The Teacher Educators' Journal

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Introducing Games and Virtual Worlds into the Classroom: Opportunities for Teaching, Learning, and Professional Development

Michael A. Evans and David R. Dannenberg, Virginia Tech

Abstract: Commercial-off-the-shelf (COTS) video games and virtual, 3D chat environments (more commonly referred to as virtual worlds) are increasingly finding their way into classrooms to facilitate teaching, learning, and professional development. In this special issue of TEJ, students enrolled in the instructional design and technology program at Virginia Tech explore various ways in which COTS games such as Civilization IV, an open-ended simulation that engages the player to make strategic decisions in historical context, and Second Life, a virtual world that serves more as an endlessly malleable platform for interaction, may benefit education. The range of issues for games and virtual worlds include: 1) Using to teach or reinforce important or difficult standards of learning; 2) Adapting to individual learner needs (cognitive, social, physical), focusing on issues of adaptability and differentiation; 3) Integrating into existing curricula, exploring single or cross-curricular topics; 4) Making modifiable for practice and assessment, discussing the need for embedded assessment; and 5) Identifying professional development needs.

Although a long historical national debate exists regarding educational reform in America, leaders in educational policy and research are now suggesting that digital media should be leveraged to improve formal schooling (Evans, 2008). A case in point is the MacArthur Foundation, which in 2006 launched a five-year $50 million digital media and learning initiative to develop and investigate digital technologies in the lives of youth (Ito, 2008). A second initiative is the Joan Ganz Cooney Center, which has turned attention to the new challenges faced by children in the 21st century. Cooney, whose research stimulated creation of Sesame Street over 40 years ago, now focuses her work on games, simulations, and virtual worlds for education (Shore, 2008). Thus, the purpose of this special issue is to provide an informed argument to advocate for the practical incorporation of commercial-off-the-shelf (COTS) video games and virtual worlds in the classroom. Teachers from all content areas along with educational researchers are beginning to understand the importance of digital video games and virtual worlds for instruction and learning (Charsky & Mims, 2008; Salen, 2008).

To illustrate, Evans (in press) has described how the COTS title Spore[1], a turn-based, massive single player strategy game developed by Maxis and designed by Will Wright, the creator of the Sims™ franchise, might be used to support the teaching of seventh grade evolutionary biology. Based credibly on the theory of panspermia (which claims that the origins of life on earth were deposited by a meteor containing the "seeds" for evolution) Spore allows a player to control the evolution of a species from its beginnings as a simple cell organism, through development to an intelligent and social creature, to interstellar exploration as a warfaring or diplomatically-minded society. The game permits micro-control of mutations and growth as the player creates and guides his or her creature through five stages of evolution, the micro-control of models and simulations highly valued by educationists (Gee, 2008). In the Cell

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[1] URL: http://www.spore.com/

Stage, a player begins as a microscopic, simple cell creature trying to survive in a shallow pool by devouring prey and evading more highly developed predators. From the start, a player must decide whether to be an herbivore or carnivore, this initial decision imposing constraints throughout game play. Mutations occur through the collection of DNA by swimming through treacherous waters and avoiding being eaten by competing predators. As the player earns more DNA points, evolution continues until the Creature Stage has been reached. To allow for micro-control of traits, a game creator editor allows a player to customize the avatar, buy more parts using DNA points, and showcase creations online through a Sporedeia, an online encyclopedia of player-generated content. Being centered on development and growth, the creature's brain continues to grow as more DNA is collected, sentience being achieved and learning to befriend other species of friendly animals that co-exist on the planet being integral to game play. At the Tribal Stage, a dramatic shift occurs as culture, custom, ritual, and socialization take priority. Suffice it to say that areas such as sociology, anthropology, astrology, and economics are engaged as a player moves to the final two stages – Civilization and Space.

In a similar vein, virtual worlds offer rich, immersive environments in which participants can experience digitally-rendered realism not possible just a decade ago. According to Stoerger (2008), "Virtual worlds enable students to learn through seeing, knowing, and doing within visually rich and mentally engaging spaces" (p. 56). Through an examination of Second Life and a review of existing literature surrounding virtual worlds and COTS games we have found that by combining the fundamental principles of game design with the affordances of virtual worlds, in particular Second Life, a unique and effective learning environment can be created.

Virtual worlds originated out of the virtual reality phenomenon of the 1980's and as such developed higher degrees of interactivity than what can be found in other non-game based multimedia programs. As an entity, virtual worlds provide a "through the window" experience in which the participant views "the 3-D world through the window of the computer screen" (McLellan, 2004, p. 465). Just like virtual reality, virtual worlds allow for recreation of and interaction with environments. They also allow for multiple participants to be in a shared space at the same time, interacting and communicating just as if meeting someone in real life. Because of this unique interaction many predict that well over half of all Internet users will have a virtual self within the next decade (Rainie & Anderson, 2008; *Gartner Says 80 Percent of Active"*, 2007).

The point is that virtual worlds such as Second Life[2] and games such as Spore™ may facilitate the development and refinement of habits of thinking valued by teachers in many content areas (Evans & Wang, 2008). For example, there is much interest in what is referred to as *computational thinking*, which requires abilities to identify, analyze, and evaluate ill-structured, complex problems in science, technology, engineering, and mathematics (STEM) domains (Wing, 2006). Digital games and virtual worlds may be especially powerful from late elementary to early high school as students are introduced to scientific habits of mind and advanced forms of mathematics, including algebra, statistics, and probability. Computational thinking requires appropriate cognitive development as well as properly matched instructional opportunities to form in the minds of young learners or novices. Whereas existing classroom

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[2] URL: http://secondlife.com/

strategies may be robust to engage students in opportunities to come in contact with complex abstract ideas and procedures, there is insufficient opportunity to engage in more realistic scenarios to observe, manipulate, and test variables in scientific and mathematical domains. This is where games and simulations may have significant impact on learning. When learners interact with models and simulations, they are able to "empathize" with the previously abstract concepts and principles and make public their attempts to understand (Gee, 2008).

Within this special issue, we examine this unique blend of both video games and virtual worlds in K12 and teacher education. We begin with *Differentiating Instruction with Video Games: How Game-Play Can Aid Knowledge Building* by Rachel Harmon. Harmon introduces the topic of differentiation and how video games have been and can be used successfully to create multiple learning paths for students of different abilities and learning styles in the classroom. Specifically, Harmon examines the use of reality role-playing games such as Civilization IV to aid in differentiation in late elementary and middle school classrooms. She posits that video games can aid greatly to language arts development and provides advice on utilizing games in the classroom to foster a collaborative learning environment.

Building on Harmon the next article, *Game-Facilitated Knowledge Building Communities* by David Marshall, discusses how games contribute to individual learning and knowledge building. He discusses the similarities in both video games and the goals of knowledge-building communities, which stress individual and group participation, knowledge construction, reflection, and learning. Marshall examines the use of Civilization IV and Spore to detail how video games could be successfully implemented in the classroom. Marshall posits that the inclusion of such activities enhances both individual and group participation, enables knowledge building and sharing, creates scaffolded learning opportunities, and provides for a deeper understanding of the material.

The next two articles shift from video games to the use of virtual worlds in education, both for K12 students and pre-service teachers. In the third article, *From Second Life to Real Life: Can Important Social Topics be Taught in the Virtual Space?*, Christa Guilbaud introduces this medium and examines its use in education. In particular, Guilbaud examines how Second Life, enhanced by constructionist pedagogy and affordances, affords opportunities for collaboration, feed-back, and multisensory environments to be used in multicultural education in a 12th grade classroom. Furthermore, Guilbaud provides an example evaluative approach when examining the suitability of Second Life for classroom instruction.

In the fourth and final article, Aimee Brenner concludes with an examination of Second Life for teacher preparation and professional development. In *Pre-service Teachers: Recognizing the Value of Second Life in Learning about Teaching*, Brenner discusses the American Federation of Scientists and the National Science Foundation call to integrate new educational programs that take advantage of virtual worlds. She then recounts how one recent study on this matter had a positive impact on participating pre-service teachers. Brenner goes on to discuss the benefits that Second Life can provide as well as list some limitations to be aware of while considering building educational activities in this area.

Practically speaking, the desire of curriculum and instructional designers is to incorporate

content into the delivery medium in such a way that students are literally immersed in learning. This is the same goal a teacher may have for her students; to create an environment in which the student is so engaged they do not realize they have mastered a new concept or demonstrated a new skill. Likewise, game designers have the same goals for their games: that players are so engrossed they do not have to think about how to do something because the game environment is so immersive they intuitively learn how to play. Although currently these three goals are more often running in parallel, it is our hope to illustrate that when utilized together they may create dynamic environments for teaching, learning, and professional development.

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Differentiating Instruction with Video Games: How Game-Play Can Aid Knowledge Building

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Abstract: No two children are the same. Young students learn in a variety of ways and usually follow a primary learning style. Popular learning styles range from auditory and visual to kinesthetic and tactile. Expert teachers have spent countless hours developing instruction that aligns content with these styles. In the past, teachers have had to utilize multiple tools in order to target students who learn at different rates and in different ways. The current differentiation techniques are time consuming. Teachers need a new, more efficient way of helping students gain knowledge. Educational game-play has broken the mold of previous differentiation techniques by allowing teachers to combine popular and motivating technology trends with options for creating an experience unique to individual learners. Research reveals that the language arts classroom is just one place where digital media can aid differentiation by boosting language development. This paper explains that video games can provide multiple routes for students to master specific content in many areas by utilizing digital media technology. Video games can create learning situations where students take on roles, work together, manipulate objects, and learn at a comfortable pace, ultimately helping teachers and students make major gains on a day-to-day basis.

Meeting the needs of all elementary age learners is a difficult task for even the most experienced teachers. Many educators receive training about how to differentiate instruction for learners across the spectrum, the reluctant readers, the fast finishers, and the lower ability learners. However, the often complicated task of differentiating every lesson can add time and effort when trying to prepare content filled materials and activities, which the majority of K12 teachers do not have to spare. Some students learn by hearing, others by seeing, and still, some others by touching. Imagine having to create a lesson about fractions that incorporate all three learning styles. Then multiply that by four subjects, five days a week. Teachers need better avenues for developing multiple explanations for subject matter and technology may be the answer. This generation of kids has been surrounded by digital technology since the day they were born. World-wide, video games are becoming more popular in the education field (Sanford &Williamson, 2005, p. 1), partly because children and educators have greater access to technology (Gee, 2008, p. 14). This increase in availability supports why there is a need for more efficient ways that educators can incorporate this new trend into daily plans. By combining technology with instruction, teachers are helping students of all ability levels learn content at their own pace while gaining 21st century skills. Teachers who can use various digital devices, i.e. iPods, game systems, and computers to enhance the typical classroom will create unique experiences for individual students. This paper discusses how late elementary and middle school students will benefit from differentiated instruction that incorporates innovative technology experiences by defining differentiation, exploring how game play can help differentiate instruction, describing research surrounding games and learning, and also by providing considerations for using games in schools.

What is Differentiation

Headed home for the holidays, a family member phones the host and explains that the route provided by the GPS does not make sense in their mind. The loving host quickly provides another route to the destination that makes more sense to the driver. Similarly, during a lesson about fractions, a teacher draws shapes on the board that represent parts of a whole. Meanwhile, that same teacher simultaneously provides a lower ability student another avenue for learning the fractions lesson, by allowing the student to mimic the math on the board with tangible pieces of candy. The teacher does this because he knows that Lucy is a tactile learner and benefits from hands-on activities. Lucy was able to process, construct, and make sense of the idea at the same time as his fellow classmates, just in a different way. This teacher was following Gee's (2007) *Multiple Routes Principle*. The *Multiple Routes Principle* says, "There are multiple ways to make progress or move ahead. This allows learners to make choices, rely on their own strengths and styles of learning and problem solving, while also exploring alternative styles" (Gee, 2007, p. 223). In this example, the learner benefitted and made strides by using physical objects versus visuals in order to move ahead. This principle parallels the definition of differentiation.

Differentiated instruction is the process of "ensuring that what a student learns, how he/she learns it, and how the student demonstrates what he/she has learned is a match for that student's readiness level, interests, and preferred mode of learning" (Ellis, Gable, Greg, & Rock, 2008, p. 32). These concepts are an important part of a successful classroom. However, when the student to teacher ratio is high, differentiating instruction for a group of unique individuals is almost impossible on a daily basis. Teachers should use a variety of different teaching strategies to accommodate for the wide range of students learning modalities. Unfortunately, a good lesson that is not differentiated will not help all students reach mastery of the content because every student is stimulated by different learning styles. To alleviate this national problem, forms of 21st century technology are at the forefront of this educational dilemma.

How Gaming Can Aid Differentiation

Part of higher order learning involves developing creative and critical thinking skills. Students' minds wander as they read about astronauts in space and then try to figure out the distance, time, or speed for a related science question. Students are provided these types of scenarios and compound themes for learning, in which they are taught to relate their learning to every day images in order to boost comprehension and memory (Steiner, 1999, p. 213). Gee (2007) has a notion called the *Identity Principle*. Gee states, "Learning involves taking on and playing with identities in such a way that the learner has real choices and ample opportunity to meditate on the relationship between new identities and old ones. There is a tripartite play of identities as learners relate, and reflect on, their multiple real-world identities, a virtual identity, and a projective identity" (Gee, 2007, p. 222). Educational games known as reality-role playing games align with this principle and make it easier for teachers to differentiate instruction.

Reality role-playing games are designed to enhance this learning strategy by creating authentic experiences that support scientific thinking for all types of students. Role playing games incorporate mechanisms such as differentiated roles where students are portrayed as different people with access to different resources and tools (Salen, 2007, p. 169). These games require teams of students to collaborate and work together to reach a common goal. An example of this phenomenon is clear in Civilization IV. Here, students can portray different leaders in

multi-player mode, allowing students to make unique decisions regarding the development of their civilization. Teachers can utilize this as a differentiating resource by assigning appropriate roles to students so that their interests align with their current learning styles and modalities.

Gee (2008) attests that other digital media more easily allows for differentiation in language arts classrooms than traditional text-based learning (p. 20) because digital environments incorporate strategies that enhance, expedite, and aid language development for all students. Learners from lower socioeconomic areas typically struggle in school due to poor reading skills and insufficient content knowledge, but it is known that more advantaged learners have a problem as well when it comes to literacy (Bransford, Brown, & Cocking, 2000). An example of how a digital environment can be beneficial is illustrated when combining learning about situated meaning, "meanings that are associated with images, actions and dialogue that are relevant to specific context or problem situation in which the word is being used" (Gee, 2008, p. 21) and the card game Yu-Gi-Oh. This game seeks "to show people what words and symbols mean in ways that make them usable for problem solving" (p.23). During this game, learners of all skill levels have cards with different descriptions explaining the role of the character in a particular context, i.e. language is tied to an action. Then, players connect and utilize the web to discuss and strategize how to best play the game. Here, "video games are particularly good examples of how learning and thinking work in any semiotic domain when they are powerful and effective, not passive and inert" (Gee, 2007, p. 81).

Teachers have begun to use games in their classrooms for a variety of reasons, i.e. classroom management, development of computer skills, etc. However, these instances are not necessarily the most educational experiences for students. This may be occurring because teachers are not familiar enough with the games to use them as primary learning resources (Charsky & Mims, 2008, p. 39). Games in classrooms can "engage learners by allowing them to explore, manipulate and discuss the underlying factors and variables that have contributed to… - processes, and to try out alternatives" (Sanford and Williamson, 2005, p. 10) creating a need for teachers to gain insights about how to develop students' understanding with game play.

Civilization Case Study
Kurt Squire (2004) as cited in Sanford and Williamson (2005) conducted a study at Indiana University that explored how the game, Civilization, influenced a student's learning inside a school setting. This game is a strategy based computer simulation in which the players take turns developing an empire, culturally, physically, economically, and militarily. Research found that "students developed complex strategies that tended to follow a pattern of problem identification, casual interpretations, brainstorming solutions, implementing these solutions, examining results, and repeating their interventions" (Sanford and Williamson, 2005, p. 12). Civilization allowed for differences in play style, a variable that is hard for most teachers to incorporate during typical history lessons. It is easy for teachers to choose game options, i.e. game speed, geographical area, type of government, etc. that most aligns with a students' needs. By creating unique learning experiences with this game, students were then able to make gains during class discussion by defending their personal strategies and revisiting their choices (Sanford and Williamson, 2005, p. 12). Discussion between peers following game play benefitted students because they were then able to write and reflect on their own thoughts as well as that of their peers. The shared intellectual thinking concerning technology and content greatly

increased interest and encouraged critical thinking (Gokhale, 1995), which is crucial for 21st century generated ideas.

Considerations for Using Games in Schools

To further emphasize a need for digital environments in school, one must review the amount of digital use outside of school. Young people are surrounded by various technologies in their personal lives. "Children ages 8 to 10 spend a daily average of 42 minutes playing console games and 23 minutes playing handheld games, resulting in an hour spent playing video games every day" (Shuler, 2007, p.32). Learners are becoming more comfortable with the digital and virtual worlds than they are with traditional chalk and talk experiences. Since this trend is not likely to disappear, it is important that on-the-go students are taught how to use these popular technologies for educational purposes. A once clique oriented classroom can be changed into a universal place where games can help students more easily make gains at their own pace, while still participating in events similar to their peers. When students play the same game in a classroom setting, an expert gamer can tutor or aid other students who are struggling by directing them towards the proper resources necessary for goal reaching game play (Sanford and Williamson, 2005, p. 6).

Creating an environment where students are practicing a single player game allows for several positive classroom situations. First, these games allow ample time for individual students to learn at their own pace while still hitting key stages. Games can be chosen that are age-appropriate and culturally diverse. Unlike learning activities that involve field trips and extra movement, games can be played by students with a handicap. Finally, games allow for teachers to easily monitor progress of students to make sure they are developing at a rate specific to their learning abilities. For example, a game entitled, Savannah (Sanford & Williamson, 2005, p. 21), is a location-based game where students are a pride of lions trying to survive in Africa. Outside of playing in a virtual world, students and their teachers are required to track their progress and reflect on and modify the decisions they have made and will make in order to continue successfully. If a teacher sees that a student is struggling and not progressing appropriately, the teacher can differentiate instruction easily by aligning game options for that student.

Conclusion

Gee (2008) asks, "But how can we grant all learners… access to such a richly mentored, lucidly structured, experiential curricula…?" The answer is clear, "Today's new digital media hold out great potential to enhance literacy and content learning and, most important, to enhance them simultaneously such that each richly supports the other" (p. 22). Role playing games, sandbox games, such as Civilization, and games that require students to collaborate all support the diverse learning styles of students. Digital media opens the door for students to go beyond their own experiences and to situate meanings in other academia.

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Game-Facilitated Knowledge Building Communities

David T. Marshall, Virginia Tech

Abstract *In recent years there has been an increase in interest around if, how, and to what extent games might be used for educational purposes. Knowledge-building communities are built on the learning science principles of participation over knowledge acquisition, collaborative learning, reflection, knowledge construction, and distributed cognition. These are some of the same learning principles that are embedded in good video games. As such, it is only natural that games might be used to facilitate knowledge building in collaborative learning environments. Sandbox games like Civilization IV are well suited for this type of setting. When combined with the learning science principles embedded in knowledge-building communities, games have the potential to become an important part of education in our technology-enhanced world.*

Introduction

There has been significant work done examining how computer-based technologies serve to foster higher-order learning (Scardamalia & Bereiter, 1993-1994). Over the past couple of decades, computers have been integrated into pedagogical practice. While most games are designed for entertainment purposes, an increasing number of researchers and educators are finding a place for them in education (Charsky & Mims, 2008, p. 38). The real question revolves around understanding how games can effectively be integrated into curriculum to promote learning and the construction of knowledge. This article seeks to examine how games and simulations like Civilization IV or Spore can help foster and facilitate collaborative learning environments, what I am terming as *game-facilitated knowledge-building communities*.

Knowledge-Building Communities

This exploration should begin with a discussion on what knowledge construction and knowledge-building communities are and why they may be a valid pursuit in attempting to include games and simulations in educational curriculum. *Knowledge construction* is "the deliberate part of learning [which] consists of making connections between mental entities that already exist; new mental entities seem to come into existence in more subtle ways that escape conscious control… This suggests a strategy to facilitate learning by improving the connectivity in the learning environment, by actions on cultures rather than on individuals" (Kafai, 2006, p. 39; Papert, 1993, p.105). As new bits of knowledge are learned, they build on what has already been learned. Learners use this schema, or framework for building knowledge, and appropriate new knowledge (Kafai, 2006, p. 39). This is accomplished through "actions on cultures," or through collaborative activity. *Knowledge-building communities* have been defined to imply that "the classroom community works to produce knowledge – a collective product and not merely a summary report of what is in individual minds or a collection of outputs from group work" (Scardamalia & Bereiter, 1993-1994, p. 270). Knowledge-building communities place value on what has collectively been learned and how these learning environments push the boundaries of learning further than ones that focus on individual work. Participation is valued over simply knowledge acquisition (Barab & Roth, 2006, p. 3-4). This is particularly true of learning that is inquiry-based in nature, such as in science or history. If one scientist discovered how a given

enzyme could be used to cure a given a disease, another scientist is not going to attempt to "discover" the same thing. He or she may attempt to replicate the work, but for verification purposes, not to find something new. The first scientist's work is an addition to the body of knowledge we call "science." It is a contribution to the knowledge-building community. This shift in focus from an individual's body of knowledge to the collective body of knowledge allows the community to inevitably learn more both as a collective body and as individuals.

How Games Might Facilitate Knowledge-Building

One way to facilitate knowledge building is through the use of games and simulations. Again, commercial off-the-shelf (COTS) games are generally designed for entertainment purposes. However, "some COTS games are not absent of intellectual challenges or content" (Charsky & Mims, 2008, p. 38). While students may appreciate the entertainment value that they find in playing games, instructors will find value in exploring the challenges and content that may exist in these titles and using it as a launch pad for learning (Charsky & Mims, p. 41).

There are two different aspects to games (Gee, 2007, p. 27-28). One is the game itself, or the internal view. The other is the social network that surrounds the game play, of the external view. Gee (2007), for example, calls this social network an *affinity group* (p.27). Barab refers to these as *affordance networks* (Barab & Roth, 2006, p. 4). Some titles like Spore or Civilization IV are open-ended simulation games (Squire, 2008, p. 170). These games allow for many trajectories that a player can take in playing the game. In a sense, each player can play his or her own game. "The game structure is less about reproducing a particular way of thinking and more about creating spaces for knowledge creation and discovery" (Squire, p. 171). These spaces call for a larger social network, or affordance network, to engage players (learners) in conversation about their game play and the knowledge creation that it fosters. A game-facilitated knowledge-building community exists when a game [the internal view] and its reciprocal social network [the external view] are wrapped around an educational topic for the collective purpose of knowledge construction.

Game-facilitated knowledge-building communities foster individual student reflection and independent growth while advancing a cumulative body of knowledge (Scardamalia & Bereiter, 1993-1994, p. 279). "Learning scientists often conceive of the problem of learning as a problem of transforming novices into experts by developing their ability to reflect on their own thinking in these ways" (Sawyer, 2006, p. 7). Learners who articulate their understanding of concepts in their own words increase their understanding of the topic(s) in question. Learners who share these reflections with the world hope to advance the understanding of others around the same topic(s). Individuals should be enticed to join such a community of practice by this idea that people who work together can make greater advancements as a collective than they can as a collection of individuals (Gee, 2008, p. 32-33). This idea is often referred to as *distributed intelligence.* While many would push back and argue that such a focus on the collective would cause individual results to suffer, there is little evidence to support that claim (Scardamalia & Bereiter, p. 281). To the contrary, these types of communities tend to foster deeper learning and motivate students to achieve beyond what they might have individually in a classroom without games or game-facilitated knowledge-building communities. In summary, games are one way to engage learners in collaboration with others, articulating their own discoveries while advancing

the collective knowledge of the discoveries and knowledge created by the affordance network as a whole.

Games in the Classroom

Games can be tools that can help facilitate knowledge-building around a topic in classrooms. "The theory of learning in good video games fits well…with the best sorts of science instruction" and stress "strategic thinking and problem solving, often collaboratively" (Gee, 2007, p. 4). These learning science principles of distributed cognition, collaborative learning, knowledge construction, and constructionism create the foundation for a knowledge-building community. For this reason, the inclusion of games in these environments is only natural. This is not to imply that mere presence of good learning principles in games is sufficient alone.

Games cannot simply be purchased one weekend and brought into the classroom on a Monday with any hope for successful implementation. Integrating games into the classroom involves a great deal of work (Charsky & Mims, 2008). A teacher interested in creating a game-facilitated knowledge-building community is going to need to begin by knowing the title he or she is using inside and out. While the open-ended nature of sandbox games can be advantageous in some ways, it is not in a classroom setting. It is imperative for a teacher to master the first aspect of the game he or she is using in the classroom. The teacher must know the title, understand where inaccuracies may exist in the game [as compared to real life], and develop ways to address these. Time is a commodity for teachers and allowing students to play a game such as Spore for an hour without a direct purpose could be considered a waste of time. Both Spore and Civilization can be saved at different points in the game. A feature like this allows a teacher to have students play a specific part of the game and allows open-ended games like the two above-mentioned titles to become feasible in a classroom setting.

Civilization IV as a Case Study

It is perhaps of even greater importance to develop the second aspect of the game – the affordance network or affinity group. A student playing a game like Civilization IV in a history class may learn different facts about history, learn how to play the game itself, and even learn how to learn (Kafai, 2006, p. 38). The social network that stems from the game play is where knowledge construction is going to take place and where the lessons learned in the game play are going to tie into the curriculum.

Decentralized, open knowledge building forums allow for elimination of turn-taking problems, opportunities for peer commentary and review, and for individuals from different entry points to all contribute to discussion in meaningful ways (Scardamalia & Bereiter, 1993-1994, p. 278). A teacher could use Civilization IV in the classroom to help address state and/or national standards of world history. As Civilization IV is an open-ended simulation, or sandbox game, there are multiple "solution paths" (Squire, 2008, p. 170-171). Rather than having a common, shared experience, each player can (and most likely will) have a unique game experience. With Civilization, a group of five players could each play the game, each "win," and each do so in a different manner. The plethora of possible paths that can be taken creates the appropriate environment for an affinity group. Each player could document his or her journey, how different decisions affected game play, and these could be posted in a shared forum like a

wiki for all to see. Players can learn from the decisions others have made and make advancements in their own play. The affinity group is also a place where the teacher can draw students back into the topics enumerated in the curriculum by wrapping a dialogue around how the game situates events in history or why certain things might have happened one way in the game and another in real life. The shared knowledge and discussions about how Civilization IV game play relates to events in actual history serves as a fine example of distributed intelligence.

Conclusion

Games and simulations like Civilization IV have a lot to offer in educational settings. Their potential is maximized when they are designed as part of a game-facilitated knowledge-building community. These collaborative learning environments value participation over knowledge acquisition and are arenas for distributed intelligence and shared learner reflections to foster an advanced collective knowledge that surpasses what the individual would be capable of on his own. Games allow learners from various entry points to participate and contribute to the collective whole. Sandbox games like Civilization IV offer a great amount of room for explorations. Historical inaccuracies and misconceptions can be corrected and remediated through guided discussion. These games are a unique way to fill the digital gap in classrooms. By utilizing Civilization IV and Spore as a supplement for lessons aligning with particular standards of learning, teachers are positively pushing their students to build a prominent future for themselves in an ever-changing technological society.

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From Second Life to Real Life: Can Important Social Topics be taught in the Virtual Space?

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Abstract: *The challenges presented by the 21ˢᵗ century globalized world are well acknowledged. Despite the advancements made in the field of learning technology, instruction has not kept pace. Thus, it is clear that new approaches are needed. The paper demonstrates key benefits to incorporating Virtual Worlds into today's classrooms for the purpose of improving learners' higher order skills and abilities. It presents most specifically that Second Life (SL), because it affords collaboration, peer to peer feedback; and a multisensory 3D digital environment naturally lends itself to Multicultural Education and Constructionist Pedagogy thereby enhances the learning experience of the 12ᵗʰ grade classroom. Further, since good instruction design principles are critical to learning, this paper offers an example evaluation approach to use in determining the suitability of a particular SL course or module for classroom instruction.*

Introduction

In his definition of constructionism, Seymour Papert, (1980) argues that learning occurs when people are actively constructing their materials and teachers assume roles as facilitators (Alessi & Trollip, 2001). In constructionism-based instruction, learners are encouraged to fully participate in all aspects of educational activities to allow co-development and co-construction of knowledge. Thus, constructionism provides a systematic method in which to engage learners in interactions and hands-on activities from a variety of perspectives.

Combined with peer collaboration, constructionism offers that students learn through experience and peer interaction. Given the current and emerging demand for a citizenry with strong communications, critical thinking, and collaborative skills, education reformers have long pressed for changing modern instructional approaches in use from a teacher-based to a learner-centered paradigm (Niguidula, 1997). Supported by learning theories, many of the new instructional approaches are intended to leverage media-rich tools and applications for use in the educational environment (Milone, 1995). With the current development in the field of learning technology, the changes which were envisioned are now possible.

Second Life and 3D Virtual Worlds

The advent of powerful multimedia computing systems has translated to the design of 3D virtual worlds which are content-rich. Further, instruction related activities such as lectures, discussions, workshops, and socialization can all be presented in an open fashion, allowing learners, educators and other stakeholders to interact in ways that would not have been possible without such an application (Milone, 1995).

Virtual Worlds (VW) are gaining greater popularity with Second Life boasting approximately 15 million users known in the medium as residents. Residents in SL collaborate, build, and create content. As a SL resident, I've attended a music recital, watched a horror flick at a cinema, relaxed at the beach, shopped for clothes, and danced at a club; engaging with people from many parts of the world, all within an hour's time, without ever leaving my living

room. Consequently, there is interest in leveraging SL for learning. Moreover, the interactions offered by SL strongly support the orientation of a constructionist approach to learning.

Multicultural Education Focus

Multicultural Education is a philosophy that holds cultural pluralism as necessary for American education in and outside of the school setting (Grant & Sleeter, 2007). In Multicultural Education classrooms, students explore racial and cultural myths, and discuss controversial topics. In this environment, teachers are facilitators while students participate in their own learning through peer-to-peer feedback, and collaborative exercises. Students learn to appreciate differences and how to resolve conflicts. These are key elements in constructionist learning environments and for the 21st Century diverse world.

Objective of Study

The literature shows many different definitions of what is considered a video game (Sanford & Williamson, 2005). A game is a system with rules and outcomes whereby players must resolve a designed conflict (Salen, 2008). Although Second Life does not fit the definition of a game, it is a simulated and fantasy world (S&FW) with the benefit of collaborative affordances that make it a more dynamic environment where participants can create knowledge and construct meaning without serious consequences (Ondrejka, 2008).

As a result, the learning conditions as expressed by Gee are similarly present. This paper argues that Second Life fosters behaviors that are conducive to learning, and affords the most salient accepted instructional and learning principles, making it suitable for 12th grade classrooms. This paper presents an educational activity that encapsulates a specific instructional philosophy designed specifically for use in Second Life. It proposes an approach to evaluating whether the instruction meets the conditions and or experiences that are crucial for learning to occur as argued by James Gee (Salen, 2008).

Theoretical Perspectives on Gaming and Virtual Reality

Research by leading scholars has concluded that *good* video game designs integrate learning principles and cognitive strategies that facilitate learning (Gee, 2007) and develop higher order thinking skills. The higher order thinking skills are those that today's business leaders say are essential for its future workforce to compete in the 21st century multicultural global economy (Nussbaum, 2005). As presented VR share similar attributes of games that make them equally appealing as vehicles for learning in today's classrooms (Ondrejka, 2008). In general, the defining characteristic of these applications is that participants create their own knowledge, collaborating in 3D digital space. And because the environment depends on having other participants sharing space and time it is well suited for supporting the novice participant (Ondrejka, 2008).

As noted by (Gee, 2008), it is through these experiences that people learn. This is because targeted experiences provide learners the opportunity to practice new knowledge, receive immediate feedback, and test out their knowledge in situations that go beyond typical classroom

activities. In VR feedback is instantaneous and communication proceeds from a natural back and forth, rather than following a sequential mode as in a blog or email (Ondrejka, 2008).

Second Life as Learning Platform
 Collaboration drives the way people learn with the constructionist instructional approach and learning paradigm. People learn by taking in new information, processing it through their memories, making connections and interacting with the real world and with people; getting feedback which prepares them to make decisions. In addition to this process, Gee argues that in order for learning to occur certain conditions must be met and adds that well designed games factor in these conditions (Gee, 2008).

 In Second Life, these conditions can also be achieved. Moreover, the student and teacher have greater flexibility with regard to experimentation and establishing objectives, appealing to those desiring broader latitude with approaches to instruction and learning.

Proposed Evaluation Approach to Review SL Course
 There are many training programs, courses and workshops currently taking place in SL. However, as in the case of games, these instructions are not all designed with the appropriate learning strategies and therefore may not produce the desired outcomes. There are well-defined academic standards to which an educational design must adhere to in order to foster effective and appropriate learning. Whatever the approach, it is critical for the design to incorporate accepted standards pertaining to how people learn.

 The evaluation approach proposed in this paper involves reviewing the salient aspects of the course design plan within the scope of Gee's conditions for learning (CfL). The approach suggested involves the following three steps:
 1) A review of the course context
 2) Examination of the design plan, and learner objectives of the course
 3) Summary table showing how the course and lesson plans match against an evaluation framework, which in this case is Gee's CfL. (*Note: The sample course used for this paper was developed by Joe Pacino. More details for the course can be found at the link provided at Notes section of this paper.*)

1. A Review Of The Course Context
 The Multicultural Discussions Inside Second Life course was designed for and conducted in Second Life. The course was created to integrate multiculturalism into the university's curriculum. Lead through facilitator, SL was chosen as the setting where different viewpoints can be expressed safely through avatars, allowing students to experience various attitudes through simulated scenarios (Pacino, 2006).

2. Examination of the design plan, and learner objectives for the course
 Instructional Design
 Below are the key components of the instructional design approach for the sample course. They are:
 • Constructivist learning strategy as learning is perceived to occur through interactions

- A virtual classroom session with international students and professors to provide alternative perspectives
- Collaborative activities occur through assigned groups with made of various cultural backgrounds, bringing diverse cultural perspectives to design and develop scenarios, costumes, and scripts to deliver in through Real Time Role Play taking place in Second Life for one to two hours
- To facilitate transfer of learning, students reflect and discuss with larger group then re-engages with assigned group to revise/rewrite their original scenario

ID - Analysis (Brief)
The above design appears to incorporate a learning strategy necessary to enable the students to meet their learning objectives. It also includes additional participants to insure diverse perspectives and they act as external sources of information to provide balance and provide challenges to the student's internal assumptions or biases.

Instructional Objectives
The instructional objectives of the course are:
- Learners will identify and define fundamental cultural conflicts of value
- Learners will identify examples of multicultural concepts: assimilation, ethnocentrism, cultural relativism
- Learners will offer personal reflections and analyses to explain the underlying conflicts between cultures
- Learners will offer strategies and plans on resolving the conflicts identified

IO - Analysis (Brief)
The course also provides a list of clearly stated, measurable objectives the students must meet to satisfy the requirements of the course. The students have access to this information from the start so they know what is expected and can gauge the degree to which they have learned the lessons.

3. <u>Summary Table</u>
    4. *Based on Gee's CfL*
    5. *² Summarized-see link at the end of the paper for further detail.*
    6. *³ Qualitative rating with regards Gee's CfL: ☒ Does Not Meet; ✓ Partially Meets; ☑ Meets or Exceeds*

Learning Criteria[1]	Instructional Design[2]	Rating[3]	Remarks
Experience must be based on structured goals because we learn best from our experiences this way	Goal: Students will engage in discussion, confront values with another culture, conflict and resolutions.	✔	Specific learner objectives for the student are incorporated
Learners must reflect on how goals relate to reasoning in the situation	Group discussions framed to focus back to the course goal	✔	Learner given the opportunity to express views with peers
Experience must benefit from immediate feedback	Scripted scenarios are played out in SL and viewed on auditorium size screen for the class participants	✔	Learner receives feedback from group and their scenarios in SL are discussed in class
Learners must be encouraged to offer and hear explanations of why expectations failed or errors happened	Participation of international students, and professors to provide additional perspectives and insights	✔	Learner receives feedback from international students, knowledge check
Learner needs an opportunity to demonstrate experience in similar	Students participate in real-time role play in SL with scripted scenarios	☑	Practice different scenarios through role-play in SL
Learners need the interpreted experiences and explanations from other people.	Participation of international students, and professors to provide additional perspectives and insights	☑	Learner shares and receives feedback from group and insights from international students

The preceding table serves as a preliminary analytical tool to determine how the details of the course meet Gee's CfL. A more thorough and detailed review of all the instruction design characteristics of the course will be needed to obtain a comprehensive perspective on whether the course adequately meets the approach and method suggested by Gee.

In evaluating the course by Joe Pacino, it is clear that a broad range of opportunities for multicultural educational activities were imbedded in the lesson plans. These include peer-to-peer collaboration, critical thinking and problem-solving, and showcase of new knowledge. Thus given the inherent benefits of using SL there are exciting opportunities to leverage new instructional design approaches in the new global and technologically-interconnected 21st Century.

Conclusion

The educational benefits from integrating games and virtual worlds into the classroom are the subject of great debate among teachers, principals, parents and other stakeholders. Critics cite the harmful effects of games such as contributing to obesity in children, perpetuating negative gender and racial constructs and for nurturing aggressive behavior (Everett & Watkins, 2008).

The approach suggested in this paper is to offer a critical means to evaluate courses or modules, which have been created for implementation in SL. As noted, the proposed model is based upon Gee's conditions for learning. Other evaluation frameworks or approaches may be used in lieu of Gee's CfL approach. Nonetheless, the critical point is to have a clear method to assess whether the instructional model under consideration is a viable learning design using a well-established learning framework.

Notes: The link for Joe Pacino's course used as an example in this paper can be found at: http://ext.sac.edu/faculty_staff/pacino_joe/slmulticul/slmulticuldiscussion.htm.

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Pre-service Teachers: Recognizing the Value of Second Life in Learning about Teaching

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Abstract: This paper explores how Second Life, the more popular of the virtual worlds, may provide a number of benefits to pre-service teachers if included in a teacher education program as a teaching tool. Second Life is one example of a rapidly growing number of digital media that have become quite pervasive and influential in the lives of today's young people. Recently, the research organizations the American Federation of Scientists and the National Science Foundation, called upon teacher education programs to integrate pedagogical practices that take advantage of these digital tools. One study discovered integrating Second Life into a technology course had a positive impact on participating pre-service teachers. This impact is discussed, as well as the limitations of Second Life, and overall conclusions.

Social networking, blogs, wikis, podcasts, online games and virtual worlds are all forms of digital media that have become everyday constructs in the lives of today's young people (Ito, Horst, Bittanti, Boyd, Herr-Stephenson, Lange, et al., 2008). With so much time being spent immersed with digital media, James Gee (2007) contends that when one engages with a video game "actively and critically" that "they situate meaning in a multimodal space through embodied experiences to solve problems and reflect on the intricacies of the design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world" (p. 40-41). Further, simulations serve as a strong means in which to afford participants the opportunity to practice skills in fields from the medical industry to law and education that might otherwise be extremely costly or even dangerous; for example, university researchers who created a virtual psychiatric ward to allow medical residents to simulate the experience of having schizophrenia. (Boellstorff, 2008).

With the advancement of online games and simulations, a new and powerful media has advanced to the forefront, the virtual world. Virtual worlds bypass the "historic impacts of geographic, professional, and generational distance by allowing their residents to create knowledge and identity in collaboration spaces" (Ondrejka, 2008, p. 229). Although a virtual world is not the same as an online or video game, it still allows participants of every age and gender the opportunity to meet in a space and work towards a common purpose. Virtual worlds offer more freedom for these residents to choose their purpose and the process by which they choose to solve it. In thinking again about the totality of digital influences, one is encouraged to consider what the dramatic implications of such a media-saturated environment could be upon the field of education and for those who want to enter the field of teaching in the future.

The American Federation of Scientists (2006) sought to explore these possible implications at the Summit of Educational Games in October of 2005. Some of their recommendations targeted institutions of education and the training industry. Specifically, they cited that teacher education programs "should engage the learning games community to develop new and revamp old pedagogy to take advantage of these new educational tools" (p. 10). This statement incites teacher educators to recognize the influences of such media, how it affects the lives of young people, and how current pedagogy might need to be more adaptive to these

progressions. Additionally, they contend that teacher education programs "should create new training materials and make developing skills to support game-based learning an integral part of new and incumbent teacher training. This includes training teachers on how to best coordinate between virtual and real world learning activities (p. 11).

Furthermore, Borgman, Adelson, Dirks, Johnson, Kloedlinger, Linn, et al. also advocate that in order to cultivate a generation of citizens that are technologically savvy, higher education institutions must work to attract talent that can effectively utilize the tools of this field, in what they term "cyberlearning," including individuals from industry and education (2008, p. 22). Teacher education programs, must in fact, aid in becoming enablers of change by incorporating opportunities to learn about and incorporating digital media into their methods courses, embedding it into their existing pedagogy, in order for pre-service teachers to utilize it in their classrooms. If not, a gap between educators and students may develop as the former loses touch with what engages today's student in this age of digital saturation. The ideas cited above serve as the primary purpose of this paper: to explore why and how a teacher education program might move towards getting involved with Second Life as an educational tool in an effort to expose its pre-service teachers to emerging digital technologies.

What is Second Life?

Second Life, created by the company Linden Labs in 1999, is a free online, 3D, virtual world that has essentially been created by its residents through digital avatars. Today hundreds of universities and school districts maintain a presence in this virtual world as a unique way to meet and advance their educational goals. Virtual worlds offer a rich, interactive, immersive environment in which participants can experience learning in ways not possible only five years ago. The educational community has become a leader in proving the value of virtual worlds, especially Second Life (SL). Foss (2009) points out that virtual worlds and the ability they provide for simulations offer participants three distinct advantages: the opportunity to engage in a simulated experience that otherwise might be too expensive in the real world; activities that include collaborative experiences; and experiences that could be potentially dangerous in real world scenarios.

Further, Ondrejka (2008) cites that SL allows participants to go beyond what the real world allows in terms of physical and geographic constraints and that "this mix of fantastic possibilities and social education opportunities has virtual worlds poised to transform basic approaches to learning and communication, as well as innovation and entrepreneurship" (p. 229). Second Life provides educators with the opportunity to meet with other educators, both nationally and internationally, to discuss educational topics; attend socials and workshops; participate in online conferences and obtain educational resources to support instruction in their content. This could potentially provide the pre-service teacher with many professional development and curricular opportunities, not otherwise possible at the collegial level, before ever setting foot in a classroom.

Situated Learning in Second Life

Second Life provides the opportunity for residents, or in this instance, pre-service teachers to learn about instructional strategy through in-world simulations, discussing these with other in-service or pre-service teachers or by observing others. In each of these scenarios,

learning becomes situated within the context of the in-world experience and presents one of the powerful components of Second Life. Ondrejka (2008) states that many college and university departments are implementing virtual experiences in their classroom curriculum because SL has "proven so effective at displaying and communicating information" (p. 240). There exists in SL an abundance of teaching resources. A pre-service teacher can visit the Discovery Educator's Network (DEN), where in-service and pre-service teachers hold regular virtual meetings or workshops on content related subject matter or to learn how to utilize SL to its fullest. Many of these educational islands also send out information about conferences and activities via listserve emails.

Gee (2007) also discusses the prevalence of situated learning in video games and virtual worlds; he states that "meaning (sense, significance) is itself specific and embodied" and that "video games are particularly good examples of how learning and thinking work in any semiotic domain when they are powerful and effective, not passive and inert" (p. 81). As a pre-service teacher begins to understand all that SL has to offer, he or she will definitely gain a clear understanding of how powerful this virtual world is and that it certainly is not static; it is truly a dynamic environment where organizations are constantly developing their resources in order to cater to a specific population of consumers. Pre-service teachers have the opportunity to not only learn more about educating others and developing their craft, but also to strengthen their knowledge of their content area. A pre-service English education teacher can visit Renaissance Island to collect information about Shakespeare, his plays and really gain a sense of what it was like in that era before developing lesson plans on the subject.

Research Study on Second Life and Pre-service Teachers

Chris Campbell (2009) describes a research study recently conducted at a university where 4th year teacher education students utilized SL in an Interactive Technologies course during the summer of 2005, as a means to observe how emerging technologies can be used as an educational tool. The students used an assigned avatar to navigate around the virtual world and then in groups, they had to develop a learning activity that could be taught to secondary level students. For further enrichment, the students had to write a reflective piece on their learning activity. Data was collected through questionnaires and online journals.

Overall, the students found learning how to use Second Life a little easier than most video games. In general, they reported, that Second Life was beneficial for creating an understanding and appreciation of it as an emerging technology and then applying it as an educational tool. The experience provided the opportunity for the students to work in groups, problem-solve and engage in an inquiry-based project. Many commented that they would definitely use SL again, if not for professional development reasons, but to aid in their curricular endeavors. The results from this study are not profound, but they serve as an insightful example of how a teacher education program can get involved in SL on a small scale and still reap positive results. This particular university did not own land in SL, but merely began by introducing its pre-service teachers to the concept of the virtual world and allowed them to explore and use resources that had already been developed by others to create their learning activity.

<div align="center">Limitations</div>

Second Life does have certain hardware requirements that must be present before the software can be downloaded and run on high-speed Internet. If a college or university does not have these technological resources available, then SL may not be a possibility. Students may face additional inconveniences if they are not technologically able to access SL from their home computer. Another issue related to this, is the fact it often takes awhile for objects, avatars and environments to download from the website, and so, they appear little by little or lag. This is called "rezzing" and can be aggravating for residents when the process becomes time-consuming when trying to visit a destination.

Another limitation or even negative of SL, as reported by Tom Boellstorff (2008), an anthropologist who conducted an ethnographic study in SL, is the overabundance of capitalism within the virtual world (p. 26). Many organizations have gotten involved with SL, not really to utilize the benefits of a virtual space, but more as a marketing ploy. Additionally, many individuals have discovered ways to make money within SL and some in ways that might be considered morally compromising. Another negative that Boellstorff (2008) discusses is the fact that many people get the impression that virtual worlds merely serve as a form of escapism from the real world (p. 26) and that people can become addicted to it, thus neglecting their real lives. Boellstorff counters both claims by pointing out that both of these negatives may exist, but that the virtual world is a much larger experience than these impressions and centers more on residents interacting with each other and creating environments that they find creative and even innovative.

<div align="center">Conclusions</div>

An overall conclusion for this paper is that there are indeed benefits to involving pre-service teachers in virtual worlds and specifically Second Life. Some of these benefits include: the opportunity to become more familiar with and utilize an emerging digital technology; the chance to collaborate with other educators, experts or pre-service teachers in-world that might not otherwise be possible; discover subject matter opportunities in-world that may encourage more innovative lesson plans and the opportunity to engage in teaching simulations before entering a real classroom. A teacher education program does not need to own land or even possess extensive knowledge about SL to involve their students. Because of some of the technical issues with SL, it is probably best utilized as an educational tool within a course. As technological sophistication and expertise increases, so do the possibilities for utilizing SL for purposes of simulation, pedagogical opportunity, and professional development opportunities.

<div align="center">**References**</div>

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