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By Jennifer Young

The basic makeup of any game consists of four components: a goal, a set of rules, a feedback system, and voluntary participation. As the late philosopher Bernard Suits described it, "Playing a game is the voluntary attempt to overcome unnecessary obstacles" (McGonigal 2011, 22). Games are challenging, social, meaningful, and rewarding, and gaming can enhance the learning experience of students in classrooms and libraries. Gamification, a relative of gaming, is the use of game elements in a non-gaming context. The term was coined in 2008 but was not widely used until 2010 (McGonigal 2011). Gamification involves making an activity into a game that normally wouldn't be a game, using game mechanics, aesthetics, and modes of thinking.

Both games and gamification have been applied for educational purposes from preschool all the way through higher education. They have proven to be useful in education to engage and motivate learners and build problem-solving skills. The use of games and gamification for educational purposes in academic libraries is a relatively new concept. Applications have included bibliographic instruction activities and classroom research assignments. While games of all types have been implemented in libraries, virtual and virtual-reality hybrid games have notably been a growing mode of choice for library games in academic settings. As with other applications of gaming in education, the focus of games created for education in libraries is on learning objectives. These goals are integrated into the structure of the game (Margino 2013).

The goals of bibliographic instruction and library-based classroom assignments include educating students on how to locate appropriate resources and increasing awareness of how to determine the value of information (Association of College and Research Libraries 2000). Game play is an ideal strategy for achieving these goals, as game-playing appeals to modern students, increases motivation, allows for socializing, and gives context to the learning material. Games can aid in meeting all four of the Information Literacy Standards established by the Association of College and Research Libraries (Nicholson 2009). Through gaming elements, academic libraries can enhance the user experience by giving students meaningful, satisfying work and catering to their learning styles and information-seeking behaviors. Though posing some limitations in an educational setting, games and gamification have the potential to improve student engagement and significantly increase positive learning.

Why play games in library instruction?

Motivating students to learn, especially in topics that do not initially interest them, is a challenge for all educators and specifically for library instructors. According to the *New Media Consortium Horizon Project: 2013 Higher Education Edition*, games can be used in educational contexts to reinforce the application of skills and knowledge in the real world (Johnson et al. 2013). In their wide and varied application, games "can help with new skill acquisition while boosting motivation to learn" (22) and significantly increase positive

learning over traditional lecture-based instruction (Broussard 2012).

In libraries, games have already proven to be a successful venture beyond the typical instructional toolkit. Game-playing in library instruction and research-based classroom activities "presents a solution to facilitating students' engagement with instruction content, self-discovery of information, and learning through trial and error" (Margino 2013, 335). Because games "emphasize continual improvement of skills" (Broussard 2014, 30), they are particularly effective in library instruction, which focuses on processes and skills over content. In a video produced by Nicholson (2009), Paul Waelchli, now library director at Cornell College, describes how virtual games align with the first four Information Literacy Standards established by the Association of College and Research Libraries (ACRL).

Modern students in higher education are among the most prolific video game players in the United States, which makes them a target group for applications of gaming in education. Approximately one-third of game players are graduate or undergraduate students (Sirigos

2014). However, game players are not just young people; the average age of game players is thirty-one (McGonigal 2011). With games, there is a potential to enhance the learning experience for students of all ages.

Traditional undergraduate and graduate students hail from the "me" generation, meaning they are focused on how the world impacts them and what gains they can achieve. For this reason, Millennials seek context in their learning environment; they want to know why they need to know something and have little patience for instruction that does not appear to benefit them. The Millennial generation "bores easily" (Sirigos 2014, 10), wants instant feedback and gratification, is comfortable with technology, and prefers classroom activities that provide interaction and socializing. Game elements cater to these characteristics and offer a unique opportunity for educators to meet the specific psychological and pedagogical needs of these students (Sirigos 2014).

With respect to the library, higher education students have strong and sometimes critical opinions of their libraries. According to a 2010 OCLC report on perceptions of libraries, "college students feel that search engines trump

ACRL Information Literacy Standard	Relevance to Game-Playing
Standard 1: "determines the nature and extent of the information needed" and "considers the costs and benefits of acquiring [it]" (8)	Game players determine what information is needed to make their next move. There may be more than one way to achieve this goal.
Standard 2: "accesses needed information effectively and efficiently" (9)	Game players find information for progressing in a game from the game itself as well as outside sources.
Standard 3: "evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system" (11)	Game players take information and evaluate it to create an effective strategy.
Standard 4: "individually or as a member of a group, uses information effectively to accomplish a specific purpose" (13)	Game players learn through trial and error – effectively using a form of the scientific method – to achieve the goals of the game.

(Association of College and Research Libraries 2000; Nicholson 2009)

libraries for speed, convenience, reliability, and ease of use" (54), yet 43 percent of students feel that library sources contain better information. This disconnect can be at least partially explained by how students feel about their skills and abilities in finding and accessing library information. In general, "the better students feel their skills are, the more satisfied they will be with the library" (Stamatoplos and Mackoy 1998, 331), which means that measures to improve the student user experience must be geared toward enhancing skills. Library instruction fills this gap, as it successfully reduces "library anxiety" in first-year students (Van Scoyoc 2003). Millennials learn best from instructors who are "relatable, engaging, entertaining and able to provide variety in learning materials" (Sirigos 2014, 10). Virtual and virtual-reality hybrid games are social, entertaining, collaborative, technology-oriented, and quick with feedback, fulfilling the preferences of current generations of traditional students for instruction. Librarians can use games to maximize student attention and retention in bibliographic instruction classes and library-related course assignments.

How games facilitate learning

The primary strengths of computer-based and hybrid games for enhancing student library users' experiences are through intrinsic motivation and feedback, context provision, satisfying work, and socializing. One unique aspect of games is that all feedback, even negative feedback, can be constructive. In a game, the ultimate prize is glory and bragging rights, which are achieved through winning the game (McGonigal 2011). This is achieved by interacting with the game and receiving its feedback, which comes in the form of a points value system. Games have a built-in motivational system through these feedback mechanisms that inspires players to continue the game. By tracking player moves and achievements, points value systems and rewards provide high levels of motivation (McGonigal 2011).

The online game LibraryGame created for public and academic libraries in the United Kingdom demonstrates this concept in its rewards system for being a responsible library user. Players are rewarded for completing library activities like checking out books, paying fines, and asking reference questions. Users can compete for top honors by earning the most achievements— such as the most books checked out or most visits to the library. LibraryGame connects to social media accounts, allowing students to share their achievements in their social networks. The success of this game was largely attributed to its motivational points system (Spina 2014).

In addition to built-in motivation and feedback, games also have built-in context. Games are dependent on their context, as the objectives of the game must be evident to the player in order to progress. The game element of context lends itself well to library instruction, fulfilling the students' need for context (answering the question, "Why do I need to learn this?") as well as evaluating their skills (Broussard 2014). First-person point of view scenarios, which place the player as the main character, let students take learning into their own hands, giving them a sense of choice and power and directly relating the content to their own outcome.

Secret Agents in the Library is a flash-based digital game created by Lycoming College specifically for library instruction in a freshman composition course (Broussard 2009). Players take on the first-person role of a secret agent whose objective is to discover a library intruder by uncovering a series of clues. They can choose from a variety of different scenarios that expose them to reference materials, books, journals, and other sources. The game objectives are clearly defined, and the instructor serves as a "guide on the side" (Broussard 2009, 25), providing an introduction and closure activity to reinforce objectives without taking away players' autonomy.

Current research in game making reveals that games are enjoyable because they aren't easy. McGonigal (2011) observes that research into psychology reveals "nothing makes us happier than good, hard work" (28). Satisfying work is that which has a goal and actionable steps. These elements make the game rewarding in and of itself, regardless of actual rewards gained (McGonigal 2011). Games have the ability to increase "flow," which American psychologist Mihály Csíkszentmiháyli defined as "the satisfying, exhilarating feeling of creative accomplishment and heightened functioning" (McGonigal 2011, 35). The rewarding and satisfying nature of game-based learning increases student interest and motivation (Broussard and Oberlin 2011).

In another digital game produced by Lycoming College, Goblin Threat leads students through a series of rooms where they must answer questions about copyright and plagiarism (Broussard 2009). When questions are answered correctly, it rids the room of goblins. The unique storyline contains an actionable goal within the core learning activity. Seeing the goblins vanish from the room provides players with a satisfying sense of flow as their progress and success is visualized. Flow is also increased by the discovery element of the game. Students must search each room to find where the goblins are hiding by investigating the unfamiliar places and spaces. As the game progresses, the story line empowers the player and builds their confidence, making it a positive learning experience no matter the outcome of the game (Broussard 2014).

Finally, digital and hybrid learning games can be social activities that develop a positive association with the learning material. McGonigal (2011) notes that "games build stronger social bonds and lead to more active social networks" (82). The benefits of using social games in the classroom include peer learning and peer teaching. Having earned their bragging rights, students who are good at the game can "showcase acquired knowledge"

(Sirigos 2014, 15) to classmates, and feel a sense of "vicarious pride" (McGonigal 2011, 86) from teaching others to be successful. In this way, games make learning a collaborative experience in which students learn from one another.

BiblioBouts, a game created at the University of Michigan, makes use of social voting and scoring to teach students how to create a bibliography using Zotero. Students earn points for writing their own citations, rating other students' citations for relevance and creativity, and using citations to generate bibliographies. They also create their own social tags—such as "scholarly article" or "book chapter"—which serve as scoring criteria. As a springboard for peer learning, "the scoring mechanism rewards good research habits and creates a sense of competition" (Broussard 2012, 82), which drives performance and interaction with the game.

The characteristics of a successful library game

The success of a library game depends on the structure of the game and how it is implemented (Margino 2013). The literature on digital and hybrid games used in libraries provides emerging evidence on what makes a game successful and examples of best practices. A successful library instructional game meets learning objectives, engages and motivates students, has a high level of player participation, and gives players a low level of frustration.

An important observation in the literature is that complex games are not always better. Defense of Hidgeon: The Plague Years was an elaborate online game designed for a for-credit information literacy class at the University of Michigan. Though the game had a visually interesting interface and clear objectives, it proved to be too "long and tedious" (Broussard 2014, 31) for an educational game. The lack of fun elements failed to "create the intrinsic motivation [the game creators] anticipated" (Broussard 2014, 31). The learning objectives were often lost in the drawn-out plotline.

Further, not all students participated in the game due to its high level of frustration (Markey et al. 2009).

Simpler games, therefore, are more likely to succeed in an educational setting. Broussard and Oberlin (2011) note that "simpler games that call for fewer resources require smaller returns for the game to be considered successful" (80). Just because a game is technically and graphically impressive does not mean that students will enjoy it and get the information they need from it. The University of Michigan used what they learned from Defense of Hidgeon to create BiblioBouts, which received a much more enthusiastic response from students. This targeted mini-game was more closely related to course content and was overall more effective at inspiring motivation and meeting learning goals (Markey et al. 2011; Broussard and Oberlin 2011).

While games are meant to be a fun way for students to learn course materials, the primary goal of educational games is to educate. Unlike most games, educational games are usually not voluntary. Therefore, students are unlikely to play the games in their free time if it isn't required. If a game is well-designed, however, students will still enjoy it along with reaping the educational benefits. Broussard (2014) explains that "library games are not appealing enough in and of themselves to attract busy college students to play in large numbers without being required activities" (31). This means that participation in the games must be required or motivated by offering extra credit. Further, the games themselves must be highly motivating while being played to make up for lack of initial motivation to participate.

Conclusion

Game play is one tool of many that can be used in the library instruction classroom. When a game is successful, it is capable of creating a collaborative and enjoyable environment for library educators to teach research skills to be used in college and beyond. Good educational games will motivate and engage students, provide context for information in the course, offer satisfying work that puts students in a state of "flow," and encourage collaboration and social learning. However, games should not be used for the "glamour factor" (Spina 2014, 71) simply to look impressive or adopt a new technology for its own sake. If the elements of an effective library game cannot be achieved for a particular assignment, or if the assignment is not conducive to game play, then the game will ultimately fail to meet objectives. Learning objectives should always be the foremost consideration in a library game. The most successful educational games are also simple, with a game play that is easy to understand regardless of how complex the learning material may be. Though game playing is still a new addition to academic library instruction, there are a growing number of examples to learn from. While trial and error is still a driving factor in determining success rates, the literature on past gaming projects in academic libraries serves as a knowledge base for improvements in future games for teaching information literacy.

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