Using *Gamestar Mechanic* with Elementary Art students:
An exploration of one teacher’s experiences.

A Thesis

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By

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ABSTRACT

Games are an emerging form of self-expression and communication. Considered plebeian, games have been ignored as an art form. Use of video games in the classroom incorporates and connects to many 21st century skills, helping students understand visual culture using something they are already familiar with – video games. Integrating games into the classroom curriculum applies current research to teaching and leaning.

Game making in the art classroom develops students’ ability to think non-linearly and to explore color, shape, balance, composition, rhythm, and storytelling, providing transformative experiences. Players learn basic game design principles, learning how to design games by playing and fixing games. Players can make their own games and post them online, receive feedback from classmates, teachers, and other players, and then revise and repost. This paper discusses how this researcher used the video game Gamestar Mechanic in an elementary art classroom and supported an art teacher in learning how to use this tool.
Dedication

Dedicated to my husband, Gordon Aubrecht.
ACKNOWLEDGMENTS

I would like to thank all of the people who have helped me through my process of writing and researching. My advisor, Dr. Ballengee-Morris for being enthusiastic, energetic and a really cool advisor who worked with me and providing mentorship and encouragement and writing a grant with me to make a game, pending funding! Dr. Ballengee-Morris became my advisor when she and Dr. Stuhr (thanks to her too) taught an OSU class at the National Museum of the American Indian in 2009. During this trip I decided on my first thesis topic about the Mound Builder Culture and intended to make a game about it. Through the process of making the game, (lots of thanks to Peter Gerstmann for programming help!) I realized my programming limitations and instead turned my topic to integrating technology into the art classroom. Special thanks to the teacher I worked with, who must remain anonymous because of the IRB requirements. She offered her classroom and allowed me to explore how to use Gamestar Mechanic with students and figure out how to support her in learning how to use it. Also, thanks to E-Line Media for giving me access to their teaching materials as they were being developed and aiding our use of the game.

I also want to thank Rob Griffiths, my colleague at the Digital Union, for supporting me and helping me to become a published author! Part of this thesis is slated to be published as a chapter: Games in E-learning: How games teach and how teachers can use them for the forthcoming book Interactivity in E-Learning: Cases and Frameworks. I would not have done it
without Rob 1) letting me know about it and 2) encouraging me to do it. Also, thanks to Kurt Squire for giving me a word file of his new book: *Video Games and Learning: Teaching and Participatory Culture in the Digital Age* before it was published; it’s an excellent resource covering most if not all of the major aspects of game-based learning. And Jeremiah McCall, who shared part of his new book before it was published: *Gaming the Past: Using Video Games to Teach Secondary History*.

Thanks to the staff at the Digital Union at OSU, where I’ve been a GA for three years, for supporting me and letting me create a role there as the game pedagogy “expert,” allowing me to teach others about game-based learning, and giving me opportunities to present, lead workshops, and grow. Not to mention that they paid my tuition! making it all possible.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Dedication</td>
<td>iii</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>iv</td>
</tr>
<tr>
<td>Vita</td>
<td>v</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vi</td>
</tr>
<tr>
<td>CHAPTER 1  BACKGROUND</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER 2  PROBLEM</td>
<td>8</td>
</tr>
<tr>
<td>CHAPTER 3  METHODOLOGY</td>
<td>12</td>
</tr>
<tr>
<td>CHAPTER 4  LITERATURE REVIEW</td>
<td>16</td>
</tr>
<tr>
<td>4.1 Game Pedagogy</td>
<td>16</td>
</tr>
<tr>
<td>4.1.1 Theory of game pedagogy</td>
<td>16</td>
</tr>
<tr>
<td>4.2 Defining game and play</td>
<td>17</td>
</tr>
<tr>
<td>4.3 The necessity of Play and Creativity</td>
<td>19</td>
</tr>
<tr>
<td>4.4 Defining game, simulation and simulation game</td>
<td>20</td>
</tr>
<tr>
<td>4.4.1 Game</td>
<td>21</td>
</tr>
<tr>
<td>4.4.2 Simulation</td>
<td>21</td>
</tr>
<tr>
<td>4.4.3 Simulation Game</td>
<td>24</td>
</tr>
<tr>
<td>4.4.4 Early Educational games</td>
<td>25</td>
</tr>
<tr>
<td>4.4.5 Virtual Worlds</td>
<td>26</td>
</tr>
<tr>
<td>4.5 How Games Teach</td>
<td>27</td>
</tr>
<tr>
<td>4.6 Using this Medium as a Teaching Tool</td>
<td>29</td>
</tr>
<tr>
<td>4.7 Game-Based Learning – three options for using games in the classroom</td>
<td>31</td>
</tr>
<tr>
<td>4.7.2 Students make games</td>
<td>36</td>
</tr>
<tr>
<td>4.7.3 Use of an existing game or a Commercial off-the-shelf game</td>
<td>51</td>
</tr>
<tr>
<td>CHAPTER 5  OBSERVATIONAL CASE STUDY: USING A GAMESTAR MECHANIC WITH STUDENTS</td>
<td>59</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 4.1: Cone of Learning</td>
<td>22</td>
</tr>
<tr>
<td>Figure 4.2: Buoyancy Playground</td>
<td>23</td>
</tr>
<tr>
<td>Figure 4.3: Pente diagram of playing the game</td>
<td>41</td>
</tr>
<tr>
<td>Figure 4.4: Game play analysis of Duplo</td>
<td>41</td>
</tr>
<tr>
<td>Figure 4.5: Duplo game</td>
<td>42</td>
</tr>
<tr>
<td>Figure 4.6: The &quot;game board.&quot;</td>
<td>43</td>
</tr>
<tr>
<td>Figure 4.7: Panovska’s wind and solar patterns</td>
<td>44</td>
</tr>
<tr>
<td>Figure 4.8: Panovska’s diagram of tiers</td>
<td>45</td>
</tr>
<tr>
<td>Figure 4.9: Do I have a Right?</td>
<td>55</td>
</tr>
<tr>
<td>Figure 5.1: Gamestar Mechanic presentation slides</td>
<td>71</td>
</tr>
<tr>
<td>Figure 5.2: Robert Torres chart of game elements</td>
<td>72</td>
</tr>
<tr>
<td>Figure 5.3: Mission completed charts for each class</td>
<td>75</td>
</tr>
<tr>
<td>Figure 5.4: Screen shot of comments on student games</td>
<td>79</td>
</tr>
<tr>
<td>Figure 5.5: Game Alley’s feedback area</td>
<td>80</td>
</tr>
<tr>
<td>Figure 5.6: Ensposuble</td>
<td>81</td>
</tr>
<tr>
<td>Figure 5.7: Birth of a Hero, student game</td>
<td>83</td>
</tr>
<tr>
<td>Figure 5.8: Screen shots from Food and Water grouped together</td>
<td>84</td>
</tr>
</tbody>
</table>
Figure 6.1 Ellen Owen’s lesson. .................................................................89

Figure 6.2. Screen Shots from *September 12: A Toy World*, and *Darfur is Dying* .................90
CHAPTER 1  BACKGROUND

"Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road."
(as cited in Hausman, 1991, p. 4).

“Can games teach?” and “What do they teach?” are two questions that are at the forefront of pedagogy. In the name of accountability, educators are confronted with demands from legislators who mandate testing as the primary indicator of success (Gee & Shaffer, 2010; Squire, 2011; Valli, Croninger, Chambliss, Graeber, & Buese, 2008). However, analysis of these accountability measures by the National Research Council (2011) report Incentives and Test-Based Accountability in Public Education has shown them to be ineffectual in increasing student achievement. Concurrently, there is a growing awareness about the importance of incorporating 21st century learning skills, many of which can be met with digital video games (smartbean, November 2009; Wellings & Levine, 2009) and new media literacies into the curriculum. This requires that both the role of the teacher and the way that schools are organized undergo examination and transformation. Gee & Shaffer (2010) call for a “radical” transformation of assessment in order “to succeed in introducing the new ways of learning that computers make possible” (p. 6). Technology, in general, can allow a teacher to move into the role of facilitator (Morrison, Lowther, & DeMeulle, 1999), partner (Prensky, 2010) and coach and advisor (Squire, 2011). Teachers can guide students in thoughtful and researched sharing of ideas, recognizing that they themselves do not have to
know all of the answers. The role of the student can also be transformed from passive receiver of knowledge to active producer (Jenkins, 2006; Gee & Hayes, 2010; Prensky, 2010; Squire, 2011).

Because students grow up in a visual culture, it is imperative that they be able to understand and navigate within it. Discussion in the art education literature suggests that video games are a significant aspect of visual culture, even when it is not explicitly stated. For example, Keifer-Boyd, Amburgy, and Knight (2003) state:

In creating, one needs to consider the cultural use of symbols and recognize how culture shapes our preferences for design, colors, and subject, or content. Creativity is not only the expression of personal feelings; it communicates cultural values and social meanings (p. 50).

They conclude by stating “perception is active interpretation, or making meaning. In other words, what we SEE is not primarily based on sense stimulus, but on past knowledge, situational contexts, and cultural narratives” (p. 51) Written in 2003, video games had not yet been accepted as an art form (and some would still dispute that), nor considered valuable in the classroom, and very few people were making their own video games. However, as the authors define visual culture, it is clear that video games, both as something to be played and created, are an essential part of our visual culture and narratives and indisputably about meaning-making. According to Freedman, (1997) understanding visual literacy requires “a broad view of creative production and interpretation in relation to multiple meanings and visual qualities is called for if we are to understand and teach about the use of images in contemporary life” (p. 7). As video games mature as a medium, conventions for the user-interface and in-game navigation are a significant use of symbols that are shaped through contemporary culture and an on-going exploration of how to communicate visually and interact with a computer or game console. For example, Microsoft’s Xbox Kinect has
radically altered the game interface by removing the controller. Players interact with the
game space by using gesture control, voice commands, and face recognition. In the past,
much of the discussion in art education has been about technology use. This thesis will
explore several aspects of technology use in art education that are relevant to the discussion
of making games in the art classroom. Video games can be understood as a form of art
making using technology.

Video games, now well established as an entertainment medium, have the potential
to change the way that students and teachers think about learning (McLellan, 1996; Jenkins,
Clinton, Purushotma, Robison, & Weigel, 2006; Prensky, 2006; Annetta, 2008; Gee &
Hayes, 2010). According to Thai, Lowenstein, Ching, and Rejeski (2009):

Educational digital games offer a promising and untapped opportunity to leverage
children’s enthusiasm and help transform teaching and learning in America. These
games allow teachers to tap into their students’ existing enthusiasm for digital games
to engage, expand, and empower them as learners. (as cited in Wellings & Levine,
2009, p. 10).

Video games provide powerful and complex learning tools and environments
through their inherent ability to combine such multimedia as video, sound, text (including
narrative), visual information (images, tables, graphs), and simulations, including pulling
information from databases in real time. MIT’s Ubiquitous Games project features games in
production that are intended for mobile devices and handhelds. Smallab Learning at Arizona
State University uses wall- or ceiling-mounted projection equipment and sensors to make use
of motion-capture technology to create multimodal, embodied learning games that are
projected on the floor. Smallab is also developing a new product, the 3D Interactive
Whiteboard, so that the games they are developing can be used with an interactive
whiteboard. Tested in classrooms and museums, their library of embodied learning content
spans several disciplines including Science, Technology, Engineering, Mathematics (STEM), Language, Special Education, Gaming, and the Arts.

Video games can provide an alternative avenue of compliance with legislative demands to teach standards and demonstrate learning through testing, without recourse to having to teach to the test through memorizing information that is soon forgotten by the students; learning proceeds through using games that have embedded assessment that can provide both the learner and the instructor with performance feedback (summative assessment) (Gee & Shaffer, 2010). Essentially, games are designed to test and challenge players. Players are actively engaged in problem solving, understanding complex relationships, building upon what they have learned in order to progress, and experiencing the consequences of their choices. David Shaffer (2006) explains that the difference between testing and learning by doing as the “difference between knowing that and knowing how – between declarative knowledge and procedural knowledge, or being able to explain something and being able to actually do it” (p. 91-92).

Games and video games in the classroom can provide students with opportunities to work together, expand the walls of the school to include other classrooms in other cities and countries through massively multi-player online role-playing games (MMORPG) and online tools. Students can collaborate through game spaces, social networks, forums, blogs, and wikis. In the hands of a skilled educator, video games are well suited to lessons that teach multiple perspectives much as novels, documentaries, and current events afford such opportunities. Additionally, games provide a visual impact that is multiplied by interactivity, providing context for the content and allowing students to make decisions and choices.
Gee (2007) refers to contextual content found in games as “situated learning”, in which students access information that they need when they need it, or “just in time,” in order to progress in a game. Medina (n.d.), a developmental molecular biologist, explains that “the brain processes meaning before it processes details.” Educators often give students details without context, expecting that students will process details to find meaning. If a student can contextualize and apply information, he or she is more likely to remember it (or build in knowledge of the process through which the goal was reached) and be encouraged to tackle more challenging tasks. Pokémon, a role-playing game that uses cards involving 250 characters and a complex rule system, is often played by elementary-age children. Gee uses the example of how some students who exhibit the ability to learn and master Pokémon’s complex naming structure and game play seemingly lack the ability to learn specific academic domains and language (Gee, 2004). This is not due to the students’ inability to learn domain-specific language, but rather to the student lacking motivation or any understanding of why it is important to learn material. Basically, students lack the connection to the context. Their learning is not “situated.” Game environments can situate terms within the context, helping the students to grasp the relevance and application of the terms and knowledge (Gee, 2004).

The theoretical underpinnings of learning in game environments come from constructionist theory attributed to Dewey and Vygostky and built upon by play theorists such as Sutton-Smith. Squire (2011) suggests that the Montessori method of teaching “provides a model of what a game-based learning system should look like” (p. 49). In a Montessori school, students are encouraged and allowed to follow their interests and learn from the materials provided in an “ordered environment designed to pique their interests,
instill a sense of order and pattern to the world, and push them toward developing deep understanding.” It is freedom within boundaries (Squire, p. 51).

There is a growing understanding among scholars and educators that video games are a viable tool for learning that is evidenced by myriad articles in professional journals and conferences such as Games for Change and Games+Learning+Society. Games can be used both as instructional tools to teach concepts and social issues and to teach. This researcher used Gamestar Mechanic with students in an art classroom. Game-making software is much like using other software tools that art educators have been using for years such as Photoshop, Paint, and iMovie, among others. Creative thinking, image making, gathering multiple perspectives, making connections, and reflective thinking are facilitated when people make games (Keifer-Boyd, 2005). Additionally, many art educators have been using Second Life, an online virtual environment, to explore identity issues. Second Life “encourages the kinds of learning we believe are most meaningful in art education – interactive, collaborative, inquiry-based, constructive, connected, interdisciplinary, and relevantly provocative” (Taylor, Ballengee-Morris, & Carpenter, 2010, p. 215).

Herein, I will explain how and what games are purported to teach with a specific focus on game making in the art classroom. This thesis is a case study exploring how an elementary art teacher used Gamestar Mechanic with fourth grade students. The purpose is to look in-depth at what support and training a teacher needs in order to understand how to use Gamestar Mechanic (and more generally video games) with students and how to design meaningful lessons.

The problem is stated in Chapter 2, explaining why this thesis is necessary. In chapter 3, I describe the case study methodology and explain the methods I used.
is a literature review that also supports why game-based learning is an effective tool and what learner outcomes are addressed through it. Chapter 5 describes the case study with an elementary art teacher using *Gamestar Mechanic* with fourth graders; and Chapter 6 concludes this thesis with a look at how this research could be furthered and the future of digital game-based learning research.
CHAPTER 2 PROBLEM

There is growing evidence that strongly suggests that non-traditional learners are more motivated when games are used in the classroom (Steinkuehler, 2010a; Klopfer, Osterweil, Groff, & Hass, 2009a) and that children with learning disabilities are better able to learn with games (Marino, Basham, & Beecher, 2011). Games seem to be finding their way into teaching environments, and for solid reasons. According to Van Eck (2006), “the core principle [of serious game is] that games can promote learning at higher taxonomic levels” (p. 22). Also, “games are good at involving students in a procedural experience” (Magerko, 2009, p. 1276). The 2011 Horizon Report projects that game-based learning will be widely adopted by higher education within two to three years. It states that “research and experience have already shown that games can be applied very effectively in many learning contexts, and that games can engage learners in ways other tools and approaches cannot” (Johnson, Smith, Willis, Levine, & Haywood, 2011, p. 22).

One study found that digital games can considerably improve students’ knowledge of the subject matter as well as their enjoyment, engagement, and interest in learning. The findings were the same for both boys and girls (Papastergiou, 2009). Papastergiou’s study supports other prior studies on the same topic while also showing increased student academic achievement and motivation (Klawe, 1999; Rosas, Nussbaum, Cumsille, Marianov, Correa, et al., 2003; Ke & Grabowski, 2007).

There is a need for more studies that demonstrate how games help students learn (Becker, 2010; Ng, Plass, & Zeng, 2009; Wellings & Levine, 2009) and how learning is facilitated (Charsky, 2010). However, evidence about the benefits of game-based learning is
hard to categorize, especially if we assume that scientifically designed studies are to be conclusive. Conclusively determining whether or not a game is successful or useful for educating children is like creating the optimal diet. Individual needs preclude a one-size-fits-all solution. There are too many variables to take into account, such as allergies, birth defects, environmental influences, and so on. Likewise, individuals have different learning styles and abilities, which may be affected by their health and living environments.

Individuals have access to different opportunities to learn outside of school, and they may or may not have parents who encourage learning and provide a computer, books, discussion, and trips to libraries, parks, and museums. All of these factors make sound research studies hard to design and conclusive evidence for success elusive.

Squire (2011) superbly describes the momentous difficulty in conducting meaningful research in the Appendix of his book *Video Games and Learning: Teaching and Participatory Culture in the Digital Age*. Access to classrooms for research is just one difficulty. Creating controls that conclusively determine what factors influence student learning is virtually impossible. Squire (2011) concludes that the best research models are ones “that instantiate pedagogical ideas in interventions co-constructed with teachers” (p. 234). Furthermore, he pointedly states that instead of dwelling on which measurements to use, we should rethink assessment and evaluation procedures, taking into account that we live in a participatory culture. He charges us to:

Imagine students, teachers, and parents discussing what evidence constitutes successful participation in science. Imagine performance not being reduced to a single score on a normed test, but rather, a battery of assessments (including those from peers) indicating what the student has done, is good at, and needs to work on in areas from game design to verbal communication. (p. 418)

Gee and Shaffer (2010) also support this view. They argue that nearly everything relevant to
typical assessment methods should be reconsidered.

We argue that three fundamental properties of assessment need to change in the 21st Century: what is assessed, how the assessment takes place, and the purpose of assessment in the first place. (p. 6)

They also explain that using digital media is an ideal way to collect and organize information, potentially using this “information to help learners and to judge the success of programs, processes, and practices for learning” (pp. 8-9).

According to a white paper from the Joan Ganz Cooney Center at Sesame Workshop, how to use technology is a more pressing question than whether or not it should be used. The white paper cites numerous benefits among which are building 21st century skills, engaging students in content creation, providing access to virtual communities and expertise, supporting STEM fields, differentiated instruction and reducing the dropout rate (Wellings & Levine, 2009). Before students can benefit from playing educational games, support materials (Baek, 2008) and training for teachers are needed so that games can be integrated into the curriculum (Becker, 2010; Oblinger, 2006; Thai, et al., 2009). According to Oblinger, (2006) “integration requires an understanding of the medium and its alignment with the subject, the instructional strategy, the student’s learning style, and intended outcomes” (p. 7). Through training and support, teachers can gain understanding, confidence, and the ability to use games with students (Becker, 2007).

It may be that integrating games will face the same challenges that teachers must overcome to use arts integration methods. Identifying barriers to arts integration methods and introducing other new curriculum materials or teaching methods (Oreck, 2004; Probart, McDonnell, Lachterberg, & Anger 1997; Werner & Freeman, 2001) reveal similarities. Baek (2008) identified several barriers to using games in the classroom, including teacher concerns
about the negative effects of gaming, student uneasiness, fixed class schedules, inflexible curriculums, and limited budgets. Rice (2007) also identified lack of adequate computer hardware, fixed class schedules, and a lack of alignment to state standards as barriers to integrating games into the curriculum. Other factors inhibiting the use of games include objections from those who are concerned about negative influences from games (Rice, 2007) or who consider games to be inappropriate for education (Charsky & Mims, 2008; Oblinger, 2006). Additionally, non-gamer students may feel concerned about their ability to figure out how to use games (Baek, 2008; Charsky & Mims, 2008).

There are many constraints that vary from school to school and teacher to teacher, including availability of computers, internet access and speed, working with IT, and, in most cases, obtaining approval for accessing online games. Teachers may not have time to play a game long enough to feel confident in using it with students, creating a lesson or unit based on it, or adapting a game lesson guide to meet specific curricular needs. Also, because games differ widely, figuring out how to assess student learning may present difficulties.

This researcher believes that games can be useful learning tools and that teacher professional development and support is a key component of implementing this new teaching tool. In order to begin my own exploration of using games in the classroom, I worked with a teacher in a school system that is on academic watch. My research question is: What kind of professional development and support does an elementary art teacher need in order to use Gamestar Mechanic with students? This is a case study of this teacher’s experience in using Gamestar Mechanic with fourth grade elementary art students including the ways in which the researcher supported her efforts and provided professional development.
CHAPTER 3 METHODOLOGY

This is an observational case study of a teacher using an existing game to teach game design and game making. Through the process of using the game, I also employed action research.

Using a case study as my methodology seemed to be the best way to explore how an elementary art teacher, (hereafter referred to as Brooke, an alias to protect her identity) working in a school district on academic watch could use Gamestar Mechanic with her students. Case studies are an established form of research and are useful for teaching purposes (Reinharz, 1992). The Dictionary of Sociological Terms defines case studies as “a method of studying social phenomena through analysis of an individual case. The case may be a person, a group, an episode…” (as cited in Reinharz, 1992, p. 164).

In this case study, the teacher is the focus. By focusing on the teacher, I could explore the kinds of support she needed to use a game with students. Brooke was unfamiliar with digital game-based learning. Brooke wanted to incorporate technology into her classroom and encourage student’s digital literacy through using the computer lab. She needed a method that would meet the academic art standards and work into her curriculum. The video game Gamestar Mechanic allowed her to do that. Since the game had been used with students during the game’s development at the University of Wisconsin, the learner outcomes had already been researched. Additionally, obtaining IRB approval to study student interaction may have proved too difficult. Brooke had asked me to help her integrate
technology into her teaching; if some students had been prevented from participating, it would have been too disruptive to the classroom environment to provide alternative activities.

My research interests lie in understanding the barriers teachers face in integrating games into their curriculum. Working with Brooke allowed me the opportunity to use Gamestar Mechanic with students and thereby understand, first hand, the obstacles she faced in her school; it helped me to figure out better ways to communicate information to students and support Brooke and her students in their use of this tool. Brooke provided the underpinnings of this activity by relating it to art curriculum goals and conducting a preliminary activity that supported introducing Gamestar Mechanic and game design principles.

My methods included:

1. observation of the class,
2. my journal reflections, and
3. interviews with Brooke.
4. Member check

Before I began working with her in the classroom, I interviewed Brooke. I also interviewed her two more times during our work with students, and then I did a concluding interview.

To conduct the interviews, I used Delbeare and Schuman’s three-interview method (as cited in Seidman, 1998). Seidman explains that this method allows both the participant and the interviewer “to plumb the experience and to place it in context” (p. 11). First, the interviewer should focus on the participant’s life history. In the first interview, I asked Brooke some questions about her background and why she wanted to use a digital game with students and what she hoped to gain. Second, the interviewer should focus on the details of the experience. In this case, I asked about how Brooke thought the lessons were going, what strategies we could use to improve them, and what support she would like from
me. Thirdly, the interviewer asks the participant to reflect on the meaning of the experience. In the final interview, Brooke reflected upon our experience with the students and what I could provide that would give her support in using this game in the future. She said she thought of our work together as an experiment and said she would likely use this as a project with students next year, even though this year, she wouldn’t have been able to do it without my assistance in the classroom.

Through the interview process, Brooke was able to discuss what we did together, reflecting on why she wanted to do it and what she learned through the experience. It also allowed us to decide how she could reuse this lesson next year, considering what she could do by herself, what changes to make, and identifying the support she would need and how she could get it. According to Seidman (1998) interviews allow the interviewee to tell a story, which is a “meaning-making process” (p. 1).

During the time I worked with her, I journaled about what we did with students and how I supported her. I interacted with her students, modeling how to teach game design and how to help students use Gamestar Mechanic. Initially, I had expected her to lead the lessons and that I would be a silent observer in the classroom. Because Brooke did not feel confident about her ability to teach this subject, I led the lessons. She and I made decisions together about what we would do in each class. We met 16 times over a 6-week period with two classes of fourth graders.

Through this process, the second methodology of action research was employed. As explained above, Brooke required this researcher’s participation in order to support the goal of introducing technology into the classroom. In this way, I supported Brooke’s professional development. We worked on it together, reflecting upon our methods and student
responses. According to Reason and Bradbury (2001), “a primary purpose of action research is to produce practical knowledge that is useful to people…” (p. 2). During the time I spent with Brooke and her students, I was able to help her to become confident in her ability to use Gamestar Mechanic with students in the future. Together, we introduced technology into the classroom through using a video game. Brooke was able to learn how to use the program and understand how game design and art can be integrated through using Gamestar Mechanic.
CHAPTER 4  LITERATURE REVIEW

The computer is the new tool, the new medium which links the concept of information and art together.... Due to the computer’s complexity and its capability of being used for such diverse possibilities, it is a tool and a medium with its own built-in agenda. Electronic tools (emphasis added) have a hidden point of view—far more complex than that built into a brush, printing press, or a camera.

(Lovejoy, 1992, p. 139, 142, as cited in Rogers, 1995, p. 17).

4.1 Game Pedagogy

4.1.1 Theory of game pedagogy

Dewey explained in 1897, “the teacher is not in the school to impose certain ideas or to form certain habits in the child, but is there as a member of the community to select the influences which shall affect the child and to assist them in properly responding to these influences” (as reprinted in Pestritto and Atto, 2008, p. 129). We now view this as a paradigm shift from sage on the stage to guide on the side. Over 100 years have passed since Dewey wrote *My Pedagogic Creed* and we are still entrenched in the factory model of education, ignoring much of what we know about learning and cognitive development in our teaching practices. Digital games and their use in teaching 21st Century Learning Skills may provide the impetus to embrace Dewey’s idea about the nature of learning and the purpose of formal education: that it is primarily a social institution. He believed that education is to support both the psychological and sociological aspects of a child’s development, building upon children’s interests and abilities, and connecting them to the community. He stated, “Education…is a process of living and not a preparation for future living” (p. 127). Game-based learning advocates students’ using games as a process of engaging in real-world
activities, participating in communities of practices, and becoming producers (Jenkins, 2006; Gee & Hayes, 2010; Gee & Shaffer, 2010; Prensky, 2010; Shaffer, 2006; Squire 2011).

4.2 Defining game and play

While many game scholars have discussed the difficulty of defining game and play, Salen and Zimmerman in their book *Rules of Play*, plumb the depths of this conundrum. After exploring and discussing the merits of multiple definitions and implications of those definitions, they settled on the following definitions:

**Game:** “A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome” (p. 80).

**Play:** “Play is free movement within a more rigid structure” (p. 304).

**Play and games:** “Games are a subset of play: Games constitute a formalized part of all activities considered to be play. And Play is an element of games: Play is one way to frame the complex phenomenon of games” (p. 311).

Agreeing with Salen and Zimmerman, Ian Bogost (2008) explains that play allows the creation of a “possibility space” that is “created by constraints of all kinds. Play activities are not rooted in one social practice, but in many social and material practices” (p. 120). Johan Huzinga’s book *Homo Ludens* is a seminal work about play and games. In this book, Huzinga (1950) states “play is non-serious,” which is not to say “not serious” (p. 5). And he further contends that “play lies outside morals” (p. 213). Huzinga (1950) coined the phrase “magic circle” to explain how a play space transports us to a consecrated spot that finds its place among temples, stages, courts of justice, tennis courts, and card tables “dedicated to the performance of an act apart” with special rules, actions, and goals we may voluntarily perform (p. 10).
According to the *Gamestar Mechanic design guide* (Institute of Play, 2009) a game is “a rule-based system that engages players by challenging them to overcome an obstacle or challenge in order to reach a goal” (p. 54). Salen (2008) explains that play is meaningful. “Games, like other forms of media, are systems of meaning that are read, interpreted, and performed by players” (p. 10). Jesse Schnell (2008) describes a game as a “problem-solving activity, approached with a playful attitude” (p. 37).

An alternate succinct characterization of games is given by Jane McGonigal, (2011) “all games have four defining traits: a goal, rules, a feedback system, and voluntary participation” (p. 21). The final component, voluntary participation, may give one pause when considering that, if a game is to be used as an educational tool, playing it would become compulsory. McGonical explains that voluntary participation means that the player accepts the goal, rules, and feedback. She then gives her own favorite definition of game play from Bernard Suits (1978), who said, “Playing a game is the voluntary attempt to overcome unnecessary obstacles” (p. 38, as cited by McGonical, 2011).

The definition of simulation and game is as elusive as the definition of play. Game scholars have many different ways of describing these terms. In 1996, these terms were differentiated in *Instructional Media and Technologies for Learning*. Heinich, Molenda, Russell, & Smaldino (1996) explained that while “these are separate concepts, they do overlap and have been used interchangeably,” causing confusion (p. 327). David Shaffer (2006) would say that all games are simulations because they are representational or models of reality. While this is true, it doesn’t help one to select the appropriate game for a given learning outcome. Having some distinctions can help sort out the options. Herein we will use the terms simulation,
simulation game, and game to describe three variations of digital interactive media. What follows is a differentiation of the terms.

4.3 The necessity of Play and Creativity

Play is a topic that is receiving widespread discussion as people revisit the purpose and necessity of it in our lives. Physical activity is essential to our physical and mental well-being. Students who exercise right before a test score higher than those who do not (Medina, 2008). The neuroscience of play has shown that students need art, music, and recess to develop creativity that is necessary for the workplace (Brown & Vaughan, 2009). However, physical education and art programs are being cut from school curriculums so that there is more time to prepare for mandated testing. Brown and Vaughan cited Panksepp’s research involving animals that indicated that “depriving young animals of play might delay or disrupt brain maturation,” which is similar to how ADHD in humans affects self control. “Without play, Panksepp suggests, optimal learning, normal social functioning, self-control, and other executive functions might not mature properly” (as cited in Brown & Vaughan, 2009, p. 100). Brown and Vaughan also discuss the findings of Byers, who studies animal play.

Byers speculates that during play, the brain is making sense of itself through simulation and testing. Play activity is actually helping sculpt the brain. In play, most of the time we are able to try out things without threatening our physical or emotional well-being. We are safe precisely because we are just playing. (Brown & Vaughan, 2009, p. 34)

Brown and Vaughan (2009) conclude:

Play is nature’s greatest tool for creating new neural networks and for reconciling cognitive difficulties. The abilities to make new patterns, find the unusual among the common, and spark curiosity and alert observation are all fostered by being in a state of play. (p. 127)
Playfulness is necessary to creativity, exploration of ideas, taking risks, trying new strategies, and creating new ways to organize data and ideas. Games employ these elements of playfulness. “Good games always involve play and schooling rarely does” (Klopfer, Osterweil, & Salen, 2009b, p. 4). Games also support learning styles that fall outside of traditional learning methods. Gardner’s (1999) multiple intelligences theory supports the idea that people learn in different ways. Prensky explains that in games students learn by doing, learn from mistakes, and experience “goal-oriented learning, discovery learning, task-based learning, question-based learning, situated learning, role playing, coaching, constructivist learning and multi-sensory learning” (as cited in Akilli, 2007, p. 157). To be competitive in the 21st century, students must be guided in developing all of their intelligences, including the emotional and physical aspects, thereby equipping them to solve problems, think critically and analytically, and use the ever-changing internet, communication systems, and software tools (Galarneau, 2007).

4.4 Defining game, simulation and simulation game

Educators have many different applications for the terms “simulation”, “simulation game”, and “game”. In 1996, these terms were differentiated in Instructional Media and Technologies for Learning. Heinich, et al. (1996) explained that while “these are separate concepts, they do overlap and have been used interchangeably,” causing confusion (p. 327). David Shaffer (2006) would say that all games are simulations because they are representational or models of reality. Becker (2010) clarifies that “all digital games are computer simulations, although the reverse is not true” (p. 29). Having clear distinctions can help sort out the options when selecting the appropriate interactive media for a given learning outcome. Below the author distinguishes the terms “game”, “simulation”, and
“simulation game” to describe three variations of interactive digital media. The author will briefly look at early educational games and discuss virtual worlds and how those can be leveraged for learning environments.

4.4.1 Game

The definition of game herein is broad and encompasses simulation games as well as all non-digital games. (Refer back to the definitions from Salen and Zimmerman and McGonigal in the Defining Games and Play section above.) A video game may or may not attempt to simulate a time in history, include a narrative, or model something realistic. Games can be abstract, like tic tac toe, chess, or Tetris. In *The Video Game Explosion*, Wolfe (2008) identifies 43 game genres. Categorizing games can be confusing. It is worth noting that games are also aesthetic objects and cultural objects (Zimmerman, June 2011). While the focus herein is on games that can be used for teaching, it is not meant to exclude games that do not fit neatly within the serious or educational game genre. Klopfer, et al. (2009b) explains the purpose of an educational game: “learning games…target the acquisition of knowledge as its own end and foster habits of mind and understanding that are generally useful or useful within an academic context” (p. 21). With this definition in mind, many games that were not intended for education could be repurposed by a skilled teacher. Simply put, a game is educational if it is being used to teach.

4.4.2 Simulation

Simulation can describe a model that accurately demonstrates a phenomenon and is user-directed, allowing for dynamic and interactive engagement with the subject matter. This is especially useful in the sciences. Bill Nye the Science Guy and his televised science
demonstrations are a good example of this. Demonstrations are good, but doing it yourself is even better. Sometimes setting up experiments for large numbers of students is impractical or expensive; a digital simulation could be the best alternative. Don Meen’s 1993 study claimed that if someone learns by doing something, even through a simulation, they will retain 90 percent of what they have learned, compared to only 10 percent of what they read and 50 percent if they watch someone performing the task (Meen, 1993, as cited in Klopfer, 2009b). This is also supported by Edgar Dale’s diagram, Cone of Learning, below (Figure 4.1) (Percepsys, n.d.).

Figure 4.1: Cone of Learning. Virtual performance of tasks makes it more likely that one will retain information at 90%.
Many examples of digital simulations are available through the PhET project at the University of Colorado (http://phet.colorado.edu/). This project has created many research-based, interactive simulations for physics, biology, chemistry, earth science, and math. The buoyancy simulation, for example, allows the user to explore how density, mass, volume, and the material of an object can affect buoyancy (see Fig. 4.2). The user can adjust the sliders to change some crucial properties of the object. This is an example of a simple simulation. It prompts to me ask, “What happens if….” As with a flight simulation, one is not actually flying, but it feels as if one were. When we are absorbed in learning something we care about, we lose track of time. A straight simulation can sometimes be totally absorbing, requiring all of one’s attention; this is an example of flow (described above).
4.4.3 Simulation Game

A simulation game builds upon the idea of representation or modeling of real-world phenomena. The more complicated simulations also share some similarities to simulation games. In a simulation game, specific goals are added, thereby introducing the possibilities of success, failure, the option to try different things, and risk taking. Players have options to employ and develop multiple strategies, and in some cases they can work together with multiple players online, as in World of Warcraft, Age of Empires, and Civilization. In these examples, one can see how fluid the line is between “simulation” and “simulation game”. Some of the simulation games could also share characteristics with the physics simulation example above. The major difference is that a simulation game does not have to be completely accurate, or it may reflect the designer’s interpretation. For example, in Civilization there are historical biases or limitations of the game environment that prevent it from being 100% accurate. Furthermore, a simulation game is an interactive model that allows students to understand a system without being hindered by minutia. The game designer decides the most important information to communicate and how much detail to include. As Squire describes, “if the model gets too complex, then you can’t observe the consequences, and it is not entertaining, nor educational. … We don’t want a 1:1 map of the world. We want a model to illustrate ideas” (2011, p. 23). Simulation games also provide defined goals and rule systems. In understanding buoyancy, there is no inherent task that leads one to reach a particular goal. The goal of the simulation is to allow a student to explore and manipulate until understanding is reached. “A simulation game combines the attributes of a simulation (role playing, a model of reality) with the attributes of a game (striving toward a goal, specific rules)” (Heinich, et al., 1996, p. 332).
Some simulation games create environments in which players take on roles, such as “game designer” in *Gamestar Mechanic* and “urban planner” in *Urban Science*. Shaffer has been researching educational games in the epistemic game group. Epistemic games engage students by involving them in a community of practice.

Epistemic games are games that help players learn the ways of thinking—the epistemologies—of the digital age. …Creative professionals learn innovative thinking through training that is very different from traditional academic classrooms because innovative thinking means more than just knowing the right answers on a test. It also means having real-world skills, high standards and professional values, and a particular way of thinking about problems and justifying solutions. (Epistemic Games Website, 2011)

At the time of publication, epistemic games, such as *Digital Zoo, Urban Science*, and others featured on the website, are not available for use because they are still in the research stage.

4.4.4 Early Educational games

Historically, Ito (2008) identifies three categories of video games that have been designed for children: educational, entertainment, and construction. Educational games used in schools are typically drill-and-practice exercises that are tied closely to curricular goals. Examples can be found in games such as *Reader Rabbit* and *Math Blasters* that focus on memorization. Trying to disguise drill and practice as fun tasks that are rewarded by game play doesn’t really fool children; they are still answering traditional multiple-choice questions and math problems. Entertainment games are defined as those that are “exploratory, narrative-based games that privilege play” (Klopfer, et al. 2009b, p. 17), such as *Where in the World is Carmen San Diego?* Finally, construction games are those that allow a player to make or operate something, such as *SimCity* and *Zoo Tycoon*. Some of the entertainment games are educational, teaching valuable skills sets, while some of the games designed to be educational were a porting of typical educational approaches to a digital medium, such as demonstrating
learning through quizzing and drill and practice exercises. In an effort to make educational games more engaging, many educational game designers are using methods similar to those that the entertainment industry uses.

4.4.5 Virtual Worlds

Virtual worlds provide an online 3-D environment where participants can “walk” around as an avatar and communicate with other online participants in real time. *Whyville* and *Kidscom.com* are two educational spaces developed for children, both of which have games embedded within them. *Quest Atlantis* is a 3-D, multi-user, immersive environment that offers quests, blogging, and interviewing and social opportunities. While it has some game elements, it is more a virtual world than a game. Similarly, *River City* is a multi-user environment that was created for middle school students in which they explore a River City where several illnesses are affecting the town. Students work in teams to do research, and they compare their evidence and hypotheses after they have explored the virtual world.

Art Educators have been using Second Life, a virtual world, to teach art and create gallery spaces. According to Taylor et al. (2010), Second Life provides opportunities for “creative challenges and possibilities” (p. 216). Exploration of identity issues, reflecting on community and social justice, and thinking about collaborative and asynchronous creation of virtual spaces and objects are some of the ways that art educators have used Second Life. Lu, a professor at Northern Illinois University, has created the Art Café @ Second Life which she uses to explore and develop “virtual pedagogies and to investigate “virtual” visual culture for the 21st century art education” ([http://arted.niu.edu/artedu/research.html](http://arted.niu.edu/artedu/research.html)). She has used this to investigate identify issues, visual culture and gender, and designed learning events in Second Life. Lu used Second Life as a sandbox for teachers to plan a design, build,
test, and reflect to create participatory learning environments (Anderson & Lu, 2011). The Art Café can be found in Second Life at The Art Cafe - NIU Glidden Campus, Glidden. OpenSimulator, similar to Second Life, is a new open-source, multi-platform, multi-user, 3D application server that allows users to create virtual environments.

4.5 How Games Teach

As mentioned in Chapter 1, games are structured environments that allow the freedom within boundaries (Squire, 2011). In Moving learning games forward, Klopfer et al. (2009b) explained how play allows one to exercise freedom along five axes: freedom to fail (step towards mastery); freedom to experiment; freedom to fashion identities (defining the self/understanding their relationship to others and the world); freedom of effort (can alternate between intense and relaxed); and freedom of interpretation (p. 4). These freedoms allow children to grow through failure and exploration. Oblinger (2006) states that “games embody many attributes associated with how people learn: games are social and experiential, they require players to recall prior learning and develop new understanding, and being successful depends on problem-solving” (p. 6).

For the player to remain engaged in game play, there must be a balance between challenge and the player’s ability to succeed. This is referred to as “flow” (Csikszentmihalyi, 1990). Flow theory can apply to any activity wherein one becomes absorbed in something and time passes quickly. Game designers have used flow theory to explain the optimal gameplay experience. Players can become immersed in a play experience for hours as they navigate through a series of challenges within a game. If a game is too easy, players become bored. If it’s too difficult, players become anxious or frustrated. Chen (2007) cites Csikszentmihali’s eight primary components of flow:
1. a challenging activity requiring skill;
2. a merging of action and awareness;
3. clear goals;
4. direct, immediate feedback;
5. concentration on the task at hand;
6. a sense of control;
7. a loss of self-consciousness; and
8. an altered sense of time. (p. 31-32)

Being in a state of “flow” is important not just to games but to any learning activity (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003).

Games that incorporate the components of flow are engaging and effective. The most effective games are those that incorporate the right degree of challenge, providing the information required to succeed as it is needed, offering more than one way to reach the goal, requiring critical and analytical thought and decision-making, and giving the player feedback and a feeling of satisfaction and pleasure in accomplishments within the game.

Within a good game, learning is scaffolded. As the player advances in the game, she builds upon what she already knows. Advancing to the next level lets the player know that she has achieved a level of mastery. The next level provides new challenges that build upon what the player has already learned. As the challenges increase, the player's skill will have increased as well. Gee (May 2010) argues that if an educational game is properly structured, winning the game indicates mastery. In such a case, there would be no need to test whether or not the student had learned the lessons of the game.

According to Salen (2008), “games, like other forms of media, are systems of meaning that are read, interpreted, and performed by players” (p. 10). Salen further explains that “the term system refers not just to the game itself, but to the entire tool-set available to the player within a gaming practice, including FAQs or strategy guides, cheats, forums, and other players in and out of multiplayer settings” (p. 13). Playing a game can encourage
collaboration and shift the student’s role from passive consumer to active producer (Squire, 2011; Gee & Hayes, 2010).

In playing a game and understanding how the game system works, patterns emerge. As Koster (2005) explains, humans are natural pattern seekers. There are patterns in nature, politics, ethics, and social behavior, all of which can be expressed dynamically in a game. As each person uses an acquired knowledge of systems and identifies her place within those systems, she creates a frame or multiple frames for viewing reality. According to Lakoff (2008), human beings can hold contradictory frames of understanding and belief. In a learning environment, a teacher can guide a student in exploring systems of understanding to identify the frames that she is constructing while also challenging her to examine them.

A teacher must identify the best games for teaching and understand how to use them. Not all games are well-suited to the educational environment and not all educational games serve the purpose of advancing 21st century skills. Many educational games mimic traditional educational methods, doing little to incorporate the innovative ways that video games can interactively engage students. Gee states that a good game is one where the way a game is designed to be played is perfectly married to the problem to be solved (June 2011). Consensus about what constitutes a quality educational video game is still being researched and has yet to be established. To this end, Squire (May 2010) stated that there is a need for designers of serious and educational games to establish common standards for creating good games.

4.6 Using this Medium as a Teaching Tool

While teachers must determine how games meet curricular needs, many online games and accompanying websites provide teaching materials and guides. Most games have built-in
tutorials that guide a player in learning how to play the game. The biggest obstacle to using digital game-based learning is the time it takes to evaluate the game (Oblinger, 2006). There must be “careful analysis and a matching of the content, strengths, and weaknesses of the game to the content to be studied” (Van Eck, 2006, p. 22). Similarly, assigning game making depends upon the tools that students will use, their available time, and the curricular goals.

Once a teacher has determined the curricular goal, she can then decide what game genre would be best suited for her purpose. For example, Van Eck (2006) suggests that SimCity could be a great supplement to a civil engineering course because it requires a grasp of city planning and calls attention to several problems, both logistically and socially, that are inherent in creating sustainable city and regional planning.

Video games require different amounts of time to play. A teacher must decide how much instructional time can be devoted to playing a game and whether it will be played individually, in small groups, or as a class. If the course is online, students may be assigned to play an online game. In a classroom, some games lend themselves to a teams approach that might use a SMART board or projector during a single class period. The simulation about buoyancy mentioned above could be used to illustrate a point or given as an assignment for individuals or teams to use in conjunction with a lecture, reading, or lab assignment. For some lessons, it may be appropriate to use a game that can be played over a few days or weeks. Many commercial games take 50-60 hours of time to play, so using them would require a teacher to plan carefully. Alternatively, nonprofit organizations and museums have created or gathered many useful titles on their websites, offering shorter and often free games. (Please see suggestions below.)
Evaluating student learning can be done in several ways; it depends upon the assessment tools that the teacher uses. A class discussion may be a viable way to evaluate and expand upon student learning. Students can be given worksheets, asked to write journals, or papers, give demonstrations, diagram aspects of game play demonstrating systems thinking, or use screens shots from the game to analyze how they made choices within the game that demonstrate problem solving or analytical thinking (McCall, 2011). In some cases, looking at the end or win state can indicate how the student thought and reasoned through the game challenges. Actually, all games provide player feedback. According to Gee and Shaffer (2010), “games are nothing but good assessment. The player is always being tested, given feedback, and challenged to get better” (p. 16). Some games provide a small amount of user and teacher feedback such as how far a student is in a game and their final score. At this point, “technology development has outpaced the assessment development” (Steinkuehler, June 2011). Incorporating this into educational games is a growing field, but at present there are few examples of it. Embedded assessment allows a student to be assessed as part of the learning activity rather than with a test that occurs at a later time. “When diagnostic learning tasks continually assess the development of learners, we get a portrait of problem solving decisions in real time. We can provide feedback to customize learning, and we can probe the strengths and weaknesses of students’ thinking” (Gee & Shaffer, 2010, p. 9).

4.7 Game-Based Learning – three options for using games in the classroom

In a review of the literature, Van Eck (2006) identified three ways that games are being used with students:

1. Educators build educational games themselves or with a game developer;
2. Students design and build or modify games; and
3. Educators integrate commercial off-the-shelf (COTS) and online games into the curriculum.

These different approaches frame the choices about how teachers can use games with students. Using video games with students requires planning and a degree of familiarity with video games, such as being able to select game genres to meet curriculum goals, knowing basic game terms, and taking time to play games that one selects for use with students.

The section will discuss how teachers can make their own games, provide several examples of how students have designed games and learned from playing them, as well as examples of how existing games have been used with students. The first part highlights how a math teacher created a game for his students. The second part provides examples of students making games in several venues: a Global Kids community program, a graduate level Architecture class, and Quest to Learn, a middle school in New York City. This is followed by brief descriptions of “modding” (changing an existing game) and using game engines. The third part includes examples of how games can or are being used as teaching tools, using iCivics games to learn about the U.S. government, simulation games in high school history classes, and how World of Warcraft was used after school in a high school to increase retention. In these examples, the term “game” is used in a general way to designate video games and simulations games. It is worth mentioning that an educator who takes the time to build a game with a simple game engine may gain valuable knowledge about game design that could inform an assignment that requires students to make a game.

4.7.1.1 Making a game to use with students

There are varying degrees of complexity involved in making a video game for use with students that depends upon the complexity of the game or simulation one is making. A
common obstacle is lack of programming skills and knowledge. Game engines that enable the user to create a game also vary along a continuum of complexity that may or may not require the user to know how to program. Many of the simulations found on the PhET website mentioned above were made by a single person. Less complex games or simulations may be within the ability of many people, especially since software tools are becoming more and more available and easy to use. A few engaging, well-designed and implemented games have been made by two people, such as Flow (created by Chen and Clark, mentioned above) and World of Goo (a puzzle construction game created by 2D Boy, an indie game company of two people, Ron Carmel and Kyle Gabler). These, as well as the majority of games, are not created with the classroom in mind, but could be instructional nonetheless.

It usually requires a team of people to build a complex, well-researched game that addresses relevant curriculum goals and includes artwork, working game mechanics, and embedded assessment. It takes time to play-test and refine the game play; however, to some degree, that can be done with one’s students. Building a game requires an investment of time to learn how to use the game-engine software and to learn principles of game play, design, and development. Really, it moves an educator into the role of game-designer, which is more complicated than researching and designing curriculum materials.

A game designer must determine the game rules, core mechanics, and goals. He/She must consider the interface design, use of space, and components (avatars, enemies, obstacles), and how these elements will best embody the content. He/She must figure out the best way to structure the learning activities, role-playing (if applicable), and scaffold the learning. Also, she/he determines the best interface design, the game mechanics (actions that a player can perform such as collecting, jumping, avoiding), rules, goals, and environmental
components. By incorporating all of these elements, the game design emerges. Consideration must be given to the following: balancing challenges with ways for the player to succeed (flow, described above), providing an experience that illustrates the appropriate facts and exposes players to the appropriate concepts, and creating meaningful progress metrics so that both players and teachers can know how well the student is doing. Through this design, success in the game demonstrates mastery of the subject.

4.7.1.2 The process of making a game

The first step is to consider why one wants to make an educational game for students; asking what one’s goals might be, what platforms are available for students to play games, and what resources one has to develop a game. Some teachers have created interactive games using common art supplies. For example, Ko’s Journey (from Imagination Education) is a video game that teaches math concepts to middle school students in a rich story environment that requires the player to learn mathematics concepts. Scott Laidlaw (2009) has been teaching mathematics for several years. As a teacher, he understood the potential of games to teach and capture students’ imagination, especially in the case of underachieving students. Explaining his process, Laidlaw (2010) describes four steps:

1. Pick a story;
2. Make a goal;
3. Have a turn-based structure; and
4. Make a prototype and test it with students.


When Laidlaw designed the game, he did it with help from the school community using hand-sewn deer hides painted by parent volunteers and stone totems that students
moved around a playing area that was spread on the floor. Students played with the prototype before it was developed into a story-based web application.

In the game, the main character, Ko, has to use her mathematics skills to navigate the terrain by learning Cartesian coordinate mapping. She also learns a whole curriculum of core mathematics concepts, including linear equations, ratios, and fractions. These are concepts that most kids do not have any context for learning. In the game’s environment, though, they are motivated to learn so they can progress and complete the journey. By the end, they have experienced real applications for mathematics skills.

The Games for Change (n.d.) organization provides a free tool kit on their website (http://www.gamesforchange.org/resource_categories/toolbox/). Here one can view videos about a six-stage process they developed for game creation: urge, concept, design leads to production, evaluation, and distribution. In each section, there is a video, a downloadable guide, and suggested readings. Here is a brief explain each section: by urge, they mean why you want to make a game; the concept is about establishing how the content is represented and how players will engage with it. Your concept is your framework for designing the game. The game design defines the goals, rules, game mechanics, and challenges in the game as well as the platform. Will the game be online? Will it need a specialized player or device? For instance, Adobe Flash Player is installed on 98% of all Internet connected computers, making it easy to use on public computers. Production is the phase in which the game is made and may include a team with a producer, game designer, programmer, visual and sound designers, and play-testers. Your play-testers provide evaluation of the game iterations, as does your team, if you have one. Lastly, the game has to reach the intended audience: distribution.
The Games for Change (G4C) focus is on making social issues games; however, these principles of game making apply to educational games as well. On their website under resources, G4C also provide links to blogs, books, articles, websites, white papers, and past conferences. There is a section devoted to assessment, and a long and growing list of educational games with a description and link to the game website. See the section on using game engines below for more information.

4.7.2 Students make games

Building games inherently teaches good teamwork skills, technology literacy, brainstorming skills, and time management. ...Beyond the intrinsic lessons of building games, games are potentially a positive and engaging medium for representing models on various topics of study (Magerko, 2009, p. 1276-7).

Playing a game teaches players how the game system works, providing choices and user feedback. Students use their analytical and problem-solving skills and evidence-based reasoning to figure out what to do and what they need to know to do a given task or reach a goal. Making a game requires these same skills, but takes them deeper. This is similar to how being able to teach a topic requires that you really know the material. Making a game requires that one really understand strategies, relationships, and interactions both of the game system and the game content. It often employs some sort of narrative that drives the action (a story).

Making games is another example of how students can become producers. Game making is also a means of demonstrating learning. In addition, game making requires students to use many 21st century skills. Choosing how to assign game making depends upon the tools available, the amount of time, and your curricular goals. Making games is an iterative process and has similarities to designing a scientific experiment.
4.7.2.1 Game making as a creative act

Making a game can be a creative act for students, much like writing a novel, making artwork, or designing a science experiment – they are all ways to “play” with ideas. Trying to separate the arts from sciences is like taking ourselves apart. Problem-solving is a creative act (Robinson, 2006). As Robinson (2006) explains, exiling our “feelings” from academic content “is a structural feature of academicism. The division between intellect and emotion was a deliberate strategy in the intellectual revolutions of the Enlightenment and in the cultural reaction of Romanticism” (p. 140). The point is that human minds are embodied and reason cannot be separated from our bodily existence (Lakoff, 1999). Robinson (2006) cites two different ways of knowing: “rational and emotional,” which he attributes to the work of Daniel Goleman (p. 146). Balancing the rational and emotional selves gives people the freedom to make significant connections and to create. Similarly, Rogers (1995) pointedly reminds us that “there was little difference between art and science during the Renaissance” (p. 22) Referring to computer art she suggests that we need to move toward a “reunion of art and science, of process and product. …Perhaps the nature of computer-based art is a merger of creative activity (process) and the completed work (product) in a non-linear event called computer art” (p. 22). This same idea is relevant to game making.

Making a game combines many ways of knowing and understanding. It requires understanding design, creating artwork, combining visual images to represent ideas, demonstrating relationships, connections, and influences. The game gives the user a way to control those variables, thereby making their own meaning. While many discussions about using video games for teaching and learning focus on how games support STEM areas, integrating socioemotinal intelligence and art as part of the educational experience is
necessary (Gee and Hayes, 2010). “There is no real divide between technology and art.” They argue that it is the arts that “drive us to see things in new ways leading to new solution” (Gee & Hayes, 2010, p. 15).

One widely misunderstood game is Super Columbine Massacre RPG. Many people think that a game cannot be about a serious topic and that making a game about a serious subject trivializes it. Some people consider games to be for children and like toys, something one plays with frivolously, not to mention that games are thought to be time-wasters. It was this view that made it unthinkable that Super Columbine Massacre RPG was a serious attempt to understand what happened at Columbine. The game creator Danny Ledonne states that making this game was his way of answering the question that surrounded the tragic Columbine shootings, “why did they do it?” Ledonne (n.d.) researched the incident and used RPG Maker to answer that question by forcing the player to assume the assailant’s role and understand what happened that day. “The understanding of the Columbine school shooting is deepened and redefined. That is the real object of the game” (Ledonne, n.d.). In his own way, he created a commentary, a documentary, and a statement through his game, much like Michael Moore did with Bowling for Columbine. Philosophical exploration in games is an opportunity to provide thought-provoking situations, even if the ideas are flawed (Konzack, 2009) or misunderstood by the public.

Below are a few examples that illustrate how students making games supports learning. Students making games is an important aspect of students as producers. Making games allows them to play with systems (Zimmerman, 2011). He explained that designers see the world as “constructible” and that as world issues are increasingly interdisciplinary and complex, bringing innovation and creativity to bear in game making is how students can
learn systems thinking and thus be able to address and understand complex problems such as pandemics, global poverty, or financial collapse.

4.7.2.2 Global Kids – Making games in a non-academic environment

Realizing the power of games to express and understand social situations, Global Kids, a nonprofit educational organization, uses game design as a way for young people to learn about global issues and create serious games through its Playing 4 Keeps program. Consent! is a game that was created by high school students to explore the life of an African American male who is sentenced to 50 years in prison and subjected to medical research. It was created in Teen Second Life, an online virtual environment. (See the project video here: http://www.youtube.com/watch?v=Jx9XJ DYOC9s&feature=player_embedded#at=24.)

Ayiti: The Cost of Life is a game about poverty in Haiti. Players must manage a rural family of five, keep them healthy, and educate them through the course of the game. (See a video about it here: http://www.youtube.com/watch?v=vfhWV7kQQdM&feature=player_embedded#at=19.) The students who designed Ayiti did such a good job that it was developed into a fully conceived video game.

Another group of students researched human trafficking. Their project used Second Life to make a dramatic video or Machinima. The heroine of the video is “Talia,” a girl who is taken from Mexico to the US on the pretense of becoming a model, when in reality she was forced into prostitution and treated as a prisoner. Although the video is not technically a game, it is an extension and repurposing of the game environment. (See the video here: http://www.olpglobalkids.org/library/)
4.7.2.3 Architecture class – Graduate students make games

Ann Pendleton-Jullian, a professor of architecture, uses game making to change the way her students think about their design projects. While at Cornell, she designed an undergraduate studio that “began with the playing of games, the analysis of game-play and then the design of the games themselves” (Pendleton-Jullian, 2010a, p. 154). One of her influences was Lewis Carroll’s description of how he crafted the narrative for *Alice Through the Looking Glass* by using an eleven-move game of chess.

He explicitly organized the movements of his characters through space, their spatial and dramatic relationships, and even their personality development through the logic of game-play (Pendleton-Jullian, 2010a, p. 154).

She states that the studio experience of playing, analyzing, and designing games made them more successful with their architectural projects, encompassing an entire range of parameters: programmatic needs; physical site constraint and opportunities; the cultural context in which the physical sites participated; and the particular bias toward meaning and the values that each student brought to the project (Pendleton-Jullian, 2010a, p. 155).

She states that the studio experience of playing, analyzing, and designing games made her students more successful with their architectural projects. Pendleton-Jullian thinks that making a game requires students to “construct society and negotiate relationships” (2010b, talk at Digital Union). This belief has stayed with her over the years, and she continues to use game making as a teaching method.

Working with graduate students at OSU, Pendleton-Jullian gave her graduate students a series of game-related activities. The first assignment was for students to work together in pairs to choose a game from a provided list and analyze their game play. Fig. 4.3 below is the diagram of a game play analysis of Pente done by Hristina Panovska and
Kristopher Cochran when they were architectural graduate students at OSU. The other figure (Figure 4.4) is an analysis of Duplo, the game that Panovska designed. Both were done to construct a play-by-play “map” illustrating player moves that were offensive, defensive, advancing the play, and the winning move.

Figure 4.3: Pente diagram of playing the game. The students videotaped their game play and then designed this chart so they could chart their game play, move by move. (© Panovska)

Figure 4.4: Game play analysis of the game Panovska designed and built. (© Panovska)
Panovska explained that this deep level of analysis really helped her to think strategically. Duplo (pictured below, Figure 4.5) is a physical game that has a game board on top and a magnetized game board underneath with a mirror to reflect the underside. Some of the spaces connected both sides of the game board, represented by the see-through game spaces on the grid.

Figure 4.5: Duplo, pictured above, is the game that Panovska designed and built. (© Panovska)
Panovska was able to transfer her deeper sense of spatial relationships to her final project: developing an existing rural area without losing the beauty and feel of that rural pastoral environment. She decided to combine the housing areas with an orchard and sheep pastures. She did an analysis of the land taking into account wind and solar patterns. (see Figure 4.6: The "game board." (© Panovska)
Figure 4.6 above and Figure 4.7 below) She defined her project by setting up a “playing field” with three variables: game board, game pieces #1 and #2. The biomass trees and orchard / apple trees comprised the grid or the “game board.” The live objects were game pieces #1: humans, animals, insects, and trees. The constructed objects were game pieces #2. The influence of making a 3D game is evident in her illustrations. The land is analogous to a playing-board used in games. The tree grid dictates where the “architectural pieces” go (see Figure 4.6 below).

She also considered the vertical spaces as “playing fields.” (see illustrations of tiers below, Figure 4.8) Panovska explains,

The vertical striations (the tiers) is an exploration of the site vertically and setting up another “playing field” - the experiential field as one navigates the architecture as they occupy the space below, in between, and above the tree grid. This sets up a combination of variables of how you would “play” or “use” the site (H. Panovska, personal communication, February 28, 2011).

Figure 4.7: Panovska’s diagram of wind and solar patterns on the land. (© Panovska)
Another benefit of making games that Pendleton-Jullian cited was that it can foster “elastic dispositions.” She explained that students who will be successful in the future are those who are willing to change their focus and change their minds, and thereby become able to see things differently and collaborate as part of a diverse team. Pendelton-Jullian explained that being able to adapt to changes is necessary when working with others who have different skill sets. One can see this collaborative effort in the game World of Warcraft, in which people create guilds, organize, strategize, and work together toward common goals. Skills learned in a game environment can transfer to the real world (American Psychological Association, 2008).

4.7.2.4 Quest to Learn – A school where students both make and play games

Quest to Learn is a public school in New York City that is focused on systems thinking and game design while incorporating a standards-based curriculum. Another sister school will be opening in the fall of 2011 in Chicago called Chicago Quest. "The big idea of the school is we looked at how games work—literally how they're built and the way they support learning—and we thought could we design a school from the ground up that
supported learning in the way games do," explained Salen, one of the Executive Directors at the school (Chaplin, 2010).

There are four primary ways that the school structures learning at Quest to Learn: learning is rigorous but engaging, games are used purposefully (meaning that the “learning itself is structured like a game”), digital media are well integrated, and digital literacy is supported (Salen, May 2010). For example, structuring learning like a game means that students are given a problem that creates a need to know fractions and decimals.

Salen (May 2010) explained that there are three dimensions of competency that are measured or assessed: 21st century skills, state standards, and social, emotional, and physical dimensions that focus children’s attention on what it means to be both human and a citizen. The teachers use models, simulations, and social networks; they encourage students to do and produce, making connections with their lives inside and outside of the school. Their goal is to make school relevant and engaging, resulting in deep learning. Salen (May 2010) defines 21st century skills as “complex problem-solving, models and simulation, working in cross-functional teams, participatory learning, intelligent resourcing or knowing how to find information and resources, credibility, and judgment” (presentation).

At Quest to Learn, data visualization tools are put into the hands of students. Each morning, a typical student logs on to About Me, a non-academic school site that focuses on wellness. Students can create an image or emoticon using drag and drop features to make a face that represents how they are feeling. This data can be charted so that students can make connections between how they are feeling and what they are doing, enabling them to identify patterns about themselves.
All of the units are structured as missions, with smaller, scaffolded quests that build knowledge. Students work in teams to discuss what they are learning and to collaborate in building theories. For example, social studies is combined with language. In order to understand how civilizations operate as systems, they look at its components: geography, technology, forms of government, and forms of religion in a given community. Then students considered how those elements work together to form systems. “Systems thinking,” Salen said, “gives you a tool to manage complexity” (as cited in Chaplin, 2010, Section, para. 4).

Al Doyle (personal communication, May 25, 2010), a former teacher at Quest to Learn, described one student’s experience. Doyle asked the student, “what have you learned by designing games?” The student responded, “it made all my other work seem easy.” Doyle continued to explain that this was a student who had previously struggled with math, science, and history, feeling overwhelmed by the topics:

because he’s doing these very complex games, and he’s breaking things down into little pieces, and he’s seeing relationships. It really made those other things manageable. (personal communication)

Doyle described a game-making challenge he assigned using Gamestar Mechanic. Students had just visited the natural history museum and they had to make a game about the different exhibits they had seen: birds, mammals, reptiles, etc. They could make it with several levels or one big level. The way the sprites (any object in a game environment such as blocks, avatars, enemies) moved could reflect the animals’ behavior, meaning that in the “room” about birds, the gravity was set very high so they could fly and for turtles, the speed that they moved was set to the slowest setting. (Changing the gravity settings or speed that a sprite moves is an option when making a game with Gamestar.) Another example of a game
assignment is for teachers to ask students to model how Earth would look from the surface to the core in a game environment focusing on how the kinds of rocks and minerals one would encounter as you move to the center of Earth: lava would move fast in comparison to the surface whereas Earth’s crust would not move at all (Gamestar Mechanic curriculum guide, 2010).

At Quest to Learn, students move through a progression of game engine use beginning with Gamestar Mechanic, then using Atmosphir, (http://www.atmosphir.com/) and then Little Big Planet (a commercial off the shelf game, see more below) by the end of the school year.

4.7.2.5 Modding

Modding is similar to what teachers have done for years, adapt existing content to fit their particular needs. Game environments are allowing players to do something similar. This emerging 21st century skill is an activity whereby an existing game can be changed or “modified” by the users, allowing them a great deal of control and self-expression (Wright, 2006). At one time, this was an achievement accomplished only by hackers. However, the desire to change one’s game map, add levels, change the game play, and add content has resulted in many game companies providing modding tools and source code. World of Warcraft, Civilization, Sims, and Little Big Planet (a game designed to teach players to become level designers) are a few examples of games that support modding. Modding has created a thriving and growing community of producers and designers who communicate and share through websites, collaborative-learning communities, and forums. Communities that players have created “display a great deal of what has been called social and emotional intelligence,” terms Gee and Hayes (2010) attribute to Goleman, mentioned above. (p. 39) Modding is a
clear example of students as active producers. It gives students an opportunity to actively engage with content in a meaningful and creative way. Additionally, thinking through how to modify a game can be easier for some students than designing a whole game.

The Sims has a large community of people who create their own content and additions to the game such as period clothing, furniture, and characters, and readily share it with others. Gee and Hayes describe the Sims players as an exemplary model of these communities. Squire (2011) cites the Sims creator Will Wright, who explained that in the Sims he wanted to provide a “smooth ramp” for players to become producers (p. 65). To that end, the Sims ships with modding tools. Modding can also serve the classroom; Squire (2011) used Civilization’s modding capabilities to create a world history mod based on Jared Diamond’s book Guns, Germs, and Steel that he used with students for his thesis research in 2004.

4.7.2.6 Using Game Engines

The easiest way to make a game is to use a predesigned game engine. Game engines are software systems that supply the game-maker with readymade actions, sprites, and environments. (Sprites are images or animations in a game environment.) Many are available for PC, Mac, or Linux and make 2D or 3D games. The number of affordable options is growing, as is the level of sophistication of these game engines. Many are free or low cost. For some engines, educational pricing is available, but restrictions may apply. Wikis, forums, and tutorials are available for most game engines.

Before using game engines or software tools, it can be useful to make a prototype using paper, pencils, scissors, tokens, or dice, to create and test out initial designs. Gamestar Mechanic is a game engine that requires no programing skills. Players learn game design by
playing and fixing a series of games. Sploder is a free flash-based game maker to make platformer games, 3D games and shooters. This game-making interface is similar to Gamestar Mechanic, but instead of earning sprites through game play, all of the sprites are available from the beginning.

Another example of a game engine is Microsoft’s Kodu, an easy 3-D game engine, which is easy to use and is a good game for a first exposure to programming, introducing conditionals, variables, state, Boolean logic, and non-deterministic/random numbers. This game is available free for the PC online and can be downloaded to the Xbox. Game-makers build their 3D world with mountains, rivers, and buildings, create characters, opponents, and vehicles, and then program the rules using icons rather than writing code. Microsoft provides a classroom kit on the Kodu website that can also be used in after-school programs. They also provide tutorials. Games can be emailed or shared with others by uploading them to www.planetkodu.com. Website: http://fuse.microsoft.com/project/kodu.aspx

Game Salad is a game engine that allows for game design on the iPad and iPhone and requires no programing. Gamemaker is a game engine that introduces basic programing concepts and allows for a great deal of design freedom. All of the backgrounds, sprites, special effects, and even animated graphics are included. This program is often used in game making day camps such as those offered at the Wexner Center in Columbus, Ohio and the Smithsonian Institution in Washington, D.C.

Scratch is another game making and animation tool for beginning programmers. Students using these game engines can share their projects with others online. See http://scratch.mit.edu/ It was created at MIT. Players use blocks of code that can be fitted together to make things happen such as telling an animated story, creating special effects,
and making games. Scratch projects can be shared online. There are many teacher resources and tutorials available. See section on game engines above for more options.


To make a game without a game engine, one must have knowledge of software such as Flash and Action Script 3 or other coding systems such as Java or C++. Knowing some coding helps the process even when using game engines. Game engines, especially the more sophisticated ones, often have options for people to adapt or write their own code.

4.7.3 Use of an existing game or a Commercial off-the-shelf game (COTS)

Games are a new artistic medium. Teaching students how to use a game is similar to teaching them how to use a book. One must be as critical when teaching games as one would in any other medium. Games put forward social commentary, they are made for advertisement and propaganda, and they can be compared and contrasted. Students can question a designer’s message by explaining how a game is persuading or putting forth a particular frame for how to understand a given topic. As described above, Global Kids uses making games as a way to discuss and research social problems and issues. Many subjects can be explored through games, including anthropological issues concerning identity, race, feminism, and the concept of “other.” Students can question how games are both changing and being used in society. In addition, games can be used to make the world a better place,
encouraging people to work together for common goals and even creating a collective intelligence through crowdsourcing.

Jane McGonigal is well-known for her Alternate Reality Games (ARG), such as *World without Oil*. ARGs are interactive narratives that involve multiple people, media, and game elements to create games that happen in the real world. At the time of this writing, her latest game is *Evoke*. According to McGonigal, “the goal of the social network game is to help empower young people all over the world, and especially young people in Africa, to come up with creative solutions to our most urgent social problems” (Alchemy, 2010). Playing *Evoke* teaches players what they need to know in order to start a business.

McGonigal is doing something really remarkable. After considering the skills that are developed playing games, she has found ways to direct that knowledge and enthusiasm for games into making the world a better place. Through playing ARGs, people can effect real-world change that makes their learning significant and meaningful. Playing an ARG can change you; and it can contribute to something real, like discovering a cure for cancer by figuring out how proteins fold by playing *Foldit*.

*Foldit*, which was developed at the University of Washington (http://fold.it/portal/), is a multiplayer online game that engages non-scientists in solving hard prediction problems. *Foldit* players interact with protein structures using direct manipulation tools and user-friendly versions of algorithms from the Rosetta structure prediction methodology, while they compete and collaborate to optimize the computed energy. (Cooper, Khatib, Treuille, Barbero, Lee, Beenen, Leaver-Fay, Baker, Popović, & Foldit players, 2010)

The players of *Foldit* were cited as authors on a published paper. Interviews with players described adults who come home after work and want to play *Foldit* to relax with an
engaging activity. In this case, playing a game can change the world. See *Foldit: Biology for gamers* by Nature Video (2010).

4.7.3.1 Selecting games for the classroom – time, game genre, and assessment

While teachers must determine how games meet curricular needs, many online games and accompanying websites do provide teaching materials and guides. Some games have built in tutorials that help and guide a player in learning how to play the game. The biggest obstacle to using Digital Game Based Learning is the time it takes to evaluate the game (Oblinger, 2006); there must be “careful analysis and a matching of the content, strengths, and weaknesses of the game to the content to be studied” (Van Eck, 2006, p. 22).

Using an existing game can take various amounts of time to play. First, the teacher must decide how much class time can be devoted to playing the game and how they will play it: individually, in groups, as a class. Some games lend themselves to group or teams using a SMART board or projector during one class period. The simulation about buoyancy mentioned above could be used to illustrate a point or given as an assignment for individuals or teams to use in conjunction with a lecture or lab assignment. For some lessons, it may be appropriate to use a game that can be played over a few days, up to 2 weeks. Many COT's game take 50-60 hours of time to play and so require the teacher to carefully plan how to use them.

Once a teacher decides the curricular goal, she can decide what game genre would be best suited for her purpose. Students can play in pairs, teams or alone. After the students play the game, the class can discuss it. For example, Van Eck (2006) suggests that “Sim City” could be a great supplement to a civil engineering course because it requires a grasp of city
planning and calls attention to several problems, both logistically and socially, that are inherent in creating sustainable city and regional planning.

Deciding how to evaluate student learning is connected with the assessment tools you design. Students can use worksheets, write journals or papers, or give demonstrations, diagram aspects of game play demonstrating systems thinking, or use screens shots from the game to analyze how they made choices within the game demonstrating problem-solving or analytical thinking (McCall, 2011). In some cases, looking at the end or win state can indicate how the student thought and reasoned through the game challenges. Some games do provide user and teacher feedback called embedded assessment. This is a growing field, but at present there are few well-done examples of this.

4.7.3.2 Using iCivics Games in the History Classroom

iCivics is a website that provides several fun, engaging, and easy-to-learn games about U.S. government. It was created in response to Sandra Day O’Connor’s vision of providing educational games that could be used in school and at home to teach people about how the U.S. government functions. In the “for teachers” section of the site there are webquests (an inquiry-based, online tool where students explore and evaluate information from websites that are selected by the teacher), descriptions of how to use the games through curriculum units, lesson plans, worksheets, and a list of state standards that each game addresses. The games, which can be played during a single class period or saved and played over several days, have simple embedded assessments that provide teachers and students with a few statistics about how each game was played. In these games, achieving particular goals and advancing to new levels does indicate levels of content mastery.
Figure 4.9: Do I have a Right? In the upper left corner is the opening title screen. As players begin, there are messages that help the player quickly learn how the interface works. The background fades and messages appear to point out where the tools are and what to do (upper right). As the player progresses, clients come more often. As the lawyers win their cases, the player gains points so she can hire more lawyers (lower left). The interface on the lower right helps the players to decide which lawyers to hire next. Choices include lawyers with different amendment specialty. (©iCivics)

*Do I Have a Right?* is a game that explores the Bill of Rights within a constitutional law firm (see Figure 4.9 above). It would probably take a few class periods for everyone to play through the whole game, but when students finish it they will have a firm grasp of several constitutional amendments and how lawyers apply them to determine what rights citizens have and which amendments are applicable to certain courtroom cases. Through the game play, “clients” come into a law firm and request legal counsel. The player decides if the problem is a legal issue and which lawyer (based upon their amendment expertise) can help...
the client. As the players win more cases, they can make their office more comfortable for clients and hire more lawyers, thereby increasing the number of amendments that the lawyers specialize in, which in turn helps the players win more cases.

Another game on the iCivics website is *Executive Command*, a game about what it is like to be the President of the United States. Players have a lot of choices about how to spend their time: diplomacy, speaking to congress about special interests, stopping or starting wars, and reading proposed bills related to energy policy, spending, education, and health.

These are just two of several games on the website. They are especially well-suited to middle school students, although they could also be used with older students. Students could be asked to make connections to current presidential policies, initiatives, and positions and then discuss or write about the connections.

4.7.3.3 Using Simulation Games to Teach High School History

Jeremiah McCall, a high school history teacher, uses simulation games such as *Rome: Total War* because they help students visualize and comprehend complex historical situations. McCall (2011) stresses that knowing how to play the game himself is essential so that he can give students a solid introduction to the game and help them when they are confused or stuck by offering strategies. He notes that more game-savvy students can help those who are unfamiliar with playing video games. Students who can step in as experts to guide others have a genuine opportunity to contribute to the class. In some cases, McCall provides some strategies upfront so that students can progress more quickly.

To use a game with students, McCall (2011) lists four activities that need to occur: “students need to learn to play, gain solid play experience, observe and analyze the game in
action, and have time to reflect and debrief” (p. 72). McCall explains that he first teaches students how to play the game. He also provides observation sheets and prompts to guide student thinking and game play. Students demonstrate their work through blogs, journals, formal papers, charts or annotated screen shots to analyze content, and diagrams of systems identified in the game. For McCall (October 2010), playing games is about learning—whether or not it is fun is not his primary concern. He explained that writing a paper is not necessarily fun, but that’s no reason to stop assigning them (presentation). After asking about the accuracy of something in the game environment, students may be asked to “extrapolate from that system to consider real world past and present problems” (p. 98).

4.7.3.4 Using World of Warcraft after School to Encourage Retention

Steinkuehler (2010a), who has done extensive research on multi-player online environments, is exploring how games can ameliorate the problem of struggling readers who are failing in schools. In working with students who play World of Warcraft, she found that students who were reading at the sixth or seventh grade level were able to read at the twelfth grade level or higher if they were allowed to choose their own texts about the game. Their self-correction rates were 33%, which is much higher than is typical. These students were so interested in the topic that they took the time to figure out what the texts meant.

Peggy Sheehy is an ITF/Media Specialist who created a special after school program using World of Warcraft. She worked with a guidance counselor to select a group of “fringe kids with no tribe,” many of whom had learning disorders. After school, the students gathered for 2 hours to play World of Warcraft and, through the process, wrote character descriptions. Because of this process, the students’ writing improved, as was confirmed by the school’s English teacher. World of Warcraft served as a narrative space, making learning
relevant. In other activities, the students negotiated naming their guild, wrote campaign speeches for themselves or others who they nominated for guild position; after the elections, they had an induction ceremony. The students were invested, as a group, in *World of Warcraft*, and their school behavior, grades, and school attendance rates improved. As part of *World of Warcraft*, Sheehy’s students became part of something bigger than themselves, learned social skills, and became motivated to do their classwork (Sheehy, personal communication, May 25, 2010).
CHAPTER 5  OBSERVATIONAL CASE STUDY: USING A GAMESTAR MECHANIC WITH STUDENTS

5.1 Why Gamestar Mechanic: Designing games – The Three dialogs

Games are a “living genre” (Games, personal communication, April, 25, 2010). They are like a novel in that they can be educational and an art form, but have the “added value that they are intrinsically science” (Games, personal communication, April, 25, 2010). The iterative process of game making is similar to the scientific method. Deciding what the game will be about and its rules and mechanics is like stating a hypothesis. Conducting the experiment is the act of making the game and asking people to play it, then redesigning based upon user feedback and trying it again.

To describe the process a game designer goes through to make a game, Alex Games describes a framework of three dialogs. The three dialogs are the material dialog, the ideal player dialog, and the real player dialog. These practices “include ways of knowing, doing, being, talking and believing” that have been identified as creating communities of practice by Lave and Wegner (Games, 2008, p. 398). The three dialogs are from Games’ thesis (2009) work in learning theory research. Gamestar Mechanic is ideal for students in 4th through 9th grades and provides a non-programming approach to game design. Players learn game design through playing and fixing a series of games. Players then make their own games and share them with others, forming a community of practice. In Gamestar, students take on the identity of a game designer, learning and using specialist language. Players can experience the practices of game designers as they learn to make games and share them with others.
Teachers can help students to understand how specialist terms relate to content and build a community of practice. Understanding and participating in the community of game designers can give students insight into how other academic subjects use specialist language and build communities of practice.

The three dialogs can be understood in the context of *Gamestar Mechanic*. The *material dialog* is the first step in making a game. The game designer considers her materials, her tools, information, and media. Then she decides what the game is about, what the game system should be like, all the while engaging in a meaning-making process. If a game designer uses Gamestar, for example, she sees the playing field as a grid. Sprites can be either stationary or mobile. Settings can be adjusted for speed, health, shooting or not, and placed anywhere on the grid. The game-making area offers many options to consider. Through this process of choice and decision-making, the game-maker has a dialog with the materials.

Then the designer considers the person for whom she is designing the game. That leads to the *ideal player dialog*. As the game is constructed, she imagines what the player will experience and what identity the player will assume. This requires thinking of the game as a system and not just as component relationships. The player’s role, as she takes on the intended identity and her actions in the game, is part of that system.

After the game is complete, the game designer has the *real player dialog*. Someone plays the game. She finds out if the real player is having the experiences she expected when she designed the game system. With feedback, she redesigns her game. Other players rate can rate the games and give written feedback on the community website. In a classroom, students can work together, providing verbal comments and suggestions. By engaging in game making in accordance with the three dialogs, students become novice game designers,
using specialist language and participating in a community of game designers. Students become game literate. Gaming literacy involves systems thinking, meaning-making, meaning-production (Games, 2008; Buckingham, 2007; Salen, 2007; Squire, 2008), digital literacy (Squire, 2008; Steinkuehler 2010b), and, I would add, visual literacy.

Game designs are visual and incorporate symbols. In the art classroom, the teacher can direct how students read or interpret those designs and symbols in their own designs and those of others. Games are a part of visual culture. It is important to be able to read the images and make meaning from these games. Many people such as Deborah Smith-Shank, Terry Barrett, and Robert Sweeney are exploring concepts that confirm the importance of reading images, meaning-making, and understanding symbols as they relate to art education. “Digital visual culture should be understood not only as forms of visual culture that are digital in nature, but also as interconnected cultural products that reflect the complexity of life in a network society” (Sweeney, 2010, p. ix). Digital video games are a cultural product in our society, interactive and visual. Children can learn from playing, critiquing, and making games. Keifer-Boyd (2005) asserts that having children make games “facilitates learning” in the area of “visual culture narrative critique through virtual revisions in their computer game story” (p. 126).

Freedman (1997) explains that teaching visual culture requires our conceptions of art to change.

Images are becoming an ever-increasing influence in the lives of our students and we are in a position to help them negotiate the complexities of that influence. To do this, our classrooms must be places where images of all types can be discussed, debated, analyzed, generated, refined, and recycled. In such an environment, students can develop the power to contribute constructively to the visual culture that enriches their world (p. 11).
Video game playing, making video games, game level design, game modding, and engaging in some aspects of remix culture are all part of how games have become an important part of our visual culture and literacy.

5.2 Using *Gamestar Mechanic* in the art classroom

*Gamestar Mechanic* is unique in that it is both a game and a game engine. Its purpose is to teach game design through playing and fixing games. It is designed for 4th through 9th graders, although it could be used with older students. Math, reading, writing, and story composition, including how music and artwork contribute to story telling, can all be easily combined with the activities in *Gamestar Mechanic*. As students work through levels, they learn the principles of game design and how to use tools to make games. Art class is an ideal place to teach game design because it incorporates the concepts of balance, use of space, color, and how these elements can combine to tell a story or describe a social issue. Game making is also about meaning making, self-expression. As cited above, Taylor, et al., state that SL encourages what is most meaningful in art education: interactive, collaborative, inquiry-based, constructive, connected, interdisciplinary, and relevantly provocative. I would argue that game making also encourages these same activities and concepts and adds other dimensions such as integration of multi-media, consideration of the player experience, and opportunities to participate in the iterative process that game making affords.

5.2.1 Brooke volunteers her classroom

I first met Brooke when she was a student teacher in one of my friend’s art classrooms during the time I worked as a substitute teacher. Over the summer of 2010, Brooke told me that she wanted to integrate technology into her classroom and that, if I would help her, she would let me come to her classroom and use it for observation and
research for my thesis. I immediately thought of the video game *Gamestar Mechanic* because players both play and through play learn to design their own games.

Brooke agreed to be my case study. Initially, we had hoped to include other teachers from her district. Brooke invited me to speak with the other elementary teachers during one of their weekly meetings. I explained how *Gamestar Mechanic* worked and demonstrated the game. I answered their questions and we were soon out of time. Two of the four teachers there were somewhat interested. However, since Brooke and I were approaching this as an experiment, we were not sure how to support the other teachers prior to our use of the game with students, nor did I think I had time to devote to more than one teacher’s classroom. Furthermore, the process required obtaining permission from the principal and a district liaison with Ohio State University who handles student teacher placement. We elected to wait until we knew more about how it worked and then share that with the other teachers. My intention is to send a written report or meet with the other art teachers again before the end of the year if possible.

5.2.2 Methods

As mentioned above, my methods included:

1. Observation of the class,
2. My journaled reflections, and
3. Interviews with the classroom teacher.
4. Member-check

To facilitate this study, I read through the *Gamestar Mechanic* literature, read two dissertations that had been written about it, and talked with Brooke about how she would like to introduce the subject and design the lessons. Together we made decisions about how to proceed. Using *Gamestar Mechanic* allowed me to introduce technology into the art classroom.
We decided we would introduce the concept of game design and use the game to teach children how to design their own games. We decided the lesson would last 4 weeks, meeting two times a week, and would be for the fourth graders only. We had discussed including the 5th graders, but Gamestar Mechanic did not address her curriculum goals for that age group. In addition, because she was unfamiliar with educational games and relying upon me to help her, she wanted to start small.

I had done an internship with E-Line Media, the distributor for Gamestar Mechanic, over the summer and fall of 2010, making promotional videos. E-Line had another graduate student in education at New York University, Katya Hott, who had been designing teacher materials. I had access to all of E-Line’s documents through a shared online space. While our process did not follow their lessons precisely, it did give me some ideas, such as introducing Gamestar Mechanic by first talking about game design elements in relationship to games that students were already familiar with such as physical games, video games and board games, which I will explain below.

5.2.3 Lesson Planning and Implementation

Brooke had used a comic book lesson with her students in the past. We decided that in November, Brooke would use this lesson to support the student’s learning about game design and using Gamestar Mechanic. After she explained how she typically structured the lesson (see interview excerpt below), I helped her think about how to restructure it so that it would lead into game design and teach the students three specific game design terms: avatar, obstacle, and goal. I suggested that she use a simple example: a dog (avatar) wants to get past the fence (obstacle) to get a bone (goal). She reported that she did not use any examples
from comic book artists. She planned to introduce the lesson by discussing and illustrating cartoon drawing techniques such as using shapes to draw figures.

During our first interview, Brooke explained how she understood the new comic book lesson and reflected on how it had changed the level of creativity that students were required to bring to the project. First, she described how she normally conducted the lesson:

I had the kids look at different examples of comic books and we talked about how you develop a story. And I asked them to create a comic using three frames. A beginning, middle, and an end. Minimum. They could throw in another frame if they wanted to or sometimes two, but it would just show a progression of a story using pictures. They could use only pictures and they could put their words in as well. And then we studied some basic cartoon drawing techniques, like how to use cylinders to create a body and show a body moving, and different ways to draw a facial expression. That was in humans and also in animals, and then talked about creating an environment. So that’s what we did (Transcription of interview, Dec. 31, 2010).

Because this was a lesson she had done before, I did not participate, nor did I observe her teaching this lesson. Below, she describes how the comic book lesson worked with our modifications.

To get ready for the video game, … we decided to have three frames again, but [in] the first frame the students would develop an avatar, the 2nd frame show the avatar encountering an obstacle, and the 3rd frame would show the avatar achieving a goal. And this would help the students think visually. And also prepare them mentally for the game design program. And so the students have started that, and I did the same sort of drawing cartoon techniques. And so they’ve created their avatar, and started their obstacle, and goal, and I really found that it was easier for them to connect with the idea of the avatar, obstacle and goal and it was easier for them to do that rather than create a little 3 frame storyline.

Personally, I think for two reasons, saying avatar, obstacle, and goal is a lot more specific than just letting a student develop their own storyline. So they don’t have to be quite as creative to do that. They still have to be creative, but not quite as creative. It puts closer parameters on it so it makes it easier. But, also, I think they liked it because they do play video games and they do relate to avatar, obstacle, and goal from their video game experience. And so they became excited about that (Transcription of interview, Dec. 31, 2010).
From listening to Brooke describe the lesson, it seemed that she has a very specific idea about how students demonstrate their creativity. As we discussed our thoughts about the creative process and how structure or limits can guide the creative process, I had the impression that Brooke views any constraints as interfering with creativity, meaning that the more open-ended the assignment, the more creativity is required.

She commented about the comic book lesson as it related to the game design lesson:

We’re still following the goals of the lesson, creating a narrative and exploring technology, which is another aspect of the curriculum that we’re supposed to be doing. So I think that’s good and I’m excited to see what happens… (Interview on Dec. 31, 2011).

Following up what she said about the new comic book lesson, I asked, “you said that the students were excited, so what about them made you think they were excited?”

They were ready to talk about the avatar, and the obstacle and goal. Their hands were shooting up; they were shouting things out. …They were just ready to volunteer information. And they didn’t have as hard of a time like with the cartooning project, sometimes [the way she had formerly done the assignment] it was a little like pulling teeth. Some of them had a little bit harder time, but once I threw out ideas, they went with it, and they were just excited about creating and I didn’t hear a lot of complaining. Most of them were drawing. All of them wanted to share their ideas. They brought them up and said, “Can I show this to the class?” (Transcription of interview, Dec. 31, 2010).

Brooke taught the comic book lesson with the modifications described above in November. We were going to begin working with Gamestar Mechanic in December, after Thanksgiving, but her lesson took longer than anticipated and I didn’t begin working with the students until late January 2011. She has two fourth grade classes. One met two times a week for 40 minutes each and the other class met two times week for 30 minutes each.

5.2.4 Academic content standards
Brooke identified the academic standards that would be covered by using Gamestar Mechanic. This academic year all of elementary art teachers in her district met to choose and adapt the content standards that are in the Visual Arts standards, which are later approved by district administrators. This is something that they usually revisit every four years. Brooke identified the following standards that were determined for her district:

**CEC4** Create a narrative image (e.g., well-connected and in a sequence) that expresses an event from personal experience.

**CRAC4** Demonstrate technical skill by creating an art product that uses common materials and tools from different subject areas (e.g., ruler, compass, graph paper and computer).

In reading through the content standards myself, I identified three areas that Gamestar Mechanic could address:

**Creative Expression and Communication**

**Benchmark B** – Use the elements and principles of art as a means to express ideas, emotions and experiences. (p. 220)

**Benchmark C**: Develop and select a range of subject matter and ideas to communicate meaning in two- and three-dimensional works of art. (p. 221)

**Benchmark D**: Recognize and use ongoing assessment to revise and improve the quality of original artworks. (p. 221)

**Analyzing and Responding**

**Benchmark A**: Identify and describe the visual features and characteristics in works of art. (p. 229)

**Benchmark B**: Apply comprehension strategies (e.g., personal experience, art knowledge, emotion and perceptual and reasoning skills) to respond to a range of visual artworks. (p. 230)

**Benchmark C**: Contribute to the development of criteria for discussing and judging works of art. (p. 231)

**Connections, Relationships and Applications**

**Benchmark A**: Demonstrate the relationship the visual arts share with other arts disciplines as meaningful forms of nonverbal communication. (p. 242)

**Benchmark B**: Use the visual arts as a means to understand concepts and topics studied in disciplines outside the arts. (p. 243)

**Benchmark C**: Create and solve an interdisciplinary problem using visual art processes, materials and tools. (p. 243)

**Benchmark D**: Describe how visual art is used in their communities and the world around them and provide examples. (p. 244)

(Ohio Department of Education, 2010)
5.2.5 In the Classroom

To introduce *Gamestar Mechanic* to the students, Brooke and I decided I would use the SMART projector and give students an overview of *Gamestar Mechanic* and talk about game design principles and concepts.

I made a presentation about “logging on” to facilitate getting the kids logged on to *Gamestar Mechanic* and to create their own accounts. In retrospect, I should have pre-assigned student accounts with a naming convention and had all of the passwords be the same. Instead, students created their own user names and passwords and it resulted in a lot of frustration as some students couldn’t remember names or passwords and things got chaotic; we didn’t get them all written down that day, although I think we did manage to get them all written down during later classes.

After taking the first group to the lab, and the ensuing difficulty logging in, we decided that I would go to the computer lab and log all of the children in to their classroom account, open Explorer, and navigate to the *Gamestar Mechanic* website, before students arrived. This allowed the students to log in more quickly and get right into the game. After the first few times, I was able to log in for all of the children in under 10 minutes.

The presentation helped them to orient to what they would see when they logged on, the game choices they would have, and described the basic navigation. We had a classroom account and all of the students’ work is grouped into a managed space, which allows teachers some control over their students’ work. It also means that the teacher’s email address is used
for all students. This was very important because most of the children did not have email accounts. Please see some of the presentation slides below:

As mentioned above, we used a SMART projector to introduce *Gamestar Mechanic* to the students, giving students an overview of *Gamestar Mechanic* and talk about game design principles and concepts. I made a presentation about “logging on” to facilitate getting the kids logged on to *Gamestar Mechanic* and to create their own accounts. In retrospect, I should have pre-assigned student accounts with a naming convention and had all of the passwords be the same. Instead, students created their own user names and passwords and it resulted in a lot of frustration as some students couldn’t remember names or passwords and things got chaotic; we didn’t get them all written down that day, although I think we did manage to get them all written down during later classes.

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Gamestar Mechanic

click “Play Now”

Navigate – how to move in the game space

Click “Play”

Use space bar to shoot

Navigate, up, down, left, right (UP is also jump)
Figure 5.10: Gamestar Mechanic. Eight slides that were part of the introductory presentation to the fourth grade students. (© E-Line Media)

I used the SMART projector to show the slides. Students seemed very excited about the game and were eager to make their own games. I did find that it took most of the class period for the students to create their accounts in the computer lab. But I expect it would have been better to have them following along on their computers as I walked them through the procedure; however, there is no built-in projector in the computer lab, and although one was available on a cart, we neglected to arrange to have it available when we needed it. However, using the SMART projector in the classroom seemed to be effective.

The same day, after explaining how to log in and before going into the lab to play Gamestar Mechanic, I introduced five core concepts of game design making: space, rules, core mechanics (jumping, collecting, avoiding), goal, and components (sprites). We then discussed how these elements combine to create a game system. To make these concrete, we discussed them as they relate to football, chess, and Monopoly, games students were familiar with. I hung up a small poster created by Robert Torres to reinforce what we had discussed (Fig. 5.2).
In the beginning, I anticipated being more of an observer, but through the process it became clear that Brooke’s inexperience with the concepts of game design got in the way and her ideas were not developed enough for her to be able to lead the lessons. I assumed a role much like that of a visiting artist in a classroom and her role was changed to one in which she would learn from me. This seemed very much like what I had experienced at

Figure 5.11: Robert Torres chart of game elements. (©Torres)
Smith Elementary School, where I had been a coordinator for teacher professional development using art integrated methods. To teach teachers, visiting artists would model lessons and teachers would, we hoped, gain the confidence to incorporate the lessons into their curriculums. Similarly, Brooke identified the learning objectives and made the connections with the state standards for art education. I modeled how to teach game design and led the discussions with the students.

**Overview of How to play Gamestar Mechanic**

There are 5 Episodes with several missions within each Episode. There are also a few bonus missions. After successful completion of each mission, the player earns sprites and background environments that can be used to make games. Each Episode moves the player through games that build their knowledge of the different options for making games as well as the core principles of game design. Episode 3 scaffolds the learning about how space, rules, and goals are essential to good game design. It does this by requiring players to repair games and thereby learn to use the toolbox to design their own games.

After completing, Episode 5, players are allowed to make games themselves and publish them in Game Alley where any Gamestar Mechanic player can play them. After playing through all 5 Episodes, players will have earned several sprites and avatars, giving them a lot of choices for designing their own games.

Brooke and I took time after most of the lessons to discuss what we would do during the next class time. I offered whatever support I could to facilitate organization and understanding. I attended all of her classes with the fourth graders, except one.
We decided that having the students use graph paper to make their game designs would help them to understand the grid structure and to consider all of the elements they would need to choose, such as background, stationary or moving enemies, block positions/obstacles, colors, and the goal. Brooke liked the 2D approach because it required the children to use pencils, markers, or crayons to draw on the graph paper. In retrospect, it may have helped to use a handout of the grid that looks exactly the way it looks in the game space. The only drawback to that approach is that players have the option to design the play space so that it scrolls in any direction, which means that some of the play space is always off-screen. Another thing that I might do differently is to ask the children to refer to their comic book lesson, bring their drawings to the computer lab, think about how to translate that to the game environment, and then have them draw it out on graph paper. Simply asking them to do it, as we did in this experiment, didn’t work very well.

After the first week, I realized we needed some way to figure out how many episodes and missions the children were completing.

I’m going to make a chart with the missions and ask them to check the ones they’ve done so I can figure out how fast they are moving through the missions. My goal is to have them play for 3-4 classes in total, make games during 2 classes (and share their games with small groups, creating 5 teams or 3-5 kids) and then present one game from each team during the final class (Michelle’s journal excerpt, Feb. 2, 2011).

I made a chart for each class. (Please see Fig. 5.3 below.) I asked students to fill them out at the end of the class period. Later, when we tried to divide the students into teams, I found out that some students were not correctly checking off their completed games. However, I’m not sure why that was. I had planned to use the chart determine who had access to making games (those who had completed level three) so that each team would be able to use the game-making area, and thus enable each team to make a game. We thought
that each team’s game would be presented on the last day. However, applying principles of
game design was difficult for them. The students, whose games I played, seemed to be
focused on making their games unbeatable, even for themselves. This doesn’t make for a
balanced game. As mentioned above, a good game must flow, not be too easy and not too
hard, in order to keep player’s interest. It may have been their maturity level, perhaps they
needed more time to grasp and implement the game design concepts, or maybe I should
have simply let those who had made games present rather than trying to move the whole
group forward.

Figure 5.3: The charts showed each mission and was divided with red lines to establish the
sections for each of the five episodes. Students checked off each mission they had
completed.
One of the reasons they weren’t demonstrating an understanding of the principles of game design may be that they didn’t incorporate the story they had made during their comic book lesson. When we began, I thought they understood that they were to use their comic book lesson as the narrative for their own games. Later, it became clear that few, if any, of the students could figure out how to make those connections or they chose not to. I didn’t have the opportunity to figure out why students seemingly abandoned their comic book story or the ones they made one graph paper. The situation in the lab was somewhat chaotic, making it difficult for us to help students see connections between game design and narrative. Ideally, I would like to have worked with students one-on-one, looking at a game they made and discussing how to improve it. I did notice that the boys had the same reaction that Alex Games (personal communication, May 25, 2010) described in an taped interview; they made games that they thought were so hard, no one could beat it, focusing on challenging other players, but not incorporating the idea of “flow” in game play. Games explained that over time students began to grasp how to make a balanced game, but in our situation that did not occur probably due to the short time period. Games had worked with children in an after-school program using Gamestar Mechanic.

During the last week, it became apparent that too few had progressed far enough to form teams. Students who had completed the all of the games and published several games still lacked enough understanding about game design to help their fellow students with this aspect of using Gamestar Mechanic. However, they were able to help their classmates win a game, find tools, and answer questions which was very helpful and empowering for the those students. Not only did the children lack an understanding of game design, but so did
their teacher (although after the process of working with me and her students, I think she has come to understand the core principles of game design). I realized that a short overview video about game design might be really helpful for teachers who want to use Gamestar Mechanic with their students. In this way, a teacher would have a rudimentary understanding of what the students were trying to achieve. Understanding game design is not trivial and necessitates understanding multiple factors. This would be essential in order for teachers to give constructive feedback to student game-designers.

In addition to difficulty in communicating how to design a balanced game using their narratives, there were several school cancellations or late starts due to snow, fog, and heavy rain. There were also a few holidays, absences, students moving in and out of the district, and one day, a new ban on using games. We had to improvise a lesson because we couldn’t log on to the Gamestar website, so that class lost a day of lab time. The IT support person granted us access again by the end of the day.

During our third interview on Feb. 17th, I asked Brooke to comment on how she thought this project was related to learning art. She responded that creating the video game was “the biggest connection to art” (Feb. 17, 2011). She elaborated by explaining how it was connected to teaching her curriculum requirements:

It’s familiarizing them with computers. And, um, I think they’re analyzing the game and we analyze art a lot. And this is a form of art because it’s using visual components – even though they can’t create them, they’re working with backgrounds and they’re working with their avatar and the sprites and they are all little visual images that they can manipulate. And the manipulation and the choices that they get to make are part of the creative process. Just like we make choices with pencil and paint, and different things and this is just a different media [sic]. And a more complex media [sic] because it’s interactive, not just something that’s made and is on the canvas and stays there. It’s something that’s constantly changing. So I think it adds a whole other level of complexity but that’s really good, in this society where computer games and computers are so important, so it adds a really good set of skills and incorporates creation at the same time.
Brooke also added that she had heard no complaints from the students about doing this project. She stated that many of them were working on it during recess and at home. (Large amounts of ice on sidewalks and the playground necessitated indoor recess most days during the time I worked with her students.)

Brooke saw benefits for several students who excelled at playing the games and making their own games.

There are a few kids that [sic] are really excelling. And so then we let them be our problem-solvers. And then go around and help the kids that need help. And it’s great because, you need extra help, there’s always a problem that needs solved, ‘cuz there’s always some kid that says, “How do you do this?” and there are two particular students that [sic] really seemed to enjoy going around and helping their classmates. One in particular today, he was just so happy going around solving problems, here and there, and it was just a rush for him. So it was exciting to see. Because these kids are from a poor area, and they really live in poverty, and I could just see this kid having great problem-solving skills and great computer skills, and so just thinking about where he might take these skills in the future. And so I think this was really a positive experience for him.

On March 12th, I wrote,

At the end of two classes this week, we decided both of them would have more time to work on it on their own during recess and at home. I logged on to the game site and played many of the games of the kids who’d posted. I made comments and suggestions for them so they could improve their games. I sent a list to Brooke so she could let the kids know.

The following weekend, I played every student’s game and made comments, giving feedback to help them figure out how to redesign their games. For example, I wrote, “think about adding some more challenges like time, stationary obstacles, points” or “nice job! – Why don’t you make a new level?” and “seems too easy, what can you add to make it more challenging?” I left a detailed message in some cases, like this one:

Think about making the maze have more challenges so it isn’t so easy to get the points. I like the way I can go so fast! I think the time is too long.
**Story:** what is your story? Can you write some directions that let me know what it is about?

**Visuals:** I like all of the colored blocks. They don’t seem to go with the background. Why don’t you try something else and see how it looks?” (see Figure 5.4 below)

![Game Image](image)

Figure 5.4. Please note the comment areas in the review sections. I indicated difficulty, but did not rate the games.

Below is another comment I wrote, exemplifying the sort of feedback I gave students.

Good idea about the way the enemies move! If you had a point counter, I might want to gather the points you put out for me!

**STORY:** what’s your story? You might write some directions that let me know what the visual images are about. How are you using them? Do they mean anything?

I gave Brooke a list of students whose games I had reviewed. I asked her to let them know and to encourage them to work on using my reviews to improve their games. Figure 5.5 shows another screen shot of the feedback I gave one of the students and includes
comments from other people who played the game, including one made by a student from our class. To my knowledge, none of the students acted upon any of this feedback by reworking their games.

Figure 5.5. Game Alley’s feedback area allows not only the teacher, but also other players to give comments and reviews.
During the second to the last week of the school year, I met with each class a final time. We used the SMART board to view and play the game. Ahead of time, I selected two games from each class and asked the designers to talk about their games. The students were unaware that they would be presenting. Brooke and I had lacked the time to communicate this clearly. She wanted the students to have time to play the game in addition to reviewing and discussing student games. Ahead of class time, I went to the computer lab and logged in to the teacher account and opened *Gamestar Mechanic* in the browser. We spent half of the time in the classroom and half of the time in the lab.

Figure 5.6. Ensposoble. The student titled the piece, wrote tips and tricks, and the goals and rules for game play.
The students came to the art classroom first. I asked for a student to volunteer to play the game. This generated great enthusiasm and the excitement made it a bit difficult for the designer to discuss his or her game, especially when a student was reluctant to stop game play so that we could allow someone else to have a turn.

Above are images from one of the games a student made called Enposuble (Impossible). The student was at first reluctant to speak in front of his peers, but soon became very excited as he discussed it. He apologized for his poor spelling. If there had been time, this would have been an ideal way to motivate him to learn how to spell the words he wanted to use to describe and title his game. (See Figure 5.6 above.)

In fact, creating descriptive titles can be a useful skill. I find that when sending emails that having a good subject line can communicate a good deal of what I want to say, which has parallels to composing descriptive titles.

Below is a screen shot from the game, “Birth of a Hero,” (see Figure 5.7 below). I was impressed with the game play of this game and the student’s use of space. The avatar had to climb a long “stair case” to reach the goal block. This student in particular made a lot of games. His games demonstrate his growth as he begins to develop a deeper understanding of game making. One of his games is called Food and Water. In Game Alley, the area where one describes the game, this students wrote:

normally I should just edit the default but no not this time I have a message people are out on the streets with no shelter no food and no water there are kids out there with no home and japan is horrible to so if you see something that says donate please do.
Figure 5.12. The avatar must climb up the stairs to reach the goal, but first the player must gather the points while the enemies come forward. The avatar can move as fast as the “bullets” fired at the enemies.

While spelling and punctuation do detract, the message communicates a desire to express something that had deeply affected him. He is clearly disturbed by the events following the tsunami in Japan and the resulting homelessness, or perhaps seeming homeless people in his town. One reviewer wrote, “I like it because it is hard and you tried to help poor people in a way” (http://gamestarmechanic.com/game/player/124604). Without any prompting on the teacher’s part, this student used game making as a way to express his ideas using symbols of
water, plants and bread. The game play could be improved and the theme could be
developed further, but it is impressive nonetheless (see Figure 5.8 below). It is clear he did
attempt to develop a narrative and understood game making as a vehicle or medium for self-
expression and social commentary.

![Game screenshot](image)

Figure 5.13. Screen shots from Food and Water grouped together. This student made four
levels and wrote a title and description. This student, realizing the importance and necessity
of food and water to human life, used *Gamestar Mechanic* to make a game about a social issue
he cared about.

As each game was presented, a classmate played the game while other students
watched on the classroom projector. Students and I gave feedback on what they liked about
the games and made suggestions for improvements. Afterwards, Brooke gave a short talk
about why the students played *Gamestar Mechanic* and made games in art class, discussing design elements and artistic considerations such as color, balance, use of space, etc.

5.2.6 Reflecting on using Gamestar in the Classroom

Our last interview was about a month after we had the last week of classes with the students. We spent about seven weeks on four weeks’ worth of lessons because of all of the holidays, school closings, and late starts. She did let me know a few days later that at least one student had made some new games and asked for my feedback. Looking through the games, I was not able to see that any of the students had acted upon the advice I had given in my reviews.

I asked Brooke if she thought this was a good idea and whether or not she was glad we did it.

I think it was a very valuable lesson to let them create a game, to let them understand, play through the games, and learn strategies and then try to make a game. I think they connected with it well. I think they understood that they are making something, just as they make things in art class with paper or clay, but they’re using computers. I think we did make that connection. And that’s a positive thing, and there were a number of kids that were really successful at it and I think it could be potentially life-changing for them, because it’s giving them something to succeed at, and some ideas about what they’d like to do in the future.

It seems a little undefined and experimental, what we did, but I’m fine with that because I think the positive lessons that were learned was that computers and video games are an art form, it’s connected to art. And it’s a creative process, making the video games, and just the act of taking part in this and creating games was enough for me.

I think they got a lot out of the activity. It’s not like we have a defined end product. And I guess that would be their games, and they do have those. But they don’t have a paper to turn in or a test or whatever. But I’m fine with that because they’re elementary students, they’re fourth graders, so I think that they’ve dealt with some pretty complex lessons and developed some new understandings through the program (Interview, April 15, 2011).
She also mentioned that this process was life-changing for some of the students. She explained that two students in particular had been helping their classmates problem-solve and using the knowledge that they had gained and their new-found creativity to teach others. She also said that they both said that they might want to work with computers as a profession, it is “really powerful … for a fourth grader to connect like that” (Interview, April 15, 2011).

She did say that she would probably do the lesson again next year. She added that she thought she would like to play through all of the levels this summer and through that process, she anticipated that she would have more ideas about how to structure the lessons. She stated that she valued the process of giving students a venue in which to create their own video games. She also said that she often asks students to help one another on class projects and so it was easy for her to allow the students who were excelling in the game play to help their classmates.

Overall, Brooke was pleased with the lessons and thought it had been worthwhile, yielding positive results (Interview, April 15, 2011). I was disappointed that we had been unable to help the students connect their game designs with their comic book lessons and to become better at understanding the core elements of game design.
CHAPTER 6 HOW I WOULD ReSTRUCTURE THESE LESSONS (in retrospect)

Game making is not widely considered to be of importance to student learning. It is not explicitly among the state standards, although, as I state above, it can serve to address several standards. While I used Gamestar Mechanic, I think that there are many game-making software tools that can provide similar results. However, Gamestar Mechanic is ideal for introducing the concepts of game design. The students were extremely receptive and always very enthusiastic.

After completing the lessons with students, I reflected on the process and evaluated what worked well and what could be improved. The Gamestar Mechanic website provides excellent teacher resources and suggested lessons. Katya Hott, E-Line Media’s Learning Content Producer, shared her lesson plans and curriculum guide during the design phase during the 2010-2011 academic year. These materials are now posted online. I was also able to meet with Scott Price, E-Line Media’s Vice President of Business Development at the Games+Learning+Society conference in 2011, where we discussed their recent experience using Gamestar Mechanic with middle school students. As a result, I’ve written a new approach to using Gamestar Mechanic with students.

6.1.1 My redesigned lesson

Beginning with a comic book lesson could have been more powerful. When Patricia Amburgy (2003) searched for materials that exemplify K-12 practice regarding teaching
“visual culture that presented current theory in ways that are both accessible and sufficiently complex” (p. 48). She found some comic book lessons, but explained that the focus was on “teaching technical skills rather than the power of the comic book and cartoon images as cultural narratives” (p. 48). While her purpose had not been to find comic book lessons, it is significant that what she did find paralleled the approach that Brooke took with her students. Brooke’s intention was to use this lesson to lead into making a game, but we had not discussed including visual culture. My understanding at the time was that that storyboards are often employed in concept development for games, and a lesson in comic books seemed like a natural place to begin thinking about how to design a game and deciding what it would be about. I thought it would help them to think about the action of the game by developing a story with an obstacle and goal. I think that including visual cultural narratives in the lesson would provide more depth and perhaps help the students to make a clearer connection to their game design.

Visual culture is significant because it presents ideas and stories that shape people's lives. It “reflects and contributes to the construction of knowledge, identity, beliefs, imagination, sense of time and place, feelings of agency, and the quality of life at all ages” (Boughton, et al., 2002 as cited in 2003, Keifer Boyd, Amburgy & Knight).

Through this process students may begin to understand that game design is a form of self-expression and allows them to create something that is meaningful to them and reflects their ideas and understanding of their world.

As Keifer-Boyd (2003) explains an approach to teaching visual culture as it relates to using WebQuests, she states that

from a postmodern social theory perspective, creativity is intertwined with critical reflective consciousness aware of the context from which the creative act arose and is intended. …creativity is valued for its integration with critical thinking to expose what is privileged and to contest the boundaries of art (p. 50).
From my perspective, Keifer-Boyd’s approach to teaching visual culture represents how I think about game design and game making in the art classroom. Happily, the WebQuest she used as an example was about comics and women, designed by Ellen Owen. Although many of the links are now broken, the lesson is still available and seems to address relevant aspects of visual culture related to comic books (see Figure 6.1). I would adapt Owen’s approach to use as an introductory lesson.

Figure 6.1 Ellen Owen’s lesson, copyright 2002, created while a student with Dr. Keifer-Boyd: [http://sva74.sva.psu.edu/~cyberfem/webquests/comics/index.htm](http://sva74.sva.psu.edu/~cyberfem/webquests/comics/index.htm).

Owen designed this for use with 10th graders and so some adjustment may be necessary, especially if it were to be used with 4th graders. Depending upon the amount of time available, I might ask students to do the Comics and Women WebQuest. I would find
substitutes for the broken links by either trying to figure out if the original links were moved and have a new URL or find adequate substitutes.

While discussing and thinking about comic books and visual culture, I would also include references to video games and point out the similarities and differences. The same idea that Owen used in her lesson is relevant to video games as well: how women have been portrayed. In fact, I would likely incorporate parts of Owen’s lesson and design a new WebQuest or a complimentary one that included links to images from games and online games. I would use examples of games that address social issues such as Darfur is Dying (http://www.darfurisdying.com/), September 12th: A Toy World where killing innocent citizens results in more terrorists appearing, and finding other examples on the Games for Change website: http://www.gamesforchange.org/play/. I would also include some instances of exemplary artistic style such as Samorost, and others from Amanita Design (http://amanita-design.net/games.html), and, time permitting, allow some game play. Ideally, we would also have a brief discussion about game genres.

Figure 6.2. Screen Shots from September 12: A Toy World, (left) and Darfur is Dying (right), both free online games.
Owen’s lesson was intended to be taught over four to five class periods. Given the fact that many art education teachers have their students for only one or two class periods a week, this would possibly need to be modified depending upon the class schedule. If students were to work in pairs, they could help each other navigate the websites and read and discuss the relevant material. I would also briefly discuss storyboarding. I would also make clear that the comic book lesson concepts would be the social considerations that they would be using in making their own video games and the cells of the comics would contribute to the narrative. When students go to the lab to make their first game, they would bring their comic strips with them for reference.

My approach to using Gamestar Mechanic would be very similar to the way it was used with Brooke’s students because it was very effective in some ways. If students were clearer about their narrative design when learning about game design through playing Gamestar Mechanic, I think it would help them to be more focused and reflective about how to apply what they learned to their task of making a game. Expanding the comic book lesson as described above will be important in students’ translating their narrative design to the game-making task.

I think that it would be important to identify students who are struggling to advance in the game and have more mentor students to help them figure out how to overcome whatever difficulties they may be having. While we did have helper students, they might have been able to have been more helpful had I taken time to talk to them ahead of time about how to help others without their jumping in and doing it for other students. The reality is that being in the moment when there are so many children asking questions, 40 minutes flies by, and there were normally many unresolved issues or questions.
Some problems had to do with children not remembering their logins. I allowed them to have great freedom in choosing names so the name could reflect something about themselves when they posted games in Game Alley, but this led to big problems afterward. I do think that having a naming convention for passwords and logins would alleviate some of these issues. Additionally, the premium package gives the teacher more options for managing student accounts. This would alleviate some of the problems, if the school were willing to pay the premium price. That might require soliciting support from the PTO and presenting a case for the reasons playing a game in school is important.

As students make games and I give feedback in the review section of Game Alley, I would require the students to go back and rework their games based on my advice rather than starting new ones. After students had finished their games, I would have all of them present their games for class critique and feedback. If some students were not done, I would call upon those who had completed a game, especially if they had done more iterations of the game. I may do as I did on the last day, and pick the ones that I thought were best and have those students present.

Time constraints are the most difficult aspects of teaching. In the case of Gamestar Mechanic, I think it would best to think of game making as a year-long process. Even before the comic book lesson, students could be introduced to Gamestar Mechanic and encouraged to play it on their own during free time at school, such as recess when students cannot go outside, or at home. This would require negotiating with other teachers to have their support and understanding about the project.
Furthermore, fellow teachers may be willing to collaborate and build upon the writing and math aspects of *Gamestar Mechanic*. The advantages of collaboration seem obvious to me, and I would hope to be able to persuade other teachers to cooperate.

Other considerations include scheduling time in the computer lab, making sure ahead of time that all students have the latest version of Flash player on their computers and that the school’s IT department has lifted any blocks to the game websites that will be accessed.
My research plan allowed me to work with an art teacher and explore how to use a game with students to help them develop their artistic creativity through the design of their own game. Through this process I came to appreciate game making as a viable and necessary part of institutionalized art education and the rest of school outside the art classroom. While I did advocate game play as a way to situate and contextualize learning, I did not fully appreciate how complex and enriching game making could be for students, even through I had made games myself. I now think that game making offers a vehicle for multidisciplinary study, creativity, problem-solving, meaning making, and analytical thinking. Students making a game engage in an iterative process that helps them to think about the user experience and how their choices impact the user. This requires them to think very deeply about what they want to express or create and how that is communicated and interpreted by the end player.

This research also brought together my past experiences working with artists and teachers when I was the coordinator for arts integrated methods, providing professional development for elementary school teachers, and involving the high school art teacher and her students in the process. Working with Brooke was similar to the artist-in-residence aspect to the work I did at Smith Elementary School in Delaware. However, this time, I was in the “artist role”, providing the expertise about game making and how to use *Gamestar Mechanic*. Through working with Brooke I began to think about how a teacher could feel
confident and comfortable in using a game without someone like me to guide them through the experience. My thinking is that, although Gamestar Mechanic and many other institutions provide teacher guides, many teachers don’t have the time to learn a new subject area, especially during the school year. Having viewed many training videos while learning various software programs, and having made several training videos about using Carmen for OSU myself, I decided that short training videos could provide contextualization that could give teachers the confidence to use a new teaching method, or, in this case, a video game with students.

Gamestar Mechanic is also more complicated than simply using a game because it requires students to both play and make games. The game-making aspect can be overwhelming for someone new to the idea of students making games as an art activity. (I am not limiting game making to the art classroom; it could potentially be used by other teachers, perhaps best as a collaborative, interdisciplinary student project). Keifer-Boyd (2005) suggests that older students making games for younger students, it maximizes learning. “When children create games for children, they for educational theories, test their pedagogy, and make changes passed on peer responses to their games” (p. 117).

7.1 Next Steps

Making training videos could support the classroom teacher. From my conversations and experiences with Brooke, I have identified three topics:

1. An overview of the game space and the purpose of each level
2. A succinct overview of game design, explaining the five core elements and how they are integrated using Gamestar Mechanic
3. A demonstration of how to use the toolbox to make games. I would also include a demonstration of how to use the keyboard to play the game.
I think these videos would aid in understanding how *Gamestar Mechanic* works and how to use it with students. The Gamestar website provides teacher lessons, but they are quite long. I think that a quick guide would also be useful with a few handouts and slides that can be used to guide students through the login and registration process.

In addition, this game incorporates math skills (ratios, grids and mazes, patterns, spatial relationships, timing), writing and reading skills (writing directions, titles, spelling, wringing constructive criticism), artistic skills (creativity, color, balance, spatial relationships), and science skills (the iterative process of design). If classroom teachers from several content areas worked together, several of the problems we faced might have been addressed. For example, a language arts teacher expanding their understanding of narrative and helping thereby relate storytelling to game making would have prepared students in art class to consider those elements in their own game-making projects. Other teachers could help students to understand the place of experimentation in the design process and why it’s important to go back and redesign their games and then ask for feedback again.

**7.2 Game-based learning and further research**

I have identified three areas where more research is needed:

1. Game researchers, scholars, and designers need to create standards and establish best practices for what constitutes a quality educational game.
2. More studies that demonstrate how games support learning in the classroom are needed.
3. More research about designing and incorporating assessment into a learning game is needed. Once games that provide assessments for teachers become more available, research that establishes how to rethink and redesign the existing evaluation and grading processes will be needed.

The first would contribute to creating quality educational games. The second would yield needed data about using games with students in classrooms, and the third would enable
teachers to rely upon assessment data from game play rather than test scores. It would also allow the teacher to evaluate a student’s thinking process and student would receive in-game feedback.

In addition, more research is needed about how to overcome barriers to using games in the classroom and other learning environments. From reviewing the literature, this researcher believes that teacher training is essential. Research is needed to determine whether short training videos about specific games would enable teachers to quickly learn what a game is about without having to play the game for several hours or read through a long teacher’s guide. That is not to say that a teacher who wants to use games shouldn’t play games. Having an understanding about current games and how to play different kinds of games will help a teacher understand the student experience and, potentially, boost teacher confidence about using games. This combined with training could go a long way toward creating avenues for games to enter learning environments.

### 7.3 Games are most effective combined with teacher guidance

A. E. Boycott stated in 1929, “The difficulty in most scientific work lies in framing the questions rather than in finding the answers” (as cited in Gaither, 2000, p. 294). I would argue that this is true for art as well. Teachers asking students questions that make the student think about their subject matter can translate into the student asking questions. When students are curious and are asking questions, they explore their world, find their place in it, grow, and learn. Games can’t substitute for a teacher’s guidance and facilitation. At the University of Central Florida, half a million students were asked to identify the characteristics of an excellent instructor (some students would have been counted multiple
times each). As the authors note, these correspond with the “seven principles of good practice in undergraduate education and to the national study of student engagement.”

1. Facilitate student learning
2. Communicate ideas and information effectively
3. Demonstrate genuine interest in student learning
4. Organize their courses effectively
5. Show respect and concern for their students
6. Assess student progress fairly and effectively (Hartman, 2005, p. 76)

While video games have a great potential for educating people, they are only one tool in the teacher toolbox.

Gamestar Mechanic has the potential to provide an engaging and meaningful addition to art instruction because through it, students learn the principles of game design. Game design requires thoughtful consideration of how to create a game that will be played and enjoyed. Aesthetic considerations and creativity are key aspects of this process. I hope that using Gamestar in schools will contribute to reestablishing art as a necessary and essential academic subject in the minds of administrators, one that must not be cut from the curriculum, and argue for putting an “a” for Art in STEM – STEAM.

Games and other forms of participatory culture that are emerging challenge educators to move from the factory model of education and create a new paradigm. For inspiration see RSA Animate - Changing Education Paradigms, a shortened and illustrated version of a talk by Sir Ken Robinson.

http://www.youtube.com/watch?v=zDZFcDGpL4U Even though our educational system is entrenched and encumbered by bureaucracy, teachers can identify learning strategies that work and implement them. Students still need teachers who care about them and who can empower them to find out what they are good at and thrive, finding joy and satisfaction in learning.
7.4 Conclusion

As Dewey explained in 1897, “the teacher is not in the school to impose certain ideas or to form certain habits in the child, but is there as a member of the community to select the influences which shall affect the child and to assist them in properly responding to these influences” (2008, p. 129). We now view what Dewey was describing as a paradigm shift from “sage on the stage” to “guide on the side”. Over 100 years have passed since Dewey wrote My Pedagogic Creed and we are still entrenched in the factory model of education, ignoring much of what we know from research about learning and cognitive development. Digital games and their effectiveness in teaching 21st century learning skills may provide the impetus to embrace Dewey’s idea about the nature of learning and the purpose of formal education: It is primarily a social institution. He believed that education should support both the psychological and sociological aspects of a child’s development, building upon children’s interests and abilities and connecting them to the community. He stated that “education … is a process of living and not a preparation for future living” (p. 127). Game-based learning advocates students’ use of games as a process of engaging in real-world activities, participating in communities of practice, and becoming producers (Jenkins, 2006; Gee & Hayes, 2010; Gee & Shaffer, 2010; Prensky, 2010; Shaffer, 2006; Squire, 2011).

As more games are created with assessment features for teachers, the burden on teachers to evaluate student learning with tests and quizzes can be lifted (Gee & Shaffer, 2010) and move us from the testing frenzy that has captivated the minds of legislators and engendered fear in the teaching community. Furthermore, how to use embedded assessment in games has to be understood and incorporated into teaching practices. Games and simulated game environments that create a community of practice for players could
potentially transform the way that students think about what they are learning, fulfilling Dewey’s vision of education as a “process of living” and making education more relevant for students.
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103


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APPENDIX A: my journals

October 2010

If I was a student in this classroom, I would not be enjoying the current assignment. I find making ads to be boring if it lacks specific direction. I think kids do a lot cutting things out of magazines. I’m sure Brooke is tying this assignment to the standards that she is required to meet. I personally would prefer an assignment that had more clear goals. However, I did not hear the initial lesson and these kids come to class only 1 x a week. It was their third class. I have to say that I think the methods of Oliva Gude would be a place I would start in helping students to think through topics that relate to their lives. I would like to know more about her work. http://www.uic.edu/classes/ad/ad382/sites/Projects/P_index.html

Art is so vast. Ads are so horribly destructive to our thoughts. Unless this assignment is accompanied by a discussion of how ads influence our lives and dictate our purchasing, I don’t see it. It’s too broad. It would make more sense to reign it in with some constraints such as make a poster about the forthcoming Halloween parade. Design an invitation to your parents to attend this event…something that teaches the same elements of design used to make an ad, but makes it about something important to them.

In the classroom

I see my role in Brooke’s classroom as support. I will bring ideas and materials to bear on our current project. We will rewrite the lessons provided by E-Line media to address the needs of the art classroom. We already looked at the standards that must be addressed. Those seem to fit into what we want to do. I will not lead the class, nor will I impose my own teaching style on Brooke. Rather, I will support her style.

My own teaching style is also laid back and encouraging of exploration. I find my ideas are always better in my head than in practice. I’ve never had my own classroom, but I do find it hard to change the stigmas and conventions that students buy into when the step into a school building. I do think their safety is the most important aspect of being at school. That is, students are not allowed to say mean things to one another – Brooke, I noticed, stopped the conversation and admonished students to change the way they were speaking to another student. (Written as part of a class assignment in 705, Research Methods.)

October 2011
Initial meeting with art teachers in Brooke’s school district

I met with teachers at XX School on Wed. October, 20th. There were five teachers present, one was late and another did not attend. Of the teachers present two seemed particularly interested in using games in the classroom. I am hopeful that another teacher will join Brooke and I in using Gamestar Mechanic with students.

When I was in the classroom with one of her fourth grade student groups, I observed a mix population of students. I know from what she has told me that they are on Academic Watch. I also know there are a lot of social issues in XX, including poverty and unemployment. I anticipate that many students receive little support or encouragement at home. Many families may not have home computers. When students have limited access to computers, it makes using them much more engaging because they are unfamiliar.

I did not observe any flagrant behavior among students indicating that there racial tensions or problems with this group. However, I was only with them for 30 minutes. There could easily be lots of underlying social issues in this school and within this class.

This game was tested with students in Wisconsin. Researchers found that students who were not engaged in after-school activities and those who had access to computers at home were less engaged with the program. The research was done as workshops in after-school settings and labs. In our case, students will use the game as part of the their art class curriculum. All students will be asked to participate and learn the principles of game design and then implement those designs in using Gamestar to make a game.

We discussed the shooting element available in the game and decided that it did not constitute an issue because there is no graphic blood. The argument for using the shooting mechanism in this game shows that it is a strategic element to be used to create game strategy for player movement and for achieving goals.

We discussed creating an introductory lesson that would allow students to talk about games that they know and look at the art of various games and trying to get at the underlying aspects of game design as art. That is, in a game, the system of play or game mechanics can be created to be artistic or not, similar to how a novel can have the essential parts, but still not be well executed. Our premise is that games are the new novels. We ask students to talk about games they’ve played and bring up examples on the projected computer screen. We will go through a few of these to get at the idea of how artwork is created in a game and why. A second assignment may include having students create their own avatars and backgrounds/ environments. Through the lessons we anticipate some tie into math concepts of top-down and side-view of the game space and discuss how that changes how the art needs to look.
Jan. 24, 2011, week 1, day 1, group 1
I was hoping to get the kids online today. I’d made a presentation to facilitate that activity. However, Art Teacher never got around to checking whether or not it would work. Turns out we need flash player 10 installed and I set up her account. I checked with E-line to make sure it all worked. After class, I sent an email to Monte who is the IT person for XX city schools. He said he would get the right player installed and make sure the game wouldn’t be blocked.

When I got to the class Art Teacher and the kids had been talking about video games they’d played. They had a few M, and T rated titles. We both talked about the way that is similar to watching R rated movies, that they weren’t old enough to know how to process the adult themes in those kinds of games.

I asked them to remember the cells they made for the comic book. The three cells were avatar, obstacle, and goal. We talked about the meaning of avatar.

We brainstormed a list of board and card games like Skipbo, uno, monopoly, scrabble, and physical games like football, tag.

I asked them to think about the games we’d identified and to talk about what makes something a game. Someone said goal/win.

Then we talked about rules and game mechanics, games as systems with examples of systems they knew of like the water cycle and the school system. We talked about what a sprite is.

We talked about game space likening it to a cheese board and a football field. They identified what the board looked like. I drew a quick sketch of a monopoly board and we talked about how there were areas you couldn’t move your piece into. We talked about the game pieces in chess and how they have different rules that govern how they can move.

We looked at the slides. I asked them to read the first comic strip, but after that they didn’t have to if they didn’t want to.

We talked about changing the comic strip they wrote if they got a better idea for a game. We said they could play it at home. Two children don’t have computers. Art Teacher said that the computer lab is open during recess.

The kids seemed very excited about making a game. They seemed to like the game.

Jan. 26, 2011
Brooke’s class, 2nd group of 4th graders
I did much the same with this group as the other, however, this one was more rowdy and less attentive. They all wanted to talk and not listen to each other.
One girl was disrespectful because of a new seating arrangement, but was eager to get back to the group after being sent to the hall. She was a bit rude with me too.

The kids were impressed that I played video games. ON Thursday we will move them directly to the lab because they are hard to control and focus as a group. There is one child with Asperger's and he has to sit alone.

Thursday, January 27, 2011
Today we did an overview of making games, I handed out graph paper and asked them to use the comic they had made in order to think about what story to use in making their game. They also watched me demonstrate some of the ways they can make a game with Gamestar. They drew obstacles, points, bad guys and their avatars. They did a nice job. Some of them understood the one to one ratio of the graph paper and the grid in making a game. Some just used the graph paper like a blank sheet of paper. Art Teacher liked it because it was drawing and using pencils, markers and crayons. – 2D approach to game making.

The second group was hindered a great deal with the whole log on process. One kid with Asperger's was very disturbed and disruptive. I think most of them got to play a little bit. We'll see where they are next week. I think I'm going to make a chart. They have to mark how far they get each day. That way I can gauge how quickly we are able to move forward and figure out when to introduce game making and when to have discussions about game making.

Just trying to get their names and passwords written down was a disaster. Maybe they'll remember them. We'll see next week.

Feb. 2, 2011
On Monday, it went really well. Some of the kids were really zipping through the levels. Some kids took most of the time getting logged in and I did a lot of it for them prior to their arriving in the lab. Some of them really struggle with the security page/ human verification. (I forget what it's called.) I don't know if it's possible, but it would be great if they could skip that page as part of the teacher area.

The second group is pretty wild and it's harder to tell what they got done. I was going to collect all of their usernames and passwords and got only half before the time was up. One kid has Asperger's and was yelling the whole time. He was very frustrated wouldn't let me help him. I was one click away from having him logged in and he lunged for the mouse and locked me out. His teacher later helped him get logged in. It was so chaotic. They couldn't meet today, but I learned from my mistakes and it made the class that met on Monday go really well. I went to the lab early, logged all the computers into the class space, opened Explorer, went to G*M, clicked through to the log in page and then showed them what they would do with an overhead projector before I took them into the lab. I also had them write their user name and password on a piece of paper before going to the lab and explained that
they needed a unique name. Only a few had to change their choices once they got to the registration area. It's also a calmer group of kids.

I'm going to make a chart with the missions and ask them to check the one's they've done so I can figure out how fast they are moving through the missions. My goal is to have them play for 3-4 classes in total, make games during 2 classes (and share their games with small groups, creating 5 teams or 3-5 kids) and then present one game from each team during the final class.

It's been a lot of fun. The biggest difficulty I see with this age group is 1) they can't type, and 2) it takes them a while to get to the right place on the internet - meaning, the teacher needs a support person to help with getting the kids logged on and to the right place in order to take advantage of the short class time allotted - 30 and 40 minutes.

Feb. 10, 2011
Meeting with the teacher's kids

Today I met with Teacher#1’s kids. There are two that are really far ahead. I asked them to work together, play each other’s games and talk about them. I also asked them to make a game with a theme or story and make it more than one level.

I made charts so that I could ask the kids to put down how far they’ve gotten. Next week I’d like them to start making games and then make a game as a team and present the week after. Signing them into the computer ahead of time helps a lot.

week of Feb. 14-17th
The kids were pretty rowdy yesterday and today.

On Wed. Mrs. Martin’s kids couldn’t log on because g*m was blocked because it is a game. There was a new filter. We asked the kids to draw their game plan out and answer a few questions about the kind of game they would make. They weren’t particularly productive. I wrote up the questions I asked them and thought about having a handout for Teacher #1’s kids, but today I just had them work on making games and if they had beat all the levels, helping other kids get through Episode 3.

I think we have to reevaluate the final week and having them give presentations. Brooke’s coming over in a while, I’ll interview her for the 3rd time and we’ll have dinner and talk about next group, making teams and what is reasonable to accomplish in the final week.

I was a little worried about her willingness to try it and if I’m really supporting her. She said she is observing and doesn’t feel comfortable enough with the topic to teach it. I realize that using this with students means that the teacher needs a class on game design, or a short workshop or else, it just won’t be possible to figure out the learner outcomes. We need to reevaluate that to in light of what we’ve done so far.
March 7, 2011  
Thinking about how to proceed with Brooke’s kids

This process requires me to think on multiple levels about teaching and learning

Teacher needs to understand how to progress in the game so she can help students
Teacher needs to understand game design so she can lead lessons.

Students need to:

Understand game terms
- right now they get avatar, obstacles, goals
- not making a connection with narrative
- not getting the complexities of game design – mainly flow

these elements are unconnected in their thinking.

Maybe if we partner with an English teacher it would help them connect with the narrative.

Brooke suggested using a game they know and go through a few examples of the story in those games

In two weeks, we'll look at some examples of the kids games and talk about what they can do to make their games better.

March 12, 2011
At the end of two classes this week, we decided both of them would have more time to work on it on their own during recess and at home. I logged on to the game site and played many of the games of the kids who'd posted. I made comments and suggestions for them so they could improve their games. I sent a list to Art Teacher so she could let the kids know.
APPENDIX B: transcription of interviews

Transcriptions of Interviews with Art Teacher

December 31, 2010 – Duration: 35:46 – before we began

M - Art Teacher as a teacher – how long have you been teaching art?

Art Teacher – well this is my fifth year teaching art, in the XX School district. So, in this job, teaching kindergarten through 5th grade. But, in addition to this job, I had two years teaching in the Peace Core, and one year teaching at the Delaware Notes alternative art school, so grand total of 7 ½, 8 years.

M – so when we started talking about using a game in the classroom, you said you wanted to bring technology into your classroom. So what made you want to do that?

Art Teacher – I think that using technology in the classroom is important because it’s an emerging art form and one that is often overlooked in the art classroom, but it’s an important skill for kids to be able to learn, and it’s important that we teach them to use technology to make art. And also helps to keep our subject, art, relevant - in the school system.

1:40 – technology in the classroom is really broad so would there be other things that you be interested in? Did, does it matter? Do you care?

Art Teacher – yeah, I’m interested in a lot of different things – thought that was an intriguing idea because it uses the creative process to to create interactive art. It takes art a step beyond the 2 dimensional form of paper and makes it something your can play with. It’s very creative and complex, and so I thought it would be an interesting project. But I’m interested in exploring technology and what it can do in education, in a lot of ways, simple things like using a projector in my classroom has really given my lessons a lot more depth.

2:55.4 – okay so, we talked about your comic book lesson and you’ve done something different this time because of the game idea, so do you want to talk a little bit about what you did the first time as a comic book lesson?

Art Teacher – I had the kids look at different examples of comic books and we talked about how you develop a story. And I asked them to create a comic using three frames. A beginning, middle, and an end. Minimum. They could throw in another frame if they wanted to or sometimes two, but it would just show a progression of a story using pictures. They could use only pictures and they could put their words in as well. And then we studied some
basic cartoon drawing techniques, like how to use cylinders to create a body and show a body moving, and different ways to draw a facial expression. That was in humans and also in animals, and then talked about creating an environment. So that’s what we did.

And this time, to get ready for the video game, um, we, uh, we decided to have um 3 frames again, but the first frame the students would develop an avatar, the 2nd frame show the avatar encountering an obstacle, and the 3rd frame would show the avatar achieving a goal. And this would help the students think visually. And also prepare them mentally for the game design program. And so the students have started that, and I did the same sort of drawing cartoon techniques. And so they’ve created their avatar, and started their obstacle, and goal, and I really found that it was easier for them to connect with the idea of the avatar, obstacle and goal and it was easier for them to do that rather than create a little 3 frame storyline.

Personally, I think for 2 reasons, saying avatar, obstacle, and goal is a lot more specific than just letting a student develop their own storyline.

6:01 –
So they don’t have to be quite as creative to do that. They still have to be creative, but not quite as creative. It puts closer parameters on it so it makes it easier. But, also, I think they liked it because they do play video games and they do relate to avatar, obstacle and goal from their video game experience. And so they became excited about that.

So, it was kinda fun. We talked about what an avatar was, the definition, they, did a good job of coming up with a definition. That it is a version of yourself, that you create, it is the being that you navigate through the game. So, that was kinda cool.

Me – did you talk about that as a group to define it? Or, how did you reach that definition?

7:03.6 –
Art Teacher – we talked about it as a group to see what the idea was and some of them said it was like the movie, that there were these blue creatures going around. And then some of them had uh, came up with that definition a little bit, uh.

Me – so did you guide them in how to think about that?

Art Teacher – I did guide them. That’s kinda my definition, too. I didn’t look it up out of the Webster dictionary or whatever, but that was what I wanted them to think of the avatar as, I guess also my perception of an avatar also formed a little bit by that seminar (OAEA) that I went to at the art ed conferenced.

…And I think it’s easier for them to identify with their avatar. It helps them create their story.

M – was this fourth grad and fifth?

Art Teacher – fourth.
M – are the students finished with their project?

Art Teacher – most of them are still finishing, I have them do sketches, sketch it out. In pencil, then I have them use fine-point sharpies to go and choose the lines that they want so that they can try to make it neater. Once we get compositions that we like. Let’s say practice that, then I give them rectangles of paper, … like a half sheet…8 ½ x 5 ½  
I figure that they can do three rectangles with that…more…not being super picky about technique. I do point out ways for them to make it better.

Me - so students have 3 pieces of paper and then they do their sketches, so you’ve worked on it 2 weeks?

Art Teacher – 2 weeks and then when we come back from break we’re going to finish them and mount them on black construction paper. And then we’ll start the video game project.

Me – you said that the students were excited, so what about them made you think they were excited?

Art Teacher – They were ready to talk about the avatar. And the obstacle and goal. Their hands were shooting up, they were shouting things out. T…they were just ready to volunteer information. And they didn’t have as hard of a time like with the cartooning project, sometimes it was a little like pulling teeth. Some of them had a little bit harder time, but once I threw out ideas they went with it and they were just excited about creating and I didn’t hear a lot of complaining. Most of them were drawing all of them wanted to share their ideas. They brought them up and said, “can I show this to the class?”

11:56.3  
me – when they came up with their ideas did most of think of a person as their avatar or did they use some other main character?

Art Teacher – a lot of them used strange amalgamations of animals and different things and I showed them, I drew a horse on the board and some of them copied it and used a horse or changed it in some way,

Me – so did you use another other examples? –

ART TEACHER - yeah, I did a person and then a horse. And I changed things about it or a robot or

12:44.6

M – as the avatar
ART TEACHER - yeah
M – and did you give them obstacles and goals too?
Art Teacher – yeah, I actually let them help me come up with them. When we had like a robot, and um, then they helped come up with an obstacle, I’m trying to remember, maybe a fence, the goal was a love interest, like the fence was keeping him from his girlfriend.

M – how many kids to you have in the fourth grade?

Art Teacher – 40, maybe a few more, 2 classes of fourth graders, 22 in a class

M – and you meet 2 x a week?

Art Teacher – one yes and the other it’s 60 minutes a week.

M – is that hard to keep them moving ahead at the same rate?

ART TEACHER - yes

M- how much have you told them about the game design project?

ART TEACHER - not much at all, I just told them we’d be experimenting with it and um working with you and we get to explore it and make our own.

M – did you have any sense of their reaction?

ART TEACHER - I think they’re excited. I don’t think they know what to expect exactly, but their reaction to the drawing project was very good, so

M – they’re positive about it?

ART TEACHER - yes

M= so for you as a teacher, how did you find that assignment working, did it meet your curricular goals?

ART TEACHER - they’re supposed to create a narrative. So in the avatar encountering the obstacle, and achieving the goal, that’s a narrative. It’s not as complex a narrative as they had to…I don’t know if it’s that it’s not as complex a narrative (as before), but it’s not as difficult to come up with. So, I think it’s still fulfilling the rules. The goals of the lesson. It’s just doing it in a different way. And yeah, I think it’s successful, I don’t think it was quite as challenging for them, it’s good to challenge them, but it’s uh, not good for them to feel overly frustrated with so it’s nice to alleviate that frustration a little bit.

16:25.7

M – so you gave them some structure, to put their story in. I mean those are common elements of stories anyway…
ART TEACHER - which I did before, I just said beginning, middle and end. And left it more open. I think it’s a good exercise for them and most of them could do it. But some of them hadn’t been used to having so much choice, had a harder time.

M – this time they came up with it more easily?

ART TEACHER - they related more to it.

17:13

M – okay, and um so are you, how do you think? Do you have any comment or anything that you’d like to share about it? What you did or what we’re going to do, anything.

Art Teacher – I think that it was good. Um, and I’m looking forward to trying the design project, like the students I don’t know what to expect. Cuz it’s kind of an experiment. And I’m fine with that. I think it’s exciting to just explore it together. And see what we discover. I don’t think that we need to know what we’re going to discover. Um, we’re still following the goals of the lesson, creating a narrative and exploring technology which is another aspect of the curriculum that we’re supposed to be doing. So I think that’s good and I’m excited to see what happens and I don’t think we can really have a failure. I think we need to sit down and decide what we’re going to do.

M – from your own background as an artist and then teaching this way, is this working well with the kind of structure that you have in the classroom? I guess what I really want to know is if you could talk a little bit about yourself as teacher…the kind of teacher your are.

Art Teacher – I like to try a lot of things, I’m very experimental. I like to discover. I don’t like to plan things out in depth. I like to get an idea and I might run with it the next day or even later that day for a class if it works into my schedule. I think it makes the class exciting because I can say look, what I discovered, I want to tell you guys about it and I have this great idea, let’s try it. And I think it keeps things fresh. And also I listen to my students and they might say ooh that looks like a dinosaur bone, can we make dinosaur bones out of clay. And I’ll be like hum, that sounds like a good idea, can we do it? And then I’ll see if it works into the curriculum and if we can do it, sometimes we can do it or a few lessons out and maybe the next year before we can do it.

M – so you’re open to suggestions from your students?

ART TEACHER - yes, I’m totally open to suggestions from my students. Sometimes, I look at the lesson book and see the curriculum map and think how can we do this um these are some ways we can do this and not sure about what material to use and I like the students to have a part in the creative process. So I’ll just spend some time in class and sit down and say “we’re finishing up this project, and we’re starting a new project. And this is the topic that we’re supposed to cover. Do you guys have any ideas for what you’d like to do. And they’re raise their hands and tell me and um, then together we’ll put together a project. And I think
that’s really cool cuz it’s not all me telling them what to do, we’re discovering it together. And I think that so often teachers think they have to prepare it on a plate and hand it to them. But art is about creating things; it’s not about a craft. It’s about being creative. And so I like to let them help me create it.

And it takes a lot of pressure off me and keeps them happy too.

M – do you do that with all grade levels?

Art Teacher - yeah, all grade levels. And then, it’s exciting because they come in and they ask me - “I have this idea, can we do it?” and I’m like well, I’ll see, maybe, maybe not. Sometimes, I can’t always do it, but sometimes I can. And I like that, that they’re thinking about it.

M – is there anything else that you’d like to add?

ART TEACHER - yeah, I’m just thinking about the project, and they way we laid out the storyline, and I was thinking about the merits, and there may not be one right and wrong way, I was just, thinking in my mind, what’s better? Is it better for them to have it open-ended where they have to develop their own story? And it can be a little more chaotic and even frustrating, but do they grow more from it? Where they have it more open-ended and they really have to work and struggle to get it? Or is it better to have a little less frustration,

M – yeah, maybe it depends on the student.

ART TEACHER - yeah, I think it would depend on the student.

M – cuz, for me as a student, when I have some, some classes are open-ended and in some classes, give movie class example of the boat, explain the structure of the assignment, so, um. That helped us because we had the subject, because we had a structure

ART TEACHER - and it’s good to know what’s expected sometimes

M – sometimes it helps you to be more creative when there are rules

ART TEACHER - sometimes, yeah it’s just different, yeah. Because in the art world, the reality is there aren’t rules. So I like for them to..but at the same time I don’t want a student to shut down because it’s so insurmountable…cuz they aren’t used to that.

M – well, some people have a vision of what they want to do,

ART TEACHER - and some people don’t.

M – gave example of the game at GLS – fit the rules …
ART TEACHER - a lot of people are afraid of failing, so if you don’t give a lot of parameters to it, they’re afraid they’re going to fail or not gonna be successful.

M – no, it wasn’t about that as much as it was that it just makes it easier to make decisions. Because when you can do anything…then it’s hard to narrow it down. But if I have to fit it within these parameter, it helped me to narrow it down. But it still gave me a lot of leeway….

ART TEACHER - I’m kinda thinking, answering my own question. Like in that cartoon lesson, maybe it did need to have more parameters at least for that age group, because frustration isn’t good cuz it can

M – shut em down, cuz it keeps you from making a choice…

ART TEACHER - mmmm,

M - I found things like that can help because when you’re trying to learn something, about like how to shoot a good video, it’s good because you don’t’ have to worry about creating the best story in the world, you just have to create a story. And that was one of our other assignments – line from a movie and we drew cards….blah, blah, blah – so we could do it quickly – it helped us narrow it down, because there were things we needed to learn …. Sometimes having some guidance helps you make decisions…sometimes structure can provide help in making choices.

Art Teacher – it’s good to provide the help, but it’s also good if students are able to learn how to initiate things and come up with original ideas. … I guess, I guess, that’s the one downfall of, I mean it’s not really bad, because it’s not of the simplicity of the three frames, avatar, obstacle and goal, is, that doesn’t take as much creative thought, but it’s okay because it does still take creative thought, but we’re just working on and they’re going to use, and it’s a simple start which we’re then going to flesh that out more. So I think then that’s a strength because we’re starting more simply and then we’re going to get more complex, where it’s not just starting with the complexity, all together, so that’s a good place.

M – even if you told everybody that they had to have a dog as their avatar, …or a horse – everybody’s would different; people have different ways of expressing things. I don’t mean cookie –cutter art projects, I’m sure you don’t use that kind of thing at all…

ART TEACHER - that’s for the classroom teachers – (like cutting skills) I think that kind of thing has its place, but it doesn’t have a place in my art room.

31:51.8

M – could you just expand a little bit about the role of the student as creator in the art room?
Art Teacher – well I just figure the subject is art. So I want to teach my student how to create art. I don’t want them to create crafts. So for the smaller kids I may concentrate more on basic skills like drawing shapes or cutting straight or around little details.

M – how do you define craft?

St – that is a sticky subject, but I guess that the point is that I don’t want to hand students to do mindlessly, I want them to understand art as a language and understand that there are so many different components to art and I want them to understand how to use, how to read art as a language, and how to speak the language.

M – what do you mean the language of art?

Art Teacher – I mean how to use images, and forms, and um, to create an idea or ideas um, um I want them to learn how to analyze and criticize artwork and to make things deliberately. When a teacher gives kids a photocopy of shapes to cut out and directions on how to put them together, that teaches them a skill that’s valid, cuz it’s important to be able to follow directions and be able to put things together the correct way. But, they’re following directions and they’re not innovating and they’re not creating, so that’s what I want them to learn how to do. How to create and discover.

M – I was thinking about how at NEA, everybody had the crafts at dinner and everybody’s centerpiece was different

ART TEACHER - the possibilities are endless…

M –

ART TEACHER - kind of like the ability to dream which is pretty exciting. And kids are. I mean sometimes they’re encouraged, like with creative writing or whatever. But, we get the opportunity to encourage them to dream and create and to express and explore a lot of different areas in art class.

***Art Teacher began playing zombies vs. plants during this time. Although she did not advance very far in gamestar.

Jan 27 part 1, 2011 – duration: 2:30 – after the first week Thursday?

M – wouldn’t this make you not want to do it because it’s taking so much time?

Art Teacher – yeah, I think it’s definitely good to have two people, I think after today with the login, I think that would have been way too much for one person. Because it’s hard to just get them logged in to the computer, and onto the internet, and then they had the whole
other step of creating the password, username for the Gamestar Mechanic, so I think that would deter me, cuz that’s too much for one person. So to get up and running, you probably have to find a helper or someone

M – and their teacher was in there helping

ART TEACHER - yeah, I think one thing we could have done and should have done, maybe we should do it with the next class, is go on there and uh, put the projector on and go through the log in steps… do it in here and do it with the projector and show em and take em through the steps….so that would probably make it a lot smoother. We have an LCD projector and take it in there

M – that’s a good idea, lets do that.

Jan 27 part 2, 2011, Duration: 9:55 – after the 3rd week

So what did you think about it as an art project?

ART TEACHER - I thought it went really well, cuz they were excited about the possibility of building a game. I thought you did a good job of going through the website and explaining all the different options, how they could choose their background, choose their sprites and their obstacles, and the layout, side vs. top and wrap around …so they were excited to see all those options. And then when you gave them the graph paper, and they could plan it out, I thought they really understood that well. And they were excited about planning it out and they were making their own little plans for the game.

M – so that was pretty good.

ART TEACHER - and I thought it gave a nice art aspect to it. Because it’s a 2 dimensional drawing version of it, of planning the game.

M – and then with group this afternoon, we just need to have better login procedures because it was too…how do you think the 5th graders would have handled that? Do you think they would have been faster and better at it?

ART TEACHER - It just depends on the class, we have some attitude in the fifth grade. I don’t think they’re as wild as that particular group (the one we just had). That’s just the wild group. I think there’s fourth grades that could have handled it better. I think there’s third grades that could have handled it better. It’s just a wild group, but I think the idea that we were just taking about going through that beforehand would probably have eliminated some of our problems. Not all of them, but some of them.

M – right. So our plan is, we’re going to give them the slip of paper with the url, we’re going to suggest that they write their username and password ahead of time, and it’s gotta be an unusual one, it can’t just be one name like Kyle. Cuz it’s probably already taken. And then we’re going to run through it in here and then go in there and then for Wed. maybe I’ll – will
you check with the boy’s teacher that he’s going to be okay, cuz I think it made him upset that everyone else was doing it and he couldn’t do it.

ART TEACHER - so even if it hadn’t been for everyone else, he still would have been frustrated.

M – I just had one more button to push and he would have been login and he just pressed something and locked me out.

ART TEACHER - I know, he'll get upset and just start ripping up paper. …That’s typical behavior

M – overall for the week do you think it was a good idea or do you regret it?

ART TEACHER - yeah I think it was a good idea. I think everything except this afternoon went well. We just have to get the kinks out of the login.

M – right, so Monday, I’ll get all the computers to the Gamestar Mechanic log in page…I’ll come at 8…and we said trying to do all this by yourself, really, is too much with the login. We’ll see how it goes once they get used to logging in.

ART TEACHER - I think if we had more planning to do and just walk ‘em through, it might be more doable. But, still it’s a lot. It’d be nice to have an extra pair of hands.

M – so is your librarian the kind of person who would help you log in ahead of time?

ART TEACHER - she’s very helpful. She’s not so into computers.

M – the kids just sat there staring at the screen, they didn’t even know what to do. It looked like some of them didn’t know how to log in. …

S –yeah,

M – yeah, I thought that was a good lesson this morning. Some of them didn’t understand that it could be a 1 to 1 ratio (with the graph paper). But then one girl did hers with blocks of 9 squares on the graph paper.

ART TEACHER - um, mm, I think that was (name removed).

M – I should have told them that it was a grid of so many squares like 12 x 16. Oh, I don’t know if you heard, that some of the boys want to make a game together and each make their own level.

ART TEACHER - won’t that be hard with separate accounts?
M- I think they should each make their own and learn how it works, but then if they want to come together they could each make a level and then recreate it in one of the accounts.

Art Teacher - can you take other people’s saved games and make them in your own?

M – no, but after they learn how to do it, they could sit together in a little cluster and make a game together. So, they could each work out a level and then one of them puts it in their account. They seemed happy with that.

ART TEACHER - they seemed really into it.

M - And some of them we’re giving me high-5s on their way out. They were really proud of their games.

ART TEACHER - they were really excited yeah. That was really positive.

M – and the other thing that this group this afternoon, didn’t know, they probably forgot, I might have mentioned it, they had to go to quest, once they got in, and some of them were going to game alley.

ART TEACHER - I didn’t even know. I’m not even sure we showed them that.

M –if we did, it was brief. Plus, I think that ½ of them we’re even paying attention. Cuz they were all talking.

ART TEACHER - yeah, we needed more of a warm-up thing for them.

M – it was too much to take them right into the lab.

ART TEACHER - yeah, especially with that group.

M – I think we need to – next time I’m going to get them all logged on ahead of time.

Feb. 17, 2011; Duration: 27:28, Thursday

So how do you think it’s going this week?

ART TEACHER - I think it’s going well this week. We’ve had some schedule interruptions and technical problems, but the kids are really into the video game. And they’re starting to make their own games.

M – do you think the kids are learning anything that has value in art?
ART TEACHER - yeah, I think they’re learning how to create things. How to create video games and (muffled) how to think strategically. I think it’s a very good and complex problem, project. But, the creating of the video game is the biggest connection to art.

M – what evidence in the kids to you see that they are thinking strategically.

ART TEACHER - well they have to problem solve to get to different levels. They have to figure out how to fix things like change the timing on some their opponents or obstacles, in order to get through a level. And then they are, they just started creating their own games.

M – so how do you see that as supporting art? Like things that are furthering your standards or things that are important for you to teach?

2:43
ART TEACHER - well, it’s familiarizing them with computers. And um, I think they’re analyzing the game and we analyze art a lot. And this is a form of art because it’s using visual components – even though they can’t create them, they’re working with backgrounds and they’re working with their avatar and the sprites and they are all little visual images that they can manipulate. And the manipulation and the choices that they get to make are part of the creative process. Just like we make choices with pencil and paint, and different things and this is just a different media. And a more complex media because it’s interactive, not just something that made and is on the canvas and stays there. It’s something that’s constantly changing. So I think it adds a whole other level of complexity but that’s really good, in this society where computer games and computers are so important, so it adds a really good set of skills and incorporates creation at the same time.

M – so we’ve got about 35 kids maybe, so how well do think they are responding. I mean like we have a lot of absences and it’s kindof rushed in some ways especially with Mrs. Martin’s group who are there only 60 minutes instead of 80 per week.

ART TEACHER - I think it’s gone really well because they are excited about it and I don’t have any kids complaining about it. Kids love working on the computers and kids love video games, and this is something totally new and they like creating it. They come in and work on it during their lunchtime, if they can. If they have computers at home, they go home and work on it. And it’s been exciting because the kids that really excel at it and worked through all the levels, - we were kind of worried about them – but they have been our technical experts because they know more about it than I do, cuz I haven’t worked through all the levels yet. So they can go around and help their friend’s problem-solve and how to do certain things.

M – so what do you think about the way some students are helping other students? Like we were talking about over dinner. How some kids are really excelling. ….

ART TEACHER - well it’s exciting. There are a few kids that are really excelling. And so then we let them be our problem-solvers. And then go around and help the kids that need help. And it’s great because, you need extra help, there’s always a problem that needs solved,
cuz there’s always some kid that says, “how do you do this?” and there are two particular students that really seemed to enjoy going around and helping their classmates. One in particular today, he was just so happy going around solving problems, here and there, and it was just a rush for him. So it was exciting to see. Because these kids are from a poor area, and they really live in poverty, and I could just see this kid having great problem-solving skills and great computer skills, and so just thinking about where he might take these skills in the future. And so I think this was really a positive experience for him. Hopefully will let him think that this is something that I might like to do with computers and problem-solving, and technology.

M – so in terms of the design skills that they may be learning, you know, the game design skills, that um, that they, my sense is that some of them kind of get it, but they haven’t had enough exposure to making games for them to get, you know I was hoping that they could make games and present, but now I’m thinking that’s not going to be possible. Because they aren’t really to that point. Maybe we need to modify to something more achievable for them, or you know like a different outcome, because 8 weeks. There’s some limitations with this age group. So I don’t know, what do you think?

ART TEACHER - as far as presenting – I think it maybe fine for a few of them present for some of them who have a really well-designed game, and maybe for the rest, for them to fill out a, well to have everyone fill out a worksheets. I might like to see them have a class discussion to cap the project, so talk about video games and talk about what’s this relation to art. Why are we studying this in art class and besides art, what did you get out of this, what sort of skills. I think it’d be interesting to take to that level and …or that angle.

M – so net week, everybody gets 2 more classes right? And that’s all we’re going to be able to do, so how would we select which kid’s piece to ….I was thinking maybe one kid could come up say, this is my game, and another kid comes up to play it (using the overhead projector) and then we might talk about why or what’s successful about it and what isn’t.

ART TEACHER - that’d be good. We could use the regular art critique stuff.

M – I figure that’d be a good way to end it. Maybe we could go around and look at what they are making on Tuesday and see if there are any of them that could work together or partner …or we could ask the kids that are further along…. you know I’m not really sure at this point with only two more classes, whether it makes sense to have the best, the furthest along students work together so they could get even further, or to have someone who’s further work with someone who’s less far, how do you figure out which…

ART TEACHER - to get further? So, if we had the advanced students work together and work on creating a more complex game, and we have the less advanced just work together and play each other’s games?

10:39.8
M – see that would …some of the kids that were making games the day I observed you know he thought that they were making really fun games, but they weren’t really incorporating a story, they weren’t, um, they were just putting a lot of enemies on. One kids is like, “you can’t beat this game, and I can’t even beat it.” So I was like, “why is that fun then?”

ART TEACHER - I know that they’re having fun.

M – they are having fun.

ART TEACHER - they were having fun creating the game. It’s exciting for them. If you wanted to get some complexity modeled for it, which some of them may continue to use GSM and about games after the class, if we wanted to model that for them, then we could, let the advanced students work together. Because so far they have been helping their peers and it might be a good opportunity for them to really develop their skill and offer an example of something that would be more complex.

M – so what do you think we should do? Like the first the group meeting on M and W – no school Monday??...

ART TEACHER - I’ll have to let you know.

M – so the next time the class meets, they will put forward their games. And they’ll work together in various teams then? And work on making games again? And then the last class we’ll try to single out at least one or perhaps 2 and then problem-solve as a group how to make the game tie into all the elements like

ART TEACHER - do we want to have all the kids play the game? Do we want to do that? Maybe we should, maybe we should, go to the lab, play the game. How better can you brainstorm than if you try the game? And then we could have the discussion with the class, but the problem is, like you said, once you get them in front of the computers, it’s hard to get em to stop. I guess we just have to be like, “turn off your screens.”

M – so take them in for ½ the time? And then take em to your classroom and then we’ll problem solve about it.

ART TEACHER - um mm

M – I guess we could do that. We could do that, that’s doable. The ones that are there for 30 minutes, is harder.

…

we went into a new term during this time and the schedule I met with them changed.
M – professional development: I've been modeling strategies for using GS and I’ve been making it up as I go along, along with you because I’ve never used it before with students. What you think is going to work isn’t necessarily true about what’s successful. Or will be successful.

So, for you as a teacher and learning, what are the things that you think? Like you mentioned a cheat sheet.

ART TEACHER - yeah, I think it's a big project to take on by yourself. And I’m glad that you’re there with me. And I think a cheat sheet would help to get this up and running it takes a lot of investment of time, to work through the levels and explore the game site. I’m really, that’s the reason I’m really glad you’re there. I think after having gone through this experience, and then investing a little more time in playing the game itself, I’ll be ready to run the show by myself.

M – so you think you’ve had enough experience by now that you feel confident by yourself, like next year or something?

ART TEACHER - yeah, I think so, the log in is a problem

M – no I can log everyone in in 10 minutes.

ART TEACHER - right, and I don’t have time to do that on my own. It’s nice to have 2 people there. But I do take people there to work on websites. The thing is that’s just logging in to the computer and going to the website.

M – well that’s all we do

S –now?

M – yeah. The first day was – I think we would have solved a lot if we had had in class a piece of paper where they wrote their username and password and then we go in.

ART TEACHER - I think we need to be strategic about it. Like when, show them the steps, these are the steps. This is what you’re going to see. And now you log in. (walkthrough the whole process before going into the lab.

M – that takes the whole class period.

ART TEACHER - It can take the whole class period. Just to get logged in. write down everyone’s log in. I guess I just have to know that that’s a big step. And once we know how to do that, we’ll be good. We can have several user names and passwords and we can have our experts help. And find out who’re the experts so they can help their friends. And I think that would be really doable, but I just haveta know it’s gonna be a pain and and take a whole class just get them all set up.
M – or, you know one thing that might work is if you as the teacher go in and create the accounts for all the kids ahead of time. If they gave you a username and password, then

ART TEACHER - or if I just assign one,

M – yeah, you assign a user name and password and you gave them accounts, then that skips that whole process of, …and then like that one girl, today, she can’t get into her account. She doesn’t know how to get into her account, what we have written down for her is wrong. I couldn’t get her in.

ART TEACHER - and you just change them slightly and then have it written down what each persons was.

M – you could be like their last name and their first initial. …Explain options….you know then their password could all be (name of school).

ART TEACHER - right.

M – something simple, like their teacher’s name

........

I just type a g and *gamestar mechanic* starts up.

…they all know their user name and password for gamestar for the most part, except a couple of them. But that one boy today, he hasn’t been here in three weeks?

ART TEACHER - I don’t know why. I didn't think it had been that long.

M – I don’t know….. So, I’m helping you in this process. And you think that you have a better sense of what design is about as a result or do you think that you would benefit from a workshop? On game design

ART TEACHER - I think a workshop on game design would be good. You know the first lesson, when you talked about me introducing, talking about the different steps, there was no way I could do that, but you know it’s even necessarily a workshop, I just need to have some time to sit down and play through the game. And get through all the levels. And if I got through all the levels, then I would understand, how to tell them about their options for creating a game, but because I haven’t done that I couldn’t go through and tell them that.

M – so it would probably take 3 hours for you to play through all of the levels. How doable is that for someone?

ART TEACHER - it would be doable, it just depends upon what else you’ve got going on, I’ve got a graduate class that I’m working on. I’d rather play through the video game that work on the graduate class,
M – well, really the time,. I mean you have children….

ART TEACHER - it’s a lot for one grade level cuz I’ve got 5 other grade levels to do and plan lessons for.

20:16

ART TEACHER - but I do think it’s worthwhile and once you do it, then you can do that lesson indefinitely.

M – and then you would become more comfortable with it.

Cheat sheet: jumping trick –

ART TEACHER - good to be working around other people, good to be able to talk to somebody.

M – I did make up a list, you know how I talked about the game design goal, obstacles and tried to relate it to the comic book story, that they made, I wrote it all down. But then I thought today the kids weren’t going to have time, Mrs. teacher’s class wouldn’t have time to do it. So I dint bother to bring it, but I could see it as maybe,. You know they play gamestar, and we talked about it at the beginning, the different elements, and we related it to the comic book and and then after they’d played it while, handing out a worksheet, you know Mrs. Martins’ class did it on Wed., except it was too unfocused.

M – I did it without a worksheet for them, I just wrote it on the board, some of the kids wrote it down so they could think about it.

ART TEACHER - you mean when we had the technical problems? (No access to the game because new district limits on game use – resolved by the end of the day)

M – I was thinking if we took a break and then we handed that out to them and they really had to develop their game idea – you know, that they would say, I’m going to have this kind of enemy, I’m going to have moving enemies, you know made some decisions.

ART TEACHER - you mean as far as story line

M – their story, is it indoors, is it outdoors, I mean some things could remain constant. And I think if they had the story, it would help them to focus their thoughts about how to tell that story with the tools that they have. Because right now, all that they’re doing is ignoring the story, I don’t see them using the story at all to guide their process. I see them discounting that whole thing (meaning the comic book lesson)

ART TEACHER - I think it’s more simple. I think they like shooting. They like Killing the enemy. And that’s fun for them. I see a lot of that when they create, do the shooting.
M – and they just like putting all that stuff in, they say, oh, I can put all this stuff in, so they put it in.

ART TEACHER - but, they’re not making mazes?

M – they’re not relating it to their story. It has no connection to that at all. And that’s why I think if they had more time,

ART TEACHER - right

M- cuz part of it is they love having access to all that stuff. Having all that power to make stuff happen.

ART TEACHER - yeah, I think it’s a matter of time. I think it’s okay that they’re putting all that stuff in there, I think it’s just an initial part of the design, cuz it’s just part of the play and they have to play and experiment with it to get probably get the sophistication and also we have to point that out, hey what's going on here?

M [- right

ART TEACHER - what are your goals, what are your obstacles, and that sort of stuff?

M – well with Mrs. Martin’s class, you know it doesn’t matter, they’re not listening. Some of them are, but

ART TEACHER - yeah, they’re a wild bunch.

M – that’s why, if we had the worksheet,

ART TEACHER - I don’t know if they connect with a worksheet more or not.

M –I don’t know.

ART TEACHER - I kinda think maybe, … I think they’d listen if we talked about it and

M – some of them, I think that, I wish I could just talk to some of them one-on-one, and work with them with their designs and help them think through their designs, but we don’t have time, you know, for me to go around and do that. … cuz it’s kind of a process. And having them talk to each other isn’t necessarily productive because there’s no model for it.

ART TEACHER - if we had more time, follow up time, but it’s hard for me to visualize the story too because I haven’t had enough experience with it. But, we could go and look at the things visually. And say, here are the backgrounds, what kind of environment is this? in a way to make it part of the story. We only have one avatar right?
M – no there’s like three, but (meaning to choose from) one thing I was thinking about was we could end this up and then we could say, you know if you guys want to play with this, and keep building upon what you’re learning in your free time, then maybe we’ll come back and revisit it for one class period in May. And then we’ll look at who’s made a game, what they made and then they could explain the game they made and then in the meantime you just tell them to explore it on their own.

ART TEACHER - we could give them an optional assignment that they could work on and see what kids come up with.

M – right that they could talk to each other, I know some of them will, especially the ones that are playing it at home.

ART TEACHER - mm,mmm

M – so that’s a thing to think about. Whether that’s a good idea,

ART TEACHER - I think that’d be fine. They love it. They could bring it back in the springtime.

M - right, like the last day of school.

ART TEACHER - yeah, close to the last day,

M – when they’re already checked-out. And

ART TEACHER - yeah, and they can check out with video games.

M – yeah, maybe it could be like a fun, end-of-the-year event. Or maybe we could say, anyone whose made games, we’re going to have a tournament, everybody’s going to play the games that are in the group. And see who can do the best and then we’re going to talk about what made those games the best or something like that, maybe we could do that the last week or two weeks.

April 15, 2011; Duration: 16:08

Michelle – need the photocopy the learning strands, state standards for art Ed.

Michelle – let’s just talk about, well we’re kind of still doing things, like I’ve been giving the kids feedback.

Art Teacher – I told the kids, but so far no one’s said anything.
Michelle = so, let’s just talk about how you think it went.

Art Teacher – It was an excitement and I’m glad that you were there because I think it’s really complex and I still haven’t had time to delve into the GSM as much as I need to, cuz you have to invest quite a few hours into playing the game in order to understand it. And so you are like the resident expert and I was just there observing and seeing how it all went together and the kids really responded well to it. I think it was a very valuable lesson to let them create a game, to let them understand, play through the games, and learn strategies and then try to make a game. I think they connected with it well. I think they understood that they are making something, just as they make things in art class with paper or clay, but they’re using computers. I think we did make that connection. And that’s a positive thing, and there were a number of kids that were really successful at it and I think it could be potentially life-changing for them, because it’s giving them some think to succeed at, and some ideas about what they’d like to do in the future. It’s seems a little undefined and exponential, what we did, but I’m fine with that because I think the positive lessons that were learned was that computers and video games are an art form, it’s connected to art. And it’s a creative process, making the video games, and just the act of taking part in this and creating games was enough for me. I think they got a lot out of the activity. It’s not like we have a defined end produce. And I guess that would be their games, and they do have those. But they don’t have a paper to turn in or a test or whatever. But I’m fine with that because they’re elementary students, their fourth graders, so I think that they’ve dealt with some pretty complex lessons and developed some new understandings through the program.

Michelle – do you have any specific things that you think they gained or learned? Like why did you say it was life changing for some?

Art Teacher- well, particularly Philip has been so excited and then Dylan C., they were so excited that they were good at the video games and because they were excelling and they had worked through all the programs, they could go around and help their classmates problem solve, and so they were using the knowledge that they had learned through the game, and their creativity to go around and teach other people and that was very empowering for them. And they both said something to me about, “hey, this is something that I might want to do in the future. Something with computers.”

4:42.6
And I think they were excited because that was the first time that they’d thought about that and was a really powerful thing for a fourth grader to connect like that. So I think that’s really awesome. I mean, I have kids come up and say, “I want to be an artist or I want to be an art teacher, but to have something specific like that is pretty cool.

M – so do you think they might want to play a game that would let them do some pre-programming?

ART TEACHER - Oh, I think so, they and some other people bought the extra packs, um, we’ve had some extra time where they could play and they’re always excited to get back to it,
Phillip didn’t, some of them didn’t want to stop playing. And start the new project but we can’t do that all year. They were very into it.

M – do you think it was enough time? Or would you do anything differently if we did it again, knowing what you know now?

…I am making videos and I’d like your feedback about what kind of support I could provide. You mentioned a cheat sheet video, so what could I put in there. I was thinking of an overview so you don’t have to play all the levels. And the principles of game-design.

Art Teacher – yeah, that would be good.

M. – What would you want to learn that you didn’t get to?

ART TEACHER - I think it would be very had to facilitate without playing, so if I want to do this again next year, I’m going to have to invest some time this summer, and play through it. And then, I’ll see what I learn from that and I think it’s a very complex process, like I said it was experimental. So as I play through it, then things will develop and more ideas of how to structure a lesson or what I want them to get out of it. But even so, I think what we did was fine, because we actually invested a lot of time into it, just letting them playing through it, it’s a big time investment, just having them play through the five levels. And so to have some more complicated task, would be even more time consuming and I don’t think that issue should really consume anymore time, so I don’t think I’d do a whole lot different, just letting them play through and create their own games and maybe talking about what they’ve created and how it relates to art class. I think that’s a good thing. I’d probably get different ideas on what I could do or how I could present it or advice I could give to them, after I’d played through it.

M – what should be on the cheat sheet? So I know jumping was one thing the kids were asking about a lot.

ART TEACHER - that probably would help.

M – what else was there. I don’t remember the other questions they had.

ART TEACHER - there’s something where you had to reset the time,

M – using the toolbox?

ART TEACHER - but the cool things is, I imagine even if I didn’t spend the time to research it, I could probably be just like, here’s this game, play through it, and they’d be like going to town and I could do what I was basically doing, I’d be like okay, ask Phillip or ask Dylan or ask your neighbor. And they would know cuz they’d played through it. But, I mean, I should play through it in order to facilitate it by myself.

M – well, I think there is a lot of validity to asking the students to help each other.
ART TEACHER - oh yeah, I’d still do that anyway. And I do that with other projects to, like if somebody doesn’t get something, it’s hard for me to around to all of the students, I’d say, “your neighbor understands how to do perspective, so can you teach him?”

M – any other areas you had difficulty with?

ART TEACHER - it just depends on the level. Little things like, in one area you had to put little blocks up in the air, in a certain area, so that they could get by without being killed by the enemies, all those little tricks that you had to do for the different levels.

M – so the repairs?

ART TEACHER - yeah, and sometimes they couldn’t get through a level because it was hard and they had to be a strategic…somebody who’d played through before had to tell them, do this strategically to get through.

M – and a couple of kids really struggled.

10:30.2

ART TEACHER - even the ones who struggled, I think they enjoyed it. I didn’t hear one kid say, “I don’t like this.” “I don’t want to do this today.”

M- do you hear kids say things like that about other lessons?

ART TEACHER - yeah, this was a new, novel idea and they were excited about it.

M – so the kids don’t use the computer lab that much at Hayes?

ART TEACHER - they do, and they use it for data collection. I do, especially with the fourth grade cuz it fits into the schedule well. For the other classes, the computer lab is always booked during my art time.

M – what do you mean by data collection?

ART TEACHER - they play little educational games on there. And then it reports their scores.

It’s
Study island – linked from the website: studyisland.com

Phonics stuff, boring
ART TEACHER - yeah, Study Island, and I don’t even know all the things that they have in.... students that are advanced and they do work on there. It’s very simple, the educational games that they play on there; it’s basically a word or a math problem.

M – worksheet kind of things and graphic animations as a reward for success

ART TEACHER - I mean it’s not very advanced; they had that kind of stuff when I was a kid. I don’t’ really know that much about it cuz I don’t’ use it. I just know they use it a lot so I can’t use the computer lab, but right now. But the fourth graders are still in the computer lab because I’m doing a project that I did last year using Green Nature.com and they choose a butterfly and then they do a detailed drawing of a butterfly and then they try to make it as life-like as they can. They cut it out and laminate it and then put it in an installation and then they look like butterflies on a tree branch….I’ve taken kids in to do interactive websites like build a still life on there interactively (buildy) there’ used to be one called Carmine’s landscapes. There are different interactive ones that I’ve done with them, and I do use the Internet all the time in my classroom with my overhead (SMART) projector. So I take them to websites, but they’re sitting at their desks and I’m navigating.

M _ last thoughts?

ART TEACHER - for me I think it was very worthwhile, it’s not very defined, it still feels very experimental, but I’m fine with that. (Garbleled) everything’s an experiment; I think it had very positive results. I want to spend more time playing it and I’m kind of concerned because I think I have to write to get more accounts.

M –I can find out for you what you need to do from them. DO you think you might like to do it again?

ART TEACHER - yeah, yeah.

M – well, I will find out for you what you need to do.
Please see page 144 for the two amendments pertinent to this thesis work.

Research Proposal / Protocol  #2010B0142

Michelle Aubrecht
Graduate Student

Mound Builder Culture Video Game

During this year, I have been researching and creating a video game for fourth graders in Ohio that will meet Ohio State Standards. This is the first phase of my thesis project.

My goal is to play-test the game I have created and find out how I can improve it from the end-users perspective (the students) and their teachers.

A working draft of the game can be seen at: http://accad.osu.edu/~maubrech/
Also, please see attached screen shots of the game.

Once I have obtained all of the necessary permissions, I will enter the classrooms and ask the students to play the game. I will observe them and take notes. I will then talk with them about their experience and record their feedback.

**Working Thesis Question:**
To what degree can children’s myths of/about Ohio Ancient American Indian culture be shifted and their understanding be deepened using an on-line activity?

**Description:** A online game or activity that explores Ancient Mound Building cultures, specifically Ohio Mound Builders/Woodland Indians and addresses fourth grade Social studies and geography state standards.

**Objective** – Play test the draft of the game with fourth graders. Having made the game, I would like to obtain feedback from representative children in order to take their suggestions and improve the activity. I would also like to find out how to more readily engage fourth graders in learning about Mound Builder culture.

**Method** – I will observe and note how children interact with the game. Each group will play it in a different way.

One group will be using an interactive white board to play the game as a group.

In the second group, they will use individual computers to play the game by themselves.
In both cases, I will observe their interaction with the game and take notes and talk with the students as a group to get their feedback. I will tape record their responses if possible.

**Data Analysis:**
I will use the information gathered to improve the game design and game play by looking for common issues that I can address. For example, someone may have trouble understanding what they are supposed to do and may be able to explain what is confusing about it.

In addition, I may include the student’s or teacher’s comments as part of a qualitative look at student feedback in making a video game for classroom use.

Michelle Aubrecht will be using Action Research methods. The principal stakeholders in using an interactive activity or game as an educational tool are students and teachers.

**Bibliography**


**Amendment to Protocol 2010B0142 - approved**

Dr. Christine Ballengee-Morris
Michelle Aubrecht, (Any use of “I” herein refers to Michelle Aubrecht.)

**Action Research – Mound Builders of Ohio interactive game**

This is an addition to the original study in which nothing has changed from the approved plan. To gain more depth of understanding, Michelle Aubrecht wishes to gather information from a small group and that differs from the original study that was done with 2 classrooms of students and their teachers. The additional research plan is detailed herein.

**Objective** – to work with a small group of students who have completed the fourth grade and are able to reflect upon how they learned during the year. They will bring their perspective as students and learners to the task of making an educational video game. They can give input, help with designing the game, and learn about current American Indian issues and Mound Builder culture. Their interests will guide the topics and activities. The research
will focus on evaluating their level of understanding and comprehension, finding out how they would use a video game to learn, specifically the Mound Builders game and how they would improve it.

They can do as much or as little as they would like. There will be no pressure for them to complete an “assignment” or discuss something that they do not want to discuss.

**Participants** – students who have just completed fourth grade and formerly attended Smith Elementary School

**Number of students to participate** – not more than 10

**Time frame** – summer break 2010 – approval of IRB amendment until mid-August

**Recruitment process**

1. Mrs. Shively will ask parents if they are interested on my behalf. She will explain that Michelle is an OSU graduate student in Art Education and that this is part of her thesis research and that she (Mrs. Shively) will not be participating in any way. She will give them a brief description of the project that she can read or send through email. (see attached email or verbal script and the flyer) Mrs. Shively has access to student records and therefore, I will not need access to private information. Because she knows the students and their parents, she will know which students are most likely to be interested. She told Michelle that several parents like having summer learning activities for their children and that is why she wanted to contact them to determine interest. There will be no pressure on parents to agree to participate.

2. If parents are interested, she will give them my contact information and email the flyer.

3. If they contact me, I will arrange to meet with parents and their child to go over the proposal for research. I will read from the research proposal to explain the suggested activities, goals for the research and participation details. I will say, “I have a permission form for the parent to sign. I would answer any questions they may have. I will use the research protocol amendment as the script for describing the project.

I will say, “you can participate I this project without being video taped or participating in that part of the study. You do not have to be photographed to be a part of this study.”

I will ask, “Do you have any questions?”

Then I will ask if both the parent and student if they would like to participate.

**Script:**
With both the parent and child present, I will describe the project as stated above in #3. Then I before asking for a signature on the parental consent form I would say,

“After hearing what this research project is about, would you like your child to participate?”

Then I would ask the child: “After hearing about this research project, would you like to participate?”

If both the parents and child are still interested, a parent will sign the IRB consent form at that time. We will meet at a location that is acceptable and comfortable for them such as the local library, coffee shop or their home.

4. Students and parents will have the option to quit the study at any time, for any reason.

**Activities**

Students will meet with Michelle Aubrecht in a safe location such as the public library for group discussions. She will use Diigo, a social networking space (http://www.diigo.com/) because it provides a secure online space where we could share links, images, videos, and discuss ideas.

The number of meetings will depend upon how much work the students would like to do and their interests. Probably we will meet once a week at the public library for 2 hours in the morning. The day, time and duration will be decided by all of the participants. Delaware County Library has a meeting room that can be used by the public.

*Meeting Topics include, but may change depending upon student interest:*

1. Talk about American Indian issues such as identity and land in relationship to the Mound Builders

2. talk about Mound Builders culture – what is culture and how is it different and similar to their own?

3. Talk about American Indian ideas and practices such as cyclical time, taking what is needed to live, giving back/ gratitude, land ownership and oral storytelling.

4. Understanding timelines – difficulties and strategies

5. Possible field trip to the mounds around Newark, the Newark Earthworks Center, and Flint Ridge, pending parental permission, participation and transportation considerations.

6. I would share game ideas for addressing these issues and ask for their feedback. I will also ask them to think of images or game ideas. We may make a prototype to find out if it is fun or works.
7. play-testing new iterations of the video game.

8. We may do artwork as part of the research process.

Optional – if interested. Students could learn about game making by playing a free, online game design program called Gamestar Mechanic. [http://gamestarmechanic.com/](http://gamestarmechanic.com/). Michelle will provide assistance as needed. This would be done on their own computers at home.

**Process**

These topics will be discussed as they relate to how to represent them visually and through game play. These topics will probably be explored through art activities as well as looking at images, stereotypes, other cultures and possibly videos.

At present the learning goals for the interactive game are:

1. mounds were built in other countries and other states
2. Ohio has several kinds of mounds and these were built primarily in the Woodland period
3. greater understanding of timelines
4. the Mound Builders culture has similarities to our culture.

These would be up for discussion and revision.

**Goal for the student group:**

Michelle’s goal is to see how their ideas grow and deepen through research and discussion.

**Data Analysis**

1. audio record group discussions
2. read and use student art, writing and other postings on the Diigo space in her thesis
3. video tape the children three times and possibly as a group: at the beginning of the project, during the project and at the end of the project.

Questions for the video recording:

**Beginning**

Why do you want to participate in this research group?
What do you know about American Indian culture now?
What do you know about Mound Builder culture now?
What is your favorite subject in school?
Do you like doing research?

**Middle:**

What are learning as we do this research?
What is your favorite thing that we have done or talked about?
What do you want to know more about?
Do you like doing research?

End:
What did you gain from this research group?
What do you know about American Indian culture now?
What do you know about Mound Builder culture now?
Was this a good use of your time?
What is your favorite part of what we researched?
Do you like research?

Purpose of the video: to make a short video for other students to see how the student researchers changed and grew as result of this process. I would like to use this on the website where the game will be available. It may also be placed on a dvd intended for school use. (This has yet to be determined.) This is optional. No student will be videotaped if they or their parents do not want to be included in this aspect of the project.

Additional Amendment to Protocol 2010B0142 - approved

Dr. Christine Ballengee-Morris
Michelle Aubrecht, (Any use of “I” herein refers to Michelle Aubrecht.)

Teacher Action Research – Mound Builders of Ohio interactive game

Description
As part of designing a video game to be used with fourth-grade students, Michelle Aubrecht, graduate student researcher, would like to add another aspect to the research. Because student’s use of the game is predicated upon a teacher’s willingness to use an alternative to traditional methods of teaching such as books, lecture and videos, I believe that it is necessary to understand teacher’s thoughts and concerns about using games. Furthermore, I think that a teacher’s willingness to use a game may be ameliorated by creating a short training video that gives an overview of the teaching objectives as well as a walk-through of how the game works.

Objective
Determine what teachers think about using games in the classroom and assess their willingness to try a new technology.

Method
I will engage in three activities to assess teacher’s thoughts and attitudes towards educational video games.

1) survey teachers (see survey questions) using an online survey through Survey Gizmo
   and ask teachers who took the survey to volunteer to watch the training videos
2) survey teacher who watched the videos using Survey Gizmo. (see survey questions)
   And ask teacher who watched the videos to talk with me.
3) interview the teachers who watched the videos and volunteer to meet with me.
The audio from the interview will be taped recorded.

**Data Analysis:**
This information will be used to improve the training videos and to determine how receptive
teachers are to using video games in their classrooms. In addition, I will be looking for the
obstacles teachers face in using games in the classroom to determine if there are ways the
game can be created or information about it provided that would aid in the use of a video
game in the classroom.

Additional Amendment to **Protocol 2010B0142**

Dr. Christine Ballengee-Morris
Michelle Aubrecht, (Any use of “I” herein refers to Michelle Aubrecht.)

**Working with XX City Art Teachers Action Research: a case study**
– Mound Builders of Ohio interactive game

**Background**

Michelle Aubrecht has been researching game-based learning and made the Mound Builders
online video game in order to find out if using a game could support teaching state standards
and help students to understand an area of Ohio history that is under-represented in
commonly used curricular materials. Furthermore, studies suggest that interactive teaching
methods such as those provided through games are effective teaching tools. As her research
has progressed, her focus has turned to how the teacher uses a video game with students.
Having started with a specific game, Mound Builders of Ohio, she would now like to explore
the broader question of how teachers use a game in the classroom. The current research
offers few examples of how teachers actually use games in their classrooms. This is in part
due to the fact that there are few games that are specifically designed to support classroom
curricular goals that meet state standards.

Unfortunately, due to Michelle’s lack of expertise in programming, the Mound Builder game
cannot be improved and used with students in a timely way. It requires extensive
reprogramming and reorganization in order to incorporate improvements that would make
the goals more clear and provide more user feedback. (Otherwise, this game would have
been the ideal game to use in exploring how teachers can use games in their classroom and
what sort of support they need.) The research that has been done already will support this
new aspect of her research. The aspects of this research, which have already been approved,
will be used in her thesis to describe the process of making a video game for classroom use.
Furthermore, the third amendment to this research addresses questions related to teachers
using games in the classroom using quantitative and qualitative methods.

This amendment will allow Michelle to conduct a case study using action research to explore
the topic using qualitative methods allowing the researcher to work with the subject in a
significant way. Together the subject, elementary art teacher Brooke (alias), and Michelle Aubrecht will explore how teachers can use a video game to teach art, thereby introducing technology into the classroom.

Brooke (alias)’s teaches elementary art education in the XX City Schools. XX City is on academic watch and has many children on free and reduced lunch. The Teacher is a friend of Michelle’s and knowing about her research, suggested that Michelle help her to find a way to incorporate technology into the art classroom. Brooke (alias) and Michelle met to discuss possibilities and her learning goals for her students. She explained that there is a threat of cutting art from the curriculum in order to spend more time on core academic subjects. Brooke (alias) also said that all of the elementary art teachers met once a week to collaborate. Among the teachers, Brooke (alias) reported that there is a concern that art class should be more relevant to students. Using technology, or in this case, a free online game, could address this concern. These teachers have also voiced interest in using a free, online game called Gamestar Mechanic, however, no definite plans have been made. See the game at: http://gamestarmechanic.com/. Brooke (alias) is exploring her colleague’s interest and may invite Michelle to a planning meeting with the other elementary art teachers in the district.

Having learned about Gamestar Mechanic at the Games+Learning+Society meeting in 2009, Michelle knew that this game was developed by professional game designers and scholars and researchers at the University of Wisconsin in Madison. Top scholars in the field including James Gee and Kurt Squire worked on this project and, at that time, it was funded by the MacArthur Foundation.

Michelle suggested this game because it features two of three ways teachers can use games with students: use an existing game and have students make games. The third method is to make a game oneself, which requires expertise in several areas and a lot of time. Gamestar Mechanic was created for children in grades 4-9. The game will be used only with 4th and 5th grade students in XX City Schools elementary art classes and only by teachers who elect to try this idea. Students meet 80 minutes a week, 40 minutes 2 times a week for 1/3 of the year and then rotate to a schedule of meeting 40 minutes 1 time a week. Brooke (alias) would like to incorporate this game into her teaching using the group that meets for 80 minutes a week. The next rotation will begin in November.

Currently, Gamestar Mechanic has been reworked and is available online through E-Line Media. Michelle has been an intern with this company during the summer and fall of 2010. Through this experience she has read two PhD theses that have been completed about the game and other documentation. This game is used in the new public school in NYC called Quest 2 Learn. The school’s mission is to teach systems thinking through using games and learning game design and was recently profiled in the NYT magazine section. (http://www.nytimes.com/2010/09/19/magazine/19video-t.html) The director of the school, Katie Salen, was also part of the design team and is also the director of the Institute of Play in NYC. (http://www.instituteofplay.com/) The target audience for this game is underserved populations. Extensive research has demonstrated that Gamestar Mechanic provides opportunities for students to develop systems thinking through learning game design and then, through designing games, practice the scientific method.
Michelle’s work at E-Line has been done from Ohio. Her task has been to create videos that explain how the game works and why it is an important educational game. As part of her work with Brooke (alias) she intends to create some demonstration videos that help students become familiar with the game. This will help students quickly become familiar with the game interface and introduce them to the curriculum. There are five lessons provided by E-Line for teachers to use. Brooke (alias) and Michelle will use these as a reference in deciding what to try. Ultimately, it is Brooke (alias)’s motivation and ability as an art teacher that will decide how to adapt these lessons for the art classroom and how they may meet her curricular needs.

The game has been reworked and was re-launched in early October of 2010. It is a free, online game that is played using Flash player 10, which is standard on most school computers. E-Line does provide a premium option for a fee. However, they intend to use the free version. E-Line will not profit from XX City School’s use of the game. Although there is the possibility that this research will demonstrate how to use the game in a classroom successfully in the Midwest in a school that is struggling academically and thereby benefit the reputation of Gamestar Mechanic and thereby benefit E-Line Media.

Description

Brooke (alias), an Elementary Art Teachers in XX City Schools would like to try using Gamestar Mechanic, an online video game that teaches game design and allows children to make games. Michelle Aubrecht would like to support Brooke (alias)’s and other elementary art teachers in XX City who elect to use this game with their students by helping them learn how to use it and by creating demonstration videos that they could choose to use with their students.

Michelle will attend the art teacher meetings upon request. She will lend her expertise about using games with students. Michelle will work with Brooke (alias) to adapt the lessons provided by E-Line to accommodate desired learning outcomes in art class. Michelle will attend class when Brooke (alias) uses Gamestar in order to assist with students using the game and to observe. She will likely not attend all of the classes. It is unlikely that she will attend art teacher’s classrooms other than Brooke (alias)’s. However, if there is a reason why a teacher might want Michelle to attend a class, she may. This will be decided by the teachers as they work with the free, online game. Because of Michelle’s association with Gamestar, XX City School art teachers and Michelle are in a unique position to offer feedback to E-Line about what may be needed to support art teacher’s use of this game.

Objective

Michelle’s objective is to use this opportunity as a case study in how teachers use an online game with students and to determine what kind of support and time commitment is necessary. Ultimately, Michelle’s goal to begin the process of evaluating whether or not teachers, especially those who have not played video games, such as Brooke (alias), can
successfully use games to teach 21st century learning skills and use technology in the form of a game as part of an elementary art curriculum.

Method

Michelle Aubrecht will meet with Brooke (alias) and possibly the elementary art teacher’s group during their regular meeting times. She will listen and provide support as requested. She will observe and share her ideas as appropriate. Michelle will also go to Brooke (alias)’s class and work with her as requested. She will observe Brooke (alias) conducting the lesson and the student’s reactions. She will take notes. Brooke (alias) and Michelle will evaluate their experience and share it with the other teachers prior to the other teachers using the game. As the lessons progress, teachers may desire to journal and later share some of their journal entries and Michelle would use these shared journal entries in her thesis. Teachers who wish to, may share their observations and reflections including their thoughts about student behavior, learning, and outcomes. This may be verbally or in a journal.

Michelle may tape record teacher conversations and/or take notes. (See teacher consent permission form.)

Michelle may take notes in class or more likely write her reflections after class. She will not use any student names, nor quote students. This activity will be part of the normal class. This method may seem innovative or novel. Michelle is not seeking an exemption, however she is requesting a waiver of parental permission (see Appendix M1). Michelle’s research is primarily about Brooke (alias)’s experience and possibly other elementary art teachers who elect to use Gamestar Mechanic. Extensive research has already been done regarding student use of Gamestar Mechanic; it’s usefulness as an educational tool and how it supports STEM. It is this researcher’s hope to contribute to the support for adding an A for art to STEM, making it STEAM through the contribution of this research.

Teacher’s who agree to participate will be asked to sign a permission form.

Data Analysis

Data collected will be in the form of journal entries from Brooke (alias) and possibly other XX City elementary art teachers, observation by Michelle, her written notes and reflections, and audio recordings. An audio recording device may be used to tape the discussion among teachers, but will not be used with students. Primarily, the research will focus on Brooke (alias)’s classroom experiences as a case study, however, it is possible that other art teachers will want to try it too and then their input would also be included in the analysis.

This data will be used to create a case study of how a free, online video game can be used with students, specifically in 4th and 5th grade elementary art class. The goal is to find out how teachers respond to using teaching tools (a video game) that they are not familiar with and what support they need. In addition, Michelle is interested in understanding the teacher’s experiences. Michelle and Brooke (alias) would like to use this experience to write a paper
together or present their findings at a conference. However, Brooke (alias) is not a co-researcher.

**Additional References**


**Additional Amendment to Protocol 2010B0142 - NEW**

March 10, 2011

**Working with XX City Art Teachers Action Research: a case study**

**Background**

As the students are working on their game projects some of their work exemplifies the process of how Brooke (alias) is using *Gamestar Mechanic* with her fourth grade students. In order to illustrate the process of how she has used this game, I would like to request parental permission to use some of their children’s drawings and screen shots of the games they have made in the game design section of *Gamestar Mechanic*.

**Description**

I will send home a letter of consent/permission form for parents who are willing to allow their children’s artwork or screen shots of their games to be used to illustrate my thesis, presentations or publications related to my research.

**Method**

Please see verbal assent document.

The teacher or I will explain that I have been helping her use *Gamestar Mechanic* as part of my thesis project. Michelle has been in the classroom supporting The teacher by logging the children on to the computers before they arrive in the lab. She answers children’s questions.
if they need help. The children are familiar with her because she has been in their classroom and computer lab when they play *Gamestar Mechanic*.

Letters and permission forms with envelopes will be provided to students who would like to give permission for their artwork or screen shots of their games to be used to illustrate Michelle’s thesis.

The teacher or Michelle will make an announcement about this and place the envelopes with the letter and permission form inside. Children who would like their art work included will be informed that they can pick up an envelope, take it home, have their parents sign it and return it to the shoe box provided.

The envelopes will be available on a specified table in the art classroom. Beside that spot will be a sealed shoe box with a hole in the top so that children can return their envelopes with permission forms signed by their parents.

All student artwork will be confidential and no identifying names will be used in any way.

Any original artwork will be scanned or photographed and returned to the teacher.