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PERSPECTIVES ON...

Using Games to Make Formative Assessment Fun in the Academic Library

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Assessment is everywhere in higher education. It is no longer acceptable to assume students are learning what is taught in the classroom or the library; administrations and accrediting bodies want to see evidence of learning. In libraries, this often happens in the form of major evaluation projects such as LibQual+®, or locally-created equivalents. More specifically for library instruction, there are standardized assessments such as Project Sails, iSkills, and ILT. These all have an important role to play in assessing student satisfaction and learning, but they are all summative macro-assessments and quite intimidating to librarians and students alike. They often require significant resources in the form of time and money and do not allow for immediate improvements of student learning. More mini-assessments are needed in the library classroom while there is still time to improve instruction. For assistance in this endeavor, librarians can learn from the literature on formative assessment and game-based learning.

This article makes two arguments. The first is for increased awareness of formative assessment among instruction librarians. The second is that educational games have the potential to make good environments for formative assessment. There are solid bodies of literature available on each subject, though little on formative assessment in the library literature. In analyzing the literature on the pedagogical qualities of each, remarkable similarities emerged. This article analyzes these similarities in detail and uses two information literacy games to demonstrate how formative assessment can be embedded in educational library games.

INTRODUCTION TO FORMATIVE ASSESSMENT

In contrast to summative assessments, which happen after the learning is complete and when students can no longer improve their performance, formative assessments are “in-the-process-of-learning

assessments (Baker & Delacruz, 2008, p. 23).” These types of assessments are a “continuous flow of accurate information on student learning (Angelo & Cross, 1993, p. 3),” and happen while learning is still taking place so that instructors can adjust their instruction to best meet the current learning needs of their students. They are informal, discrete, and frequent, as often as every few minutes. Examples of formative assessments include discussion, interpretation of nonverbal cues, pre-tests, summary writing, think-pair-share, and using clickers or hand-signals for class polls. In each of these cases, it is only formative assessment if the instructor uses the feedback to modify instruction (Black & Wiliam, 1998). Formative assessment can also be considered a dynamic conversation between instructors and learners. Just as formative assessment provides the teacher with feedback, students are also given feedback, allowing them to receive an answer to the question “how am I doing?” rather than just “how did I do (Rolfe & McPherson, 1995)?”

Formative assessment is widely accepted as an effective practice and it is heavily emphasized among education practitioners in the primary and secondary levels. Black and Wiliam (1998) conducted an extensive literature review of several hundred articles on formative assessment. They found a large number of quantitative studies where cultivation of formative assessment practices led to significant learning improvement. They concluded that the effect of this policy change was larger than most other educational interventions.

While all educators can benefit from learning about formative assessment, it is perhaps particularly useful to instruction librarians as we usually are restricted to “one shot” sessions with students. This means that our time with students is particularly limited for the content we have to share with them, we usually do not have time to develop relationships with the students, and we do not often see the final research projects. Each of these factors hinders our ability to get feedback on how much of the content they have absorbed. Consciously working formative assessment into our limited time allows students and librarians to exchange meaningful feedback while engaging both at the same time.

Because formative assessment is so prevalent in the education literature and because it has the potential to work well within the confines of the typical library classroom, it is surprising that there is so little information in the library literature about it. The author was able to identify only two articles with titles containing “formative assessment” in library journals. Dunaway and Orbych (2011) used a pretest and mid-instruction assessment in order to adjust their instruction with MBA students. Seely, Fry, and Ruppel (2011) closed an instruction session with pre-service teachers by asking students to list one thing they learned and one thing they still had questions about. The librarians followed up with the students on these reported

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questions outside of the scheduled bibliographic instruction session. This could be considered lower-level “formative assessment” as it was used to correct confusion after the library session rather than while learning was still taking place. In this case, students had to be deprogrammed for any misconceptions they adopted (Angelo & Cross, 1993). Ideally, formative assessment corrects learning within the library session, although this remains difficult when limited to an hour or two with students.

FORMATIVE ASSESSMENT IN EDUCATIONAL GAMES

The 2012 Horizon Report (Johnson, Adams, & Cummins, 2012) lists educational games as one of the up-and-coming technologies that will transform education. Educational games provide a unique opportunity to embed formative assessment into the library classroom in a fun way. By combining educational games with pre- and post-tests, multiple studies show it to be at least as effective as other methods of assessment, and students prefer them over comparative methods (Coleman, Livingston, Fennessey, Edwards, & Kidder, 1973; Delacruz, Chung, & Baker, 2010). A prominent video game scholar argues that “A [commercial] 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).” The formative assessment is what is going on throughout most of the game as students test out new skills, get feedback, adjust strategies, and advance to new levels. The “boss fight” is the summative assessment, the “one that counts.”

A number of articles and prominent scholars in the education and game studies literature analyze how games can be used for assessment. Delacruz et al. (2010) looked at a mathematics game called *Puppetman* to teach units and addition to summer school students. Game performance was significantly related to pre- and post-test scores and the students reported wanting to continue playing the game even outside of the classroom. Schiller (2008) demonstrates how the commercial game *Portal* uses a technique called “gating” (also known as “choke points”) to ensure players do not progress beyond their abilities by chance.

Two articles specifically focus on games for formative assessment. Baker and Delacruz (2008) emphasize the importance of designing games and assessment activities to support learning goals. Assessments can focus on the process, rather than just reaching the goal. Therefore, recording the time it takes to complete each task and number of attempts at each task, not just the end result, are examples of formative assessment. Hudson and Bristow (2006) analyze the use of *Who Wants to Be a Millionaire* in a medical class. After each question was answered by the student in the “hot seat,” the entire class showed what answer they had each chosen and a tutor led a discussion. This game demonstrated two common formative assessment activities, response cards and discussion (Fisher & Frey, 2007), and the authors highlight the need to maintain a safe environment for discussion.

INSTITUTIONAL BACKGROUND AND GAMES

Lycoming College is a small, private liberal arts college of approximately 1400 students. The Snowden Library has a strongly established games program that is well documented in the scholarly literature. This article will focus on two that are directly related to information literacy. The small size of our campus is important to the context in which these games were designed and implemented. They were each designed by one or two librarians with a very small budget that included a book on Flash programming, small prizes for raffles to encourage survey participation, and minimal printing costs.

Secret Agents in the Library was the first structured game, which was designed as a general introduction to library research in four sections of

freshman composition (Broussard, 2010). This was designed to be played in a one-hour class in the library and mixes online activities and resources with a physical exploration of the library. In the game, students work in small groups of rookie agents to catch an intruder who has broken into the “information mainframe” (a. k. a. the library). In the process of catching the spy, they explore reference materials, books, databases, and the MLA citation style. The game is followed by a debriefing activity using clickers. This game was successfully used for several semesters until the professor of a majority of these sections left the college and his successor used a more specific assignment that was not compatible.

In the fall of 2009, we launched an online plagiarism game called *Goblin Threat* (Broussard & Oberlin, 2011). This game was designed to create a positive environment in which students can learn about plagiarism and how to avoid it. In the game, the campus has been taken over by plagiarism goblins. The player must save the campus by clearing each room of its hidden goblins, each goblin asking one question about plagiarism. This entirely-online game was marketed to our faculty as something that could be played as homework, with a printable certificate as proof of completion. The game has been used hundreds of times among our own students. Furthermore, as the material is not institution-specific, over seventy other high school media centers, college libraries, and English departments are linking to it from their own websites. Statistics for page visits are only available from January 2011 to the present, but in that span of time the page has been visited over 54,000 times.

EIGHT SHARED ELEMENTS OF FORMATIVE ASSESSMENT AND GAME-BASED LEARNING

The following section addresses eight remarkable similarities in the literature between formative assessment and game-based learning, and illustrates how these were demonstrated in the three information literacy games at Lycoming College. Most of these elements are in themselves widely considered to be effective qualities in the classroom. Each of these eight qualities interacts closely with each other in complex ways, as illustrated in Fig. 1. The author of this article argues that because there is such an overlap in the major elements of these two methods of instruction, one could conclude that games make good environments for formative assessment, thus allowing assessment to be fun for the instructor and the students.

Active learning

Formative assessment and game-based learning each have an inherent assumption of being incorporated into an active learning environment. Active learning, in its many forms, is so integral to both, that all of the other elements that will be discussed fall within its domain, as shown in Fig. 1. Formative assessment only works with active learning (Black & William, 1998; Shepard, 2005) as formative assessment is a dynamic conversation between teacher and students. It requires students to be testing their understanding, providing feedback to the instructor, and interpreting feedback received from the instructor. In lecture-based learning and most online tutorials, there is no conversation. The information flow is one way, from the teacher or tutorial to the student, until the time of the quiz at which point neither the instruction nor the learning can be modified for improvement. Requiring students to be active participants throughout the learning process has been shown to improve student performance, engagement, and motivation (Cauley & Mcmillan, 2009).

It is important to note that while active learning and formative assessment are so closely intertwined that it is often hard to distinguish between the two, that they are not the same thing. Active learning can and does happen without formative assessment. This happens when the instructor is not looking for evidence of student understanding and providing feedback. Many articles on active learning will admit that the

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