Gaming, Gamification and BOYD in library settings: Bibliographic overview

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Abstract

Games, serious games, gamification or game-based learning are variations of a trend, which by the New Horizon report, in two to three years, will be part of the daily life in higher education. This projection is based on the fact that Millennials (born around 1980) and Generation Z (which follow the Millennials) have strong roots and persisting habits in electronic games. The issue of gaming and gamification is far from simply adopting the practices and products of the highly profitable and booming industry of games for leisure. Rapid technological developments make gaming a moving target. Gamification of the educational process requires deep theoretical knowledge of pedagogy and time- and energy-consuming application of these theories into practice. Libraries, specifically academic libraries have the prerequisite to become leaders in gamification of the educational process.

Keywords:
gaming, gamification, game-based learning, GBL, serious games, Bring Your Own Device, BYOD, mobile devices, Millennials, Generation Y, Generation Z, academic libraries, education, assessment, badges, leaderboards

1. INTRODUCTION

Lev Vygotsky’s “Zone of proximal development” and his Sociocultural Theory opened new opportunities for interpretations of the learning process. Vygotsky’s ideas overlapped Jean Piaget’s and Erik Erickson’s assertions that cooperative learning, added to experimental learning, enhances the learning process. Peer interaction, according to them, is quintessential in accelerating the learning process (Piaget, 1970; Erickson, 1977; Vygotsky, 1978). Robert Gagné, B.F. Skinner, Albert Bandura, and others contributed and constructivism established itself as a valid theory in learning. Further, an excellent chapter of social learning theories is presented by Anderson, & Dron (2014).

Games are type of cooperative learning. Games embody the essence of constructivism, which for students/gamers means constructing their own knowledge while they interact (learn cooperatively). Learning can happen without games, yet games accelerate the process. Games engage. Games, specifically digital ones, relate to the digital natives, those born after 1976-80, who are also known as Generation Y, or Millennials (Howe & Strauss, 2000).

Millennials in the United States, as per the recent Programme for the International Assessment of Adult Competencies (PIAAC), are performing rather poorly compared to their peers from 22 countries around the world (Schaffhauser, 2015b). While research is still tackling the reasons why, novel approaches to learning needs to be considered for a generation, which differs from previous generations in acquiring information and constructing knowledge.

Millennials are gradually leaving the educational field and entering the working force, to be replaced in school settings by Generation Z (Levine & Dean, 2012). Gen Z, the next digitally-native generation, seeks changes of the learning process; changes even more drastic then the ones sought by the Millennials (Hackschooling, 2013). Gaming for Generation Z is not an alternative, but rather expectation. Gaming for Generation Z is associated with creativity (Jackson, A., Witt, Games, Fitzgerald, von Eye, & Zhao, 2012). Creativity, next to collaborative learning and knowledge construction, is one of the prevalent characteristics of games. Using games increases learning, making games increases learning more and is “tantamount to project-based learning” (Shapiro, 2014b).

2. Games and Gamification: Definition and delineation

2.1. Games

Ralph Koster defines a game as a system of rules that, taken together, creates a simplified model of some aspect of reality (Koster, 2013).

2.2. Serious games

In the last decade the notion of “play” in education, as discussed by Vygotsky (1978), was renamed to “games.” During the same decade when “game” replaced “play” in regard to learning practices, the term “serious games” was also introduced. Ulicsak and Wright (2010) define serious games as simulations and virtual worlds. They quote Sorensen and Meyer’s (2007, p. 559) definition of serious games as “digital games and equipment with an agenda of educational design and beyond entertainment” (Ulicsak and Wright, 2010, p. 24). Further, Ulicsak and Wright (2010) provide a long and excellent selection of definitions and literature regarding serious games.
Similarly, the European Alliance for Innovation (EAI) (http://eai.eu/transaction/serious-games) defines serious games as of “not designed for the sole purpose of entertainment but rather for training, educational, marketing or awareness raising objectives. These [serious] games are designed to create a skill development environment for the player while retaining the same focused motivation context of “fun” games. The player must perform tasks, analyze processes and draw conclusions in order to increase his/her productivity and knowledge following the game’s positive and negative feedback, sometimes after risks or events that, in real life, would be harmful or even fatal. Serious Games are used in numerous areas like engineering, health, education, defense, military, emergency management, and scientific exploration, among many others.”

2.3. Gamification

Gamification takes game elements (such as points, badges, leaderboards, competition, achievements) and applies them to a non-game setting. It has the potential to turn routine, mundane tasks into refreshing, motivating experiences (What is GBL (Game-Based Learning)?, n.d.). Gamification is defined as the process of applying game mechanics and game thinking to the real world to solve problems and engage users (Pettiteplace & Felker, 2014, p. 19; Becker, 2013, p. 199; Kapp, 2012). Gamification requires three sets of principles: 1. Empowered Learners, 2. Problem Solving, 3. Understanding (Gee, 2005). Some authors, e.g. Malykhina (2014), fail to make the distinction between games and gamification in the educational process and attribute gamification to the influx of games in the curricula, rather than to the application of game elements as defined above.

An excellent outline and historical and bibliographic overview of games and gamification in their learning context is recently published by Liu and Santhanam (2015). As per Liu & Santhanam (2015), there are certain “commonalities between gamification and other game-related designs, but they differ in terms of whether they are predominantly work-oriented (versus play-oriented) and whether they have well defined goals and structures” (p. 6). Liu & Santhanam (2015) also offer a useful framework, describing the roles of different gamification design elements.

2.4. Game-based learning

Game based learning (GBL) is a type of game play that has defined learning outcomes. Generally, GBL is designed to balance subject matter with gameplay and the ability of the player to retain and apply subject matter to the real world. GBL describes an approach to teaching, where students explore relevant aspect of games in a learning context designed by teachers.

Teachers and students collaborate in order to add depth and perspective to the experience of playing the game (What is GBL (Game-Based Learning)? (n.d.). Researchers are readily taking GBL to the next DGBL level (Digital Game Based learning) emphasizing on the fact that Millennials and Generation Z affinity to electronic and online games versus “in-person” games (Tsai et al. 2015).

In the past decade, the education-based definitions of “games” is being deconstructed and changed: besides serious games, gamification and game-based learning, practical solutions by instructors in their attempt to introduce games as learning method spurs new “definitions. E.g. game-enhanced learning, portrayed as a misnomer of game-based learning by Barseghian (2014) can be safely harbored under “gamification.” One of the challenges, which immediately needs to be addressed is a standardized definition and classification of “educational games” and their subdivisions, such as game-based learning, serious games and gamification.

2.5. Games, gamification and BYOD

The definition of games and gamification is added by the important distinction of video games from other media (e.g. books, TV, movies etc.) by active participation, possibility for participation in singularity or cooperatively, online or in physical presence. Moreover, Granic et al (2012) as well as Fournis & Abou (2014) agree that game platforms are becoming increasingly diverse and easily accessible. Further, they consider a distinction between games, video games in particular, being played on consoles such as Sony, Nintendo, Xbox, etc. but also on computers and mobile devices. In a series of blog postings, Shapiro (2014a, 2014b) asks very same questions about GBL and its mobility.

Gaming on mobile devices as a trend must be observed closely, considering the recent fact of mobile devices surpassing the sale of desktops and laptops (Bosomworth, D., n.d.). Respectively, studies regarding games and gamification, particularly in education, might have to refocus from consoles only and expand research to the Bring Your Own Device (BYOD) imitative, which is gaining strong momentum in middle and high school settings as well as in higher education.

NFER’s study on game-based learning is also focusing on a distinction between gaming and gamification. The authors of the study use Kapp’s definition of gamification as already cited in this research. They define gamification as a much newer concept than game-based learning.

Gamification, according to them, is “about using ‘elements’ derived from video-game design, which are then deployed in a variety of contexts, rather than about using individual video games” (Perrotta, Featherstone, Aston, and Houghton, 2013, p. ii). The NFER report points out the lack of research, which evaluates the impact of gamification (being such a new trend) (Perrotta, Featherstone, Aston, and Houghton, 2013, p. 10). An earlier study of the UK-based Futurelab looks into “the relationship between games, serious games, simulations, educational simulations, and virtual worlds” and the “the underlying pedagogy in education games, and assessment within games” (Ulriczek and Wright, 2010, p. 2; p. 11). Further studies remind the importance about the dominance of multi-player online games MMOGs and, respectively the importance to study single-player online game strategies versus multi-player online games (Tsai, Tsai, Lin, 2015).

2.6. Board or in-person games and activities.
Board games or as per Margino (2013) “in-person games and activities” (p. 335) are not the focus of this research. Instead, this bibliographic overview concentrates on the rapidly burgeoning topic of online games, promoted through educational organizations such as Mindshift (https://www.facebook.com/MindShift.KQED, http://blogs.kqed.org/mindshift). In-person games and activities do have and will keep their place in educational settings, academic libraries in particular. However, considering Millennials and Gen Z propensity toward electronic games, it is reasonable to focus efforts on providing them with a natural milieu where they can apply more easily their learning efforts.

3. Game-based learning and libraries

The academic library has an important role in establishing gaming and gamification as a legitimate learning approach. The following factors determine the library as the developmental hub for game-based activities in education: 1. The academic library serves and reaches the entire campus. 2. Academic librarians teach mostly short (credit-wise) sessions, which is an advantage to start and complete a rather complex implementation of game-based activities in the curriculum process. 3. The development of sound pedagogical gaming by librarians can enable them to service and consult departments across campus in replicating the pedagogical success of applying gaming and gamification in the curriculum process.

As reflected in the NFER initiative, teachers’ attitudes toward gaming is decisive for the success of gaming practices (Perrotta, Featherstone, Aston, and Houghton, 2013, p. 18). Therefore, a limited and controlled endeavor to gamify learning process on a small scale, e.g. bibliographic instruction for undergraduate classes in different disciplines, can steer faculty’s attitude in the right direction and affirm the value of gaming in learning.

Gaming in the libraries can be divided in two broad categories: physical (also board, or in-person) and electronic/digital/online games. Both categories deserve consideration in the educational efforts of the library, yet considering the interests of Millennials and Generation Z, preference must be paid to the second category. There is no shortage of literature on how to approach both in-person and online games at the library. Nicholson (2013) presents a comprehensive historical overview of the application of tangible games in the American libraries. Margino (2013) presents an anthology of library games; in-person, virtual and hybrid. Similarly, Kirsch (2014) published essays with a comprehensive approach toward in-person, virtual and hybrid games. University of Minnesota Libraries’ practical guide to video games is an example for the electronic/digital/online category (Rauber, Farrell, & Neese, 2014). So is the Web site for the Library Technology Conference 2015 (https://sites.google.com/a/umn.edu/learninggame/home). In a similar fashion, Canadian academic librarian, Olivier Charbonneau offers collection of similar information on his site: http://outfind.ca/2015/04/15/what-about-games-in-academic-libraries/

The support to develop elaborate educational games is incomparably minuscule to the funding for gaming entertainment industry. The lack of finances makes it only logical for academic institutions to combine their resources across campus in an effort to enable gaming and gamification as a recognized approach to learning and teaching. In that sense, in the beginning of this paragraph was proposed the logical solution to use the academic library as the hub of such combined efforts.

Within the campus setting, the library can prove to be the preferable sandbox for possible testing and implementation of game-like activities and projects. Academic libraries are well-known as early adopters of new practices across campus. Using games for fostering information literacy skills among students has been underway for a long while (Smith, 2007; Walker, 2008; Markey, Swanson, Jenkins, Jennings, Jean, Rosenberg, & Frost, 2009; Nicholson, 2010; Buchanan, & Elzen, 2012; Forsyth, 2012; Porter, 2012; Becker, 2013; Brown & Kaspar, 2013; Margino, 2013; Thomas, & Clyde, 2013; Phetteplace & Felker, 2014; Walsh, 2014a).

Regrettably, information literacy skills remain the focus of most academic libraries in 21st century. Skills taught through digital literacy elude academic librarians. Considering the importance of gaming in education, Alan Gerschenfield, a publisher of computer games, underlines the connection between games in education and the importance of teaching digital literacy (Fletcher, 2014); a literacy, which academic librarians often neglect on account of information literacy. Not surprisingly, such discrepancy regarding the importance of digital literacy determines the attitude toward the leadership role of the academic library in the game-based learning practices on campus. Buchanan & Elzen (2012) are on the opinion that librarians do not have to be experts in the “gaming” area. In their opinion, librarians need to only understand the place video games could have in libraries and adjust their services accordingly. In the same fashion, Phetteplace & Felker (2014) fail to see the grand responsibility of the academic library on campus as early adopters and in terms of video games, they advocate only engagement of patrons and outreach programs. On the other hand, Becker’s (2013) study of gaming in libraries takes him to Shapiro’s (2014b) conclusion, namely, the necessity to level up students to the learning challenges by creating their own games and/or supporting students in co-designing and manipulating games.

It is important to note, though, researchers’ emphasis on traditional library services turning obsolete and the necessity to promote reinvented library services such as game-based learning (Felker, 2014; Phetteplace & Felker, 2014).

Academic librarians’ most suitable contribution toward game-based learning is library instruction. Margino (2013) recognizes the stagnation of the existing library instruction, which “primarily exhibits lecture-style teaching and consequently results in students’ roles as passive observers rather than active participants,” (p. 334) whereas the Millennials’ expectations are for “service, immediacy, interactivity and group activity” (Oblinger, 2003, p. 45). As recommended by Schiller (2008), “instruction librarians who wish to teach information literacy to upcoming generations can benefit from looking at video games...because they are an emerging media that play a central role in the development of the current generation of college students” (p. 351).

Similar attitude toward the reversal of lecture-based library instruction toward a game-based one is shared by other advocates for game-based library instruction (Broussard, 2012; Martin, & Steinkuehler, 2010: Porter, 2012; Smale, 2011; Walker, 2008). In addition to library instruction, Phetteplace & Felker (2014) identify library orientation and resource usage as potential fertile ground for turning

The traditional services of library instruction and library orientation overshadow the relatively young role of online/distance/mobile education services, which the academic library is part of on campus. Porter (2012) emphasizes that library instruction for online education need to include synchronous and asynchronous demonstration of “proficiency in the use of current information and communication technologies” (p. 68). Game-based learning, per previously mentioned didactic advantages can be the fitting environment to deliver the expected proficiency for online and distance learning (Nielsen, 2014).

There is no singular approach to game-based learning in the academic libraries when it comes to the selection of gaming environments. E.g., Vrasidas, & Solomou (2013) propose the use of Quest Atlantis (www.questatlantis.org). Walker (2008) suggests simpler approach utilizing a Jeopardy-like game. The authors of this study has accommodated Brandel Library’s game-based library orientation for students’ mobile devices (http://web.stcloudstate.edu/pmilenoff/bi/); an inexpensive and replicable approach to gamifying library orientation. Among the advanced and elaborate endeavors for game-based library services is the University of Michigan’s Bibliobouts. With their shrinking budgets and overworked staff, few academic libraries can afford allocating an entire team to accomplish a product such as Bibliobouts. Step-by-step instructions on how to utilize Bibliobouts in library instructions sessions are already made available by librarians (Hofer, 2013).

Creating in-house games such as Bibliobouts can be an expensive endeavor and most institutions do not have the organizational support or financial ability as, e.g. University of Michigan, to embark on such projects (Spina, 2014). Building a game-based learning experience in the academic library and, respectively for campus classes, can be accomplished using newly emerging platforms, such as Koondis (Schaffhauser, 2015a). The advantage of Koondis, described as "social homework system," to existing LMS, such as Blackboard and Moodle, is a better management of the discussion forums and a better organization of students into groups, where they can themselves gamify the learning experience and, as already mentioned, students creating games learn better then students just playing games. It seems that products like Koondis epitomize the best of the old world of LMS and the new world of social media to provide students with opportunity for new type of learning, which includes game-based learning.

In addition to the examples listed above, the following Web page offers a conspicuous account of examples for games in libraries: http://gamemakinginterestgroup.wikispaces.com/Library+Game+Examples. The authors of the Web page list games to enable learning in libraries. The Web page also offers sources for building games in the libraries and, as previously mentioned, per Shapiro (2014b), “with game design students take metacognition to the next level, learning how ideas are constructed.” Further, University of Alabama’s Project Velius, provides an opportunity to engage students in library orientation by involving them in a sort of online mystery scenario. Spina (2013) recommends SCVNGR platform and Walsh (2014b) recommends Lemontree (https://library.hud.ac.uk/lemontree/). However, SCVNGR is pulled from the market (by 2015, Google had retired SCVNGR) and Lemontree seems to have remained a locally-used platform.

The literature on gaming and gamification inevitably and rightfully focuses on student learning. However, with the increasing influx of technology in professional duties, library staff and faculty themselves can benefit from gaming and gamification for updating and upgrading their skills.

Stephens and Johns (2015) propose “utilizing concepts such as self-directed learning, play, and an emphasis on lifelong learning, these programs have been offered for individual libraries as well as consortial and state level iterations to reach thousands of library staff. Benefits to staff include increased comfort with emerging technologies and an increased desire to continue learning (p. 348). The best way for the academic library to become the hub and leader for game- based education is to practice games and gamification (play) itself.

Goal of a gaming imitative at an academic library must be a long-term research on how to bridge “leisure time experiences and practices and practices into the formal educational domain” (Perrotta, Featherstone, Aston, and Houghton, 2013, p. 25). Hayman, & Smith, (2015) leave wide open the decision about adopting of emerging technologies, such as games and gamification: “Educators, practitioners and researchers must be willing to consider whether our own libraries and institutions can and should support these trending technologies” (p. 8). They draw attention to the fact that it is not only the hardware and software to consider but the staffing of such positions. The concept of flow, introduced by Csikszentmihalyi (1990) constitutes a state of mind when they have completely focused on a task; a task which has a purpose. Academic library, only hosting games for leisure, is a welcoming but insufficient endeavor, considering the opportunities described by Csikszentmihalyi’s “flow” concept and supported by the literature presented in this research. At any moment, the goal of the academic library should be how to elevate the foundations entertainment element of leisure when gaming and bring it to the higher purpose of connecting with the respective discipline of the student as well as enticing the student in participation at the game-based learning process.

For informal assessment of information literacy, McCulley (2009) suggests “active-learning library sessions” (p. 175). Games and gamification of the instructional sessions is one of the best approaches for active learning, since it involves student actively in the acquisition of the content and allows building skills. Gaming using electronic means, such as the library instruction session tailored for mobile devices (http://web.stcloudstate.edu/pmilenoff/bi/) replaces McCulley’s (2009) classroom assessment techniques such as 3x5 cards, bypasses unnecessary data entry and integrates the assessment process into all electronic streamlined data, which can be readily exported for further analysis by Excel, SPSS or any other statistical mean.

Bluemle, Makula, & Rogal, (2013) study the effectiveness of information literacy among first- year students. Their research stresses the importance of moving from a quantitative form of assessment to performance assessment using Gilchrist and Zald’s model for instruction design through assessment. There is a large volume of research on changing assessment tactics in regard to learning in academic libraries (e.g. McCulley, 2009; Mullins, 2014), which awaits being placed in the context of gaming and gamification. In that sense, Frederickson
“BYOD” movement and how to adapt the use of personal mobile devices toward game-based learning. In addition, Gaming goes to the core of constructivism as defined by Vygotsky, Piaget and other last-century scholars. A rapidly emerging centers and consequently, the hub of such activities as well as to support and affirm cooperation between departments and pooling resources to jump start game-based education.

The movement around game-based learning can be expensive and time consuming process. Few are the educational institutions, which can afford to devote time and resources. It is good planning to consider entities, such as the academic library as the forefront and, respectively, Minecraft EDU and SimCity EDU acquire increasing popularity among educators.

In his blog, Terry Heick claims that the shortest path to student-centered learning is BYOD (Heick, 2015). He further affirms that “[B]y allowing students to bring in their own devices for learning—rather than insisting that they learn both content and device in school—there is an important opportunity to connect with not just their personal lives, but their natural way of doing things” (Heick, 2015). Mobile devices are in the heart of the recent wave of gamification in “many industries, including business, marketing, and education,” as well as the “evidence that game elements, if used properly, can increase engagement and motivation” (Spina, 2013, p. 7). As recognized by Mozelius (2014), Minecraft and SimCity are games, with an increasing number of users shifting their game to their mobile devices.

The BYOD movement is young and still needs time to polish policies and break barriers; only several years ago, smart phones were kept out of K12 and to a great degree from higher education. While tablets and smart phones are enabling the BYOD movement, gaming consoles are still remaining taboo (Hockley, 2012). Similarly to the need of recognizing games and gamification as legitimate learning practice, the use of mobile hardware will continue to struggle for recognition in and out of the classroom.

5. Conclusions

Learning must not be confined in “educational” games and involve “leisure-use” games (Perrotta, Featherstone, Aston, and Houghton, 2013, p. 6). Yet learning is also an effort well beyond just offering learning the games, those being either “educational” or “leisure-use” ones.

The success of the gaming industry, besides enormous financial support, which education lack, is determined by absent restraints of educational content. Gaming and gamification of education is and will not be an easy process: game with fun but poor content is not a wishful product (Ulicsak and Wright, 2010) and vice-versa, game with robust content, which does not engage student is equally impotent to achieve learning goals. In other words, the “chocolate-covered broccoli” problem— the games look great, they are good for you, but they ultimately fail to work because the creative game dynamics that induce transportation and immersion are missing, making them simply not fun (Granic, Lobel, & M. E. Engels, 2014, p. 74). “Thus, the question for psychological research on gaming is not what games are “good” or “bad” for us; rather, it seems important to start by acknowledging the growing complexity and interactivity and, from there, to develop equally complex models to explain how gaming influences players in relevant cognitive, social, and emotional domains” (Granic, Lobel, & M. E. Engels, 2014, p. 74).

Gaming for educational purposes should not be constrained only within consoles (e.g. Sony, Xbox, Nintendo), but also online games such as SimCity ‘EDU’ and MinCraft ‘EDU’ must be considered (Perrotta, Featherstone, Aston, and Houghton, 2013, p. 7). A comprehensive approach to games and gamification is needed, which includes not only games with consoles and online games, but deep understanding of the BYOD movement and how to adapt the use of personal mobile devices toward game-based learning. In addition this comprehensive approach must understand and connect the new opportunities for assessment in the gamification process and in the game-based learning process. Last but not least, the consideration of game-based learning process must plan the participation and ability of students to create learning games. As outlined by Kapp (2014), incorporating gamification into learning strategy should not be simply “a bolt on” of meaningless, superficial game elements” (p. 52).

The movement around game-based learning can be expensive and time consuming process. Few are the educational institutions, which can afford to devote time and resources. It is good planning to consider entities, such as the academic library as the forefront and, consequently, the hub of such activities as well as to support and affirm cooperation between departments and pooling resources to jump start game-based education.

Gaming goes to the core of constructivism as defined by Vygotsky, Piage and other last-century scholars. A rapidly emerging centers and
organizations around government and educational institutions put an effort in streamlining the enormous task of connecting the vast area of vast are of gaming and complex environment of education to bring game-based learning. Adoption of rules and guidance such as the principles and mechanisms of game-based learning from those organizations, such as NFER Research Programme, can provide useful framework (Perrotta, Featherstone, Aston, and Houghton, 2013, p. 8) and the necessary start to develop and implement GBL in education.

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