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Building the games students want to play: BiblioBouts final performance review

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Building the Games Students Want to Play: BiblioBouts Final Performance Review

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Final Performance Review: Part 1, Narrative

Building the Games Students Want to Play: The BiblioBouts Project

1. **Cover Sheet:** The cover sheet is this final performance review's title page.
2. **Project Title:** Building the Games Students Want to Play: The BiblioBouts Project
3. **Partners:** Library liaisons at these three institutions assisted in the recruitment of instructors, classes, and student game players, the deployment of BiblioBouts, and its evaluation: (a) Saginaw Valley State University (SVSU), (b) Troy University Montgomery Campus (TUMC), and (c) University of Baltimore (UB). George Mason University was a subcontractor, specifically Zotero technical staff at the Roy Rosenzweig Center for History and New Media.
4. **Brief Overview (150-word limit):**

A University of Michigan (U-M) research team designed, developed, deployed, and evaluated the BiblioBouts information literacy game. BiblioBouts gave students repeated opportunities to develop and practice information literacy skills while they completed a research-and-writing assignment. The evaluation enlisted a multi-methodological approach to data collection. BiblioBouts players were exposed to more online sources than non-players. Players cited more sources in their final-paper bibliographies than non-players. Players felt that they would be *better* at and *more confident* about performing various research tasks than they felt before playing the game. They rated their motivation and perseverance at playing the game at high and very high levels. They cited many game-play benefits such as getting a head start on their research, finding relevant sources from classmates' submissions, becoming a more confident researcher, and being better prepared to write their papers as a result of using the Zotero citation management system.
5. **Project Activities:** The BiblioBouts Project had the following objectives:
 - a. Design and develop a game that teaches students information literacy skills and concepts while they complete their assigned coursework.

Three full design, development, deployment, and evaluation cycles took place during the research project. BiblioBouts is an online tournament made up of a series of bouts, each of which introduces students to a specific subset of information literacy skills within the overall research process. Instructors used the game's administrative interface to schedule the game's starting and ending dates for its three or four bouts, set bouts' caps or quotas, and invite their students to the game. Before instructors deployed BiblioBouts in their classes, the team recommended that they invite librarians to introduce students to the library's database portal, demonstrate one or two relevant databases, and show them how to use Zotero to save citations and full-texts for the sources they find online.

Three BiblioBouts versions were deployed by 32 instructors who invited over 1,700 students enrolled in 56 classes at 20 different colleges and universities in the United States and abroad to play the game. In addition to the U-M, the BiblioBouts Project team

partnered with librarians at three universities, SVSU, TUMC, and UB, to evaluate BiblioBouts.

- b. Evaluate the game to determine its effectiveness for teaching information literacy skills and concepts.

Two important goals drove the BiblioBouts Project team's analysis of evaluation data: (1) improving the game so it had the functionality students wanted and (2) demonstrating the game's benefits so more instructors would incorporate the game into their classes.

The BiblioBouts Project team enlisted a multi-methodological approach to evaluate BiblioBouts. Students completed game diary forms and pre- and post-game questionnaires, and participated in focus group and instant messaging (IM) interviews. Instructors participated in pre- and/or post-game interviews. Student game-play activity was recorded to logs. At the four institutions where the evaluation was conducted (i.e., SVSU, TUMC, UB, and U-M), the BiblioBouts Project team encouraged instructors to submit their classes to the full-fledged evaluation of BiblioBouts. At non-participating institutions, instructors volunteered to participate in pre- and post-game interviews only.

- c. Transform our initial list of premises for the design of information literacy games into a model of best practices for the design, development, and deployment of information literacy games so that institutions that want to pursue game development can streamline their efforts.

As a result of developing, deploying, and evaluating the game, the BiblioBouts Project team developed a best-practice model, grouping practices into several categorized. Examples of categorized best practices are:

- Instructional support: A curriculum guide is an essential component of game deployment especially for academic instructors going it alone minus librarian assistance.
- Game-system functionality: Players want immediate positive and negative feedback from games to improve their performance.
- Administrative functionality: Games must give instructors tools for monitoring student progress including evaluating and grading their game play performances.
- User support: Players, instructors and their proxies, teaching assistants, and librarians expect on-demand user support 24/7/365.

6. Project Audience:

- The BiblioBouts Project team was made up of the principal investigator (Karen Markey) who was responsible for all aspects of the project, three internal project consultants who were U-M faculty with experience in game design (Fritz Swanson), entrepreneurship and software-business management (Victor Rosenberg), and credibility assessment (Soo Young Rieh), project manager who was a U-M graduate student research assistant managing the day-to-day operations of the project (Chris Leeder), system programmer-architect (Gregory R. Peters, Jr.), web designers (Michele Wong and Brian Jennings), scoring expert (Beth St. Jean), and several graduate student assistants who were involved in user-support services, and data collection, coding, and analysis (Andrew Calvetti,

Caitlin Campbell, Meggan Frost, Sarah Lemire, Adrienne Matteson, and Emily Thompson). Over the four-year period of the project, a total of 17 people staffed the BiblioBouts Project team in various capacities.

- The Zotero subcontractor team was made up of the Zotero Director of Research Projects (Sean Takats) and his programming staff who responded to the BiblioBouts Project team's requests for Zotero assistance.
- Library liaisons, one at each of the three participating institutions SVSU (Averill Packard), TUMC (Alyssa Martin), and UB (Catherine Johnson), recruited instructors interested in incorporating BiblioBouts into their classes, trained fellow library staff to answer questions about BiblioBouts and Zotero, visited classes where students played BiblioBouts to brief them on the game, Zotero, library portal, and library databases, and conducted focus group interviews with student game players.
- Instructor-users of BiblioBouts deployed BiblioBouts in their classes. Initially, such users came from the four institutions, SVSU, TUMC, UB, and U-M, where the evaluation was conducted. Eventually, the BiblioBouts Project team invited instructors from colleges and universities in the United States and around the world to adopt BiblioBouts in their classes. Examples of colleges and universities where instructors deployed BiblioBouts are Baruch College (City University of New York), Hunter College, Portland State University, University of Adelaide, University of Toronto, and Youngstown State University.
- Instructor-testers of BiblioBouts tested the game to determine whether it would achieve their course objectives. Examples of colleges and universities where instructors tested BiblioBouts are Bob Jones University, Curtin University, Redlands University, Simon Fraser University, Spaulding University, and University of Louisville.
- BiblioBouts players were 1,704 undergraduate students whose instructors invited them to play BiblioBouts.
- Anyone interested in BiblioBouts was welcome to play the demo BiblioBouts game. Some demo game users later registered for a BiblioBouts account and created games for their classes, and others played the demo game only. We estimated the number of the latter to be 434 users.

7.a.i. Significant Project Achievements:

- An operational BiblioBouts game

BiblioBouts has a fully functional administrative interface that instructors use to administer BiblioBouts for their classes. It also has a fully functional game interface that puts professional research tools into players' hands and ushers them through the research process where they and their classmates work together to find, evaluate, and select high-quality information for their papers. At the end of a BiblioBouts game, players can search the BiblioBouts post-game library bearing full-texts of all sources they and their fellow students contributed to the game and the trail of everyone's credibility assessments to choose the very best sources for their research papers.

- Deployment of the operational BiblioBouts game

From fall 2009 through April 2010, the alpha version of BiblioBouts was available to instructors and their classes at four participating institutions (i.e., SVSU, TUMC, UB, and U-M). From January 2011 through December 2012, the BiblioBouts Project team made beta versions of BiblioBouts available to instructors at colleges and universities anywhere in the world. At the BiblioBouts game web site, a demo version was available so that instructors interested in deploying BiblioBouts in their classes could familiarize themselves with game play. Between fall 2009 and December 2012, three BiblioBouts versions were deployed by instructors in 56 classes at 20 different colleges and universities in the United States and abroad who invited a total of 1,704 students to their BiblioBouts games.

- Successful evaluation of the operational BiblioBouts game

Selected classes at SVSU, TUMC, UB, and U-M participated in the evaluation of the operational BiblioBouts game. Two important goals drove the BiblioBouts Project team's analysis of evaluation data: (1) improving the game so it had the functionality students wanted and (2) demonstrating the game's benefits so more instructors would incorporate the BiblioBouts game into their classes and enlist gaming generally into their classes for teaching their students about information literacy and academic subjects.

The BiblioBouts Project team enlisted a multi-methodological approach to evaluate BiblioBouts at the four participating institutions. The full-fledged evaluation of BiblioBouts involved students who volunteered to complete game diary forms during game play, complete pre- and post-game questionnaires, participate in focus interviews one to two weeks after the game ended, or participate in follow-up IM interviews several months after playing the game; it included instructors who volunteered to participate in pre- and/or post-game interviews. Student game-play activity was recorded to logs. At non-participating institutions, instructors volunteered to participate in pre- and post-game interviews only.

- The benefits of playing BiblioBouts

The evaluation of BiblioBouts demonstrated that players were exposed to more online sources than non-players, and players cited more sources in their final-paper bibliographies than non-players. BiblioBouts players felt that they would be *better* at and *more confident* about performing various research tasks than they felt before playing the game. They rated their motivation and perseverance for playing the game at high and very high levels. They cited many game-play benefits such as getting a head start on their research, finding relevant sources from classmates' submissions, becoming a more confident researcher, and being better prepared to write their papers as a result of their experiences using the Zotero citation management system. This player's comment sums up BiblioBouts' benefits, "I think [the game] is good because you're not realizing at the time that you're learning about research. Like, you might not want to think, 'Oh, I want to go learn about library research today.' You're playing the game and you're learning about it without doing that."

- 7.a.ii. Significant Unanticipated Events or Circumstances (that created delays or obstacles to project success including lessons learned):

The BiblioBouts Project team identified three such events or circumstances.

- I. Difficulties enlisting Zotero to build the BiblioBouts database of closed sources, specifically citations, abstracts, and full-texts, and passing source data from Zotero to BiblioBouts.

The connection between Zotero and BiblioBouts was problematic for many reasons, and as a result, the sources that players saved to Zotero were not always dispatched to BiblioBouts or dispatched in a timely manner. The BiblioBouts Project team worked with Zotero subcontractor programmers to solve technical problems and simplify the BiblioBouts' registration process. Despite their efforts, technical problems continued to disrupt game play, and BiblioBouts team members handled these problems on a one-on-one basis. Especially during the evaluation, the BiblioBouts Project team had to divert resources to user support. As a result, data analysis, report writing, instructor recruitment, and publication of project findings took a backseat to user support.

In terms of lessons learned, several best practices address what we learned including these two: (1) if the game begins with technology problems, it is doomed especially in the court of public opinion and (2) establish user forums where new users can get support from experienced users so that game developers do not have to assume 100% of the user-support burden.

- II. Expecting instructors to be involved in game play is not a given.

Instructors may be positive about incorporating the game into their classes but that does not mean their full attention is focused on game play. In fact, we could represent our experience with instructors' involvement in an on-going game as a continuum from total immersion in every aspect of the game to total uninvolvedness in every aspect of the game except for grading student performance at the end of the game. BiblioBouts' alpha version required instructor involvement at several critical points. When an instructor's response was delayed, game play was adversely affected. As a result of our experience, we redesigned the beta versions of BiblioBouts so that they would not require instructors' involvement during game play.

In terms of lessons learned, several best practices address what we learned including this one: Design games that require no intervention or input from instructors during game play.

- III. Designing information literacy games must include administrative interfaces so that instructors can create games, edit parameters of on-going games, and evaluate students' game-play performance.

Our initial game-design activities paid no attention to administrative interfaces. Upon finalizing the game interface, we realized that we needed an administrative interface to enable game administrators to create games and edit existing game parameters. While designing the administrative interface, we realized logged game-play data would be useful to game administrators so they could monitor their students' game play. Instructors who immersed themselves in game play advised us on needed administrative interface functionality especially tools for evaluating and grading player performance. In terms of lessons learned, several best practices address what we learned including this one: Games

must give instructors tools for monitoring student progress including evaluating and grading students' game play.

7b. Because the BiblioBouts Project Identified Learning of Any Kind as an Intended Result, Describe the Outcomes of the Project:

- Outcome #1: Playing BiblioBouts exposes players to many more online sources than they would have encountered on their own.

On three separate game-play occasions, BiblioBouts players encountered online sources: (1) finding and submitting their own sources to BiblioBouts, (2) evaluating fellow players' sources in the game's evaluation bout, and (3) choosing sources for their best bibliography from the BiblioBouts database of all players' sources. After the game ended, players could search the game's post-game library bearing the sources that all players submitted to the game including everyone's evaluations of them. Had students not played BiblioBouts, the only sources they encountered would have been the ones they found on their own to write their papers. As a result of playing BiblioBouts, players' final-paper bibliographies cited more sources than non-players' final-paper bibliographies. In focused-group interviews, students praised game play because it introduced them to more sources and to better sources than they would have found on their own. Here are players' comments about this.

“I liked the idea of holding the sources together. Everyone had to submit a certain amount of sources and we all Rated & Tagged ‘em. I think that would be in a class that would be really useful because of course everyone wouldn't have all of the exact same sources but if you Rated & Tagged all of your sources and you pulled them together and everyone could choose and pick and choose from those different sources, it would make for stronger papers and stronger assignments in school in general.”

“It was just nice to have a stockpile of sources you can look through. I know of the five that I initially chose, I think maybe I selected one ... or two in my bibliography. But it was just nice having a bunch of other ones that you're like, ‘Oh, I didn't see this. This is interesting and this actually suits my topic really well.’ And so I think like just having additional perspectives of sources ... are always nice.”

- Outcome #2: BiblioBouts players learn what questions to ask themselves about sources to assess their credibility.

When students played BiblioBouts, they answered three questions about a source to assess its credibility. To meet the game's evaluation quota that averaged about 20 sources, players repeated the credibility-assessment process over and over again, making credibility assessment criteria salient in their minds so that the next time they searched for sources, they knew what to ask themselves about sources to assess their credibility. These BiblioBouts players expressed this in their own words.

“I also think the practice of ... credible versus not credible. We can take and use those ideas obviously in anything else that we do for any other paper ... and use those techniques.”

“I obviously picked sources that I thought had value but until I was actually shown or asked how credible is this, how trustworthy is this, I didn’t realize what it is that gives something value and what it is I should be looking for so I thought that was really helpful.”

- Outcome #3: BiblioBouts players cite evidence to support their credibility ratings.

Seldom did players rely entirely on their intuition or project their own ideas about credibility into their assessments. When giving reasons for their credibility ratings, the vast majority (85% or more) of players’ credibility assessments cited evidence in support of their credibility ratings. Cited evidence pertained to (1) authorship, for example, author credentials, reputation, author affiliations with named or unnamed organizations, sponsors, publishers, (2) subject content, (3) non-content characteristics of sources such as their currency, length, detail, format/genre, or cited sources, (4) the recommendation of a person or organization, (5) personal experience with the author, organization, sponsor, publisher, etc., and (6) the topic, assignment, or project they were working on. In focused-group interviews, players remarked about this.

“[BiblioBouts] showed me what people think like sources are credible. Because it’s not just what sources are credible. It’s what people think. So because we were voting on it, it was just the peers. So it’s kind of like interesting to see what people think is a trustworthy source and what aren’t. Because there are actually a decent amount of like New York Times [articles] that ... [people rated] in 80s and 90s that were high, which is not like a scholarly journal but it’s a highly respected like newspaper. And then obviously the journals like from the U of M website were really high up there, too, and like the ACL database and stuff like that. So it was interesting just to see how those lined up with like credibility ratings and stuff like that.”

- Outcome #4: BiblioBouts players cited evidence to support their relevance ratings.

Seldom did players rely entirely on their intuition or project their own ideas about relevance into their assessments. When giving reasons for their relevance ratings, the vast majority (90%) of players’ credibility assessments cited evidence in support of their credibility ratings. The same categories that described the evidence they cited for their credibility assessments applied to their relevance assessments; however, whereas authorship was most popular for credibility assessments, content and topic were most popular for relevance assessments.

- Outcome #5: Players learned a structured research process as a result of playing BiblioBouts.

Playing BiblioBouts introduced players to a systematic process for searching for information, assessing the information they and others found, and choosing the best information for writing their papers. In follow-up IM interviews that were conducted several months after game play ended, players did not need prompts from interviewers to describe BiblioBouts’ structured research process. Also in support of this outcome is this focus group interviewee’s observation.

“I really think that step-by-step process helped me a lot. At the very least, having the deadlines there to keep you going through it helps a lot. And I think it keeps you organized, too, maybe in a way that I hadn’t always been. Like maybe in the past I would just go to Google and open up just a ton of tabs and have everything just there and not organized but this really helped me find better sources that were more relevant and focus in on those rather than just a smattering of from all over.”

- Outcome #6: Playing BiblioBouts gave students valuable experience using professional resource discovery tools that they vowed to use in the future.

Game play introduced players to the library’s database portal, relevant library databases, and the Zotero citation management system. They recognized these tools’ usefulness for conducting library research and stated their intention to use them in the future. Here’s what they had to say in this regard.

“I mean I just think that like usually I use Google just, you know, and like comparing the results I would get from Google to these databases is a huge difference and like I really realize that now, that the material that I was getting was not that reliable and not that scholarly and to be writing research papers and stuff I need to be using like databases and stuff like that.”

“I do a lot of research so ... I am most familiar with PubMed ... And what I do is I just download the PDF and just put it all in one folder and it’s just a mess. And so I feel like especially with Zotero, like it would definitely help me just organize articles and topics and like scientific journals and just kind of better organization so I can look at ‘em more efficiently.”

- Outcome #7: Playing BiblioBouts made students feel that they would be *better* at and *more confident* about performing various research tasks than they felt before playing the game, and, as a result of playing BiblioBouts, that these tasks would present *less of a challenge* to them in the future.

Before and after playing BiblioBouts, players completed pre- and post-game questionnaires that asked them to rate *how well* they thought they would be able to perform various library-research tasks, *how confident* they would be performing them, and how challenging these tasks would be in the future. On average, post-questionnaire ratings increased between two-thirds and three-quarters of a point for the “how well” and “confidence” questions, respectively, and decreased about one-half of a point for the “challenging” question.

- Outcome #8: BiblioBouts enabled both players and instructors to experience library research as a collaborative process instead of a solitary activity.

When students and instructors played BiblioBouts, the library research process was no longer a black box. BiblioBouts transformed library research from a solitary activity to a collaborative process. Everyone in the class knew what sources had been found, how others rated sources and the reasons for their ratings, and what sources were the best ones for writing a paper on a broad-based topic. Here are comments from a BiblioBouts player and instructor about this.

“I think ... this is an interesting experience just because I don’t think there will ever be another time in my life that I can go up to—like when writing a paper and

being like, ‘Hey, can I see your sources because I want to see if they’re good and like if they line up with mine?’”

“Collaborative. I liked that about [BiblioBouts] and my students liked that as well. Getting to see what other people were coming up with ‘cuz people are very curious about, ‘Well, what are you doing?’ I mean talking about it can be really tedious and can put people to sleep but if you can see it on your own through BiblioBouts when it’s kind of like a little window into, ‘What is this person writing about?’ It is kind of cool ... voyeuristic [too] because students got a chance to see what other people were doing. Because they can see the results. You can see who’s commenting and how and why.”

- Outcome #9: Players were more fluid and thoughtful about their research topics, adjusting them not only based on the sources they found on their own but based on their fellow players’ sources and evaluations.

Because BiblioBouts rewarded players for game-play decisions that involved scholarly sources, we expected players to cite mostly scholarly sources in their final papers. In one class in particular, our analysis of the sources they cited in their final papers did not confirm this hypothesis. Not only did non-scholarly sources dominate players’ final-paper bibliographies but the vast majority of their cited sources did not come from the BiblioBouts post-game library. When we asked players why their final papers went in different directions from BiblioBouts sources, they told us how exposure to so many sources and source evaluations made them more deliberate and circumspect about their paper’s topic. They were no longer content with their initial ideas. This player’s comment confirms our assessment in this regard.

“I read articles that I didn’t even think—like I got ideas I didn’t even think of and it changed the direction of my paper ... There were things that were included in this like that were uploaded that I had looked at and I was like, ‘I never even thought of that.’ And it made me want to change my paper a lot because I was focused on one thing and [having all these sources] brought it into a more interesting and different direction.”

Instructors did not discourage players from topic shifts interpreting them as indications of students’ increased involvement in the research process. Here are comments from instructors at non-participating institutions.

“A lot of [students] found it was very useful to have references that they all pooled together and found and rated and that was good. But ... the students ... said, ‘Initially I started with an idea of what I wanted to write on this theme. But after all this reading and so on, my ideas have formed in slightly different ways from what I had initially thought of and that was too simple. So can I not use any of those [BiblioBouts] sources because I have formed my idea about what I want and I need to look for other sources? I might use one [BiblioBouts source] but I want to use something else as well,’ [and so] I let them do that.”

“[Students] have taken much more seriously the idea of really exploring and thinking about what their sources are saying about the topic and many more of them seem to be rethinking their own ideas about the topics based on their

research. And so they seem much more involved in the research process ... The game and I had them write summaries of some of their sources and things, all of that kept pushing them to actually look more closely at the sources and not do a kind of skimming and scanning and, ‘Where is the quote that I can pull?’”

- Outcome #10: Players’ final papers improved as a result of playing BiblioBouts.

Instructors acknowledged the game’s impact on final papers. In a post-game interview, this instructor at a non-participating institution described BiblioBouts’ positive impact on her students’ research and writing.

“[Playing BB] made a lot of students read a lot of papers. So as a result of the reading, I think this game made them want to read because in bout two they had to actually read and rate and so on, it actually got them reading. And because of that huge volume of reading, it sort of consolidated all my efforts earlier in building the vocabulary and teaching them structures, etc., because they then could put it into place in this very demanding assignment. And so of course the assignments, the essays came out really much, much, much better than I have ever seen them with this group of students ... I mean [with] this quality of writing in their disciplines, pros wouldn’t be pulling their hairs in frustration or TAs would have no problems reading what they are trying to say. So the quality of their thinking has gone up, which is why I am very excited about using this game and wanting to get my colleagues to be using this approach in the different courses.”

- Outcome #11: Players who liked competition thrived on the competitive aspect of BiblioBouts.

Students acknowledged that playing a game motivated them because it was an open competition with their fellow students.

“I think the game is an effective way [to learn], especially if it’s with others because a lot of people are competitive ... and I think if others are involved, like with each other trying to reach the same goal, like it’s able to like motivate you more to do what you need to do and so I think a game is a good way to learn.”

7c. Project Impact:

Two research findings are *impacts*, that is, large-scale and/or long-term results that affect one or more institutions, communities, or fields.

- Library research should be a collaborative, not a solitary activity.

BiblioBouts has given the field its first glimpse of library research as a collaborative process instead of a solitary activity. Everyone in the class knew what sources had been found, how others rated sources and the reasons for their ratings, and what sources students considered for their papers. Rarely did students cite the sources they originally submitted to BiblioBouts in their final papers. Instead their paper topics shifted based upon exposure to many sources than they would have found on their own, and they continued searching for information to support their shifted topics. Citation managers such as Zotero and RefWorks already allow working groups to share saved sources. They could be enhanced with evaluation capabilities similar to BiblioBouts. Then working group members could collaborate on bibliography building, rating sources, making

comments that explain their ratings, and rewarding useful comments with “like” comments. Groups could work together in search of the best sources for college assignments. Such functionality would also be welcomed by graduate students and research faculty who could stage informal competitions, rewarding players who find the best sources while ensuring the comprehensiveness of their project’s literature review.

- Online games are effective tools college students can use to develop and master information literacy skills.

The BiblioBouts Project yielded data and analyses that demonstrated the effectiveness of online games as tools college students can use to develop and master information literacy skills. This report’s outcomes are confirmation of the game’s effectiveness. Forthcoming publications will disseminate the BiblioBouts Project team’s experience designing and developing the game in the form of best practices so that future developers benefit from our experience. IMLS will be acknowledged in these future publications.

8. **Next Steps:** Project investigators are taking these next steps: (1) publishing a book about how to design, develop, deploy, and evaluate online information literacy games that enlists the BiblioBouts game as a case study to show what went right and what went wrong with an actual online information literacy game implementation, (2) proposing to the National Science Foundation follow-up research to instruct and promote web search and evaluation skills for high school students, and (3) seeking a permanent home for BiblioBouts.
9. **Grant Products:** Attached are copies of published journal articles about the BiblioBouts Project. [Note: Copies are not attached to the review that is deposited in the U-M’s Deep Blue institutional repository. Please check your library, order copies from interlibrary loan, or contact this review’s first-listed author.]
 - a. “Playing games to improve the quality of the sources students cite in their papers,” by Karen Markey and 2 others. *Reference and User Services Quarterly* 52, 2 (2012): 123–135.
 - b. “Through a game darkly: student experiences with the technology of the library research process,” by Markey, Karen and 2 others. *Library Hi Tech* 30, 1 (2012): 12–34. (Special 30th anniversary issue of *Library Hi Tech*)
 - c. “Developing a faceted taxonomy for rating student bibliographies,” by Chris Leeder and 2 others. *College & Research Libraries* 73, 2 (2012): 115–133
 - d. “Students’ behaviour playing an online information literacy game,” by Karen Markey and 1 other. *Journal of Information Literacy* 5, 2 (2011): 46–65.
 - e. “BiblioBouts: What’s in the Game?” by Karen Markey and 2 others. *College & Research Library News* 72, 11 (December 2011): 632–645.
 - f. [“The Benefits of Integrating an Information Literacy Skills Game into Academic Coursework: A Preliminary Evaluation,”](#) by Karen Markey and 12 others." 2010. *D-Lib Magazine* 16, 7/8 (July-August 2010).
 - g. “Will undergraduate students play games to learn how to conduct library research?,” by Karen Markey and 7 others. 2009. *Journal of Academic Librarianship* 35, 4: 303–313.

Final Performance Review: Part 2, Quantitative Information

Building the Games Students Want to Play: The BiblioBouts Project

Institution Name: University of Michigan

Grant #: LG-06-08-0076-08

A. SITE-SPECIFIC PROJECT ACTIVITY:

1. _____ Total # of collection items conserved, relocated to protective storage, rehoused, or for which other preservation-appropriate physical action was taken.
2. _____ Total # of collection items digitized, scanned, reformatted, or for which other electronic or digital preservation action was taken.
3. _____ Total # of collection items with new or enhanced accessibility (include items that were cataloged or for which finding aids or other records were created or computerized) [includes _____ items made accessible to users other than grantee staff for the first time, _____ items with new or enhanced access for staff only].
4. 2,138 Total # of lectures, symposia, demonstrations, exhibits, readings, performances, concerts, broadcasts, Webcasts, workshops, multi-media packages, or other learning opportunities provided for the public (do not include PSAs or other promotional activities) [includes _____ out-of-school or after-school programs, _____ exhibits].
5. 1 Total # of tools created, improved, or produced for searching, information management, or information analysis by users other than or in addition to grantee staff.
6. 67 Total # of conferences, programs, workshops, training sessions, institutes, classes, courses, or other structured educational events provided.
7. 6 Total # of internships, apprenticeships, mentoring opportunities, or other extended educational opportunities provided.
8. 0 Total # of degrees/certificates earned as a result of the grant [includes _____ Master's, _____ Ph.D. degrees, _____ other (specify): 1 significant progress toward Ph.D.].
9. 3 Total # technology upgrades or improvements (specify): There were 3 versions of the BiblioBouts game: alpha version, beta 1.0 version, and beta 2.0 version.

10. If your grant engaged in other activities not covered by the categories above, please briefly identify and quantify them here. Attach another sheet if necessary.

B. PORTABLE PRODUCTS (relating to the activity named in section A)

11. 12 Total # of research reports, papers, books, reprints, or other publications generated.

12. 2 Total # of Web sites developed or improved [include URLs/addresses]:

BiblioBouts research web site: bibliobouts.si.umich.edu

BiblioBouts game web site: bibliobouts.org

13. 1 Total # of learning resources produced [includes _____ oral histories, _____ curriculum resources, _____ curriculums, 1 (one) Web-based learning tools, or _____ other (specify): _____].

14. _____ Total # of key management documents created [includes _____ emergency plans, _____ conservation surveys, _____ strategic plans, _____ other (specify): _____].

15. If your grant created one or more quantifiable products not covered by the categories above, please briefly identify and quantify them here. Attach another sheet if necessary.

C. PARTICIPANTS/VISITORS/USERS/AUDIENCE (relating to the activity named in section A)

16. _____ Total # of **community organization partners** [includes _____ informal partners, _____ formal partners].

17. _____ Total # of **schools** (pre-K through grade 12) that used services provided by your grant (include only schools that actively participated, not those to which material was simply distributed or made available) [includes _____ students participating in field trips].

18. _____ Total # of **teachers** supported, trained, or otherwise provided with resources to strengthen classroom teaching or learning.

19. _____ Total # of **pre-K through grade-12 students** served [includes ____ youth 9-19 who used, participated, visited, or otherwise interacted with activities, experiences, resources, or products offered by your grant].
20. _____ Total # of **viewers and listeners** for radio, television, and cable broadcasts (for series, include total actual audience for all broadcasts; do not include audience for PSAs or other promotional activities or Webcasts; do not report potential audience).
21. 2,138 Total # of **users of Web-based resources** provided by your grant (include all individuals the project served). Choose the measure that best represents your use rate (choose only one): ____ visits (hits), ____ unique visitors, 2,138 registered users, ____ other measure (specify):
_____.
22. 2,266 Total # of **individuals** benefiting from your grant (include all those from questions 18-21 plus others the project served, including staff or others in your field). Only include those who actually participated or used your project services in some way.
23. This number includes: 111 **professionals**, 2,138 **non-professionals or pre-professionals**, _____ **docents or interpreters**, _____ **volunteers**, 17 **staff** that received services provided by your grant.

24. If your grant served one or more quantifiable audiences not covered by the categories above, please briefly identify and quantify them here. Attach another sheet if necessary.

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Any views, findings, conclusions or recommendations
expressed in this review do not necessarily represent those
of the Institute of Museum and Library Services.