

Game-Based Learning

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Overview and Definition

Game-based learning refers to the borrowing of certain gaming principles and applying them to real-life settings to engage users (Trybus 2015). The motivational psychology involved in game-based learning allows students to engage with educational materials in a playful and dynamic way. Game-based learning is not just creating games for students to play, it is designing learning activities that can incrementally introduce concepts, and guide users towards an end goal. Traditional games can incorporate competition, points, incentives, and feedback loops. These concepts have become increasingly popular in higher education and in libraries as a way to engage students in learning.

Basis for Current Interest

Game-based learning and gamification is a trend that has been implemented in many settings including workplace training, education, and social media. Many people have been exposed to game-based engagement techniques in one form or another, whether they've been aware of it or not. Popular social media apps like [Untappd](#) and [Foursquare](#) engage their users by allowing them to share with their peers what beer they are drinking or where they have been. These apps allow users to log their experiences, share with friends, and even earn badges for certain milestones like checking in the most times into a particular location.

The 2014 NMC Horizon Report lists games and gamification as a trend in higher education with an adoption timeframe of two to three years. The report states that "the average age of today's

gamers is 30, with 68% of gamers over 18 years old -- university age" (Johnson et al. 2014, 42). This information may be of interest to those who work with this demographic because they may be more receptive to game-based learning in the classroom.

Current Applications in Academic Libraries and Higher Education

Many universities and academic libraries have begun to employ a variety of game-based technologies. Bohyun Kim (2013) suggests that "gamification can add an extra level of motivation and incentive to many higher education activities." With new applications and technologies being developed, incorporating game-based learning has become much easier.

Some libraries use game-based mechanics to motivate and incentivize library usage like the University of Huddersfield Library, which uses a service called [Lemontree](#) (created by [Librarygame](#)). Lemontree links students' library accounts to award points for certain library activities such as checking out a book or looking up an article in a database. Students collect points for doing these tasks, compete with each other, and keep track of their accomplishments via a leaderboard, which is displayed on the main homepage. The goal of Lemontree is to encourage students to use the library in a fun and social way, and in University of Huddersfield's final report, they found that users had overwhelmingly positive feedback about the gamified library experience (Walsh 2012).

Digital Badges

Digital badging is another example of using game-based learning in higher education and academic libraries. For example, Purdue University's [Passport](#) "allows users to visually display their work as concrete evidence of their knowledge" (2015). Each badge has metadata which details when the user earned the badge, what criteria they completed in order to earn it, and the name of the organization that awarded it. The badge itself can serve as an

incentive for students to engage in learning activities, and it allows for external stakeholders to verify the skills students have learned.

Portland State University librarian Emily Ford also uses [digital badges in a community health program](#) to acknowledge undergraduates' creativity and critical thinking skills. The badges offer students both recognition and certification of skills that may not otherwise be evaluated in the traditional classroom. Additionally, badges add an element of fun and an opportunity for students to take pride in their accomplishments in a highly visible way.

According to the MacArthur Foundation (2015), digital badges are "designed to make visible and validate learning in both formal and informal settings, and hold the potential to help transform where and how learning is valued." Openly available tools like [Credly](#) allow for anyone to sign up for an account and earn, issue, and display digital badges. The learning activities that students complete to earn these badges can be very flexible, making it easy for academic libraries to adopt them for their own learning objectives.

Scavenger Hunts

Scavenger hunts are another example of a playful, game-based learning activity for students to accomplish a set of tasks and learn about the library. These can be done using simple paper forms or mobile applications. North Carolina State University uses a [mobile scavenger hunt](#) to orient new students to their library. Students form teams, and use an iPod Touch to take pictures and answer questions about the library. In contrast to a traditional library tour, this scavenger hunt allows students to collaborate with each other, compete against other teams, and learn about what the library has to offer while using familiar technology tools. The University of Arizona Library used SCVNGR, a now defunct mobile app, for asynchronous library orientations, which allowed students to explore the library without having to depend on staff to oversee the activities (Pagowsky 2013). Appalachian State University has also created their own [virtual tour/scavenger hunt game](#) from scratch that orients their students to the library. For libraries without in-house programmers, other mobile scavenger hunt apps like [Scavify](#) or [Social Scavenger](#) allow organizations to easily

create scavenger hunts for groups, with the potential for asynchronous exploration.

Applications in Academic Library Instruction

Librarians who provide instruction are always looking for new ways to engage learners both in-person and online. Game-based learning offers students the opportunity to explore and experiment with new research skills without fear of failure or bad grades. It also offers opportunities for increased student engagement by adding a sense of fun to their library instruction experience.

In the last decade, several libraries have dedicated considerable time and resources to the development of their own information literacy games. Often grant-funded, some of these games may no longer be in active development or offer support to libraries who want to use them. One example, the [Bibliobouts Project](#), created an online social game that taught information literacy skills as students worked through the process of completing an assignment that required research and writing using the social research and citation management tool Zotero (Markey, Leeder, and Taylor 2012). [Quarantined: Axl Wise and the Information Outbreak](#) is a single-player role-playing game developed by librarians at Arizona State that simulates the complexities of selecting, using, evaluating, and synthesizing sources for research. [Gaming Against Plagiarism](#) is an open source set of three mini-games developed by librarians at the University of Florida with grant support from the National Science Foundation. Michelle Foss Leonard, one of the project's principal investigators, stated in an email that the games have a wide variety of applications, and are currently used in credit courses on research integrity, library instruction workshops, and as part of a remediation process for students with honor code violations.

It is not necessary for librarians to embark on large-scale game development projects to incorporate gaming into their instruction, however. Gamification, "the addition of game-like-elements, also called game mechanics, in non-game settings," can provide opportunities for engagement, flexibility, competition, and collaboration. Gamification can include the incorporation of

points, levels or even just time restrictions which encourage students to compete with themselves and value their own achievements. Social elements can also be used that encourage competition and/or cooperation with other students (Huang and Soman 2013, 13). Even traditional board and card games can be used to engage learners. Andrew Walsh, a librarian at the University of Huddersfield, developed [SEEK](#), a card game designed to be played in class. It takes about 10-20 minutes, and covers topics such as plagiarism, credibility of sources, and finding key words.

These and many other games and gamification projects demonstrate a growing interest in experimentation and integration of games into information literacy instruction. Any librarian considering developing or integrating games into their instruction should look at success stories as well as projects that were either unsuccessful or short-lived. Additionally, as many of the large-scale online games are open-source, there is opportunity to adapt and build upon those that already exist.

Potential Value

Game-based learning provides an opportunity for librarians to incorporate active learning into their instruction sessions, promote students' interest and engagement, and provide immediate feedback on performance. There is also a significant amount of research that suggests that game-based learning can increase student learning.

James Paul Gee, a prominent scholar in the field of game-based learning, describes some of the learning principles that games utilize, including the opportunity to experience the world through new roles and identities and the potential to encourage reflective practice by having players engage in a cycle of probing, hypothesizing, probing again, and rethinking their strategies (2003, 208-209). Because the experience of the game is unique for each player and dependent upon their actions and decisions, gamers are allowed to become producers, rather than just consumers, of content (195).

Gee states that "good video games incorporate good learning principles, principles supported by current research in cognitive science" (2005, 34). Significantly, games provide an opportunity for

learners to experiment, take risks, and learn from failure without fear of real-life consequences (Gee 2003, 62). Games also allow players to develop skills incrementally through practice and challenge players to push themselves without feeling like the tasks are insurmountable (71). By incorporating game-based learning in the in-person and online classroom, these attributes can be leveraged by librarian educators to create more compelling learning experiences.

Finally, games offer a unique opportunity to assess student learning. Higher-order thinking skills such as critical thinking and problem solving can be evaluated by observing students as they play games and by looking at performance data, an assessment strategy referred to as "stealth assessment" (Kaya 2010).

Potential Hurdles

While there are many benefits to using game-based learning strategies in our teaching, there are also significant challenges. First and foremost, it is important to consider whether the technology or game is being used for its own sake or if it actually improves learning. Instructors should consider their students' proficiency with technology so that the technology itself doesn't become a barrier to learning. Additionally, for those who want to create their own games, it is worth noting that, even for experienced game designers, creating a game is difficult. What is even more difficult is making a *good* game--one that effectively teaches and engages players. Librarians who want to learn about game design are encouraged to explore resources that examine e-learning design, as many of the same concepts can be applied to educational game development.

Game-development can require significant time and resources. Librarians who are considering developing their own game should think about how the project will be maintained. A game development project must be well-planned and have support from colleagues and administrators. If it is viewed as a short-term project and investment is limited, it is likely that the project will not be supported in the long-term.

While many of these hurdles are most significant with large game development projects, they are

also worth considering for smaller-scale implementation of game-based learning. The potential benefits must be weighed against the time and resources required even if you are only incorporating a ready-made game, or game elements, into your library instruction sessions. Amy Hofer (2013) described her experience incorporating the game *Bibliobouts* into her for-credit online information literacy course and the considerable technological challenges her students faced. She then adapted a lower-tech game for use in the same class which she felt was much more successful, though not without its own challenges. Learning from other librarians' experiences and developing an informed and well-planned approach can do much to alleviate some of the hurdles to incorporating games into information literacy instruction.

Conclusion

Game-based learning can be used in a variety of ways to enhance library instruction, and research across disciplines supports its effectiveness in the classroom. When designed with learning principles in mind, games can increase student motivation, engagement, and learning.

Librarians may use board or card games like SEEK to add an element of fun, cooperation, and competition to face-to-face classes. Gamification strategies, like the incorporation of digital badges and virtual scavenger hunts, can offer a way for students to obtain visible recognition for skills and knowledge and can potentially reinforce engagement and participation. Librarians can also use commercial or open-source games, or create their own games, for use in library instruction. While much more labor- and resource-intensive, developing a new game can be successful if librarians collaborate with fellow educators and instructional designers to leverage expertise in educational technology and game development.

It is clear that game-based learning offers an exciting opportunity to promote engagement and learning in library instruction. Increased access to the technology that allows us to create and access games, as well as the relatively recent popularity of gamification in our everyday lives, have enabled us to experiment with these technologies and applications in interesting and innovative ways.

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Further Readings

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