fantasy game about ninja pandas).

Purpose of this Study

This paper reports findings from Pilot Year Three (PY3) of this model implementation in the state of West Virginia. In this report, we present qualitative case study results for a single pilot location, Randolph Technical Center High School, which is a high school we have been studying since Pilot Year 1 of the project. The report addresses two main Research Questions:

- How are high school student participants in the Globaloria program learning game design, in the context of the co-learning model?

- To what extent did high school students develop new skills and learning abilities through their participation in Globaloria in Pilot Year 3 (2009/2010)?

This question is addressed through analysis of two case study students, Vanessa[1], a 17-year old senior in high school, and Craig[1], a 15-year-old sophomore in high school, who each participated in Globaloria daily for 80 minutes for the entire school year.

Literature Review

Principles Applied in Globaloria Program Development

The Globaloria program was conceived and produced over the past four years by a small team at the World Wide Workshop Foundation, a NYC-based educational non-profit founded by Dr. Idit Harel Caperton, who in the 1980's and 90's collaborated with MIT Professor Seymour Papert to establish the technology-driven learning "framework for action" Constructionism. Constructionist learning is inspired by the constructivist theory that individual learners construct mental models to understand the world around them. However, Constructionism holds that learning can happen most effectively when people are also active in making tangible objects in the real world. In this sense, Constructionism is connected with experiential learning and builds on some of the ideas of Piaget. Constructionist principles were applied in projects occurring in selected schools in Boston, Costa Rica, Australia, and other cities and nations, and also informed development of one of the first Internet companies with web services for children (MaMaMedia, Inc.), founded by Harel Caperton.

Globaloria is unique in that it applies constructionist principles for learning in a curriculum of game design offered via a Web 2.0 technology environment called MyGLife.org. Some of the traditional Constructionist principles applied in Globaloria include the following (e.g., Papert, 1980; Harel & Papert, 1991):

- Workshop-based learning in an informal classroom setting where students can talk openly, share their learning, collaborate, and work in teams with their peers, creating a community of practice;
- Students' use of programming languages and computational design tools to create complex representational digital artifacts such as games with a goal to help younger learners understand a concept in a given subject domain (the game's topic);
- Affording students with significant time daily, across many months, to pursue the completion of a final design artifact;
- Frequent student reflection upon and social expression about their work in progress;

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[1] Student names have been changed.

- Sharing and presentation of final work in the team and group context.

Research has found that programs applying Constructionist principles provide opportunities for students to develop a sense of meaning and purpose in creative work on a digital artifact, while developing deeper knowledge and undersanding about the subject domain of the artifact than that elicited by more instructionist, top-down types of lessons (e.g., Harel & Papert, 1991; Harel, 1988, 1989, 1991, 2002; Kafai, 1995, 2006; Lawler, 1984, 1985; Wilensky, 2003; Klopfer, 2008; Seely Brown 2005, 2006; Collins & Halverson, 2009; Dede, Ketelhut, Clarke, Nelson, and Bowman, 2009; Reynolds & Harel, 2009a & b). Globaloria gives students hands-on experience in becoming active users and creators of new technologies, in ways that we expect will be integrated in their future professional lives. This sense of personal meaning results in a greater "appropriation of the project" (Harel, 1991), and gives learners a feeling of ownership over the work they create and share.

Supporting this goal is John Seely Brown's research (2005) in which he discusses the importance of digital literacy and collaboration in networked, evolving, technological environments. Seely Brown notes that "since nearly all of the significant problems of tomorrow are likely to be systemic problems – problems that can't be addressed by any one specialty - our students will need to feel comfortable working in cross disciplinary teams that encompass multiple ways of knowing" (p. 2). As such, he emphasizes the importance of "learning to be" active users of technology, in contrast to "learning about" technology. He further states (p. 6),

> *Today's students want to create and learn at the same time. They want to pull content into use immediately. They want it situated and actionable - all aspects of learning-to-be, which is also an identity-forming activity. This path bridges the gap between knowledge and knowing.*

Situated learning is learning that occurs in the same context in which is applied. This has also been called "epistemic learning" or learning by role-taking experimentation by scholars such as Shaffer & Gee (2007).

The Globaloria program provides a model for situated, epistemic learning in which both students and educators engage in game design activity in a workshop setting in school, in which students take on the role of a real game designer. Globaloria can be considered a social learning system, in which Wenger (2003) suggests that competence is socially defined, and knowing is a matter of displaying competences defined in social communities. Wenger (2003) diagramed four areas of social constructivist learning that is achieved in communities of practice (which make up social learning systems). These areas are shown in Figure 1 (derived from Couros, 2006, p. 8; Wenger, 1998, p. 5).

Figure 2. Social Learning in Communities of Practice, from Wenger (2003)

Student engagement and meaning-making are constructs integral to social learning systems (Wenger, 2003). Wenger (2003) defines engagement as "doing things together, talking, producing artifacts" (p. 78). In engaging together, members "identify gaps in their knowledge and work together to address them" (p. 82). In addition to engagement, two important facets of a social learning system are realistic imaginative activity, as well as alignment (the extent to which activity can be effective beyond the local engagement). Wenger (2003) suggests that every social learning system involves all three to some degree or another.

In Globaloria, students share language, tools, artifacts and methods. Globaloria also builds in realistic imaginative activity in that students practice professional roles. Further, students create games that are published online and playable by others – which reflects Wenger's third attribute of alignment (effectiveness beyond the local engagement). Wenger (1998) suggests that meaning-making activities bring about learning and change.

6 Contemporary Learning Abilities

As students engage together in situated learning in the Globaloria program, we suggest that they cultivate 6 contemporary learning abilities that are becoming more and more necessary for successful participation in today's technology-infused work and professional cultures. These abilities are the main learning objectives for the initiative. Table 1 outlines the 6-CLAs and some examples of activities in Globaloria that are designed to cultivate these abilities. Their development and conceptualization is presented in greater detail in papers by Reynolds and Harel Caperton (2009a & 2009b) resulting from Globaloria--West Virginia's PY1 implementation.

Table 1. Contemporary Learning Abilities (CLAs)

Contemporary Learning Ability:	Examples of Globaloria activities that cultivate CLA:
1. Invention, progression, and completion of an original digital project idea (*e.g., an educational game or simulation in the Globaloria context*)	• Choosing and researching a subject for a game design project • Writing an original game narrative and a proposal to explain the game's purpose and main subject • Programming and completing a final game

2. Project-based learning and project management in wiki-based, networked environment	• Coordinating and managing the process of building the game (design document, user flow, budget, schedule, introduction, overview, treatment, competitive analysis, teamwork, planning, managing implementation process) • Managing the team work (defining and assigning team roles, coordinating tasks, and executing one's role within the team)
3. Posting, publishing and distributing digital media (*e.g., creating and uploading digital graphics, interactive designs, videos, notes, prototypes, and games*)	• Creating a wiki profile page and project pages • Integrating and publishing text, video, photos, audio, programming code, animations, digital designs on the wiki pages • Posting game design iterations and assets to wiki
4. Social-based learning, participation, and exchange (*e.g., forming and sharing ideas, process notes, programming code*)	• Collaborating by using Web2.0 tools, such as posting to wikis, blogs, open source help forums, Instant messaging • Exchanging & sharing feedback & resources with others by posting information, links, source code questions and answers • Reading and commenting on blogs and wiki pages of others
5. Information-based learning, research, purposeful search, and exploration (*e.g., researching the subject domain of a game; exploring design resources*)	• Searching the Web (using Google, wikipedia and other sources) for answers and help on specific issues related to programming games • Searching and finding resources on MyGLife.org network, website, and wiki • Searching the Web for new Flash design, animation and programming resources
6. Surfing websites and web applications (*e.g., game examples, wikis, blogs, web apps*)	• Surfing to MyGLife.org starter kit site and other game sites and playing games online • Keeping track of and bookmarking surfing results that are relevant to projects • Browsing Web2.0 content sites such as Youtube, Flickr, Blogs, Google Tools

The CLAs are a working framework that we are continuing to refine through our research and development in the Globaloria-West Virginia pilot project. They serve as outcome objectives and are key drivers for the continued program design and curriculum decisions made in developing the program. Through participation in Globaloria, we expect that students' 6-CLAs develop in parallel, contribute to each other, and can be achieved in an integrated way through constructive, project-based

activities that engage learners in a wide spectrum of technology uses. We will address results in the context of this framework.

Digital Divide in West Virginia

A primary reason we chose an initial pilot implementation in the state of West Virginia was to test our learning innovation with a population experiencing the effects of the digital divide, and provide immediate benefit to disadvantaged students. The U.S. state of West Virginia has a lower median household and per capita income, and higher poverty level as a percent of the population in comparison to figures for the nation as a whole. As a rural and mountainous state with a higher poverty level than most of the country, West Virginia's residential broadband diffusion has been challenging, due to geography, infrastructure and cost. This is evident in the lack of broadband coverage for rural, under-served communities located in poorer, remote pockets of the state. The population is at greater risk of the effects of the digital divide, at both the first and second levels (access due to cost, and sophistication of use), limiting the potential for technology learning by young learners in the home context.

Globaloria Integration into LHS Course Schedule

LHS was a new pilot location in 2009/2010. Prior to Globaloria's inception at LHS, no high school classes about game design, Web 2.0 activities or social networking had previously been offered.

In the Fall semester, Globaloria was implemented as an elective course called *Digital Imaging and Multimedia I,* offered for credit during school hours to students in grades 9 through 12. Fifteen students participated in Pilot Year 3 in the fall semester.

In the spring semester, *Digital Imaging and Multimedia II* was offered to the same cohort of fifteen students. Mrs. H[2] was the educator for this class during both semesters of Pilot Year 3, and was completely new to the program.

Regarding educator training, in the summer prior to the school year, and again in the winter, participating educators across WV were provided 2-day workshop trainings at a central location conducted by the World Wide Workshop called the Globaloria Academy. Students were subsequently supported throughout the year by their educators, and they also learned through use of online resources and tutorials, and participation in periodic virtual training offered by the World Wide Workshop through Webex and Skype. Participants also learned through interaction, sharing and collaboration with their peers in class as well as students at other locations, via communication on the wiki.

The following table presents the syllabus topics covered by Mrs. H and her classes during the four quarters of game design in Pilot Year 3. In addition, we include a selection of her reflections on her own and her class's progress during each timeframe.

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[2] Pseudonym

The source of this data is her Year 3 quarterly progress reports. The comments provide insights into the evolving mindset of the educator, as she enhances her knowledge of game design, and her strategies to guide and manage students' game design learning in a workshop-style social constructionist environment. As it is organized by quarters, this table parallels the chronological presentation of the case study findings below. This table serves as a reference for the quarterly research findings presented in each case study.

Table 2. LHS Syllabus Topics by Quarter, and Aligning Educator Reflections

Timeframe, Syllabus Topics and Tutorials Covered	**Selected Reflections from the Educator on Class Progress**
First Quarter: August 28, 2009 – September 11, 2009 Course Overview Create Your Profile Create Your Blog Participation Guidelines	I have learned a lot in regard to Web 2.0 tools. Prior to this class I had never used a wiki or a blog and now I have successfully led my students in creating their wikis and blogs. I have learned a little html coding and quickly realized how much I do not know. I think my greatest accomplishment at this point is selecting a really great group of kids for my inaugural class. Their work is amazing so far and I can't wait to see what they will accomplish. My personal goals for the next quarter are to blog more frequently and to spend some self-learning time on Flash. I have put a lot of time into this program because I can already see the implications Globaloria will have for my students. It is very rewarding to see students not only interested, but engaged in the learning process. I have seen students who usually do not relate well socially, start to interact and become part of a community. My concerns at this point lie solely within my inadequacies using the Flash software.
Second Quarter: September 16, 2009 -- December 16, 2009 Playing to Learn Choosing a Topic Mini Game Project Imagining Your Game Paper Prototyping Planning Your Game Drawing in Flash Adding Navigation Adding Animation Adding Sound Adding Interaction Assembling The Game	I have applied the knowledge gained in regard to wikis and created a page for the FBLA group I sponsor. I am continuing to learn html coding and practice Flash skills. I purchased a Flash for Dummies book after I couldn't figure out guided motion and used it to figure out that particular task. I would like to work my way through the whole book, but at this point in life, I do not have the time. If I teach this class again next year, I plan on using some of the summer doing so. I have not blogged much this quarter. Hopefully, I will do better next quarter. I love the creativity that this class inspires. I feel like I have gotten to know students in this class really well compared to other classes. The amount of interaction is fantastic. I am not under pressure to be teaching them every second, they have, in fact, have taught me on several occasions. I am not really certain how to progress at this point. We have finished all of the Game Design topics and I am not sure what to do next. Am I supposed to

Presenting Your Game	try to keep each team together and work through the Game Development topics or are they to work on their own? What happens when the students complete their games in January or February and this is a year long class? I am hoping some of the second and third year teachers will offer me some insight.
Third Quarter: January 22, 2010 – February 24, 2010 Assembling The Game Presenting Your Game Development Plan Intro to ActionScript Programming Practices Learning From Others Finding Solutions	I have continued to learn through completing several of the development design topics on the wiki. I feel that this program has been a great experience and I am so happy that Liberty High School was selected to take part. One of the greatest benefits of the program is that the curriculum matches up very closely with my CSO's and the CSO's that are not covered within the class will be covered once the students have finished their games. Also, I plan to recruit most tenth graders for my class next year, so that by the eleventh grade, they will need only one more class (web design) to be a completer in our E-Business Publishing Concentration. Not only will this help build our program, but will also give students the job skills they need. Considering the number of days we have missed, I feel my students are doing exceptionally well. They are currently working on development topics in their groups and will finish by March 26, 2010. Our target date for final presentations is May 4, 2010. There are two seniors in our class and their last day of school is May 15, 2010. The Window for Westest II is May 17-28, 2010 so this date seemed to be the time for presentations. I don't anticipate any major problems with having our final games completed by this date. Our class meets daily for 1.5 hours so I feel we will have adequate time to finish. I have offered to be in the computer lab during lunch for any student that needs the extra time.
Fourth Quarter: February 25, 2010 – May 12, 2010 Finding Solutions Moving on a Path Special Effects Scrolling Background Score Keeping Collision Detection Sound Effects Timer Character Effects Drag and drop Platforms Running and Jumping Coding "enemies" Testing and Debugging	Thank you so much for allowing LHS to become a part of this fantastic program. We had a great time and learned so much! I am looking forward to the upcoming summer academy to further enhance my knowledge in Flash. Denise was a wonderful mentor and helped me out on a number of occasions – I appreciate the willingness of others to reach out and help when you don't have the answers. All of my students (with the exception of one) were able to bring a game to fruition and I learned along side of them. It was a great first year. I am very proud of my students. I think they did an excellent job! They worked really hard to get their games finished and in working order by May 13th. Originally we had decided on May 4 as our presentation day; however I soon realized we would have to have just a little more time. As far as the presentations, the sound quality using the FlipCam wasn't all that great. I think I will use my camcorder next year. Also the speakerphone wouldn't work in the classroom – I could hear Shannon and Meredith [World Wide Workshop leaders] but they couldn't hear me. So we experienced a few "technical difficulties" but that is to be expected. While we finished a little

Publishing Your Game	bit earlier than most classes, our class still had CSO's to cover that were not met within the Globaloria platform and that is why I have several weeks with no teaching hours. I probably will do things a little differently next year, although I can still seeing the need to finish early because I have several Seniors enrolled again next year and they leave 2 weeks prior to other students.

Method

In this paper, we use case study method to explore the performance of three students. The data sources utilized in the case studies are described as follows.

Case Studies

In the 2 case studies, for each student we present findings as they emerged in chronological sequence in the data across Semesters One and Two. The data sources for each case study are as follows:

- 4 Educator Progress Reports submitted quarterly to the World Wide Workshop Foundation, presenting a brief synopsis of each student's performance;
- Students' pre-program survey responses to 5 open-ended questions (late August);
- Students' mid-program survey responses to 13 open-ended questions (early January);
- Students' post-program survey responses to 9 open-ended questions (June)
- Wiki posts (including text, video, game design files, graphics files, Flash project files, code);
- Blog posts

To make sense of all the extensive data and develop the student case studies, we batched the disparate data from all of the sources by student, and by chronological order, and developed observations about student performance across time based on the content observed and reviewed. As we batched the data together and reviewed student performance across time, certain longitudinal trends and findings emerged for each.

Chronologically, Semester One data sources used were as follows.

First Half of Semester One (September/October, 2009):

- First Educator progress report (September, 2009)

- Students' pre-program survey responses to 5 open-ended questions (late August);
- Student Wiki activity and blog posts for this timeframe

Second Half of Semester One (November 2009 - Early January 2010):

- Second Educator progress report (December, 2009)
- Students' mid-program survey responses to 13 open-ended questions (early January);
- Students' post-program survey responses to 9 open-ended questions
- Student Wiki activity and blog posts for this timeframe
- Post-hoc interviews with the Educator

Then in Semester Two, the data sources were as follows.

First Half of Semester Two (January 2010 – Early March 2010):

- Third Educator progress report (March, 2010)
- Student Wiki activity and blog posts for this timeframe

Second Half of Semester Two (Late-March 2010 – June 2010):

- Fourth Educator progress report (June, 2010)
- Student Wiki activity and blog posts for this timeframe
- Students' post-program survey responses to 9 open-ended questions

In the case studies that follow, we present observations, evidence from the data, and summarized findings for each individual student, related to the study's two research questions on student engagement, and contemporary learning abilities gained. The resulting cases present a narrative of student engagement, and in many ways the data presented tells its own story.

The wiki served as a valuable data source in that it offers a history of all student actions. Students must login each session in order to contribute anything to the site, so their actions are recorded and searchable in the Wiki history and archives. Further, the wiki provides automated overall metrics for each individual student's activity (number of wiki edits and uploads). It was very useful for case study generation by researchers who

were working remotely and using students' produced and posted work as a main data source.[3]

That said, there are several limitations to our use of these data sources for retrospective analysis. In particular, not being present to watch and observe student learning at the local level hinders us from seeing and observing phenomena as it unfolds. The wiki provides a host of historical data and actual student artifacts including some video, that creates a trace impression of the learning processes that we can speculate occurred within the margins. However, this remote analytic approach hinders us from validating our observations, which can only occur through direct observation and interactions with students and teachers themselves as they experience the program across time. Thus, we recognize that a lot has occurred outside of this picture that we are unable to know and analyze and report upon. That said, the case files still provide a chronology and narrative to the learning from which we can glean important findings.

[3] In Pilot Year 3 we did not conduct site visits and thus rely upon the actual work they produced and posted online to the Wiki environment as data sources.

Chelsea

Globaloria-WV case study student Chelsea was a 15 year-old 11th grader at Liberty High School during Pilot Year 3. Like all LHS students, she participated for the entire year. Regarding her background, Chelsea makes her experience very clear, stating at length in the pre-survey that:

I use Photoshop/GIMP 2.6/Microsoft Digital Imaging 2006/ Photoscape to edit and perfect digitally taken photographs. (I) do amateur and experimental photography in my spare time. I post my work on my own Deviantart page frequently. I operate a Canon EOS Rebel Xsi Dslr camera. I do HTML/CSS coding for my own graphics and layout design on my Myspace profile. I enjoy playing video games on consoles such as the Xbox 360, PS2, gamecube, DS etc. I volunteer at Raleigh General Hospital for 4-5 hours once a week. I sketch often. Usually models with outfits I have designed myself. I wish to go into fashion when I get older.

As for her career interests, she adds,

> *I want to get a double major in Fashion/Graphic Design, and a minor in Photography. I want to go to work in the fashion industry, preferably with a big name fashion magazine. Such as vogue, nylon, harper's bazaar, or WWD. I want to be a stylist, but the graphic design major will allow me to also do my own page layouts. The photography could come in handy for extra shots I need, etc. The colleges I'm looking into include SCAD in GA, Pratt in NY, and Pittsburgh Art Institute in PA.*

In the early first progress report on September 15, Chelsea's instructor, Mrs. H describes her as "by far the most creative person in the class." She adds that, "This is both a benefit and a detriment to her in that she spent too much time in the design of her wiki page and blog (she created her own template for blogger using her photography), and did not put a lot of effort into either her learning log or the first blog post."

Chelsea was chosen as one of the two cases for LHS because of her previous experience entering the class, the leadership she took on her videogame design team, the expressiveness of her blog posts that offer significant insight into her learning and team processes, and her team's advanced final project, all of which set her apart from the other students in her class this year and present an exemplar of one type of student who flourishes in Globaloria.

Semester One wiki edits and uploads, Chelsea and her class

Students use the wiki as an online learning environment for sharing, collaborating, and presenting their design artifacts for peer feedback. Wiki engagement for these purposes is a key objective of the Globaloria program, reflected in CLAs 2, 3 and 4. Here we provide some data on students' Wiki edits and uploads across Semester One, offering initial insights into students' level of wiki activity across the timeframe. As an introduction to her work, we present Chelsea's individual activity monthly, in relation to the class range.

It appears from the wiki activity overall for this location that students at LHS made wiki edits to profile and project pages more frequently when they first began in September and October, tapering off somewhat while learning game design (November and December). Students were in class for 90 minutes each session. Table 4 shows Chelsea's wiki edits for Game Design I by month, and compares her posts to the class range. In September, she made 54 posts, which was in the upper range compared to other students. In October, she engages in the upper range of activity in her wiki page editing, waning in November and increasing again in December.

Table 3: Chelsea's Wiki Edits from Game Design I, by Month

Month	**Chelsea's Wiki Edits**	**Range of Class Wiki edits, low to high**
August	0	0
September	54	16 - 78
October	120	7-120
November	3	1 - 36
December	18	1 - 33

Supporting the results for wiki *edits*, Table 5 indicates Chelsea's wiki *uploads* from Game Design I, in which she added files such as Flash files or images to the wiki. On average, her metrics are in the mid to lower range for file uploads.

Table 4: Chelsea's Wiki Uploads from Game Design I, by Month

Month	**Chelsea's Wiki Uploads**	**Range of Class Wiki uploads, low to high**
August	0	0
September	27	5 - 35
October	12	2 - 51
November	16	8 - 42
December	4	0 -46

Overall, Chelsea's wiki editing activity is about average in most months except October when she is the most active student.

Chelsea's Participation in the First Quarter of Game Design: Late August to September 15, 2009

At Liberty High School, the teacher segments the first two weeks of class into a unit, and describes this as the "first quarter" – aligning with the World Wide Workshop Foundation's requirement that teachers submit an early progress report to confirm they have successfully launched the class. Thus, in this case we use the same timeframe to present samples of Chelsea's early work, and early enthusiasm for Globaloria.

Chelsea's first blog post of the semester is only one sentence long, but her second blog post on September 14, 2009, shows initial approval and enjoyment of the class, highlighting some of the activities the group has already engaged in within the first two weeks. Chelsea states,

> *I'm already loving this class. Every normal day, I would go home and recode my social networking profiles, and take and edit some new pictures. Now I can incorporate some of the things I have fun doing in my spare time into school. Globaloria has given me a chance to learn more about graphic design and coding.*

Chelsea's statements indicate that she is already an active, fluent and expressive user of social media who experiments daily with her online identity and self-presentation. She herself relates her naturalistic at-home technology activity to the game design experience. She suggests that Globaloria fits well with her current mode of technology engagement, and enjoyment of trying out new looks and identities.

Further, Chelsea's grammar and paragraph structure in the post are nearly flawless, and she, unlike the others in her class, seems to already have a very good grasp of how to structure her text with a digital photograph in a sophisticated, well organized manner. In the September 15 progress report, her instructor, Mrs. H, gives her a B, explaining, "I know she has been working really hard and I hate to not give her an A but she needs to see the importance of balancing creativity and content."

Figure 3.

Q1 Teamwork

In the first quarter of the academic year (from about August 28, 2008 – September 15, 2009), Chelsea joined the team "The Epic Failz," which was made up of team members Celia and John. Chelsea's group was expected to complete the modules "Course Overview," "Create Your Profile," "Create Your Blog," and "Participation Guidelines." During this time, Chelsea completed all of the assignments under these curriculum topics.

Chelsea and her team worked together on a game called "WV Animal Rescue Squad," which is about "saving animals and learning about how to properly take care of your pet." Chelsea states in her pre-survey that "I looked into social issues to decide upon the topic of my game, thus learning a bit about them… I've learned a lot about animal cruelty and how we can fight it… and what you can due to insure good care taking of your pet." The Epic Failz team game pitch is as follows:

> *Audience:* The information is for all ages, yet the art style suggests middle school and younger.
>
> *Game Play:* You play as Chelsii, who is an animal rescue worker. It's point-and-click style, so there aren't many controls/instructions. The goal of the game is to rescue the animal, solve its problems, and then find it a loving home!
>
> *Fun Factor:* The poppy art style and atmosphere make a fun environment for our players.
>
> *Smart Factor:* It gives you informative facts and truths about animal cruelty, and how to properly take care of your pet.
>
> *Style Factor:* Very, happy-go-lucky , pop-art-ie.

> *Originality Factor:* Our game characters are people from our team, and i don't see anyone else doing an animal game!
>
> *Team Introduction (According to Chelsea's blog):* "Celia: content developer/writer, content expert/client, and information architect. Me: graphic (visual) designer, programmer, and producer. John: project manager and end user."

The group's game topic demonstrates young people taking an interest in and becoming aware of the issue of animal cruelty, as well as integrating in some trivial facts people may not have known already about their own pets. It appears that this game topic provides a motivating context for the students in this team to learn new digital skills. It also provides them an opportunity to do online research to learn more about the game's subject, while reflecting the ability of these students to express concerns of a socially relevant message.

Paper Prototype

The goal of the paper prototype module is to allow students to create mockups of their game on paper, before producing the digital files. Students design and present this storyboard in a digital video discussing their game plan, and then post this on TeacherTube and embed the video on their wiki.

Chelsea seemed to think this step took her team excessively long to complete. In her October 11th blog post she writes,

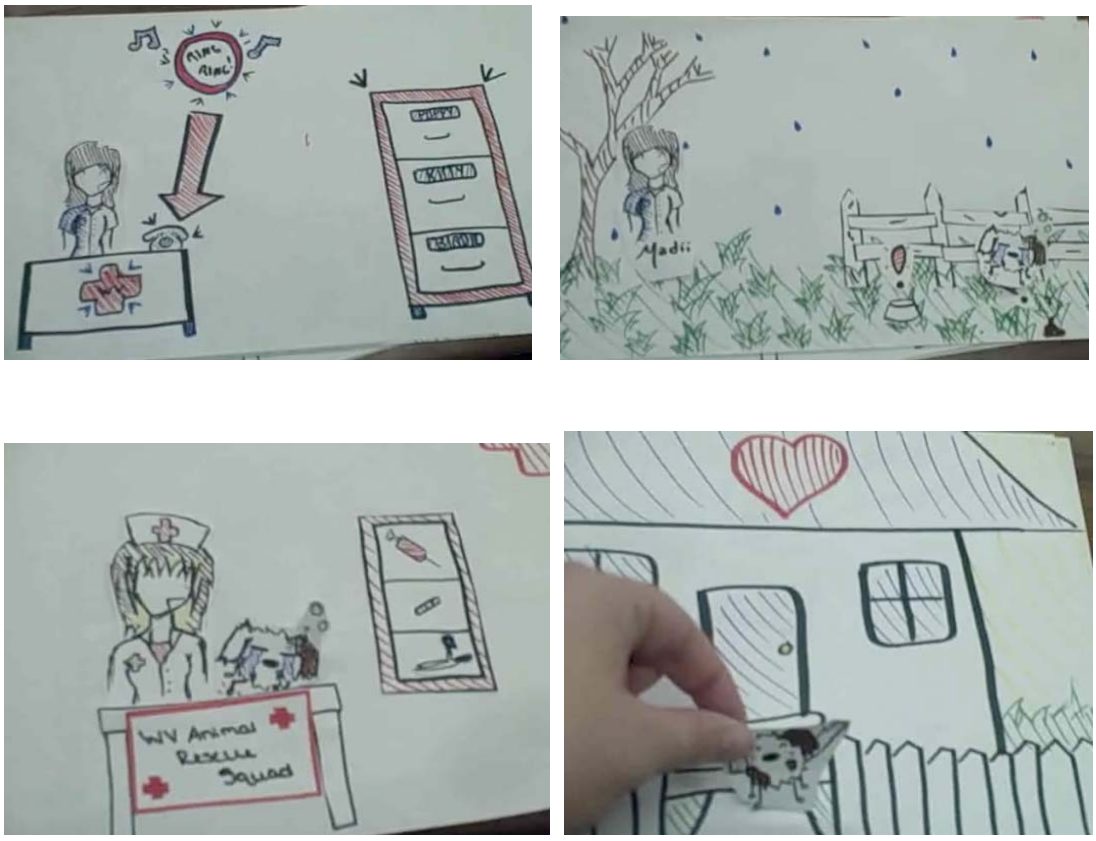
> *So we finished the first group project, finally…. The art style of our game kind of took a less serious, pop-art-y, cartoony feel. Which, kind of matches the vibe of the game. … We did a run through of the game on the perspective of you choosing the dog to save. If we would have done cat and bird as well, it would have taken quite a bit of forever…. I present to you now the video of it all! Enjoy it thoroughly, for it consumed much of our time. …*

In The Epic Failz team's paper prototype, each screen of the game is presented on a different piece of paper, pulling away each previous sheet to reveal the progression of their game. Objects that will be animated are represented by different cutouts, such as the character the player can choose, and the trivia questions. Their prototype shows an animal clinic office, as well as various settings where animals require help to escape cruelty. The Epic Failz explain that their game consists of various levels of cause and effect choices, including: the choice of the character you wish to play with at the beginning, which type of animal you are seeking to rescue, and the resulting questions that change based on these choices.

The students added a learning component by including a trivia quiz challenge on animal fun facts and cruelty statistics, featuring questions such as, "Can Dogs See Colors?"

which requires correct responses before the player can presume. Figure 5 shows screenshots from The Epic Failz team's paper prototype.

Figure 5: Screenshots From Paper Prototype of "WV Animal Rescue Squad"



Chelsea's Interest in Graphic Design

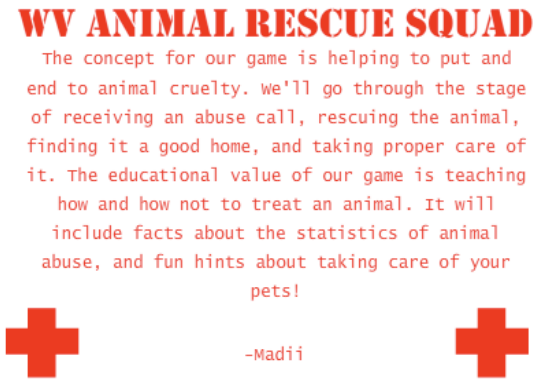
Chelsea's expressive blog posts indicate that she is most enthusiastic about graphic design. She echoes her pre-survey comments in a blog post dated September 14, 2009 that

> *Globaloria has given me a chance to learn more about graphic design and coding. I love furthering my knowledge of these things because it relates to what I want to do later in life. I plan on going to art school, either in GA, PA, or NY, and getting a double major in Fashion/Graphic Design and a possible minor in Photography. All things I love, of course. It's my dream to be able to work at a high name fashion magazine, such as Nylon, Harper's Bazaar, or maybe even Vogue. I want to be able to wake up every morning and actually be excited for work, unlike a lot of people I know. Getting background information on the basics of the industry is going to help in the long run, and I feel as if this class is an awesome start.*

Chelsea's wiki project page displays some of the art that she has created during the first quarter, some of which relates to the game that her team is working on. Figure 3A shows some images that reflect visuals unrelated to her team project. Figure 3B shows an image reflecting the visuals related to her team project.

Figure 6: Images from Chelsea's Wiki Project Page

Figure 7: Images from Chelsea's Wiki Project Page



It appears that her participation in Globaloria is giving her an opportunity to experiment with the design role she already knows she wants to pursue in her future, making the experience particularly meaningful for her.

Chelsea's Participation in the Second Quarter of Game Design: September 16 to December 16, 2009

The second quarter of Globaloria ran from September 16, 2009 through December 16, 2009. During this time Chelsea and her team members completed the modules "Playing to Learn," "Choosing a Topic," "Mini Game Project," "Imagining Your Game," "Paper Prototyping," "Planning Your Game," "Drawing in Flash," "Adding Navigation," "Adding

Animation," "Adding Sound," "Adding Interaction," "Assembling The Game," and "Presenting Your Game."

During this time, Chelsea diligently kept up with her learning log, which provides insight into the tasks of the day. For example, on September 24 she writes, "completed adding actionscript to minigame, uploaded files." Then on September 28 she writes "Split into groups. Decided on a game topic." and on the following day she notes, "Created a one frame flash movie on the topic of our game." On October 28th she states that "developing a concept for our flash games. The beginning!"

Chelsea evidences a tendency to add a few extra sentences to each of her blogs where she gives a small update about her personal life and events outside of the Globaloria class, for example on October 18, 2009, she writes at the end of her blog, "My birthday is in 6 days! Almost 16. (: My party is in 5. I'm thinking about not making it dress-up, but just doing a bonfire type deal. fun, fun, fun! ;D Also, I've been eating the best brocolli soup evarrrr! TY grandma, you rock. ;D" Chelsea is using the tools afforded in Globaloria to enmesh both personal and professional / school-related expression. She uses the blogging medium for reflection about her learning process as well as her life in general, indicating that she has appropriated and is gaining fluency in using these tools.

Game Presentation

At the end of the second quarter, the students present the current iteration of their game to members of the World Wide Workshop team via a virtual web conference session and screencast which is recorded and posted on the wiki. There is a "reflections" section of the Epic Failz team's game presentation in which they talk briefly about their experience to this point. They note in their Powerpoint presentation that "The hardest part of our game this far was actually getting motivated." Figure 6 highlights moments from the screencast. Comparing their game presentation to what was eventually their final project presentation, there were actually very few divergences, even down to the earlier graphic designs. This shows that the team was able to keep their early visions of the product consistent through their delivery at the end of Semester One.

Figure 8: Updated Game Presentation for The Epic Failz

Summary, Semester One

In Chelsea's first semester, she appears to be expanding upon her graphic design skills, as indicated in her paper prototype and her digital graphic files. She also appears to self-report having successfully completed several of the initial assignments requiring Actionscript, and engages in blogging, commenting on other classmates' blogs, and wiki posting. She uses the blog and wiki to express in text thoughts about the team dynamic, and the learning process in which she is engaged.

In this timeframe, Chelsea blogs regularly and shows a strong degree of enthusiasm and humor. At times, stress and frustration about time constraints for her group's work are conveyed in her posts. For instance, it appears their class had some scheduling difficulties and was not always afforded access to the lab in their school where Flash was installed. She states in a post on September 29th,

> *So, today, yesterday, and the day before we've been stuck in another lab. This lab is without Flash, so that's just great. This is obviously creating a stall in our game projects. Mrs. H is not so happy about this, and neither are we. But we put up with it, as always. The nerdy kids once again get the boot-end of everything, even when it comes to their own domain, the CPU lab.*

On a brighter note, she adds what they did instead:

> *Accepting our defeat, we had a free day, and then yesterday we went outside and had a class photoshoot. Thisssss was so much funnnn. Aaron, Celia, Jamie, Heath, Mrs. H , and myself took all of the shots. John did some free- running stuff and everyone else kind of just acted silly. There were some epic leap frog shots, and then some not-so-epic jumping through shrubbery shots… All of them are really interesting to look at, though. And it gives you a better idea of the personality of our class!*

Several of these photos made it onto the LHS wiki, and indeed they are expressive.

Summing up Chelsea's progress and determination in the first half of the program, she states in her January 14, 2010 blog post,

> *This class has helped prepare me in some ways for my aspiring future career. The computer and web usage has helped some, but I think that the Flash program has helped the most. It familiarized me with the layout of using creative design tools.*

She also for the third time reiterates her career ambitions in this post, presenting a consistency in her goals and aspirations, and perhaps a further instantiation of these dreams through her Globaloria experience. She reflects and dreams at length:

> *I want to go into the fashion industry. It's a big goal to tackle, but I'm determined. My dream job in the industry would have to be being part of a high-end magazine, such as Nylon, Bazaar, Vogue, etc. An even bigger dream, trust me, I know. I want to do fashion spreads, pick out the outfits, talk about why I picked them out, put my own pages together. It's definitely something I'm willing to devote my life to try and do. I realize that I'm not going to start out doing this, and that I'll definitely end up having to climb the job ladder, but that's something I'm excited to do. At least I'll gain experience along the way, which can help me later in life." She also speculates and brainstorms about the path she expects will be necessary for her future success: "Art and Design school. I plan on applying to SCAD in Georgia or The AI Institute in Pittsburgh, and if those fall through, then maybe Raleigh, NC. I want to try and get a double major in Fashion and Graphic Design, with maybe some Photography classes, for job security.*

Mrs. H notes in her December 16, 2008 progress reports that

> *Chelsea is a great student and she has a great eye for design. She is one of the few students who does not mind blogging, and her posts are usually very entertaining. She sometimes does not do what she is supposed to, ie. on other sites, doing Chemistry homework, etc. I have been firm about needing to stay on track and have told her that I will begin to cut her grade if she isn't working on class assignments.*

This type of distraction is an oft-cited worry from educators. It appears Mrs. H is being vigilant in supporting her students' level of focus.

Chelsea is gaining experience engaging creatively in Globaloria, and trying out the role of designer in an epistemic workshop-based learning environment that has ties to her interests in a future job in fashion. This allows Chelsea to continue imagining, visualizing and articulating her career interests and future dreams. It appears that she would be motivated to work further on her projects at home if she was afforded greater access. One comment in particular highlights the extent of motivation that the program inculcates in some students. In her mid survey, Chelsea notes that one thing she dislikes about the class is, "…the fact that i can't really work on my projects outside of school for the (lack) of a flash program i have on my cpu." For Chelsea, level 1 (access) of the digital divide is a reality, and while her participation in Globaloria is helping her to overcome this limitation, having even greater technology affordance is still needed.

Semester Two: Wiki Edits / Uploads / Posts

In the second semester, students transition into some of the more technical "game development" modules of the Globaloria curriculum. During this timeframe, Chelsea's wiki activity appears to be above average in relation to her fellow students for edits and below average in uploads. The two tables below indicate her Semester Two wiki activity.

Table 5: Chelsea's Wiki Edits from Game Design II

Month	**Chelsea's Wiki Edits**	**Range of Wiki edits, low to high**
January	49	0 - 49
February	18	2 - 18
March	6	0 - 53
April	5	0 – 23
May	11	0 - 24
June	42	0 - 42

Table 6: Chelsea's Wiki Uploads from Game Design II

Month	**Chelsea's Wiki Uploads**	**Range of Wiki uploads, low to high**
January	48	0 - 48
February	1	0 - 6
March	4	0 - 34
April	0	0 - 20
May	8	0 - 16
June	0	0

Chelsea's activity is above average at the beginning and end of the semester, most notably when it comes to Wiki Edits. In January, February and June, she is at the top of the class range for the Wiki Edits. As for uploads, she is highest in her activity in January, and then tapers off until May when she uploads eight final files.

Chelsea's Participation in the Third Quarter of Game Design: January 22 – February 24, 2010

During the third quarter timeframe, Chelsea's class was assigned to complete the modules "Assembling The Game," "Presenting Your Game," Development Plan," "Intro to ActionScript," "Programming Practices," "Learning From Others," and "Finding Solutions."

The group was posed with a set of question for creating their development plan, and responded in detail on the wiki, which appears to contribute to their clarity.

Chelsea's Learning of Actionscript

Chelsea's blog posts during the third quarter indicate a growing comfort level with the initial Actionscript assignments. She writes about the module "Intro to Action Script" on February 19,' 2010, stating that "Before we had the massive 8 snow days in a row; we did some action scripting tutorials. They were fairly easy." She finished her entry that day by explaining, "It's all about knowing where (to) put the code and what line to alter it on to change it the way that you want."

About adding animation, Chelsea says on November 20th, "We did four parts to the adding navigation section of this. A, B, C, and D. These included a bunch of navigation-ie stuff. like! making a ball bounce! anddd making a ball turn into a pentagon thingyyy. anyway. yeah. you can find these things on my projects page...."

Adding Sound

Regarding adding sound on January 12, 2010 Chelsea states,

> *The adding sound topic was about adding noises/music to a flash file, and making a stop and play button for a sound. On the first part, I just took a file I had already made and drag and dropped a sound I downloaded onto the stage. The file I made was pretty random... two egg-shaped characters chasing one another, one made to look vicious and blood-thirsty, and the other scared out of it's little mindd. :D baha; So, the noise that I added was a horrifying man scream which seemed to match quite well. (: After I had finished that much I added some flashing subliminal messages at the end. If you can't see it yourself, the messages include cheesey government slurs. 'Anthrax' 'Eat Your Siblings' 'Andrew Bush'... The usual.*

Overall, Chelsea's descriptive and process-detailed blog posts provide evidence that she was comfortably informed, prepared for, and even excited when it came to adding interaction. She states further,

> *After everything is completed from the other assignments, the interaction will be added to the scenes. This will make the game actually playable, and, well, interactive for the players. I guess its what differentiates a video from an interactive flash file, or game. Anywho! Yes. After the interaction is finished, after being compressed into one main file, it will be upload to our individual project and team wiki pages.*

Her fluency of expression and voice comes through in the blog, as does her comfort level in reflecting on and describing her process steps in detail. In her Third Quarter progress report, Mrs. H notes, "Chelsea is doing a little better with staying on task. I still have to remind her to pay attention to her deadlines."

Conflicts in the Team

It appears from Mrs. H's Third Quarter progress report that some team conflict arose in the Epic Failz. When writing about Chelsea's progress in particular, Mrs. H notes,

> *There has been a little controversy within her group and I have had to play referee on several occasions. It has been a good learning experience for this group. I have stressed to them the importance of collaboration and willingness to overlook the fact that maybe you don't like someone within in your group, but the fact remains that in real life, we all have to work with people we may not like.*

It appears that Chelsea and another student experience interpersonal conflict. It also should be noted that Jon is not listed as one of the group members in the final game posted on the LHS wiki, and it looks as if he had switched teams mid-way through the course.

As for other evidence, Chelsea's only complaining came early in the course when she felt she was the only one doing the work. There is no evidence of Jon's departure from the group other than his absence from the final game presentation and lack of presence in the game credits. This event demonstrates some of the limitations of our retrospective and remote data analysis. The team process of students is clearly an area where a greater level of research focus is needed.

Chelsea's Experience With Self-Learning

Chelsea's experience with self-learning in this course appears positive, in consideration of how close her team's early sketches in their Paper Prototype, as well as the game design components, resembled what was ultimately their final project. Chelsea's heavy blog activity, as well as her role as the teams' spokesperson during any on-camera presentations, provide the notion that she was the leader of the Epic Failz.

Chelsea's Participation in the Fourth Quarter of Game Design: Late February – End of June, 2010

The final quarter of the academic year took place between approximately March 22, 2009 and the end of May. During this time period, the students focused on the modules: "Finding Solutions," "Moving on a Path," "Special Effects," "Scrolling Background," "Score Keeping," "Collision Detection," "Sound Effects," "Timer," "Character Effects," "Drag and drop," "Platforms," "Running and Jumping," "Coding "enemies," "Testing and Debugging," and "Publishing Your Game," as well as completing their team games.

Success in Programming during the Fourth Quarter

The pace for these team members picks up considerably in the fourth quarter when Chelsea completes several of the design elements and her team members successfully program several interactive features. The team puts forth significant effort at integrating sound effects to their game. On March 26, Chelsea recounts how she was

having difficulty finding royalty free music to use on The Epic Failz game. In her April 13 blog she recounts:

> *We were having some horrible trouble finding free use game music on the internet; so I had someone I know make it for us. [Thank you so much Zack! (:] It's a really cute 40-second loopable N64 8-bit-ish tune. We plan on maybe adding different music later on throughout the game. Zack sent me the file; and I e-mailed it to myself here at school. I uploaded it to my Preloader screen's library, and drag and dropped it onto the timeline. SUCCESS! (: It matched great, and now we're going on to the next topic!*

In the final game, the sound effects were limited to the initial telephone ringing with the first rescue squad mission. It appeared that while they had a tune prepared, they ran out of time to integrate it.

Chelsea assigned her teammate, Celia the responsibility of programming "Drag and Drop," and reported on her progress. Celia also contributed to the animated background of the game. Discussing this effect, on March 8, 2010, Chelsea reflects in her blog that Celia problem-solved this issue for the team independently with apparent encouragement from Chelsea, and direct help from World Wide Workshop Foundation staff:

> *…at first it was a fail. In the beginning, we had painted the rain drops on the actual frame; rather than putting them in a layer all their own. So after fixing that; we wanted to make them actually move downward; to create that rain effect. . . This is where the scrolling background game development topic came into play. Celia got the rain moving; but it would end after a set amount of time. She needed to somehow loop the rain and get it to maintain constant flow. She asked Heath for assistance; and after several failed attempts, they asked Meredith [a World Wide Workshop staff member]. She has replied and now we are going to use her information and insight to call it a wrap! (:*

Figure 10 provides a screenshot of this scene, which was successfully executed and provides a dynamic effect in the game (the animated rain drops fall consistently while this screen is viewable). The process Chelsea recounts here clearly evidences the discovery-based learning inherent to Globaloria's model, as well as the scaffolding and support provided by the World Wide Workshop.

Figure 10 – Scrolling Background Example in "WV Animal Rescue Squad"

Outlining another further success, in her March 22, 2010 blog post, entitled, “Celia is a drag and drop BEAST”, Chelsea writes,

> *One of the development topics for our game would be Drag and Drop. We needed it for several screens such as the nurse/medical frame and the pet boutique frame. In these screens, we will have a sidebar of different drag and drop items that you can use to interact with the animal and earn points throughout the game. Celia was in charge of this development topic; and (the) beast mode-ed at it intensely. She even designed the little outfits for each of the animals in the boutique. She didn't really run in to any problems except for once; and she got that sorted out in a matter of minutes. GO CELIA. Beastin' it up all in hizz-ere. No, really. Awesome Show.*

Here again, Chelsea appears to be very complimentary of her teammate’s contributions, indicating that the earlier team conflicts appear to have been minimized at this point. The praise Chelsea expresses exemplifies her team management role taken in addition to graphic design.

Figure 11 – Animal Boutique from “WV Animal Rescue Squad”
Scene illustrates “Drag and Drop”

Finally, discussing an additional interactive feature, scorekeeping, that the team successfully implemented, Chelsea writes on April 13 that,

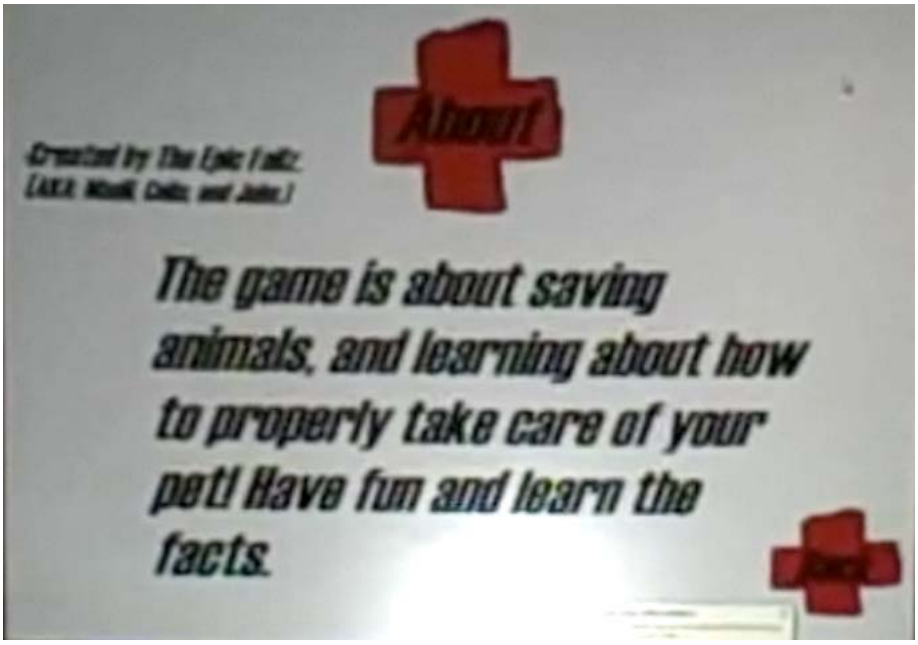
> *Our final development topic that we JUST uploaded to our team wiki page would be the 'Score Keeping' topic. Which is simply adding a numerical score box to our game screen. We used the field rescue screen as our example on the wiki. For every bad item you click on, you get 25 points for cleaning it up and realizing it is a hazard to the dog's health.*

The Epic Failz team's final game reflected a hybrid educational / social issue / entertainment themed game that mixed trivia about animal cruelty and care, with fun simulational gameplay allowing the player to feel immersed in the role of an animal rescue squad member. Then, at the end of the game, the player is rewarded with a game level that enables one to dress their animal, purchasing clothing and accessories for it based on the points earned during the trivia portion. This layered aspect of game play suggests the group's ability to integrate learning with fun and rewarding activities. Chelsea also integrates her interest in fashion in a playful and humorous way.

Final Game Presentation

At the end of the school year, the students put together a final game presentation that was filmed and posted on the wiki. The Epic Failz team's final game presentation begins with a PowerPoint that discusses the elements of their game, target audience, the game development process, and the roles each member played in the team. In discussing their roles, the students note that Chelsea drew pretty much every scene that is shown in their presentation. In their final presentation video, Chelsea and Celia can both be heard saying they both designed, created, and animated the graphics together.

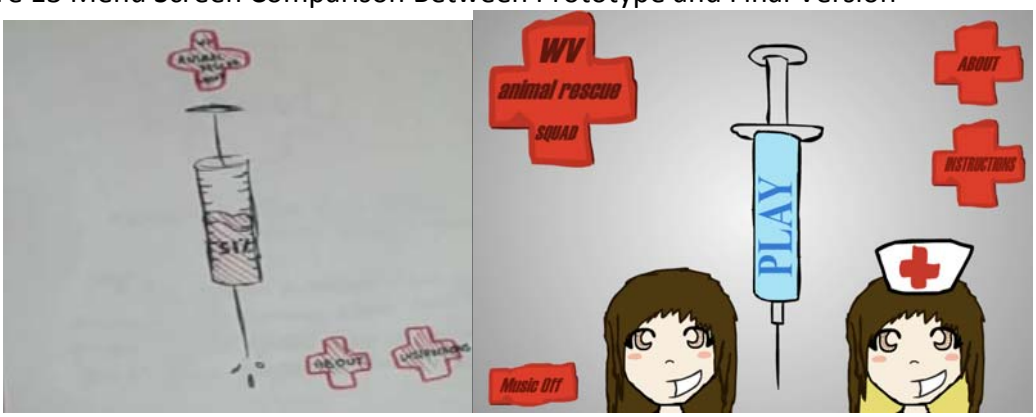
Figure 12: Scene From Final Game Presentation PowerPoint



Their finished game was made available for play on the Liberty High School Wiki homepage. The “WV Animal Rescue Squad” game is posted as both an FLA and SWF file via the class wiki. Their description for the game is, “"WV Animal Rescue Squad" is a game made by The Epic Failz. The goal of the game is to “save the three animals. It teaches the player about animal cruelty and important need-to-know facts concerning the care of your pet. It also has fun random trivia that is animal related. It's a fun, socially educational game.”

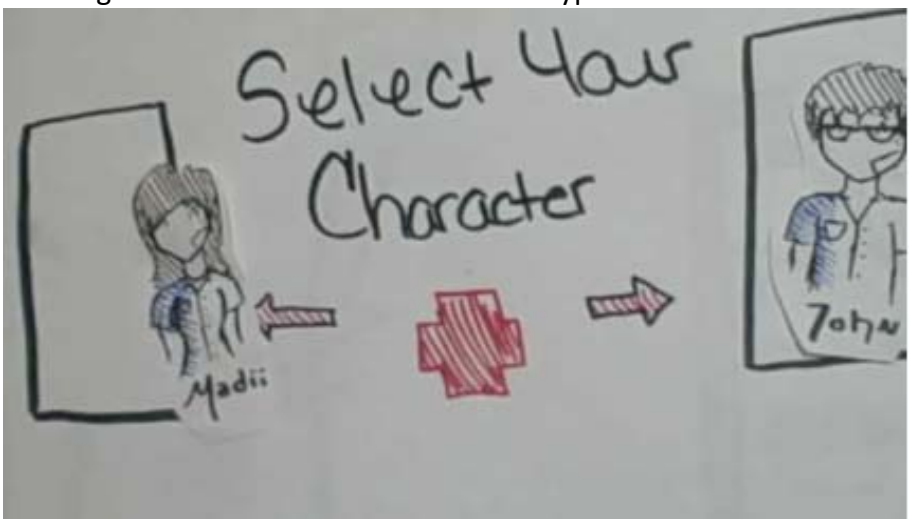
Figures 13 and 14 show a comparison of these scenes between the prototype, and the version presented in the final fame presentation.

Figure 13 Menu Screen Comparison Between Prototype and Final Version



One notable difference between their paper prototype and their final game is that they had hoped to have a “Select Your Character” option, but this did not actually happen in the game.

Figure 14: Difference Between Prototype and Final Version



The first level of the game consisted of a series of click-and-point challenges, including answering the clinic phone, selecting the correct animal case file (Dog? Cat? Bird?), and then answering the multiple-choice question: “Can dogs see colors?” Figures 15 and 16 show the paper prototype vs. the final version comparison between the trivia question scene and interior of the clinic scene.

Figure 15: Comparison Between Trivia Questions screen on the Paper Prototype and Final Version

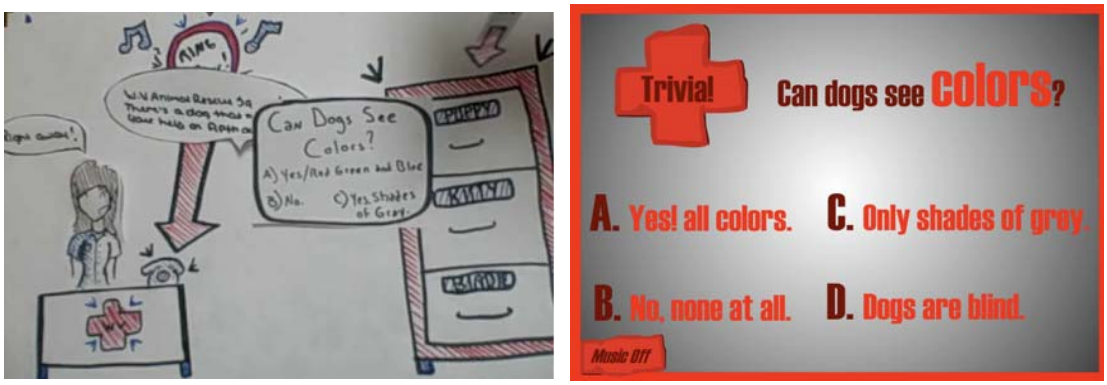
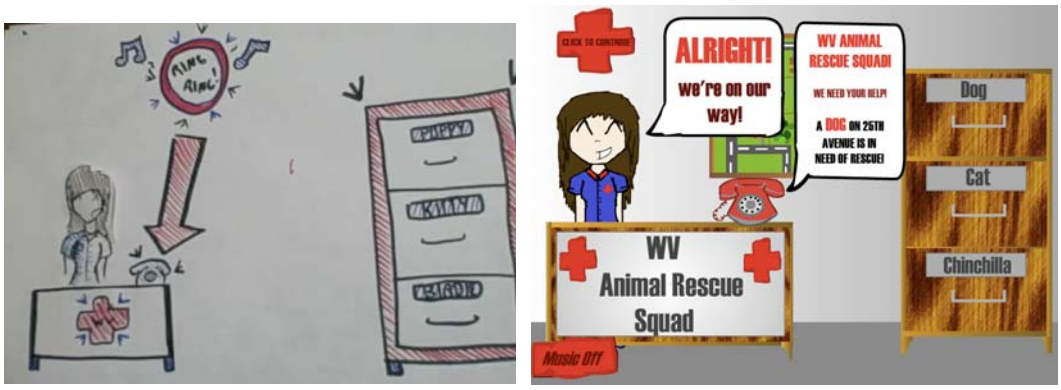


Figure 16: Clinic Interior Scene Comparison Between Prototype and Team Wiki File



In the prototype, the trivia question appears far smaller and less invasive of the screen. In the final version, the question opens as a full screen, complete with colors. The clinic interior came out quite similar to the original plan from the paper prototype.

Their final presentation has a total of five quiz questions and two click-and-play along scenarios included. The programming of the quiz seems consistent and you can't progress until you have properly clicked on the correct answer.

Mrs. H expresses great pride in her final progress report, stating that, "I am very proud of my students. I think they did an excellent job! They worked really hard to get their games finished and in working order by May 13th."

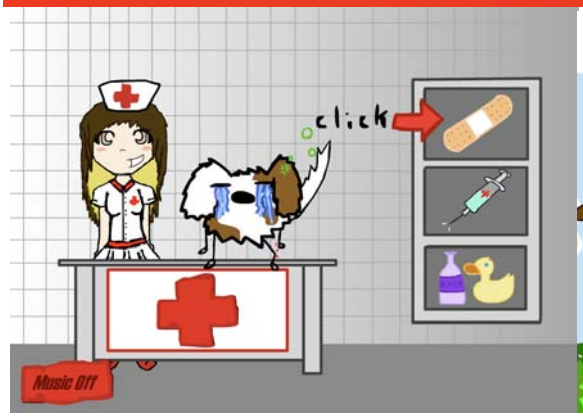
From May 17-20, the class wrapped up their projects and completed the final survey. In her final survey, Chelsea distinguishes her Globaloria class from her other classes, by openly responding, "It gives me an outlet to express myself through my work; like in the artwork and design of our game. Other classes don't really allow for creative elements; and for me to function properly, I need that in my curriculum."

Chelsea's willingness to collaborate and interact with other students is made evident with her cheering on of her teammate, Celia. This was made especially evident in her final survey, When she answered the question, "What are two things you enjoyed about class?" Chelsea responds,

> *My team mate, Celia. This was her last year at LHS, and it makes me sad. But; I'm glad I've been able to share this one of a kind experience with her.*

Her collaborative abilities is also made evident the fact that she commented on other people's blogs up to nine times per month throughout the year.

Figure 17: More Screenshots From Final Game



Globaloria STEM Games Competition

Pilot Year 3 saw the launch of the first Globaloria Games Competition in Science, Technology, Engineering, and Mathematics (STEM) by the World Wide Workshop in collaboration with the West Virginia Department of Education and Senator Rockefeller as Honorary Chair to cultivate and inspire the STEM leaders of their generation. 23 teams (65 students, advised by 7 educators) participated in the competition.

As it turned out, the Epic Failz team tied for first place in this competition for their hard and effective work in developing Animal Rescue Squad, winning a laptop with software for supporting their computational creativity.

In a press release issued by the World Wide Workshop Foundation, Senator Rockefeller, Honorary Chair of the competition stated,

> *I could not be happier to congratulate Chelsea, Celia and Malachi – winners of the STEM Games Competition. These students used their incredible imaginations and talent to create some amazing games while using STEM skills that will help them for years to come. I thank all the schools, students, and educators for making these games a success, and encourage all students and teachers to continue to find ways to make learning STEM subjects fun.*

Former Governor Gaston Caperton stated,

> *I am deeply impressed with the students' ability to master very difficult concepts and to produce highly professional work. These WV students will be well prepared to excel in college and compete for the jobs of the future. I highly compliment the teachers who have effectively taught and motivated students to use mathematics and technology as they learn about today's pressing issues.*

Summary of Results: Chelsea

Chelsea's ability to turn out a very thoroughly designed game like "WV Animal Rescue Squad," after ending the semester with only one team mate, and having been concerned at points that she was the only one working hard at their project, shows the strength of Chelsea's performance in this class and success in producing a completed project. Her instructors' evaluations suggest she may have had somewhat of a slow start, but quickly progressed especially in the second semester, to keep up with the various topics covered in the class.

Chelsea emphasizes again in her post-surveys that her career goal is to land a job in fashion and/or graphic design. Reynolds (2008) found that younger students who engaged in project-based work centered on an already instantiated individual interest as opposed to a situational interest (Hidi & Renninger, 2006) put forth a greater level of effort in project-based work, and, their final projects evidenced a higher level of complexity. This one individual case of Chelsea at LHS appears to further support this finding. Entering this class with some experience already in graphic design allowed Chelsea to use this class to launch her toward her lifelong goals. Her team's success in winning the STEM games competition will be a valuable addition to her college portfolio. Further, through the win, Chelsea has been afforded the access at home with her laptop that will allow her to pursue her individual interests on her own time. Overall, Chelsea'cs case serves as a highly positive example of the learning, life and livelihood opportunities that Globaloria offers students who already possess creative talent and potential.

Andrew

Globaloria-WV case study student Andrew was a 16 year-old 10th grader at Liberty High School during Pilot Year 3. Like all LHS students, he participated for the entire year. According to his pre-survey Andrew's background in graphics and design is, "playing video games and surfing the web." His career goal, according to this survey is "to get a job in video game design." He answers that his reasons for joining the class were "because I love games and want to be a video game designer," and also "to achieve a better understanding of how video games are made." As far as knowing early on what sort of a project he wanted to work on in the class, he responded: "I do not have any ideas right now."

In the first progress report on September 15, Andrew's instructor, Mrs. H describes him as "a very quiet student." She adds that, "He has done very well on his wiki and blog. He seems very creative and imaginative."

Andrew was chosen as one of the 2 cases for LHS because although he entered the class with little experience in graphic design and similar programs, he was able to parallel what he was learning with his vast knowledge of the mainstream videogame industry. He thus set himself apart, receiving positive evaluations from his teacher, and emerging as a leader within the class despite his social shyness and quiet demeanor. He also discovers a new career interest through his participation that he makes known at the end of the course.

Semester One Wiki edits and uploads, Andrew and his class

Table 4 shows Andrew's wiki edits for Game Design I by month, and compares his posts to the class range. In September, he made 17 posts, which was in the lower range compared to other students. In the later months, he engages in the mid to lower range of activity in his wiki page editing.

Table 7: Andrew's Wiki Edits from Game Design I, by Month

Month	**Andrew's Wiki Edits**	**Range of Class Wiki edits, low to high**
August	0	0
September	17	16 - 78
October	30	7-120
November	8	1 - 36
December	8	1 - 33

Supporting the results for wiki *edits*, Table 5 indicates Andrew's wiki *uploads* from Game Design I, in which he added files such as Flash files or images to the wiki. On average, his metrics are in the mid to lower range.

Table 8: Andrew's Wiki Uploads from Game Design I, by Month

Month	Andrew's Wiki Uploads	Range of Class Wiki uploads, low to high
August	0	0
September	14	5 - 35
October	3	2 - 51
November	8	8 - 42
December	3	0 -46

Overall, Andrew's wiki editing activity is below average in most months except September when he is in the middle range.

Andrew's Participation in the First Quarter of Game Design: Late August to September 15, 2009

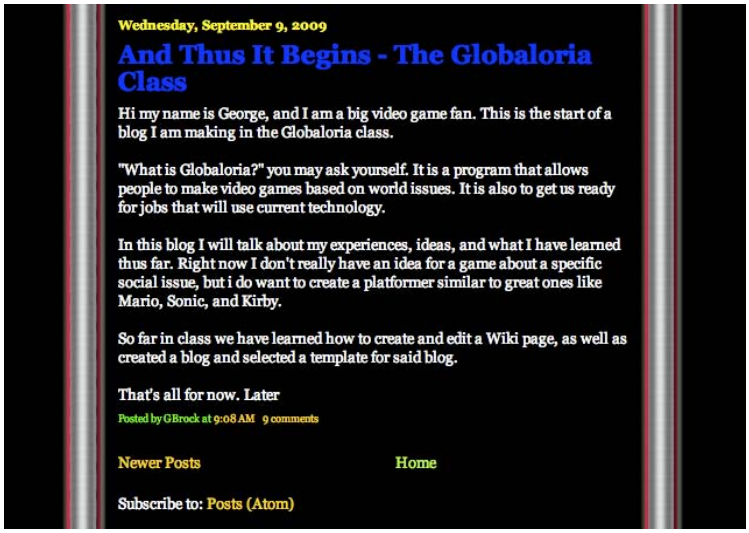
Andrew's first blog post of the semester on September 9, 2009, seems to be based on a prompted set of responses. He states,

> *Hi my name is Andrew, and I am a big video game fan. This is the start of a blog I am making in the Globaloria class. 'What is Globaloria?' you may ask yourself. It is a program that allows people to make video games based on world issues. It is also to get us ready for jobs that will use current technology. In this blog I will talk about my experiences, ideas, and what I have learned thus far. Right now I don't really have an idea for a game about a specific social issue, but i do want to create a platformer similar to great ones like Mario, Sonic, and Kirby. So far in class we have learned how to create and edit a Wiki page, as well as created a blog and selected a template for said blog.*

Andrew's statements indicate that while he is experienced as a consumer of video games, this class marked his first venture into the design and creative production of the product itself. His high interest in mainstream videogames provides a solid foundation for his ability to create a game of his own.

While the structure and design of Andrew's blog suggest he is a beginner, his punctuation and grammar are accurate and he seems to be meeting basic expectations for the first blog post.

Figure 18. Andrew's first blog post



Wednesday, September 9, 2009

And Thus It Begins - The Globaloria Class

Hi my name is George, and I am a big video game fan. This is the start of a blog I am making in the Globaloria class.

"What is Globaloria?" you may ask yourself. It is a program that allows people to make video games based on world issues. It is also to get us ready for jobs that will use current technology.

In this blog I will talk about my experiences, ideas, and what I have learned thus far. Right now I don't really have an idea for a game about a specific social issue, but i do want to create a platformer similar to great ones like Mario, Sonic, and Kirby.

So far in class we have learned how to create and edit a Wiki page, as well as created a blog and selected a template for said blog.

That's all for now. Later

Posted by GBrock at 9:08 AM 9 comments

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In the September 15 progress report, his instructor, Mrs. H, gave him an A, explaining, "I think he will do very well in this class. I am hoping he will come out of his shell a little."

Early Teamwork

In the first quarter of the academic year (from about August 28, 2008 – September 15, 2009), Andrew joined the team "Elite Shuffle," which was made up of team members Jesse, David, James, and Aaron. Andrew's group was expected to complete the modules "Course Overview," "Create Your Profile," "Create Your Blog," and "Participation Guidelines." During this time, Andrew completed all of the assignments under these curriculum topics.

Andrew and his team worked together on a game called "The Gamble of a Lifetime," which is about "Gambling and the problems that it causes." The Elite Shuffle team game pitch is as follows:

Learning Topic Gambling and the problems that it causes.

Audience Teenagers so they wont get addicted to gambling.

Game Play A series of complicated but neccesary button pushing. Collect enough money to pay out the mob so you can escape. Escaping the mob by getting enough money.

Fun Factor We have four types of casino games to play.

Smart Factor Our game will teach the negative effects of gambling. They will learn that gambling causes more problems than it solves.

Style Factor It will look like a cartoon and we will use flash. We will use some music from Sonic

Originality Factor Our game will have four types of casino games to play.

Team Introduction

1. Content expert/client: AWilliams, JHonaker
2. Project manager: **GBrock**, JHonaker, AWilliams
3. Information architect: DBlack, JDLee
4. Information designer: DBlack, JDLee
5. Instructional designer: AWilliams, JDLee
6. Interaction designer: AWilliams, **GBrock**
7. Visual designer: AWilliams, **GBrock**, JHonaker
8. Content developer/web writer: **GBrock**, JHonaker
9. Programmer: AWilliams, **GBrock**

The development plan indicates that team members each take on multiple roles. Andrew appears to gravitate towards project management, interaction and visual design, content development and programming. His team's topic demonstrates an interest in the issue of gambling addiction, though it is unclear whether any of the team members claims a personal connection to this issue.

Paper Prototype

In his blog post on October 7, 2009, Andrew explained how the Elite Shuffle team segmented the responsibilities of the project by team member: "I recorded the video, Jamie talked about each screen, Aaron moved the pages for each screen, and David moved the characters around. Jesse was absent so he's not in the video."

The Elite Shuffle team's paper prototype opens with title graphics. Each screen of the game is presented on a different piece of paper, pulling away each previous sheet to reveal the progression of their game. Objects that will be animated are represented by different cutouts, such as the main casino game floor and the mini-games including Black Jack, Texas Hold 'Em, Slots, and Roulette.

Their prototype shows the title screen, the rules, the loading screens, and various characters and their locations within the game, as well as the game screens (featuring playing cards and poker chips). According to Andrew,

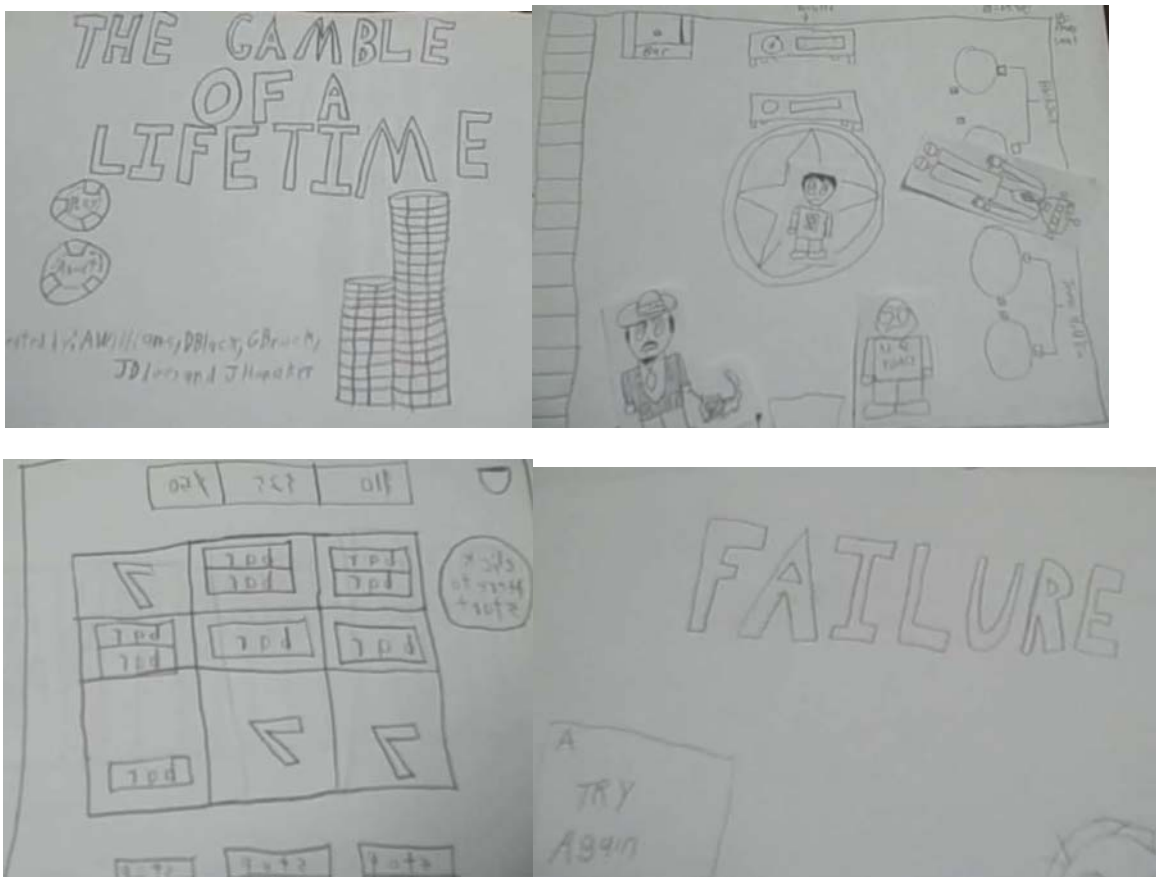
> *The basis of the game is that the casino you were in has been taken over and you need a certain amount of money before they let you leave.*

The Elite Shuffle explains that their game consists of "a series of complicated but necessary button pushing. Collect enough money to pay out the mob so you can escape. Escape the mob by getting enough money."

According to the Paper Prototype, you will receive a “FAILURE” screen if you do not raise enough money to pay off the mob to get out of the held-up casino, yet you will inevitably receive a failure screen anyways. Perhaps this is their way of suggesting that gambling is a lose-lose situation. Figure 19 shows screenshots from The Elite Shuffle team’s paper prototype.

The first image is the title screen. The second image is the casino floor, complete with the playing character and the villainous mob men. The third image it is a still from the slots mini-game. The last image depicts the apparently inevitable “FAILURE” screen that all players reach one way or another.

Figure 19: Screenshots From Paper Prototype of “The Gamble of a Lifetime”



Andrew’s Team Player Quality

Andrew demonstrates a “team player” attitude, not only through his instructor’s progress reports, but also through his blog. On September 22, 2009 the class was working with movie clips and when Andrew finished his quickly, he used the rest of his time to help his classmates complete he project. In his words:

> *Today we made a small movie clip. The clip simply moves a character over. I made my character look like Meta Knight. I figured out what to do to get the clip to work, so I helped a few people get theirs to work.*

This assistance he provides his fellow classmates becomes a theme for this case as Andrew discovers a new talent he holds through his peer mentoring.

Andrew's Project Page

Andrew's wiki project page not only displays some of his own original graphic artwork that he created during the first quarter, but also some images of mainstream video game artwork that inspires him. Figure 20 shows some images that reflect visuals unrelated to her team project. Figure 21 shows an image of Sonic the Hedgehog, one of his favorite videogame characters.

Figure 20: Images from Andrew's Wiki Project Page

Figure 21: Sonic The Hedgehog

Andrew's Participation in the Second Quarter of Game Design: September 16 to December 16, 2009

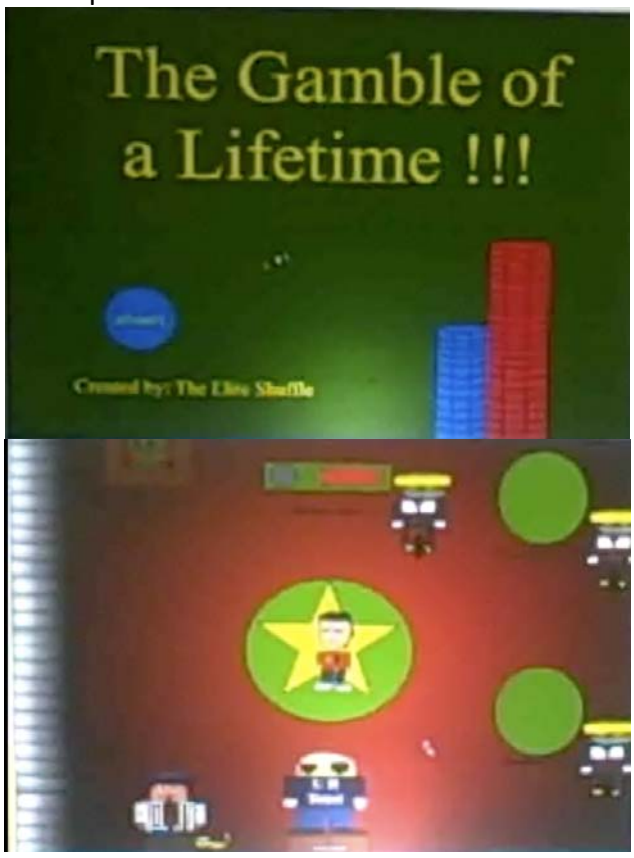
The second quarter of Globaloria ran from September 16, 2009 through December 16, 2009. During this time Andrew and his team members completed the modules "Playing to Learn," "Choosing a Topic," "Mini Game Project," "Imagining Your Game," "Paper Prototyping," "Planning Your Game," "Drawing in Flash," "Adding Navigation," "Adding Animation," "Adding Sound," "Adding Interaction," "Assembling The Game," and "Presenting Your Game."

During this time, Andrew diligently kept up with his “learning log,” which provides insight into the tasks of the day. For example, on September 18 he writes, “searched for resources and blogs about the game we will create” Then on September 28 he writes “Separated into groups, chose a group name (The Elite Shuffle), and began thinking of ideas for a game.”

Game Presentation

The game presentation made at the end of the first semester provides an opportunity for students to present their work in progress at this midpoint in the semester. The presentation at this phase is quite similar to the original game design proposed in the paper prototype. Although the Elite Shuffle team has only partially built one of the four casino mini games, the anti-gambling message is still noticeably absent from the game play. Figure 22 highlights moments from their screencast presentation. Comparing their game presentation to what was eventually their final project presentation, there were quite a few changes. For instance, they eventually abandoned the casino games, replacing each different game table with a different round of trivia pertaining to the history of gambling and gambling addiction statistics. Their visual designs remained largely consistent from as far back as their paper prototype, but the anti-gambling message eventually became somewhat clearer.

Figure 22: Updated Game Presentation for The Elite Shuffle



Summary, Semester One

In Andrew's first semester, he appears to be learning graphic design and creative process as a rapid level. He reports in his learning logs that he has successfully completed several of the initial assignments requiring Actionscript. His blogging remains consistent, and he posts 3-4 times a month on average, also taking the time to comment on his classmates' blogs, especially in September and October. He uses his blog almost as a journal to keep track of his progress in the class.

On December 4, 2009, he writes a review of the class thus far, saying:

> *The class is still fun and getting even better. Everyone works well together, too. I really like working in flash because you can create your own stuff and have it do all kinds of things. Making our game is definitely going to get harder because we will need a lot of different codes for all the things in our game. We'll find a way to make everything work though.*

Andrew relates his learning processes in game design to his experience with mainstream video gameplay. For example, in his December 1, 2009 blog about sound design in games, Andrew writes: "Sound is very important to a game. Could you play a game with music that really annoyed you?" He adds, "Some games have really great music. One example of great music from a game is Live and Learn from Sonic Adventure 2. It is a really great song and fits perfectly in the final boss fight. "

Mrs. H notes in her December 16, 2008 progress reports that

> *Andrew is a great kid. He has done really well in this class. He is one of the leaders of team Elite Shuffle. I rarely have to help him with anything and he always completes each assignment.*

Mrs. H's observation of Andrew during the second quarter supports the notion that he is acting as a leader within his group. By January 14, 2010, Andrew already seems to have

developed a more specific idea of what he wants to work toward career-wise. He writes,

> *My dream job is to be a video game designer Capcom. I want to design games for Capcom because they make my all time favorite series - Mega Man. To do this I will need to study 4 - 6 years at a technical college and hope Capcom hires me. I should learn Japanese too. I feel as though this class has helped prepare me by teaching me how to add animation, interaction, and how to plan a game.*

Semester Two: Wiki Edits / Uploads / Posts

In the second semester, students transition into some of the more technical "game development" modules of the Globaloria curriculum. During this timeframe, Andrew's wiki activity appears to be below average in relation to his fellow students for edits and below average in uploads. The two tables below indicate his Semester Two wiki activity.

Table 9: Andrew's Wiki Edits from Game Design II

Month	**Andrew's Wiki Edits**	**Range of Wiki edits, low to high**
January	7	0 - 49
February	9	2 - 18
March	13	0 - 53
April	13	0 – 23
May	9	0 - 24
June	1	0 - 42

Table 10: Andrew's Wiki Uploads from Game Design II

Month	**Andrew's Wiki Uploads**	**Range of Wiki uploads, low to high**
January	3	0 - 48
February	1	0 - 6
March	0	0 - 34
April	0	0 - 20
May	0	0 - 16
June	0	0

Andrew's wiki activity is about average in March, April, and May. As the project manager, the interaction and visual designer, the content developer/web writer, and the programmer, there is a chance that Andrew oversaw his teammates who were working as the information architects, rather than doing the editing and uploading himself.

Andrew's Participation in the Third Quarter of Game Design: January 22 – February 24, 2010

During the third quarter timeframe, Andrew's class was assigned to complete the modules "Assembling The Game," "Presenting Your Game," Development Plan," "Intro to ActionScript," "Programming Practices," "Learning From Others," and "Finding Solutions." The Elite Shuffle team's design plan is completed very meticulously as the students describe each and every scene. Two scene examples are presented as follows.

Game Scene 6: *Slot Machine*
1. Describe this scene *I see the reels, the amount of money you bet buttons, slot buttons, and return to lobby buttons*
2. Describe the action in this scene *You bet the amount of money you want to use then click stop when you want the reels to stop.*
3. List of Assets for this scene:
Character(s): none
Object(s): slot machine
Animation(s): The reels spinning
Sound(s): none
Button(s): Three stop buttons, $10 button, $25 button, $50 button, and Click to Start button
Text: Bar and 7

Game Scene 9: *Texas Hold'em Loading screen*
1. Describe this scene *You see 13 cards dealt out on top of each other going from Ace to King, and then a card that says click here to play.*
2. Describe the action in this scene *13 cards will be delt out on top of each other going from ace to king, after this is done, a click to play card will be placed next.*
3. List of Assets for this scene:
Character(s): none
Object(s): cards
Animation(s): the cards being delt out
Sound(s): sound of cards being delt out.
Button(s): the click to play card
Text: the Ace to King symbols

The degree of organization Andrew and his team put into the design plan (every game scene was detailed in this way) provided the team with a solid foundation from which to continue building their game.

Andrew's Learning of Actionscript

Andrew's blog post on February 19, 2010 indicates that he is having trouble with his Actionscript assignments. In the entry, titled "Actionscripting and Problems," Andrew writes

> *As of now we have done the Intro to Actionscript topic. Well we tried to at least. There is a problem with the first video's audio that it does not match up with what is being done onscreen. There was also this thing where you mess with the Actionscript of a game about a diver and another game about a frog. Both of the games were fun too. At least it works right. Then there was this one site where we were supposed to do a tutorial, but the link didn't work so we couldn't do that part of it either. We really need to get those fixed because Actionscript is a crucial part of game creation.*

Andrew's sense of urgency and awareness that this problem needed to be dealt with is further evidence of his passion for the course. It appears he is taking the issue seriously as opposed to using it as an excuse to avoid working on the project.

While learning how to add animation to his game, Andrew indicates strong enjoyment of testing out and playing with the different effects. For instance, he writes on his blog on December 3, 2009,

> *The coolest thing about learning to animate is being able to bring a still drawing to life and have it do all kinds of things. The only limit you have is your own imagination. One animation in games that I admire are transformation sequences. I really like these because they show one character change into something else entirely.*

About adding sound effects on March 18, 2010 Andrew says,

> *…we finished the Sound Effects topic. We used what we found in this topic and some other stuff we found on the Internet to make a sound volume bar for our game. We originally had a button to stop and start the music, but there were some problems with that. Eventually we decided that the bar worked better for our game. We got our music from Sonic Heroes in the Bullet Station, so SEGA owns all the rights to that. We really liked it, so that's why we put it in the game.*

Yet again, Andrew has connected his learning with a mainstream video game. Globaloria gives him the opportunity to produce media he typically is a consumer of. Andrew and his group are also exercising a tactic that very few other students do, which is to give the player the ability to turn the music on and off, so as not to be a captive audience to their music choice. This effort from the team demonstrates their advancing knowledge in game design.

In her Third Quarter progress report, Mrs. H says quite simply that, "Andrew continues to do a great job. He remains one of the best students in the class."

Group Dynamic

Since Andrew is one of four members on his team, their team makes up one of the larger teams in the class. Within the Elite Shuffle team, Andrew holds the responsibility of being the project manager, the interaction and visual designer, the content developer/web writer, and the programmer. On March 24, 2010, Andrew writes in his blog, "I must say, Jesse is doing a lot for this team. He can figure out things easily, and he has worked hard in these topics." This comment indicates a leadership stance.

Andrew's Participation in the Fourth Quarter of Game Design: Late February – End of June, 2010

The final quarter of the academic year took place between approximately March 22, 2009 and the end of May. During this time period, the students focused on the modules: "Finding Solutions," "Moving on a Path," "Special Effects," "Scrolling Background," "Score Keeping," "Collision Detection," "Sound Effects," "Timer," "Character Effects," "Drag and drop," "Platforms," "Running and Jumping," "Coding "enemies," "Testing and Debugging," and "Publishing Your Game," as well as completing their team games.

Andrew's Growing Actionscript Knowledge

Andrew reflects on the "Score Keeping" lesson in his blog on March 22, 2010, stating

> *Score keeping will be a major part of our game. When your score gets to a certain point you will leave the casino and win the game. With this being how you win, the score system is a crucial thing for us to get right.*

In the final implementation of "The Gamble of a Lifetime," the player must earn 2,000 points by answering trivia questions correctly to escape the casino that is being held up by the mob. Each correct answer awards the player 100 points, so the player must answer 20/20 correct to move on to the final level at the check out. If the player fails at the checkout, he or she must start all over again. In Figure 23, the functioning score feature can be seen on the bottom right side of the screen.

Figure 23 – Score Keeping in "The Gamble of a Lifetime"

Final Game Presentation

At the end of the school year, the students put together a final game presentation that was filmed and posted on the wiki. The Elite Shuffle team uses a SmartBoard to demonstrate how their game is played. The final screen in the game links to Gambler's Anonymous.

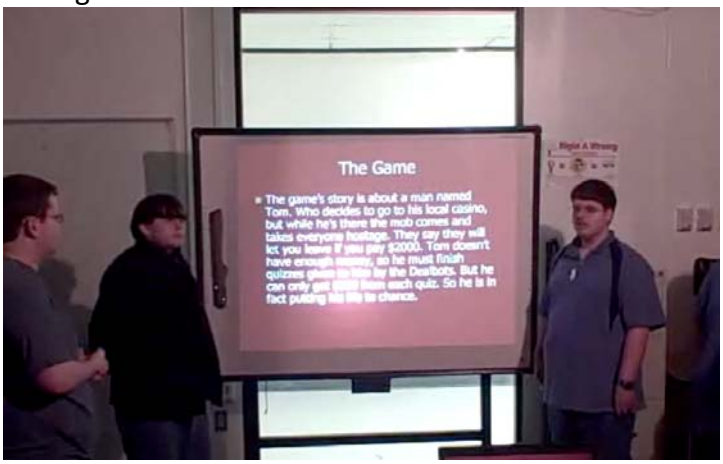
At the end of their presentation, when the floor was opened for questions and comments, a member of the World Wide Workshop team on speaker phone asks, "What is it specifically that you're aiming to teach? Is it about the history of gambling or is it about not gambling?" She adds, "It's unclear to me based on the questions and then the links at the end."

Andrew is the one to answer, saying,

> *Our main point was to find a game that could be both fun and entertaining and also teach about a social issue. We chose gambling because it was probably the easiest to make a game involving both of those… The story itself was just one scenario, which we thought of where the mob breaks in and uses peoples' addiction to gambling to fulfill their own need. It's a scenario that is most likely not going to happen, but it's not like it's unheard of. Our main thing was to show that (the) problem- gambling does affect people . Our scenario, though unlikely, has happened in the past. But, that's basically all it was.*

It seems that the Elite Shuffle team did not have a full response prepared to the question of why their game includes trivia on both the history of gambling and statistics involving gambling addiction. The solid connection between their game design narrative, and the problem of gambling addiction was noticeably absent factor from as early as their paper prototype.

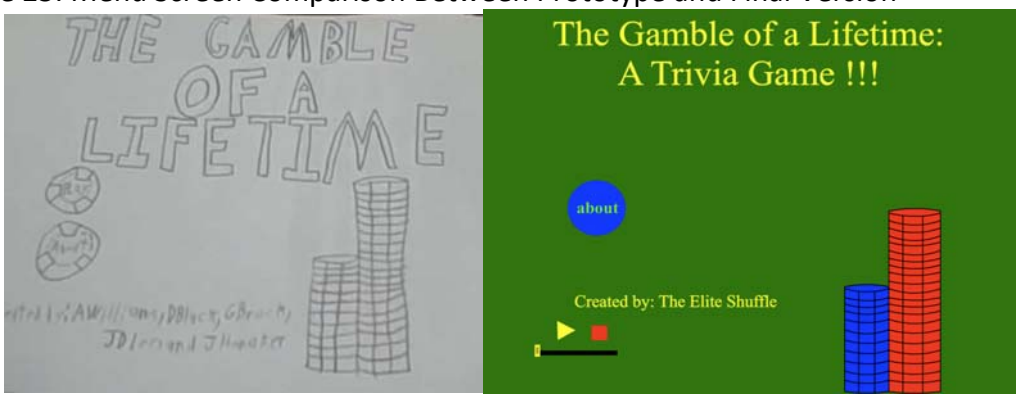
Figure 24: Scene From Final Game Presentation



The team's finished game was made available for play on the Liberty High School wiki homepage. The "The Gamble of a Lifetime" game is posted as both an FLA and SWF file via the class wiki. For their game's description, they write, "This game teaches the player facts about gambling such as the trouble gambling can cause in society."

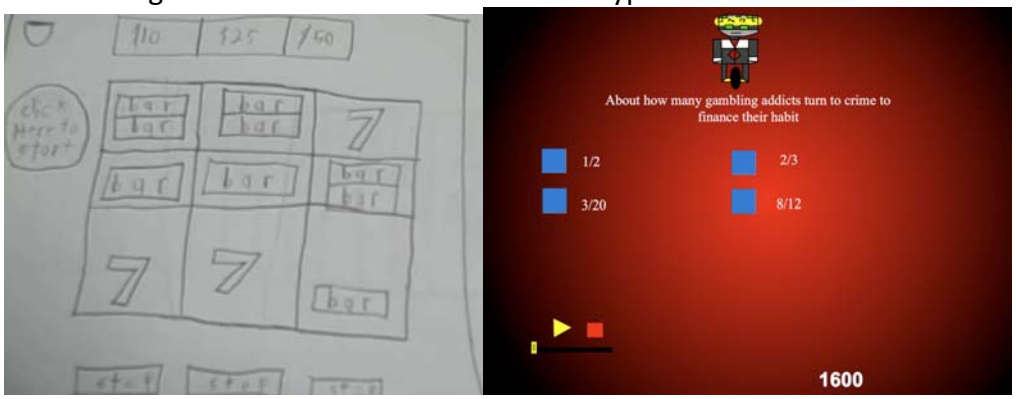
Figures 25 and 26 show a comparison of these scenes between the prototype, and the version presented in the final fame presentation.

Figure 25: Menu Screen Comparison Between Prototype and Final Version



The biggest difference between their paper prototype and their final game is the switch to a trivia-centric game versus a point system based on casino mini-games.

Figure 26: Difference Between Prototype and Final Version



The mini games (left) were replaced with trivia (right)

Figure 27: Comparison Between Casino Floor Area on the Paper Prototype and Final Version

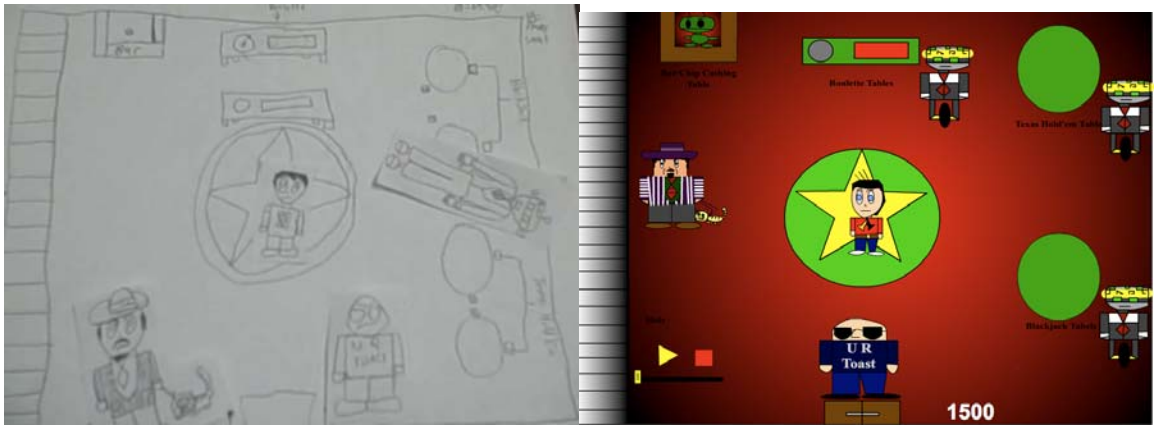
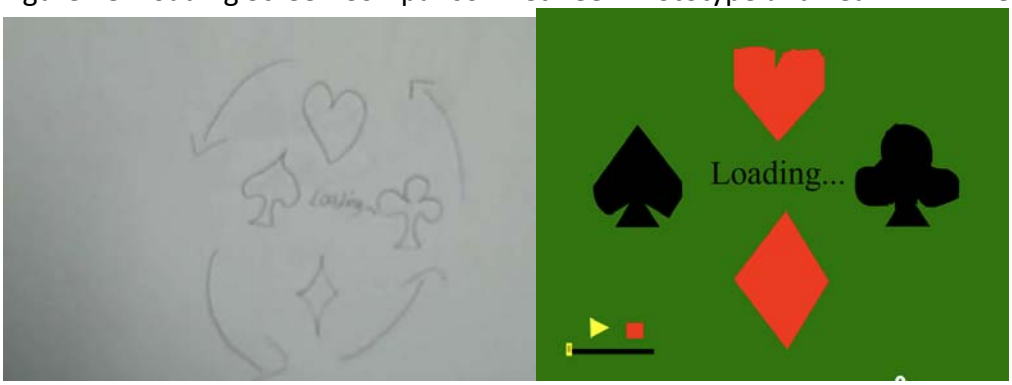


Figure 28: Loading Screen Comparison Between Prototype and Team Wiki File



Although the Elite Shuffle team changed their game format between the prototype and final game, they still maintained a large portion of the graphic designs they had already come up with.

Their final presentation has a total of twenty-one quiz questions. The player is able to determine the order of the questions based on which "game tables" they select. The player must answer every single one of the initial 20 questions correct (five questions each at four game tables) before advancing to the final question that enables them to leave the casino. The programming of the quiz seems consistent and you can't progress until you have properly clicked on the correct answer.

For Andrew's progress report Mrs. H states,

> *I Love Andrew! He is an exceptional student – although he's very quiet, he can say something out of the blue that is so funny you will be in tears. I think he was a little disappointed with the outcome of his game but when you work in groups sometimes you have to make compromises.*

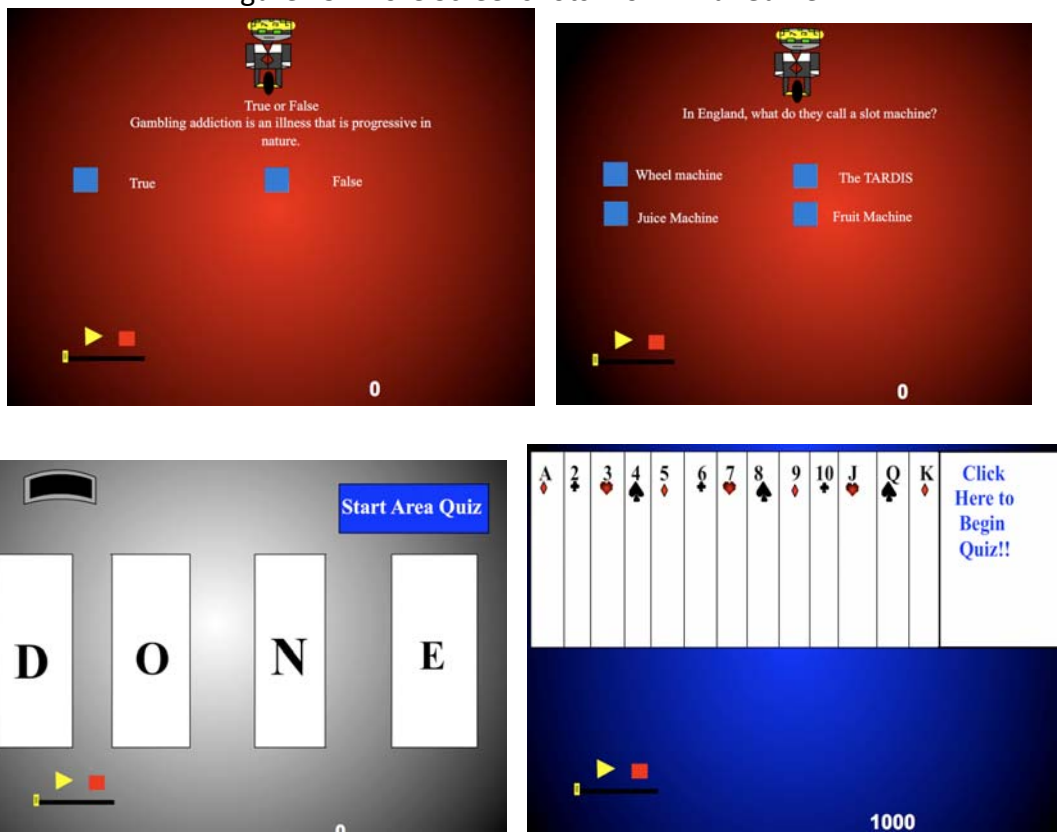
There is the chance that this was because as he did all along, Andrew may be comparing his final product with the likes of Sonic and Mega-Man, which cost millions of dollars to

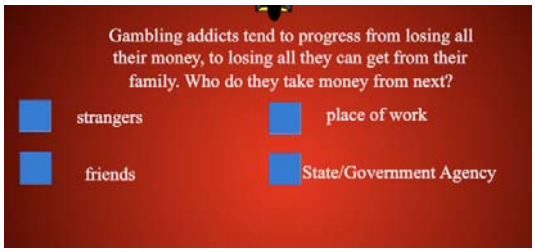
make. Andrew however does not mention any dissatisfaction in his final survey. Instead, he specifies that he is not only continuing to consider a career as video game designer, but also now as a teacher, as a result of his positive experience in peer mentoring.

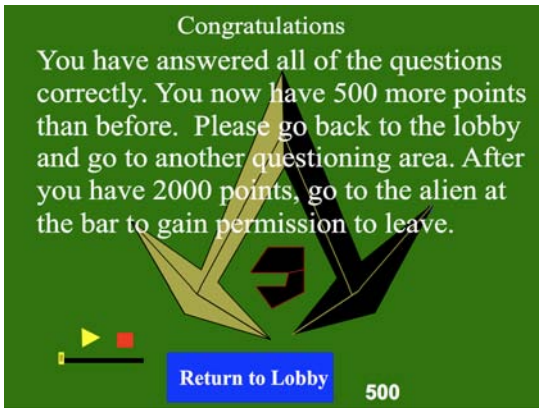
When asked what (was) most difficult about Globaloria, he responded, “Being able to get everything you want in your game on time.”

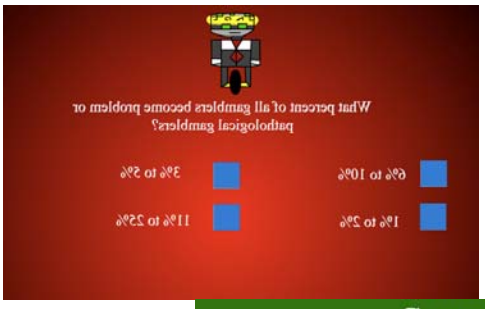
From May 17-20, the class wrapped up their projects and completed the final survey. In his final survey, Andrew distinguishes his Globaloria class from her other classes, responding, “I enjoyed creating the game and being able to work in groups.”

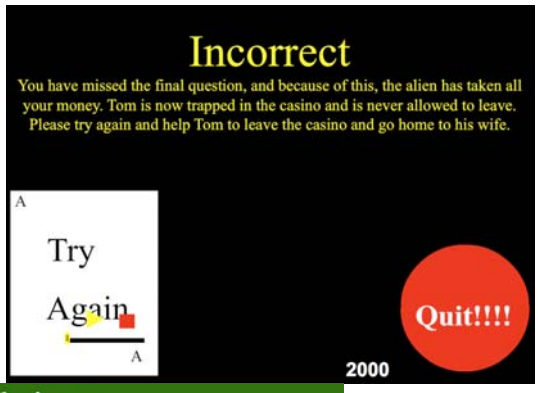
Figure 29: More Screenshots From Final Game











Summary of Results: Andrew

Andrew's only noted experience entering the Globaloria class was as a consumer of video games. Throughout the course, Andrew relied heavily on his knowledge as a consumer to put what he was learning in perspective. Whether he was learning to add sound effects or move characters, Andrew applied lessons from the mainstream games he was already familiar with.

One issue Andrew and the Elite Shuffle team faced, was the inability to fully connect their game, "The Gamble of a Lifetime," with the social issue of gambling addiction. In their final game, they quiz the player on gambling addiction statistics and provide two links to Gambler's Anonymous. They also quiz the player on the history of gambling, causing a confusing message to be sent where it is unclear if the player is being

rewarded points for understanding the larger context of gambling addiction or enjoying a brief history lesson in 20th Century gambling, for example: "What year did it become legal to gamble in Las Vegas?"

It appears that the team did not fully appropriate a critical stance towards this social issue. Being teenage boys, they may have also felt there was a coolness factor to gambling that hindered them from focusing only on its harms. It seemed that the team had initially intended to simulate gambling games in the execution of their own game, and use such games to teach about gambling addiction, creating an immersive experience that could have been rather clever. While the team did not arrive at this level of Actionscript knowledge, they were able to complete a fully playable trivia game. Andrew mentioned in his post-survey that he wished they had more time to complete the game.

When Andrew began the course, he expressed an interest in being a "video game designer." My the middle of the course he elaborated that his dream job would be to work for Capcom, which was the company that designed his favorite video game, *Mega-Man*. By the end of the course, Andrew indicated in his final survey that he was still interested in a career as a video game designer, but also was now additionally interested in being a teacher.

This additional triggered situational interest (Hidi & Renninger, 2006) appears to have been an outcome of his experience in the class supporting and mentoring other students with his growing game design and programming expertise. This shy student seems to have found a new talent. It appears that the co-learning model and a workshop setting that encourages interaction and teamwork among peers and student role-taking that allowed this new interest and talent to emerge.

Conclusion

The cases of Chelsea and Andrew, while particularly exemplary, indicate that even in the first year of implementation, a school like LHS with a single dedicated educator is able to make great strides towards implementing a cohesive, integrated curriculum in Globaloria. Both of these case study students are active bloggers, as well as active programmers, and consistently keep up with their learning logs. Further, both engage extensively in leadership behaviors, peer mentoring, and support of others. Both enter the program with prior career interests in the creative arts (Chelsea, fashion and Andrew in game design) and for both students, it appears their experience reinforces these interests.

While we need to continue to monitor the progress of the full range of students, the success of Chelsea and Andrew in Pilot Year 3 at LHS indicate that the program is providing supports to educators through the summer and winter trainings that give them a strong basis in the course implementation, even those in their first year. The level of detail the LHS students provide in their reflections, as to the syllabus topics they have completed and their game design process indicates that by following the

curriculum closely, first year educators and schools can achieve. Further, it appears that improvements made in Pilot Year 3 to the course wiki, including requiring detailed development plans with very specific question prompts benefited these students' game development process.

While we don't know from a focus on case study students alone that the other LHS students in Pilot Year 3 faired so well, overall, we can say as a baseline that as a first year school, LHS enjoyed some measure of success, given the consistency of students' progress and work across the year, and especially given Chelsea's team's grand prize win of the Globaloria STEM Games Competition. It will be worthwhile to watch and observe the ongoing involvement of this educator and school, to identify further clues to their success, so they can be shared with other first year locations that we have seen to struggle somewhat more at the start.

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