Investigating Learning Outcomes through Game Design in Information Literacy Classes

Angela Ramnarine-Rieks
School of Information Studies
Syracuse University
auramnar@syr.edu

Abstract

The use of games are being explored in many domains, why not libraries? Games as learning tools, has potential use in instructional activities such as the teaching of information literacy. The concentration of literature on the educative value of games has escalated since the late 1990s and has been generated in the areas of entertainment, military, academic, and business sectors acclaiming its positive effect on learning and its potential as an instructional tool (Bonk & Dennen, 2005; Bowen & Morrison, 2005; Chappell & Stitt, 2005; Foreman, 2003; Halverson, 2005; Jenkins & Squire, 2003; Oblinger, 2004; Oreovicz & Wankat, 2005; Prensky, 2000, 2001; Stafford, 2005). Books, and scholarly think pieces tout other benefits of the use of games such as knowledge acquisition, retention, recall of factual content, creative and critical thought, decision making, the development of strategic skills, and problem solving (Aldrich, 2004, 2005; Gee, 2003, 2005a, 2005b; Jenkins & Squire, 2003; Johnson, 2005; Lieberman, 2006; Prensky, 2000).

For most libraries, a primary component of their service missions is to educate users on information literacy concepts and skills. Information literacy has become a centerpiece for the continuing discourse on the role that librarians should assume in the educational spheres of instruction, curriculum and faculty development (Breivik, 1999). This type of instruction often occurs either in a face-to-face workshop setting or online. Ultimately, the goal of information literacy instruction is to encourage library users to be independent researchers confident in their abilities to locate and use valid information both in physical and digital formats (Eisenberg and Berkowitz, 1990). With the new philosophies and modified spaces in libraries there have also been changes in the delivery of instructional sessions over the years. Specifically, there has been interest and incorporation of experiential and collaborative learning techniques (Mabry, 1995).With the focus on information literacy there has been a heightened interest in the theoretical approaches to instruction. For example, Grassian and Kaplowitz, 2009 has an entire chapter in their book about learning theories. They cover specific theories from Piaget, Bruner, Bandura, Ausubel and Keller along with summaries about the cognitive science movement, behaviorist theory etc. There is also focus on research on learning styles such as Keefe's categorization of styles and Kolb's experiential learning. The interest of theoretical underpinnings is also seen in journal articles. Complementing the interest of learning theory among instructional librarians is the push for learner centered instruction. The terms active learning and experiential learning are being seen more frequently. Grassian and Kaplowitz, 2009 equate this type of learning to participatory learning activities (group discussions, collaborative learning and learning communities).

Learning-by-design is neither a new concept nor one that is limited to constructing computer games. The idea of "design" represents a broad class of experiences, but a key experience is that of learning by engaging in design-and-build challenges (Kolodner et al., 2003), culminating in the production of an "artifact" that represents underlying understanding (Kafai, 2005). Scratch is a one of the media rich programming environment available that can facilitate the design activity. It was developed by the Media Lib and Massachusetts Institute of Technology and makes it easy to create interactive stories, animations, games, music, and art and allows students to share their creations on the web.

The goal of this study is to explore how undergraduates collaborate to design educational games (using Scratch) that explore how to identify what information is needed, understand how the information is organized, identify the best sources of information for a given need, locate the sources needed, evaluate the sources critically, and share that information. It examines if the use of game design has an impact on learning and retention of knowledge of content that was taught. The study investigates the types of learning processes in three teaching strategies (lecture with gaming, lecture with game design and traditional lecture/discussion) and outcomes that resulted. Learning processes focused on how students represented their understanding in the three teaching strategies and in the context of developing an educational game as well as the collaborative influences in the process of developing and revising their games. A quasi experimental approach will be used to measure the variable(s) of interest. Observations, game artifacts, and interviews would be used as qualitative data sources. Quantitative data from the quasi experiment will linked to the qualitative data to corroborate and extend the qualitative approach. The unit of analysis for study will be individual students, student

groups and artifacts centered collaboration. Learning outcomes will document what types of learning and retention gains occurred in the three teaching scenarios.

The theoretical framework looks at the external process of constructionism, which emphasizes design and sharing of artifacts. Papert was instrumental in developing educational theory and pedagogy associated with young children as game or computer programmers, namely that of constructionism. One of the most distinguishing features of constructionism is programming or designing artifacts. Designing sharable artifacts reflect students' different styles of thinking and learning make that principle of the theory most important. Papert, 1991 stated that in order for students to gain a deeper understanding of something, students have to create it, construct it and build it. Collaboration is another component of constructionist learning environments in which students share ideas and not only receive feedback, but also gain assistance. Interaction among individuals and collective activities are of critical importance in for learning and development in social context. Intersubjectivity involves cognitive processes consistent with Piaget's, Vygotsky and Lave and Wenger view of constructivism (Koschmann, 1996, Koschmann, Zemel, Conlee-Stevens, Young, Robbs, & Barnhart, 2005). Intersubjective space in which the students operate act as the "glue" that holds the collaborative learning activity together. It is what makes possible the functioning of the group (Koschmann et. al., 2005). This study will also explore meaning and practices of meaning-making in the context of intersubjectivity and the ways in which these practices are mediated through collaborative designed artifacts (in this case game artifacts).

References

Aldrich, C. (2004). *Simulations and the future of learning: an innovative (and perhaps revolutionary) approach to e-learning*. San Francisco: Pfeiffer.

Bonk, C. J., & Dennen, V. P. (2005). *Massive multiplayer online gaming: a research framework for military training and education*. Washington, DC: Advanced Distributed Learning.

Bowen, D. F., & Morrison, J. (2005). Taking a journey with today's digital kids: an interview with Deneen Frazier Bowen. *Innovate*, 2. Retrieved from http://www.innovateonline.info/index.php?view=artic le&id=230.

Breivik, P.S. (1999). Take II – Information Literacy: Revolution in Education. *Reference Services Review*. 27 (3), 272 -275.

Chappell, L., & Stitt, J. (2005). *Games that make leaders: top researchers on the rise of play in business and education*. Retrieved, from http://wistechnology.comiartic1e.php?id=1504

Eisenberg, M. B. and Berkowitz, R. E. (1990). Information Problem Solving: The Big Six Skills Approach to Library and Information Skills Instruction. Norwood,N.J.: Ablex.

Foreman, J. (2003). Next- generation; educational technology versus lecture. *Educause* (July-August), 12-22

Gee, J. P. (2003). *What Video Games have to Teach us about Learning and Literacy*. New York, Pal-Grave-McMillan.

Gee, J. P. (2005a). What would a state of the art instructional video game look like?[Electronic Version]. Innovate, 1(6). Retrieved April 20, 2010, from http://www.innovateonline.info/index.php?view=artic le&id=80.

Gee, J. P. (2005b). Why video games are good for your soul. Australia: Common Ground
Grassian, E., & Kaplowitz, J. (2009). *Information literacy instruction: Theory and practice*. New York: Neal-Schuman.

Halverson, R. (2005). What can K-12 school leaders learn from video games and gaming? *Innovate*, 1(6). Retrieved from http://www.innovateonline.info/index.php?view=aticl e&id=81

Jenkins, H., & Squire, K. (2003). Harnessing the power of games in education. *InSight*. 3, 5-33.

Johnson, S. (2005). *Everything bad is good for you*. New York: Penguin Group

Kafai, Y. B. (2005). The classroom as living laboratory: design-based research for understanding, comparing, and evaluating learning science through design. *Educational Technology*, 45(1), 28-34.

Kolodner, J.L., Camp, P.L., Crismond, D., Fasse, B., Gray, J., Holbrook, J., Puntambekar, S., & Ryan, M. (2003). Problem-based learning meets case-based reasoning in the middle-school science classroom: Putting learning by design into practice. *The Journal of the Learning Sciences*,12 (4), 495-547.

Koschmann, T. (1996). Paradigm shifts and instructional technology: An introduction. In T. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm*. Mahwah, NJ: Lawrence Erlbaum.

Koschmann, T., Zemel, A., Conlee-Stevens, M., Young, N., Robbs, J. & Barnhart, A. (2005). How Do People Learn? Members' Methods and Communicative Mediation. In *Barriers and Biases in Computer-Mediated Knowledge Communication. Computer-Supported Collaborative Learning Series*. (Vol. 5) pp. 265-294. Springer.

Lieberman, D. A. (2006). What can we learn from playing interactive games? In J. Bryant & P. Vorderer (Eds.), *Playing video games: motives, responses, and consequences*. (pp 447- 470). Mahwah, NJ: Lawrence Erlbaum Associates.

Mabry, C. (1995) Using Cooperative Learning Principles in BI, *Research Strategies*. 13,182-185.

Oblinger, D. G. (2004). The next generation of educational engagement. Journal of Interactive *Media in Education*, 8, 1-18

Oreovicz, F., & Wankat, P. (2005). Gaming the curriculum. *ASEE Prism*, 15. Retrieved from http://findarticles.comlp/articles/mi qa3797/is 200509/ai n15639781

Papert S. (1991). Situating constructionism. In I. Harel & S. Papert. (Eds.), *Children designers: Interdisciplinary constructions for learning and knowing mathematics in a computer-rich school* (pp. 1-13). Noorwood, NJ: Ablex.

Prensky, M. (2000). Digital game-based learning. New York: McGraw Hill.

Prensky, M. (2001). Digital natives, digital immigrants. On the Horizon, , 9(5), 1-6.

Stafford, D. (2005). Educating the video-game generation. *Middle Matters - NAESP*, 14. Retrieved from http://www.naesp.org/ContentLoad.do?contentId=17 7