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Finding Learning in Entertaining Multimedia

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Abstract

The value of entertaining educational multimedia, or edutainment, is an often debated topic. Edutainment comes in many forms but is most often employed in the form of games. Some educators are incorporating educational games into classroom activities while others are opposed and trumpet the negative effects of computer-based learning. Principles of learning found in games are analyzed. Games and other multimedia in application are reviewed. Well designed edutainment can provide desired learning outcomes.

Finding Learning in Entertaining Multimedia

Children are growing up today in a media saturated environment. Sensory-stimulating technological devices are part of young people's everyday communication and inherent learning. As learners become more accustomed to interactive media, their interest in traditional learning methods, such as lectures and textbook study, decreases (Howard, Ellis, & Rasmussen, 2004). Educators are now competing for their students' attention. Effective methods used in the relatively recent past to sustain students' interest may no longer be useful today (Sims, 1997). New technologies continue to alter the way instruction is being delivered to students. Under the broad umbrella term of edutainment, media developers are employing educational games, virtual reality simulations, hypermedia software, non-linear video presentations, and other interactive learning modules. The focus of this paper is to discover how entertaining multimedia is being used in education today, and if it is yielding desired learning outcomes. Definitions of multimedia, edutainment, and gaming, and educational software will be considered and then be used synonymously. How learning theories support multimedia learning will be discussed. Opinions and research about entertaining multimedia will be addressed. Finally, uses and evaluations of good edutainment will be described. Before considering whether individual entertaining educational products produce acceptable learning outcomes, a fundamental question must be answered. How do media influence learning?

What is Multimedia?

Multimedia, as defined by Mayer, is the "presentation of material using both words and pictures," (2001, p. 1). Mayer insists that pictorial and verbal information must be present in a presentation to be considered multimedia under this description. This assertion allows the study of multimedia to be linked with dual-channel learning research. Implicit with this construct is

the notion that human cognitive processing allows for verbal and visual stimulation simultaneously. Even though working memory is severely limited, using both channels improves the learner's opportunity to encode the material into long-term memory (Clark, 2002). Since multimedia is having both visual and aural stimulation to teach content, one might ask how individual media types influence learning.

In a somewhat confusing debate about learning and media, Clark (1994) contends that no specific media influences the way people learn, only the method by which media is employed. In contrast, Kozma (1994) suggests that the media and method cannot be stripped apart. Though this debate continues in different forms, it may be useful to think of media as what a device can do rather than the device itself. Television, film, and now computers can all display moving pictures (De Laurentiis, 1993). Whether or not a specific media influences learning, the means by which people employ them certainly does. Kozma also asserts that media learning research may be constraining some findings by evaluating media against a behavioral-learning-theory rubric.

Multimedia and Learning Theory

Deciding whether or not meaningful learning can occur through the use of multimedia requires a researcher to adopt a theory of learning against which to evaluate one's findings. In a comparative review of learning theories Ertmer and Newby (1993) suggest that instructional designers should choose the approach that most effectively caters to the learners and the tasks they are asked to perform. Learning in a constructivist environment requires high cognitive processing and task knowledge to be successful in the activity. Most of the studies presented in this paper view multimedia learning through the constructivist perspective. According to Bolliger (2004), constructivism is an educational theory that is focused on the learners building

knowledge constructs rather than being passive recipients of information. Driscoll states that, “constructivist theory rests on the assumption that knowledge is constructed by learners as they attempt to make sense of their experiences,” (2001, p. 376). Given a constructivist lens through which to view multimedia learning, it is important to consider how one can learn through multimedia.

Edutainment

The most common and popular form of multimedia learning today is edutainment. “Depending on how it is used, ‘edutainment’ is either a dirty word or a welcome concept,” (Oransky, 2004, p. 1305). The term edutainment became popular in the 1990’s to describe anything that incorporated technology, entertainment, and learning (Sheilds, 2003). Contributors to Wikipedia.org define edutainment as “a form of entertainment designed to educate as well as to amuse,” (Wikipedia, no date). Bob Heyman, a documentary producer for National Geographic, is credited for coining the term (Wikipedia, no date).

It seems that a great chasm exists between educators who feel that edutainment (and computerized learning in general) are ruining a child’s ability to study and those who see it as keeping up with the way children learn anyway. “Many academics feel that using entertainment technology to improve learning lies somewhere between pandering to our students and cutting a deal with the devil,” (Marinelli & Pausch, 2004, p. B16).

In an emotionally charged review of the harmful effects of edutainment on learners, Okan (2003) suggests that this method of instruction is creating a mindset in children that if learning isn’t fun, it isn’t worth while. A negative effect of hypermedia may be that the learners wander in an unfocused way through the software instruction. Okan requests that educators look past the attractive surface features of edutainment products and recognize that computers may be

engaging only in a limited way. The article concludes with a call for more studies to evaluate the effect of the computer on children's brain functioning. With little data to make decisions on how and what to implement into a school's curricula, educators may be making poor subjective decisions on the use of games and computers in the classroom.

Healy (2004) editorializes her firsthand observations in early childhood education. The author asserts computers should not be introduced to children before the second grade or age seven, connecting this opinion to research on child brain development. Noting that the earliest years of life provide a critical time frame for learning physical and cognitive functions, Healy suggests that computer's provide artificial stimulation that encourages guessing rather than critical thinking. Young children are developing language, interpersonal, psychomotor, attention, and listening skills, all of which may be harmed by inferior edutainment. From observation, she gathers that educators are using computers as digital pacifiers and are not regulating computer learning activities.

A reason some educators don't support edutainment may be that technology is overwhelming to them. A survey of K-12 teachers revealed that teachers don't feel adequately trained on software (Rother, 2004). Many teachers worry about the time involved to learn computer skills generally. Requirements for teachers and administrators in technology use are minimal. Regardless of their own abilities, 80% of teachers believe that computers in the classroom improve students' performance in the classroom. Unfortunately, most schools cannot afford a sufficient number of computers for every student. Teachers hope for more age appropriate and useful technology for their students. While some educators are hesitant to use computers in the classroom, some are anxious to replace textbooks with laptops. Chapman (1998) suggested that being over anxious to overhaul traditional texts with laptops is a

misapplication of the usefulness of technology. Requiring families, regardless of their economic position, to purchase their child a laptop is inappropriately demanding, and won't guarantee learning. Access to technology should be the first concern.

Gaming

Gaming, being one of the most popular forms of edutainment, can be used as a way to teach content, enhance critical thinking skills, and focus on student learning (Graceffa, 2005). Unfortunately, those who have tried to make education entertaining have managed to make some not-so-educational games, and some not-so-entertaining educational products (Virvou, Katsionis, & Manos, 2005). Educational games can be meaningful if students are active participants and are required to solve problems using decision making skills (Franklin, Peat & Lewis, 2003). Gaming is no longer an age or gender specific activity. (Howard, Ellis, Rasmussen, 2004) Computer and video games are becoming increasingly popular with the middle-aged (Dickey & Meier, 2005). The average age of recreational gamers is 29 (DeKanter, 2005). Gaming is being used in business training and higher education as well as public schools.

In a literature review prepared for the m-learning project conducted by the Learning and Skills Development Agency, Mitchell and Savill-Smith (2004) undertake the task of discovering why it would be advantageous to use computer games as a learning tool and how they have been used in the past. According to their research, games engage learners in immersive environment and motivate through entertainment. Games can challenge learners, provide instant feedback, and encourage visualization, creativity, and experimentation. Some of the drawbacks to gaming are that learning objectives may not be congruent with gaming objectives, learners may be

distracted by aspects of competition built into the game, or learners may not find the game entertaining and find the process burdensome.

Educational games are being employed more and more in classroom settings. In a study to evaluate the effectiveness of a virtual environment in an educational game, it was found that the students who performed poorly in geography prior to using the game, experienced the greatest benefit from using the geography teaching software (Virvou, Katsionis, & Manos, 2005). It was also discovered from interviewing teachers that students who are usually a discipline problem in normal classroom activates were fully engaged in the software and did not succumb to distractions. In responding to the claim that educational software is designed to replace teacher-student interaction, Virvou, Katsionis, and Manos said that their view is that games “should be used to supplement traditional classroom education. Human teachers still have more abilities in explaining domain issues and diagnosing students’ problems than any kind of software irrespective of its sophistication,” (p. 57). Similarly, De Laurentiis (1993) asserts that gaming can only support a reinforcing role in learning activities, not an instructional role. DeKanter (2005) also sees gaming as a supplement to, not a substitute for other methods of instruction. In fact, internet games can be a way for people to engage with other people, not just a computer.

Pillay (2003) compared learners who engaged in recreational computer games and then played an educational game against students who only played the educational game. Findings indicated that students performed better in the educational game when the recreational game had similar skill requirements. The study ignores content and focuses on form and structure of the games tested. It was found that recreational and education games engage players in proactive, anticipatory and recursive thinking. “Linear cause-and-effect games tended to encourage means-

end analysis strategy, whereas adventure games encouraged inferential and proactive thinking,” (336).

Other Educational Software and Uses

In a study of the effects of hypermedia on student learning, researchers found that student success in learning cognitively difficult content, such as law in this instance, increased for all experience levels (Howard, Ellis, Rasmussen, 2004). “Hypermedia allows an environment wherein students are not just passive viewers of predetermined, sequential presentations,” (p. 431-440). Interactivity requires decision making to be effective (Marinelli & Pausch, 2004, p. B16). Interactive media allows for guided discovery and exploratory learning (Clark, 2000; Jih, 2001). Virtual reality environments, as a form of interactive media, provide immersion and multisensory cues, which assist learners in better understanding complex and abstract scientific concepts (Dede, Salzman, Loftin, & Ash, 1997).

In order for games to be adopted and used in high school and college settings DeKanter (2005) suggests that the software needs to be customizable, transparent (allowing the instructor to see the underlying structure of the game), and dynamic enough to permit feedback between student and teacher.

Multimedia is being used in a variety of contexts outside K-12 classrooms. Museums are applying interactive multimedia to teach visitors in an interesting, functional, and engaging way (Sauer & Gobel, 2003). User-centered design techniques are employed since the end user ultimately determines the value of the presentation. Interaction occurs using all of the learners senses, as well as the ability to speak. Physical and talk-initiated sensors greet or respond to visitors. The aim of this type of interaction is immersion in the learning activity in order to overcome distraction in a highly mobile environment.

In an article suggesting the use of popular film to educate pre-service teachers about how to provide meaningful instructional activities for gifted students, Nugent and Shaunessy (2003) explain the advantages of this media in classroom type instruction. The use of film to help gifted children in teacher- or counselor-to-student interactions has been termed cinematherapy. Specific clips can be used as concrete examples of characteristics of people or situations in which gifted people may find themselves. The use of popular cinema as an instructional tool has been shown to be effective on several levels. Like other multimedia examples discussed, popular film helps to attract student attention and generate interest in the subject matter. Dramatization of issues helps learners connect to issues presented, which also provokes discussion. For adult learners, Lavelle (1992) lists three ways Hollywood film clips can be an effective instructional device. First, learners are motivated to study the represented issues on their own. Second, discussions become active rather than passive, due to the group experience of watching the media. Lastly, difficult ideas are easier to conceptualize when expressed visually.

Taking advantage of the popular media format, a medical doctor has written a novel and a documentary to educate family and friends of those suffering from multiple sclerosis (Oransky, 2004). The point of incorporating technical information about a disease is to help people empathize with their loved one through the power of narrative.

Evaluating Educational Software

So what separates good educational software from that which merely entertains? According to one author's standard, excellent educational software employs effective visuals, can be adapted to the learner, and allows for student control (De Laurentiis, 1993). The method of teaching should match the content, and thoroughly teach that content. Associations between concepts should be explicitly stated. The learner should get appropriate feedback and the

software should give consistent learning results. Software that is in a drill and practice form, following a behavioristic model, though often criticized, can be effective (Polonoli, 2000). If the software is error proof in its conditioning, it may not be as successful as cognitive based software that allows learners to discover their own misconceptions (Hogle, 1996). An interesting and often overlooked aspect of good educational software is that it is culturally sensitive (Polonoli, 2000). Misrepresenting or ignoring non-European ethnic groups will perpetuate negative stereotypes, which is a poor moral and educational choice.

According to Buckleitner (1994), software evaluation standards have steadily declined since the year 1984 as software types and amounts have increased. Buckleitner's observation is that most educational software is reviewed by biased government groups. Due to the dynamic nature of non-linear media, evaluating multimedia is a complex process compared to evaluating textbooks or children's literature. Books are two dimensional, and have a long history of evaluation precedence. Evaluating software is like evaluating a teacher-student interaction. Simplicity of the user interface, degree of user control, and depth of content add to the difficulty in evaluating software. Evaluators must have an understanding of learning psychology, and judge products against what they claim they can do. In the context of an e-learning environment, Duncan and Wallace (2002) state that if the focus of student learning is removed from evaluation than the whole point of teaching is no longer relevant.

A study cited by Buckleitner (1994) reported elementary/middle school aged children's evaluations of educational CD-Rom products (Tammen & Brock, 1997). Surprisingly, responses about entertainment value criticized the software for getting in the way of the content or presenting it inappropriately for the suggested age group. Student reviewers were most concerned about usability, variability, and depth of the content.

Conclusion

Though many claim that entertaining educational media isn't useful, it is being employed in schools, businesses, and other contexts. Children enjoy games and if they are well designed, they can be educational. Very little empirical research on the effect of interactive edutainment on learning has been conducted. Many software developers who are making edutainment are not employing good instructional design. Educators should take a more active role in developing interesting educational products, incorporating the aesthetic achievements of the entertainment industry. In a perfect world, media developers would not be motivated by money and what sells but what teaches. All educational media would be designed by strict adherence to learning theories and would be rigorously evaluated.

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