Investigation of Learning Environments

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To what extent do these sites serve as models for promoting meaningful learning (Bransford, et al)? Or in other words, what is required of an online learning environment to promote meaningful learning? To what extent does the site you visited do so? How is this learning different?

We analyzed the website Invention at Play (http://www.inventionatplay.org/index.html). This appears to be an excellent website for young students. It offers four distinct interactive simulations that are geared toward different learning experiences. The simulations are Cloud Dreamer, Puzzle Blocks, Tinker Ball, and Word Play.

Cloud Dreamer has the learner manipulate the shape of a cloud by dragging the edges of the cloud to create whatever shape the learner wishes. Then, the learner can release the cloud into the sky and see it pass by a landscape. This simulation is a good example of one of Gardner's multiple intelligences, referring to spatial intelligence, in which the learner learns best from creating and looking at images (Bertrand 2003).

Puzzle Blocks has the learner try and place blocks of different shapes into a bird, boat or man. The learner can manipulate the block by rotating the block and then dragging and dropping the block into the outline of the shape chosen. This a constructivist approach to problem solving, which appeals to the visual individual, according to Taurisson (Bertrand 2003). The learner will need to look at the object to be completed and analyze the different shapes and their relationship to each other for the completion of the puzzle. The pieces may need to be rotated for correct orientation into the puzzle.

Tinker Ball has the learner using many simple machines to create a Rube Goldberg type device to place a ball into a cup. This is a constructivist approach where the learner must rely on prior

knowledge and apply it to a new problem to be solved (Bertrand 2003). The learner applies what

he or she knows about the movement of a ball when it falls, how different objects move and how

a ball reacts when colliding with different objects to solve the problem of placing the ball into

the cup.

Word Play has the learner collaborating with other students to create a story one sentence at a

time by having each student contribute a sentence to the story. The learner can invite up to three

friends for a group of four learners cooperatively creating the story. This is a cooperative

learning activity, where the process of creating the story will allow students to interact to create a

final product (Bertrand 2003).

Another site analyzed was Thinkfinity, (http:///www.thinkfinity.org). This website offers

countless resources for the 21st century teacher and learner. Through this website, learners and

educators are able to conduct research using a variety of resources, those being: free online

courses, online library, collections, and podcasts. The overly creative and innovative site

provides bountiful research links for teaching, learning, managing, and volunteering.

This site is organized by four major sections; a section for teachers, students, parents, and after

school activities. The educator section provides a plethora of interactive games and activities for

the classroom as well as free lesson plans. Students are provided with interactive games and

activities that allow them to practice individually. For parents, interactive games and activities

for the family are provided. These resources give parents access to the same valuable

educational information as teachers. Lastly, Thinkfinity provides a section where students can

go after school in order to have fun while still furthering the educational experience. The

interactive games in this section are geared towards the students who prefer video games.

Students can enjoy a unique "video game" experience while learning in an environment that they find enjoyable and that is a departure from what has become the standard method of learning new information..

Thinkfinity definitely promotes meaningful learning as it allows students to develop the technological skills required to survive in the real world. With this site, students are developing these skills as they are truly enjoying the learning experience. With many students becoming more aware of technology and its many uses, this website gives students an exciting learning experience that they can truly relate to.

Our group also analyzed the Interactivate website (http://www.shodor.org/interactivate/). This site contains a large variety of games which are designed to reinforce mathematical concepts. There are far too many games available on this site to list them all here, however many of these games are variations of other games available on the site, such as Fraction Four and Order of Operations Four, which are both designed off of the game Connect Four; these versions of the game simply require students to correctly answer a question about the math topic before they are allowed to place a piece on the board.

The majority of the games on the Interactivate website would be useful aids to assist students with reviewing concepts, especially since the games include the option to check there answers and see which are correct or incorrect right away. The range of subject matter that these games cover includes everything from Algebra to Calculus. The topics covered by some of these games include basic skills, such as identifying multiples of certain number, to advanced skills, such as determining an equation of a line when given certain points on that line.

How do these sites demonstrate attention to 21st century learning skills?

The Invention at Play website incorporates four of the six elements of a 21st century education, as stated in "Learning for the 21st Century" (Partnership for 21st 2004). The elements this website incorporates are: emphasis of core subjects; emphasis of learning skills; use of 21st century tools to develop learning skills; teaching and learning in a 21st century context. The last two elements, teaching and learning 21st century content and assessments that measures 21st century skills aren't readily visible on this site.

Invention at Play incorporates art skills with the Cloud Dreamer simulation. It incorporates problem-solving skills with the Puzzle Blocks simulation. It incorporates science and problem-solving skills with Tinker Ball. It incorporates reading and writing skills with Word Play. Visitors to the website can also gain an understanding of the history of several inventions through the Inventor's Stories section of the website.

All simulations emphasize learning skills. These skills include "information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills" (Partnership for 21st 2004, pg. 4). These skills are necessary for every citizen to lead a productive life in today's society. As a group, the activities presented on the Invention at Play website address the set of learning skills individually and collectively in a variety of ways.

The Invention at Play website uses digital technology tools for the development of learning skills. Learners must understand the basic functions of a computer, such as clicking on items, dragging and dropping items and working through a simulation step-by-step. Learners must communicate digitally with others in Word Play. Learners are introduced to information and

must process this information to build upon their own knowledge. Learners must evaluate situations to create solutions to problems.

The information presented on the Invention at Play website is in a 21st century context. The simulations provide simplified, but real-world experiences that the learners may encounter in the world outside of the school building. This method makes the information that is presented more engaging and meaningful (Partnership for 21st 2004). Students today have grown up using technology and need to be shown how to properly use the technology that is available to them. Students are going to use technology to further their learning base; however, it is up to the teacher to present the material in a way that attracts the learning attention of their students.

The Thinkfinity website also serves as a great model for promoting meaningful learning since it is a member of the Partnership for 21st Century Skills (Partnership for 21st, 2004) and International Society for Technology in Education ("ISTE," 2008). This site is an excellent tool for teachers and the classroom as information found on the site mentions the "[concern] about preparing today's children for tomorrow's world" and also states that the framework and guideline for the site outlines "what our students need to know to meet the challenges of the modern age". While the site's first goal is to achieve "mastery of core content areas", there is also an emphasis on "the importance of cultivating interdisciplinary themes, such as global awareness and financial, civic and health literacies, and weaving key skill areas (creativity and innovation, communication and collaboration, research and information fluency, and critical thinking, problem solving and decision making) into core subject matter" (Verizon Foundation, 2008).

The author of the article *Closing the Digital Divide: 7 Things Education & Educators Need to do* states, "Digital learners prefer receiving info quickly from multiple multimedia sources, parallel processing and multi-tasking: processing pictures, sounds, color, and video before text. (Jukes, 2008). Uniquely, this website offers the opportunity for older students to multitask which parallels 21st Century skills and state standards.

The Interactivate website addresses many of the elements of a 21st Century education which are mentioned in "Learning for the 21st Century" (Partnership for 21st Century Skills). Interactivate includes a focus on the core subjects by specifically focusing on math. As mentioned earlier there is also a focus on learning skills by expecting students to not only learn material, but to also identify a situation in which to use that knowledge, such as using sets of points to determine the equation of a line, instead of using the equation for a line to determine a set of points.

To what extent and how do these contribute to an improved learning environment for students?

The Invention at Play website applies the idea of scaffolding, where learners utilize their cognitive abilities and apply these abilities using computer technologies to make more complex tasks much easier (Bransford, 2000). If learners were to accomplish the same tasks without the use of computer technology, more time would be needed, more materials required, and the desired effect of higher-level thinking skills may not be achieved. The technology allows for faster work time, more opportunities for immediate feedback and revisions of the learners' work without the fear of failure or time constraints.

Thinkfinity directly aligns with world's expectations with technology today. The 21st century learner requires the ability to multitask as well as to think on a global level. The website is

directly linked to the demand for 21st century technological skills. The multitude of activities and lessons that are provided on the Thinkfinity website provides educators, students, and parents with the resources to improve how learning takes place as information is presented on a variety of subject areas and also in a variety of methods. Learners have access to these resources and can use them to build on their knowledge base.

Interactivate helps create an improved learning environment by allowing students the opportunity to practice the skills they acquire in the classroom, as well as practicing applications of these skills. It is a very helpful tool because the games provided on the site offer feedback regarding the correctness of answers at the click of a button, instead of needing to wait for an assignment to be graded. This immediate feedback will help students to not only know whether there answer was correct or not, but it also provides the student the possibility to try more examples and see why their original answer was incorrect.

Thinkfinity, as well as Invention at Play and Interactivate, prepares students for life after high school by teaching them the necessary technological survival skills. Not only do the sites provide the skills to learners, but they provide the skills in a colorful and gratifying way. Both websites address the idea that there is more to being literate in the 21st century than simply being able to read, write, and have computing skills. Alvin Toffler makes a statement about being literate in the 21st century in the report *Learning for the 21st Century.* He states, "The illiterate of the 21st century will not be those who cannot read or write, but those who cannot learn, unlearn, and relearn."

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