Engaging online students through the gamification of learning materials: The present and the future.

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The benefits of gamification in learning and instructional design to help engage and improve student learning online are investigated in this paper. The use of scenario-based learning and alternate reality gaming (ARG) are identified as key representations for improving user engagement, productivity and help shift away from classroom based learning activities towards fully self-paced and collaborative online activities. The paper outlines the reasoning behind, and the advantages of, using scenario-based and alternate reality gaming as an instructional tool in tertiary online education.

Keywords: Gamification, Scenario-based Learning, Learning Design, Alternate Reality Gaming, User Engagement

Introduction

Recently, there has been an efflux in "gamifying" education, or presenting course content in a game-like context to motivate learners to engage with the material (Pappas, 2013). Gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning and solve problems. Games have been suggested to provide more effective learning by bringing more fun, appealing, and learner-centred environments (Ebner & Holzinger, 2007; Prensky, 2001). Gamification is still a fairly new in higher education, but it builds on the success of the gaming industry, social media and decades of research on human psychology (Werbach, 2013). Many on-the-job training programs are already encouraging the use of game strategies to make work and study more engaging, rewarding and applicable (Pappas, 2013). This paper looks at the adoption of game thinking in e-Learning for higher education and the effectiveness of using game techniques to help stimulate learning and encourage student engagement.

The benefits of gamification in online learning and teaching

As Werbach (2013) identifies, effective gamification is not layering goals and rewards on top of content, rather, it involves adopting a game thinking mentality in order to integrate game mechanics into learning in a planned approach. Effective games influence both psychology and technology, in ways that can be applied outside the environments of games themselves. Game thinking includes more than just a badge system and leaderboards; it requires a thoughtful understanding of motivation and design practices (Werbach, 2013). The structure of an online course, including the navigational interface, visual design of materials and information, as well as the communication tools to facilitate learning, can affect students, instructors, programs and educational organisations in various ways. The structure and design of online courses can have an impact on the student learning outcomes, instructor evaluations and instructional decision-making and reputation (Lee, Dickerson & Winslow, 2012). When gamifying a course for distance education the ultimate goal in game thinking is to

create positive learning outcomes while students are committed and stimulated with the learning materials online. As stated by McGonigal (2011) we live in a world full of games, more than 31 million people in the UK alone are gamers with the average young person spending 10,000 hours gaming by the age of twenty-one . By using game mechanics, educational practice can transition from a lecture to an interactive and engaging activity (Pappas, 2013). Research shows new generations of students are fundamentally different from former generations, mostly because of changes in their media consumption patterns (Bourgonjon, Valcke, Soetaert & Schellens, 2009). This generation of students grew up using hypertexts, social networking sites and video games. Thus it is argued that these students have gained specific technical skills, new ways of thinking and different learning preferences, which require a new educational approach (Oblinger & Oblinger, 2005; Prensky, 2011; Bourgonjon et al, 2009). An essential component of facilitating learning is understanding learners. The learning styles, attitudes and approaches of high school students differ from those of twenty-two year old university students (Oblinger, 2003).

To help cater for different learning styles and those new to contemporary pedagogy, instructors and instructional designers need to effectively use elements of gaming in an educational context. This can be achieved with the use of scenario-based learning and alternate reality gaming (ARG) to help aid in the delivery of online content. Many theories have been suggested to account for the positive effect of games in learning. One is that, in order to move to higher levels of play, games require individuals to use prior knowledge, transfer new information into new situations, apply information in correct contexts, and learn from immediate feedback (Oblinger, 2004; Ozelik et al., 2013). One of the reasons for individuals preferring to learn through games may be their optimal flow experiences and their motivation on playing games (Squire, 2003). While playing games people usually spend considerably longer time-periods in the subject of the game. They tend to enjoy the environment and have higher levels of motivation to remain in such environments (Ozelik et al 2013). This concept has been elaborated by researchers of the flow theory.

Csikszentmihalyi (1993) defines flow as 'a state of consciousness that is sometimes experienced by individuals who are deeply involved in an enjoyable activity' that is the key to successful gamification. When people are in the optimal flow experience, they are in such a psychological state that, during the activity, they do not care about their environment (Intal & Cagiltay, 2007; Killi, 2005; Ozelik, et al.,2013). Players temporarily lose track of time, surroundings, and the actual environment that they are in. Studies show that participants perceive higher levels of flow, and apply in-depth problem solving strategies with computer games (Liu, Cheng & Huang, 2011; Ozelik et al., 2013). The sense of competition and feeling of closure once the problem is solved and a level is complete, is far more powerful than anticipated. Gamification isn't solely about competition; it's about developing skills throughout each level. Student interaction with the materials, unlocking new problems, levels and boards based on their performance allows self-paced learning and self-gratification (Pappas, 2013). This game-based platform interlinked with explanations of solutions, synchronous feedback and dashboards that track student progress makes the experience much more pleasing. This interaction between the student and their learning materials creates a collaborative and constructive learning experience creating opportunities that integrate thinking, feeling and action.

As noted by Thomas & Brown (2011) gamified learning is in the early experimental stage incorporating such ideas into an online course is no easy task and while e-Learning research and methods are slowly evolving the use of game-based platforms and technologies are becoming more popular. E-Learning incorporates computer-assisted learning tools such as stand-alone computer-based training programs, materials, and exercises, as well as those that are accessed through the internet (Wankel, Marvoich & Stanaityte, 2010). The use of game-based systems are customisable, individually (or instructor) paced, interactive platforms (Wood, Solomon, Marshall & Lincoln, 2010). They are useful for helping bridge the gap between classroom theories and the real world. Reports from the corporate world suggest that the use of game-based learning results in a knowledge transfer four times greater, and in knowledge retention ten times greater, than traditional methods ("Total Learning", 2008; Wankel et al., 2010). In the next section an example of scenario-based e-learning incorporated into an undergraduate finalcial accounting subject is described.

Scenario-based e-Learning

Scenario-based e-learning design processes are based on an asynchronous mode of delivery, where learners interact with the course material and each other independently. This adds constraints to the delivery component, as instructors must create courseware that is engaging without the benefit of real-time interaction. They must also work with available technology, which limits decisions about delivery (Iverson & Colky, 2004). The second unique aspect of this model is that it involves course design featuring one or more goal-based scenarios, where learners pursue an object by practicing key skills and using content knowledge (Schank, Berman, &

Macperson, 1999; Iverson & Colky, 2004). The principle behind scenario-based learning is that a good program consists of a story in which students play a key role – the role that the student might perform in real life or might need to perform in the future (Iverson & Colky, 2004). Students are placed in a realistic scenario, where they take on the key role of the protagonist.

After researching the advantages of scenario-based learning as an instructional tool, we developed this approach in an undergraduate financial accounting subject at the University of New England. Within this subject students assume the role of an 'accountant' and undergo tasks and problems that an accountant would stumble across in the real world. The work may be done individually or in a team environment, allowing a richer learning experience. Supporting materials and resources may be provided, and online mentors may be available to answer questions and provide guidance as needed. As students work through the scenario to achieve their mission and goals, they learn the critical skills required to accomplish their tasks successfully. Since the scenario problems are based on authentic, work-based challenges, the transfer to the work environment is seamless (Iverson & Colky 2004). The platform aims to overcome criticism of undergraduate financial accounting education as being too abstract and theory driven. In addition, undergraduate students often perceive financial accounting subjects as difficult, formalistic and unattractive.

Through the use of gaming techniques, in which students interact with academic materials by working through a trimester long interactive story, set in a virtual business, the use of a scenario-based gaming environment for this subject has resulted in a shift away from classroom based learning activities towards fully self-paced online activities which are integrated into the underlying interactive story. The interactive learning environment also enables the use of targeted early intervention strategies (both automated and manual) as the progress of individual students is monitored continuously. Evidence was collected via an analysis of formal subject and teaching evaluations provided by students, and a survey which evaluated the perceptions of students in regard to the utilised gaming environment. Overall, the collected evidence indicates that students perceive the scenario-based gaming environment as engaging and useful for their learning. In addition, overall student performance in the subject for which the scenario-based gaming platform was adopted improved considerably whilst academic rigour was maintained.

The notion of e-learning adds the additional components of an engaging story communicated via electronic delivery, enhanced by virtual communication and an extensive knowledge base (Iverson & Colky 2004). Current students gaining entry into university either use, or have used games once in their lives. This may include social networking games, game-based phone applications used between friends, online gaming and even competition based games to win prizes. It is then no surprise for instructors to consider game-based approaches to help facilitate online learning. Alternate Reality Gaming (ARG) is an exciting new medium, a genre that blurs the boundaries between producer and consumer that fosters a more participatory popular culture (Ornebring, 2007).

The Future: Alternate Reality Gaming (ARG)

According to McGonigal (2004) the definition for Alternate Reality Gaming (ARG) is an interactive drama played out online and in real-world spaces, taking place over several weeks or months, in which dozens, hundreds or thousands of players come together online, form collaborative social networks, and work together to solve a mystery or problem … that would be impossible to solve alone. As argued by Owings (2009) this definition can vary with every game, every website, and every player. The only thing that all ARGs have in common is the alternate reality gaming motto: this is not a game. Players must interact within the ARG as if it were real. And the success of the game depends on how willing the players are to lose themselves in the game and how interactive they become in it. These games combine narrative elements of a story that are built up and presented to players across a whole range of online and offline media (Owings, 2009). Websites, blogs, SMS messaging, web cams, podcasts, phone calls, emails, letters and live interactions with characters are among the many different ways existing ARGs have utilised to present and show players to enable interaction with particular narrative elements (O'Hara, Grian & Williams, 2008). It is up to the players to combine the different elements together to make a coherent story. There is also a culture in these games whereby clues and problem solving are important components. That is, there are places in the story where specific clues and problems need to be solved to uncover important pieces of information that will progress the story (O'Hara et al., 2008). Having said this, it is very difficult for individuals by themselves to work out all the components and be able to put together the narrative thread by themselves. Having to collaborate with numerous players, players feel more capable, more confident more expressive, more engaged and more connected in their real everyday lives (McGonigal 2004). McGonigal (2004) notes that there are three main areas of ARGs that are beneficial to the user and their self-development. Technological confidence: Players gain skills and experience using a variety of

new media and network technologies, players become confident in real-world contexts. Collaboration Skills: Players experience the new kinds of collaboration made possible by mobile and ubiquitous network technologies: e.g., ad-hoc, real-time cooperation. Community: Players feel more connected to and actively engaged with others, both in terms of local community and distributed community, players become a part of "something bigger". The use of these three features of ARG incorporated within online learning creates excitement and a sense of communal presence. These features differ to scenario-based learning where the student participates at a stand-alone level and self-paced learning. Using ARGs for learning is an extension of the work that continues in video gaming. But whereas many universities lack resources for in-house development of a video game, they may possess the skills necessary to create an ARG: storytelling, project management, information structuring, asset creation, and web development (Evans et al, 2010).

Conclusion

As we move forward, the continual growth of information technologies requires that educators engaging in distance education look for new methods and theories for designing and delivering effective teaching (Picciano, 2001). As more and more courses and programs move online, it is critical for instructors to understand culture relevant to online course structure expectations (Lee et al., 2012). Figuring out how to make students feel proud about learning a topic, rather than chastised for not knowing about it, is an important area that needs to be solved, and gamification can lead the way (Pappas, 2013). Using Web 2.0 technologies to create fun learning activities incorporating game mechanics will not only encourage learning but engage students with learning materials in a positive way. This can be accomplished by giving students' instant self-gratification by unlocking more difficult topics (Pappas, 2013), incorporate scenario-based e-learning to connect real life responsibilities with the curriculum being taught, adapting ARG techniques to help keep students engaged and collaborate with materials as they would any other game played and creating an environment that students are experiencing optimal flow and therefore deep-thinking and problem solving with their material is accomplished. As evidence has shown, students engage, collaborate, participate, and experience new ideas and technology because of the use of gamification. Including these game-based thinking approaches in online teaching at the university level will help achieve these goals for next generation of students.

References

Bell, M., Martin, G., & Clarke, T. (2004). Engaging in the future of e-learning: a scenarios-based approach. Emerald Insight, 46(6/7), 296-307. doi: 10.1108/00400910410555204

Bourgonjon, J., Valcke, M., Soetaert, R., & Schellens, T. (2010). Students' perceptions about the use of video games in the classroom. Computer and Education, An International Journal, (54), 1145-1156. Retrieved from http://www.sciencedirect.com/science/article/pii/S0360131509003121

Evans, E., Christopherson, L., Sturm, B., King, E., & Haefele, C. (2010). Alternate reality games: a realistic approach to gaming on campus? In Proceedings of the 38th annual ACM SIGUCCS fall conference. 157-164. doi: 10.1145/1878335.1878376

Grandzol, J.R., & Grandzol, C.J. (2006). Best practices for online business education. International Review of Research in Open and Distance Learning, 7(1), 1-18. Retrieved From http://www.irrodl.org/index.php/irrodl/article/download/246/506

Iverson, K., & Colky, D. (2004). Scenario-Based E-Learning Design: [1]. Performance Improvement, 43(1), 1-7. Retrieved From http://search.proquest.com/docview/237239419

Jeffrey, Y., Allen, J.P., & Lee, E. (2008). Alternate Reality Gaming. Communications of the ACM, 51(2), 36-42. Retrieved from http://cacm.acm.org/magazines/2008/2/5456-alternate-reality-gaming/fulltext

Lee, C.Y., Dickerson, J., & Winslow, J. (2012). An analysis of organizational approaches to online course structures. Online Journal of Distance Learning Administration, XV(1). Retrieved from http://www.westga.edu/~distance/ojdla/spring151/lee_dickerson_winslow.html

McGonigal, J. (2011). Reality is Broken, why games make us better and how they can change the world. Random House Group Limited, London.

McGonigal, J. (2004). 'Alternate Reality Gaming', MacArthur Foundation Powerpoint presentation. University of California. Retrieved From http://www.avantgame.com/McGonigal%20ARG%20MacArthur%20Foundation%20NOV%2004.pdf

Oblinger, D. G., & Oblinger, J.L. (2005). Educating the net generation. Online e-book: Educause.

Oblinger, D. (2003). Boomers & Gen-Xers, Millennials: Understanding the "New Students". Educause. 38(4). Retrieved From http://net.educause.edu/ir/library/pdf/ERM0342.pdf

O'Hara, K., Grian, H., & Williams, J. (2008, December). Participation, Collaboration and Spectatorship in an Alternate Reality Game. In Proceedings of the 20th Australasian Conference on Computer-Human

Interaction: Designing for Habitus and Habitat. Cairns, Australia. Retrieved From http://dl.acm.org/citation.cfm?id=1517787&bnc=1

Ornebring, H. (2007). Alternate reality gaming and convergence culture: The case of Alias. International Journal of Cultural Studies, 10(4), 445-462. Retrieved From http://ics.sagepub.com/content/10/4/445.full.pdf+html

Owings, H. (2009). Building an ARG: alternate reality games challenging teens to use technology in new ways. School Library Journal, 55(12), 26. Retrieved from http://www.schoollibraryjournal.com/article/CA6708200.html

Ozcelik, E., Cagiltay, N.E., & Ozcelik, S.N. (2013). The effect of uncertainty on learning in game-like environments. Computer and Education, An International Journal, (67), 12-20. Retrieved from http://www.sciencedirect.com/science/article/pii/S0360131513000481

Pappas, C. (2013). Gamify the Classroom. Retrieved from http://elearningindustry.com/gamify-the-classroom

Prensky, M. (2001). Digital natives, digital immigrants, Part II: Do they really think differently? On the Horizon, 9(6), 1-9.

Squire, K. (2003). Video games in education. International Journal of Intelligent Simulations and Gaming, 2(1). Retrieved From http://f3program.org/sites/all/files/eg/20082009/mmorpg/Research%20-%20Video_Games_in_Education-MIT_Study.pdf

Wankel, C., Marovich, M., & Stanaityte, J. (2010). Cutting-edge Social media Approaches to business Education: Teaching with Linkedin, Facebook, Twitter, Second life, and Blogs. Information Age Publishing, Inc, North Carolina.

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