Fun Assessment: How to Embed Evaluation with Educational Games

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Assessment is an integral part of teaching and learning. Students are most eager to learn what they expect will be on tests and instructors are required to use assessment measures to assign grades. Given the weight that is placed upon this data, it is not surprising that most librarians, and indeed students, tremble at the very mention of the dreaded word. Assessment, the use of data to demonstrate goals are being met, is increasingly important in libraries as well as higher education in general. Libraries commonly carry it out at the macro level (e.g., LibQual), but too often it is not done at a micro-level—looking at individual assignments or activities. To students, most assessment appears as yet another boring, or worse, anxiety-producing task. Furthermore, the results often arrive too late to provide meaningful feedback to the teacher or student to be used to improve learning outcomes.

Assessment does not have to be so threatening. Formative assessment can be empowering for both instructors and students. With this type of evaluation, teachers gain information in time to adjust their teaching to focus on what students are having difficulty with, and learners have access to meaningful feedback while they still have the opportunity to remediate. It also has the potential to be much less anxiety-producing. It can even be fun. Frequent, non-threatening, instruction-integrated formative assessment allows students to show what they know, apply concepts, explore uncertainties, and try again to improve deficiencies and increase their chances of succeeding. It therefore has the potential to enhance students' learning outcomes, even as it documents successful results.

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Games that are carefully matched with educational objectives can actually enhance learning outcomes. Commercial video games intrinsically test and teach, even if instruction is not one of their primary goals. To quote James Paul Gee, "A video game is just an assessment. All you do is get assessed, every moment, as you try to solve a problem. And if you don't solve it, the game says you fail, try again. And then you solve it, and then you have a boss, which is a test, and you pass the test" (Ellis, 2008). Embedded assessments in video games come in the form of points, badges, power-ups, and an increase in difficulty level. Players must gain the necessary skills before they are allowed to progress to the next level. Immediate feedback allows players to test hypotheses and practice new skills. Even traditional skill-based board games such as *Trivial Pursuit* or *Scrabble* allow for players to easily identify how well they are doing through feedback on answers, pie slices, and points. This type of assessment is pleasant, less-threatening, and offers participants emotional and intellectual rewards even as they learn content and game strategies.

The learning and assessment in games does not happen by accident. Well-designed educational games begin with learning objectives. What content do you want students to learn? What do you want to assess in their learning, and what feedback do you want them to receive? Once you have answered these questions, look for game ideas that can support those educational goals. Shelton and Scoresby (2011) suggest writing learning objectives on the game's storyboard, then physically drawing lines from each part of the game to the learning goal it supports.

In this paper, the authors will discuss how they embed assessment into electronic and traditional games at two Pennsylvania academic libraries to challenge, engage, and motivate students during all parts of the learning process. The

information that results from these games provides meaningful feedback that is invaluable to both librarians and students. Most of these six games involve informal and formative assessment, finding fun ways to prove that students have understood the content and demonstrated a minimum competency. Concrete data is not always collected, but suggestions are provided on ways in which it could be.

Games as Pretests- *Library Jeopardy*! for Great Beginnings

While it is far from novel to use the popular game show *Jeopardy*! as a model for library instruction, it is most often used as a review activity. However, it can also be used as a great icebreaking assessment tool as it is in Indiana University of Pennsylvania's one- and three-credit information literacy courses (Magolis & Neyer, 2011). In these classes, after a general introduction to the course, the students are divided into teams and are asked to compete with each other in *Library Jeopardy*! Questions focus on finding, evaluating, and ethically using information in ways that are relevant to college students' everyday lives.

The game experience engages students, but also demonstrates to them how much they still have to learn. Individually and collectively, they come to realize that their time will be usefully spent during the semester, therefore encouraging them to attend class, pay attention, and actively participate. Furthermore, *Library Jeopardy*! provides the librarian with information concerning how much the students already know and allows him or her to adapt instruction to best address the students' pre-class knowledge level.

Location-based Games for Informal Assessment

Librarians at Lycoming College designed two very different location-based games. Three years ago, they redesigned their freshman library orientation experience around a mystery game (Gregory & Broussard, 2011). Students follow clues throughout the library to collect letters that complete a ransom note and identify the location of the missing Lyco Dog. Additionally, the library designed a game as part of the college's bicentennial celebrations. *The Lyco Map Game* (http://www.lycoming.edu/library/game/lycomap.html) required students to explore their campus in teams and take pictures of currently-existing buildings as well as former buildings around campus. These pictures were then uploaded to a Picasa account (using a QR code) and scored manually.

In each of these two games, a physical orientation of the library or campus was the primary learning objective. Students received feedback when they found what they were looking for. For the faculty, students proved they had found the requested item or location by collecting a clue planted at that location (in the orientation game) or taking and submitting a picture (*Lyco Map Game*). *The Lyco Map Game* had an additional advantage of offering supplementary data through the use of the technology. Each photo was time-stamped, which allowed the librarians to see how long it took for each group to play the game, and identify where students experienced difficulty without detracting from the students' game-playing experience.

Drawing from Popular Television Programs for Formative and Summative Assessment

Often, requiring students to apply their new-found skills is a more effective summative evaluation than a test or quiz. At IUP, librarians have turned to television's *Worst Case Scenario* and *Truth or Consequences* for creative inspiration. In *Library Worst Case Scenario*, students demonstrated their mastery of course content by creating "worst case scenario" situations with the library offering the lifesaving solutions for college students. In *Internet Truth or Consequences* (Drummond, 2011), students first discuss the importance of Web site evaluation and evaluation criteria. Students (either individually or as groups) then draw the name and URL of a either a legitimate or a hoax Web site from a hat, which they must then evaluate. The amount of time given to groups for each of these games varied from ten to thirty minutes before the students had to present their scenario or Web site to the rest of the class. The game element comes from the competition involving audience participation after the presentations. In *Library Worst Case Scenario*, students vote on the best presentation to select a winning group. In *Internet Truth or Consequences*, classmates vote on the reliability of each presented Web page.

As these were used at the end of a course or section, they serve as summative assessment. Through the presentations, students not only demonstrate their knowledge of course content, but their ability to apply it creatively. Additionally, each of these games encourages discussion through use of pop culture, humor, and class participation. Discussion is a very effective form of formative assessment as the instructor is able to learn the general perceptions of the class and provide feedback to students if that perception needs correction. While these games allow for many official winners, all students win because they have the opportunity to publicly demonstrate their knowledge.

Goblins, Plagiarism, and Assessment "Choke Points"

Lycoming College already had a traditional online plagiarism tutorial, but the librarian wanted to make it more interactive. With some Creative Arts Society students providing the inspiration, the idea of a game based on an escape-the-basement genre of online casual games was born (Broussard & Oberlin, 2011). In *Goblin Threat* (http://www.lycoming.edu/library/instruction/tutorials/plagiarismGame.aspx), players find their campus has been invaded by plagiarism goblins. Players must find the hidden goblins, and then clear each room by correctly answering questions about plagiarism. These questions are multiple choice, true/false, or sorting questions. At the end of the game, the goblins' secret entrance is blocked and the campus is saved. This game has become popular for professors to assign as homework at Lycoming College and is linked to by over 70 colleges and high schools from around the English-speaking world.

Goblin Threat demonstrates an evaluation technique called "gating" or "choke points," where players cannot progress until they have demonstrated competency in a particular area. As the topic of plagiarism is very important, the designers made each question a "choke point," but allowed the player infinite chances to attempt each question. While this allows players to guess answers without reading the question, they quickly realize completing the activity as intended can be achieved much more quickly than random guessing. Additionally, this game is simply an interactive tutorial with lots of feedback. When a student answers a question, they immediately find out if they are incorrect with a humorous sound effect and a mini-tutorial to inform their next attempt. Upon submitting the correct answer, they are rewarded with a splat of green blood (complete with coordinating sound effect), and the goblin disappears from the room. Finding each goblin (the non-educational, game-like part of the tutorial) and answering questions correctly (the educational part) each provide the player with positive feedback that encourages a sense of accomplishment. The last page of the game includes applause and a certificate that can be printed for the professor as proof of successful completion.

Conclusion

The 2012 Horizon Report (Johnson et al., 2012) states that educational games are one of the six up-and-coming technologies that will change higher education in the future. That report cites the National Education Technology Plan, which specifically highlights educational games' assessment potential, particularly due to its "immediate performance feedback to players" (p. 18). We have introduced several educational games from two academic libraries that demonstrate creative ways to assess students' learning either during the activity (formative assessment) or at the end of a class (summative assessment).

While most of these assessments are informal and do not provide data that can be taken away, additional activities can be added to provide such data. For libraries that have access to clickers, adding a debriefing activity using clickers can help assess what students learned and how effective the game was. That data can be stored and used for macro-evaluations, allowing for correction of any misconceptions, as well as discussions on how the games' activities translate into real-world information literacy skills. This last aspect is particularly important for games involving a great deal of fantasy where students might not identify the real-world applicability of what they have learned. With adequate programming skills among the game designers, online games can track players' progress and any common problem areas. This was beyond Lycoming College's resources, but some data can still be obtained through Web page statistics using tools like Google Analytics. Additionally, it is easy to link to an online survey at the conclusion of the game that focuses on satisfaction or skills learned. Designers can even withhold the certificate of completion from players until the survey is submitted. These are just some suggestions, though any additional assessment added to a game should be carefully considered as some assessments can detract from the game-playing experience.

Finally, games provide a fun and non-threatening platform for feedback on student performance. Correct answers and demonstrations of competency are met with rewards. Incorrect answers are not punished; rather they are gently treated as learning opportunities. Many of the games discussed offer feedback that serves as tutoring so the player has additional information and tools to be successful for the next attempt.

Educational games for library sessions offer a great deal of creative assessment potential. Just like board and video games that are played for pure enjoyment, library sessions can include non-threatening and even fun evaluation. Games can serve as pretests, showing what students come into the library knowing. They can offer an occasion for students to prove their understanding and apply their newly-obtained skills. They often offer opportunities for feedback and discussion, so students continue to learn during the game and library instructors can add additional information if necessary. Games are inherently interactive and engaging. They not only offer new ways to teach and learn, they also make the often painful job of assessment pleasant for all involved, and allow everyone to be a winner in the learning process.

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