

21st Century Literacy and The Creation of Video Games

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ABSTRACT

This paper explores how the Delaware Department of Education interprets one definition of 21st century literacy into present academic standards. It discusses how these standards are translated into curriculum activities in ninth to twelfth grade classes. This paper suggests that these curriculum activities do not acknowledge or account for the technology that students deal with every day when they are not in school. It reflects on the consequences of classroom activities that do not align with the student's reality outside the classroom. This paper discusses how aspects of video game technology relate to 21st century literacy. It proposes that video games are an integral component of the students' reality and that this reality is global. It explores options that educators may want to consider that would integrate technology into curriculum activities. It is the characteristics of ninth to twelfth grade students that drive the structure of the teaching methods and design of the learning environments that are represented here.

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Introduction

The International Technology Education Association (ITEA, 2009) defines technological literacy as “the ability to use, manage, understand, and assess technology”. The technology of the 21st century is more than a personal computer on a desk. Students are immersed in technology every day in every facet of their lives. The advances in technology that include internet access, broadband, and 2.0 web functions have created an environment that connects the entire world to every citizen and this technology evolves constantly. This constant transformation demands that students acquire increasing skill levels and knowledge if they are to function in the work world and in institutions of higher learning that exist today. Squire (2003) explains that the schools that students attend today do not reflect the developments that have occurred in even the most recent years. Research and theories on how people learn have evolved as quickly as the technology they attempt to understand. These findings and proposals are different from what many people understand as learning (Papert, 1998). They are new, but they mirror the world that exists today. It requires a transformation of understanding to initiate any change in the systems that will meet the requirements of the 21st century. Not everyone agrees that there is anything about video games that can benefit learning. But, there is a great deal of technology already in place that argues that they do. These findings may provide answers to academic administrators and institutions concerned about how to prepare their students for the world that exists outside of the classroom. However, this transformation involves immeasurable time needed to acknowledge, accept, accumulate, and actuate the necessary resources. The teachers meanwhile, face the daunting task of finding viable options in curriculum activities that prepare their students for the reality of the 21st century right now.

21st Century literacy and Academic Standards in Delaware

The Delaware Department of Education (DDOE, 2007) is determined to prepare it's students for the 21st century. It identifies the tenants of the International Technology Education Association's Standards for Technological Literacy (ITEA, n.d.) as the bases for the standards and recommendation for curriculum for Delaware's Technology Education program. This definition of technological literacy is "the ability to use, manage, understand, and assess technology." In the "Components of the Career and Technical Education Standards Teacher Resource Guide for Recommended Curriculum Development" the standards are clarified under the headings of "Goals, Big Idea, Enduring Understandings, and Essential Questions." Teachers are asked to translate this definition into viable classroom activities.

However only frail fragments of these tenants appear as part of other areas of study. The word "media" is used in portions of the English Language Arts Content Standards (DDOE, 2006). It is defined in the attached "Glossary of Language Arts" terms as "Multiple means of communication such as overhead transparencies, flipcharts, or audiotapes". The word "technology" does not occur at all as part of the glossary (DDOE, 2006).

The Science Standard 1, Nature and Application of Science and Technology offers slightly more technological involvement, but this is hardly preparation for the 21st century environment that the student lives in away from school (DDOE, 2006).

This is not the preparation that will convince employers to hire the student when he or she graduates or encourage higher institutions of learning to accept their applications for higher degrees. The disparity between how the students live with technology and what they learn in school can cause a disconnect in the student from the educational process they are asked to experience. This disconnect can lead to a lack of interest and engagement with the classroom

and teacher expectations. This student may be more vulnerable to the many factors that lead to academic failure and even dropping out of school before graduation. (Woodruff, 2007).

Statistics indicate that the dropout rate in the United States ranks among the highest in the world.

In the academic year of 2007 there were 37,944 students enrolled in Delaware schools. That year 2,207 of those students dropped out of school (Delaware Department of Education, Annual Dropout Report Summary [DDOE], 2008). Delaware's Secretary of Education, Valerie

Woodruff (2009) explains that students who do not graduate face a grim future. It is a future that consists of unemployment, poverty, poor health, and includes a high prediction of imprisonment and dependence on public assistance to survive. But, it becomes even more of a concern as Woodruff (2009) declares that a high school diploma does not automatically guarantee a student is prepared to compete in the work world or succeed on the college campuses that exist today.

Resnick's (2000) ongoing work on the "changing nature of knowledge" explains that the world our students are presented with in the classroom, is not the world they experience in daily life away from school. The education system in place is structured upon the demands of a world that no longer exists. The industrial based economy of the last century has evolved into the knowledge based economy we know today. This economy is driven by a global component that few of Delaware schools' curriculums are equipped to address.

Recent reports (Peters, 2009) warn that our students must be prepared for a world that demands global collaboration and a comfort with 21st century technologies. To succeed, and even to survive, students must compete in a world where the jobs are awarded to the workers with the best computer skills, and the most knowledge of software, and expertise with web 2.0 technology. Peters (2009) stresses that these facts should not be avoided, ignored, or dreaded.

These facts exist as a reality, and this reality needs to be welcomed as the future of our students.

An environment that supports this reality needs to be present in the schools of today.

The present disparity that exists between these two worlds impacts the learning experience for even the most motivated and gifted students. They cannot equate the limitations of today's

classroom, curriculum, and academic expectations as relevant to their lives outside the

classroom. When students are away from school their connection to technology is ubiquitous.

This connection involves every layer of their lives. The communication technology lifts access

to a global arena that is high speed, and ever evolving, and available at all times – twenty four

hours a day and seven days a week. In school they are restricted to chalkboards, lectures, and

tests that measure few of the skills they see as relevant. Students need a 21st century skill set

when they interview for a job or apply at an institution of higher learning. Students who are

unable to see how school will benefit their futures are less likely to stay in school until

graduation. (Woodruff, 2007)

But, there is hope. Research indicates that if students are introduced to subjects and technologies

that they see as relevant to what exists in the world outside their classroom then they are more

likely to stay in school. Students who become emotionally connected to the learning experience

are more likely to be engaged with and more likely to own their learning experience. These are

the type of behaviors and higher level thinking that students who are at risk of dropping out of

school, or who do not have access to 21st century technology desperately need to attain if they

are to experience success in school, the workplace, or as citizens in the world outside the

classroom. (Shaffer, D. W., Squire, K.D., Halverson, R., & Gee, J.P., 2005).

The Department of Education in Delaware has introduced initiatives to improve the chances of

keeping students in school until graduation. These initiatives also address how to raise the level

of their graduates' technological skills so that they are prepared for the expectations of today's employers and higher education institutions. Delaware has put a great deal of work and effort towards changing the dropout statistics with a massive program, "Reaching Higher For Student Success" (DDOE, 2007). In 2007 the Delaware Department of Education launched this plan that incorporates the "Yes You Can" and "Career Cruising" websites that support the educators, students, and their families in an intensive and comprehensive effort to connect students with a desire and a reason to stay in school. The hope is that by involving the families, community, educators, and students; students will see a reason to stay in school (DDOE, 2007).

These efforts by the Delaware Department of Education represent a sincere effort to prepare students for the world of work and higher education. They are based on a strong foundation of research and high hopes for the future of citizens of this state. I believe that as this initiative continues to change the experience for our students in Delaware, that it would be a great help to consider some of the innovative ideas recent research has developed, and incorporate these findings into class room curriculum or after school programs. There are activities that could engage students and introduce them to the skills and technology of the 21st century.

21st Century Learners Inform Instructional Design

Video games are a dominant presence in our culture today. This presence is relatively new, but it's remarkable growth reflects the transformation that technology brought to our society in recent decades. This growth shows only signs of increasing (Squire, 2007). Video games afford entertainment but they do much more than that. They are very serious business for several federal agencies.). NASA is preparing to launch a video game about space exploration. They have a long history of using interactive game technology to train their astronauts. This latest effort involves years of research and design and will culminate in a world wide massively multi

player online game about space exploration. It is scheduled for release in 2010 (NASA, 2009).

The Department of Defense is experiencing great success in training and recruitment efforts with their massively multiplayer online game, *Americas Army*. The Army has released twenty six previous versions of this wildly popular fighting game since 2004 (*Americas Army*, 2009). At the University of California's Institute for Creative Technologies, Professor Rizzo is using video game technology to provide an interactive platform that allows soldiers traumatized by combat to reenter society. The Institute's work on this technology is also addressing the needs of individuals with Autism and Attention Deficit Disorder symptoms (University of California, 2009). There are many other examples of how the technology of video games is used in the fields of science and medicine. Games of diverse genre appear on laptops, televisions, and telephones for most people in the United States, and for most people in the world. The significance of this global factor brings home the importance of ensuring students are acquainted with the technology involved. This is their world, this is their future, and if they are to succeed – it needs to be their “now”.

It becomes more important every day that students know how to use these games so that they can work and train in these agencies, schools and companies. It is even more crucial that students learn how to create this technology (Harel, 2009).

The level of technological abilities necessary to succeed in today's world is not reflected in what the students are able to experience in classrooms. This state of disparity is caused by many factors, but what is essential to focus on is that for our students who do not receive the education necessary to succeed in the 21st century world they live in, the result is the greatest disappointment we can deliver. All levels of government and educators are scrambling to address the situation, but this transformation involves great effort, resources and time. The

teachers in the classrooms today do not have that time. They are dealing with the realities of a disparity between what they can provide for their students, and what the students need to succeed on a daily basis (Shaffer, 2005).

Research Towards Transformation

Decades of studies, research, and work at major institutions including Carnegie Mellon, MIT, the National Science Foundation and NASA has resulted in innovative projects of video game innovation and creation. These are programs whose origins were the basis for the learning theories of the 21st century. Papert (1998) built upon the work of Piaget's constructivism theory and developed a theory that included the thought that students learn more when they are creating their own objects. Papert's research for constructionism learning theory was performed at MIT and resulted in the development of LEGO MINDSTORMS Robotics Invention System (LEGO Foundation, 2009).

Idet Harel Caperton, (2009) founder and President of the World Wide Workshop Foundation worked with Papert and has conducted a great deal of research and writing about how to infuse new digital technologies and global communication realities into curriculums around the world. She extended the constructionism theory to include her conclusion that students who learn how to create, develop, and produce their own video games on educational and social topics are able to successfully incorporate into their skill set the 21st century skills that are needed to survive and succeed in today's world. Her project, Globaloria (Harel, 2009) provides an environment that supports educators and provides opportunity and instruction to students to learn how to create video games using open source collaborative technology and sophisticated programs like Flash.

West Virginia is in the middle of a five year pilot of the program with Globaloria and new schools in that state are added every year. The resources of the program and it's supporters bring an infrastructure that supports and broadens the educators' knowledge base and experience with technology. This translates into opportunities for the students. It provides the physical resources that meet the technological demands of this effort. The Globaloria (Globaloria, n.d.) website is a environment that is a rich and varied collection of resources that include tutorials, examples, access to experts, and a chance to share with other students in the program in an open and supportive atmosphere of mutual learning and communication. The program includes the education of the educators and administrators. It depends upon a strong scaffolding component for teachers. Due to the collaborative workshop structure - as the students learn; they themselves are teaching each other. This comfort in a collaborative workshop environment is an essential component of the skill set that Harel passionately believes is necessary for success as citizens in the 21st century.

Harel and her associates (Harel, Reynolds, 2009) have isolated "Six Contemporary Learning Abilities" that are developed and strengthened by the program Globaloria. These include completion and mastery of digital projects, successful collaboration in a wiki environment with peers and experts in the field of choice, presentation with 2.0 web technologies of digital creations, and skillful use of web applications. The results and research that are possible through her efforts are part of a growing interest in the creation of video games as integral to the new literacy's so essential for success in the 21st century. Harel's (2009) agrees with other researchers such as Gee (Shaffer, Squire, Halverson, Gee, 2005) that the skills involved in playing video games can be compared to the reading skills in the 21st century. Harel further

proposes that the skills involved in creating video games can be compared to writing skills in the 21st century.

An integral component of the very foundation all of Harel's (2009) efforts focuses on meeting the needs of the populations and groups that due to financial limitations and limited access to technology are unable to attain 21st century skills. This goal is the foundation of the World Wide Workshop that she started. Her program in West Virginia is vast and involves the organization of a great deal of resources. Research continues on the progress during the pilot period and as they are needed adjustments are made to address issues and problems.

Outside of West Virginia and the Globaloria project there are several configurations of learning environments and resources that allow for the diverse learning needs that exist for the high school population. There are also ways to include rich and varied opportunities for students who require adjusted support in order to attain optimal learning. Some of the relevant theories and findings are interpreted and then developed into instructional design possibilities by private entrepreneurs, corporations, libraries, or communities of game enthusiasts. Some of these are able to address issues for students who are unable to access 21st century skills in a classroom. For individuals who have access to high speed connections and computers with the required technology either at home or at a workshop in the library, there are web sites that are set up for users to share, make and play games that use 2.0 web based technologies. Some of the best of these sites do not cost money to use and a user can spend as much or as little time as they want learning, and creating, and playing, and sharing information with the global community. Yo Yo Games (Yo Yo Games, 2009) is an example of just such a site that offers visitors a chance to download a program called Game Maker that is free to use (an upgrade is offered at a minimal cost). Game Maker is a powerful drag-and-drop interface in a software that is extremely user

friendly. It allows a novice to begin “building” games almost instantly (Habgood and Overmars, 2006). Tutorials are on the website and they are free of charge. The resources are readily available for collaboration with fellow “Game Makers” worldwide. Alice (Carnegie Mellon University, 1995) is a program developed at Carnegie Mellon University and it offers a user-friendly programming environment that also teaches programming in a fashion that many students find easier to deal with than the traditional methods of learning to program. It can be used for making some video games. Its’ 3D interface is open source and easily downloaded from the Alice.org site (Pausch, Burnette, Capehart, Conway, Cosgrove, et al, 1995). The program is seen as a way to interest females and ease them past an initial fear of programming. For the segment of our society that can afford it, there are more than a few private corporations that have evolved to meet the interest and demand for technology driven programs that focus on the creation of video games. These are presented outside of the classrooms of a regular academic program and appear as technical camps that students can attend during the summer. One such organization is iD Tech Camps (iD Tech Camps, 2009). It is based in California, but uses facilities on over sixty different college campuses that are located across Canada and the United States. The programs are offered for a week or more and provide instruction in a wide range of video game technologies; including 3D video game design, web design, Flash, programming, robotics, and video editing. Game Builders Academy is another such corporation that offers a strong web presence to support an in person instructional experience for students who can afford to pay for the courses and the travel (Game Builders Academy, n.d.). But, there is a program in Chicago that combines the stronger features of all of these programs. It is free, available to all social and economic levels, and is accessible at more than one level. It has a strong and robust website presence that is augmented by instruction in small hands on

sessions in readily accessible libraries. This public location for the teaching allows for students with special needs a better opportunity to become a part of this activity. These classes are offered after school and include opportunities for educators to attend and learn how to teach the programs in their schools. It uses a combination of software that is user friendly and designed to appeal to male and females. The instructional workshops are in software such as Scratch and Game Maker. They are designed to help students approach programming in a way that allows them to connect with their project and encourages learning.

Conclusion

As NASA announces it's plan to launch a major multi player game for the world based on exploration of space, it is evident that our students need to be active participants in the world they are born into. Forcing them to exist in a world that an older generation grew up in leave us with high drop out levels and disconnected students who are not prepared to work and succeed in the world that exists. The students know it. The task of clarifying standards and updating curriculums to reflect the needed changes is time consuming and requires a great deal of resources that are not available at any level. Teachers in the classrooms are in a position where if they want to support their students in the acquisition of these necessary skills then they must be creative and innovative in the curriculum activities they provide their students. The changes in technology have brought about the need for a transformation, but perhaps some of this technology will help the teachers in their job. Students are highly motivated to learn when they engage in activities that are interesting to them. The challenge and the opportunity exists for teachers to learn new technology and collaborate with peers and experts. They can use web 2.0 resources to share and discover materials and ideas that can begin the transformation in their classrooms.

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