Building the Games Students Want to Play: BiblioBouts Project Interim Report #4

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Abstract

The University of Michigan's School of Information and its partner, the Center for History and New Media at George Mason University, are undertaking the 3-year BiblioBouts Project (October 1, 2008 to September 30, 2011) to support the design, development, testing, and evaluation of the web-based BiblioBouts game to teach incoming undergraduate students information literacy skills and concepts. This fourth interim report describes the BiblioBouts Project team's 5-month progress achieving the project's 4 objectives: designing, developing, deploying, and evaluating the BiblioBouts game and recommending best practices for future information literacy games. This latest 5-month period was marked by extensive progress in the analysis of evaluation data from the testing of the alpha version of BiblioBouts and putting to work what was learned from this analysis in the design and development of the beta version of BiblioBouts. Major tasks that will occupy the team for the next 7 months are completing the development of beta BiblioBouts, pretesting BiblioBouts, testing BiblioBouts in classes at the five participating institutions, and evaluating test administrations. For general information about game design, pedagogical goals, scoring, game play, project participants, and playing BiblioBouts in your course, consult the BiblioBouts Project web site.

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Project Objectives

The BiblioBouts Project has the following four objectives:

1. Design and develop a game that teaches students information literacy skills and concepts while they do their assigned coursework.

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

3. Expand our list of premises for the design of information literacy games to give direction to future designers.

4. Develop 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.

During the last 5 months of the project (May 2010 to September 2010), the BiblioBouts Project team has been hard at work on the second iteration of objective #1, game design and development, and made considerable progress on the first iteration of objective #2, game evaluation. In the evaluation, the team has been attentive to findings and analyses that have the potential to become premises for game design (objective #3). To develop a model of best practices (objective #4), the team can draw on its experience with game design, development, and deployment.

Project Design

Table 1 enumerates the 12 design steps of the BiblioBouts Project. It includes the people responsible for and the original and actual dates of the work effort. To date, the BiblioBouts Project team has made progress on and/or is making plans for design steps 1–7. These 7 steps are the organizing principle for this fourth interim report.

Table 1. 12 Design Steps of the BiblioBouts Project

Step	Original date	Actual date	Responsibility
1. Design and develop BiblioBouts I	fall 2008, winter, & spring 2009	fall 2008, winter spring, & summer 2009	Project team
2. Learn about the research needs of incoming students	fall 2008	summer 2009	Principal Investigator (PI), Co-PIs, student assistants; instructors at participating institutions
3. Conduct baseline study #1	summer 2008	fall 2009	PI, Co-PIs, student assistants

Step	Original date	Actual date	Responsibility
4. Test BiblioBouts I	summer 2009 & winter 2010	fall 2009 & winter 2010	Project team; project liaisons, students, and instructors at participating institutions
5. Evaluate game play I	fall 2009 & winter 2010	fall 2009 & winter 2010	PI, Co-PIs, student assistants, instructors and students at participating institutions
6. Analyze evaluation data and report findings I	spring & summer 2010	winter, spring, & summer 2010	PI, Co-PIs, student assistants
7. Design and develop BiblioBouts II	winter 2010, spring, & summer 2010	2010	Project team
8. Conduct baseline study #2	fall 2010	fall 2010 & winter 2011	PI, Co-PIs, student assistants, project liaisons at participating institutions
9. Test BiblioBouts II	summer & fall 2010	winter & spring 2011	Project team; project liaisons, students, and instructors at participating institutions
10. Evaluate game play II	summer & fall 2010	winter & spring 2011	PI, Co-PIs, student assistants; project liaisons, students and instructors at participating institutions
11. Analyze evaluation data and report findings II	winter, spring, & summer 2011	spring & summer 2011	PI, Co-PIs, student assistants
12. Support widespread distribution and adoption of BiblioBouts	winter, summer, & fall 2011	spring & summer 2011	Project team

Step 1. Design and Develop BiblioBouts I

(The BiblioBouts Project team finished this step in fall 2009. See Interim Report #3 for a full discussion.)

Step 2: Learn About the Research Needs of Incoming Students

(The BiblioBouts Project team finished this step in summer 2009. See Interim Report #2 for a full discussion.)

Step 3. Conduct Baseline Study #1

In fall 2009, students in SI 110 volunteered to play BiblioBouts for extra credit. The result was that the class was divided between students who played and did not play the game, and thus, comparing the citations from papers written by student game players and non-players was possible. BiblioBouts team members collected student papers and extracted citations from them.

Team members conducted a literature review in search of criteria that previous researchers used to rate students' bibliographic citations. This review revealed that most criteria described characteristics of print-based publications, and thus, did not aid in the

evaluation of our two sets of student papers, which contained citations for predominantly online materials. The BiblioBouts Project team developed the Five-Faceted Taxonomy for Classifying Citations to Digital Information. The Taxonomy features these facets: (1) information format, (2) literary content, (3) author identity, (4) editorial process, and (5) publication purpose. Each facet is divided into about 6 to 24 categories. A panel of judges who were the three instructors whose classes played BiblioBouts assisted us to assign categories a score from 1 (low) to 4 (high) that ranks citations with respect to the extent to which they are likely to be vetted by an objective review and/or editorial process.

Team members randomly chose 30 bibliographies from the entire pool of the SI 110 class, with 15 chosen from students who played BiblioBouts (treatment group) and 15 from students who did not play (control group). They extracted bibliographies from the papers and assigned anonymous codenames. Two master's degree students in the School of Information served as the independent coders. They coded three sample student bibliographies, checking each URL to verify the source and code it. Differences of judgment were discussed and resolved, and agreement was reached on how the sample sources were to be coded. They then applied the taxonomy to the remaining 27 bibliographies. Study findings have been described in a manuscript that team members are sending to a peer-reviewed journal for review and publication. The research questions that the manuscript addresses are:

1. How does one operationalize "quality" of student bibliographies?
2. Can a standardized assessment tool be developed that is flexible enough to encompass the variety of online sources cited by today's students?
3. Does playing the BiblioBouts game improve the quality of student bibliographies?

Step 4. Test BiblioBouts I

(The BiblioBouts Project team finished this step in spring 2010. See Interim Report #3 for a full discussion.) Here is a brief summary to provide context for the steps that follow. Students at 4 of the 5 institutions participating in the BiblioBouts Project have played the game. Students played 3 games in fall 2009 and 7 in winter 2010. At Troy University, 2 sections of ENG 2205 played one game, and 3 sections of ENG 1102 played one game. Thus, a total of 13 classes at 4 different institutions played the alpha version of BiblioBouts.

Step 5: Evaluate Game Play I

When game play ended in spring 2010, the BiblioBouts Project team began its analysis of data resulting from the data-collection tools and methods enumerated in Table 2.

Table 2. Data-collection Tools and Methods

Tool or Method	Description	Notes
Pre-game questionnaire	Completed by *students* prior to game play, this web-administered questionnaire asked students to rate their perceptions about their ability to perform library research and their expectations about playing the game.	Only SI 110 and EDU 222 classes were large enough for the project team to conduct a statistical analysis of pre- and post-questionnaire responses.
Game diary forms	On this web-administered form, *students* told	We limited diary-form

Tool or Method	Description	Notes
	us what BiblioBouts mini-games they played, what went right, and what went wrong.	administration to fall 2009 game play because the repetitive and similar nature of their responses was not likely to yield new information in winter 2010.
Post-game questionnaire	Completed by *students* after game play, this web-administered questionnaire asked students about their perceptions of their ability to perform library research, their experiences playing particular mini-games, and their suggestions for improving BiblioBouts.	Only SI 110 and EDU 222 classes were large enough for the project team to conduct a statistical analysis of pre- and post-game questionnaire responses.
Post-game focus group interviews	Interviewers asked *students* about their motivation for playing BiblioBouts, what they learned from game play, improvements to BiblioBouts, and whether they want to learn about library research and academic topics generally by playing games.	Librarians at participating institutions and project team members at the U-M conducted a total of 13 focus group interviews.
Follow-up personal interviews	Interviewers queried *students* to determine to what extent their information searching behaviors changed as a result of the game.	Project team members conducted 6 interviews via instant messaging chat with student game players at the U-M.
Pre- and post-game personal interviews	Interviews yielded comparative information about *faculty* expectations before and after game play, what students learned, and whether a game was an effective approach to learning how to conduct library research.	Project team members conducted a total of 14 personal interviews.
Game logs	Logs enabled us to chart the game-play performance of individual *students*, to identify typical game-play patterns, and to rank closed donations using the ratings, tags, and number of *students* choosing them for their Best Bibliographies.	The project team analyzed logs from SI 110 and EDU 222 classes because these classes were large and yielded sufficient data to see trends and draw conclusions about game play generally.

Step 6: Analyze Evaluation Data & Report Findings I

Project team members used data from the fall 2009 testing of the alpha version of BiblioBouts to publish two papers:

- The Benefits of Integrating an Information Literacy Skills Game into Academic Coursework: A Preliminary Evaluation. *D-Lib Magazine* 16, 7/8.

- BiblioBouts: Online Social Gaming for Academic Research Skills Development. In: *Bridging and beyond: Developing librarian infrastructure: 38th annual LOEX library instruction conference proceedings*, Dearborn, Mich., April 29–May 1, 2010, edited by Brad Sietz et al. Ypsilanti, Mich.: LOEX Press, in press.

Having spent summer 2010 analyzing data, the BiblioBouts Project team is poised to write more papers based on the evaluation of data from the winter 2010 testing of the game.

Because instructors could not mandate their students to complete the questionnaires, we only have enough completed questionnaires from the largest classes, SI 110 and EDU 222, to conduct full-fledged before-and-after statistical analyses to determine whether playing BiblioBouts had an effect on students with respect to their perceptions about conducting certain library research tasks. Post-game questionnaires and diary forms have been useful sources of information about students' problems playing the game and their suggestions for improvements. Focus group interview accounts are much richer because they provide detail, explanation, and clarification that is not possible through questionnaires or diaries. Additionally, the personal interviews with instructors have yielded interesting insights about student experiences because instructors could draw on their knowledge of the class that played the game versus previous classes and reflect on the overall impact of the game on student learning, attitudes, and preferences.

A content analysis of open-ended answers on post-game questionnaires, problem reports on diary forms, and focus group interviews resulted in comments falling into 5 or 6 major categories for students and instructors respectively. Table 3 lists categories, subcategories, and whether they occurred in the analysis of interviews with students and/or instructors. Overlap was not expected because data-collection instruments queried students and instructors about different aspects of the game and the course context into which BiblioBouts was integrated. It remains for the BiblioBouts Project team to synthesize what was learned in the analysis and formalize it in published papers.

Table 3. Content Analysis Categories and Subcategories

Category or Subcategory	Student data	Instructor data
Before game play		
Initial set up	X	X
Adequacy of our preparation for game play	X	X
Using Zotero	X	X
Librarian visit and assistance	X	X
Broad-topic selection	X	
Non-players		X
Students' completion of pre- and post-game questionnaires		X
Playing BiblioBouts Generally		
Playing	X	X
Problems	X	X
Improvements	X	X
Technical reading of full texts	X	
Scoring and incentives for playing games	X	
BiblioBouts' limitations	X	
Affective responses	X	X
Reasons for not playing	X	
The right audience(s) for BiblioBouts	X	X
Instructor's experience playing BiblioBouts		X

Category or Subcategory	Student data	Instructor data
Playing the [Donor, Closer, Rating & Tagging, Sorter, Best Bibliography] bout		
Playing	X	X
Problems	X	X
Improvements	X	X
What do students learn as a result of playing BiblioBouts?		
What do students learn?	X	X
What do they learn that they would use in the future?	X	X
Negative learning experiences	X	X
Previous information literacy skills and instruction	X	
Impact on students, e.g., attitudes, confidence, etc.		X
Students' preferences for learning about information literacy		
Preferring a game over other approaches	X	X
Preferring other approaches	X	X
BiblioBouts' step-by-step approach	X	
Benefits of playing BiblioBouts	X	
Usefulness of playing BiblioBouts	X	
What other games do students want to play?		
Information literacy games	X	
Academic subjects	X	X
Would you play BiblioBouts again?		X
Course and assignments		
Course objectives		X
Instructor's expectations for the students playing the game (before and after the game)		X
Course assignments pertaining to BiblioBouts		X
Choosing sources to cite		X
Formatting cited sources		X
Grading the BiblioBouts assignment		X
Impact of BiblioBouts on course learning objectives		X
Incentives to play the game	X	X

Step 7: Design and Develop BiblioBouts II

Based on the BiblioBouts project team's analysis of evaluation data, the team has begun design and development improvements to BiblioBouts. The most pressing development issue facing the BiblioBouts team is a simplification of the game's initial sign-on procedure.

Changes to Registration

The registration system of the alpha version of BiblioBouts required setting up and maintaining three different sets of authentication information: (1) username and password

to login to BiblioBouts, (2) username and password to connect to the WebDAV server for storing file attachments, and (3) username, password, and authentication-key combination for accessing Zotero. This made the account creation process onerous for the players and led to numerous challenges getting classes signed up to play.

The new system we are implementing for the beta version of BiblioBouts still requires separate Zotero and BiblioBouts authentication but gone are the authentication-key combination for accessing Zotero and everything connected to WebDAV because we will be converting our file storage to use Zotero instead of using WebDAV. Authentication problems should be simple ones to diagnose such as students using their personal email addresses instead of their university email addresses, failing to use the Firefox web browser, and failing to sign off Zotero on public machines in computer labs.

The rest of this discussion enlists new BiblioBouts interfaces to highlight improvements and enhancements to the game. The impetus for these improvements and enhancements comes from our analysis of evaluation data.

New BiblioBouts Homepage

Figure 1 displays the new BiblioBouts homepage. It features information about the game generally such as a bouts timetable, links to the current game, announcements, and this player's game play to date such as his score, his place on the leader board, his closed sources, and the latest badge he earned.

Figure 1. BiblioBouts homepage

BIBLIOBOUTS

Help

Game Instructions
Learning Objectives
About Zotero
Zotero Tutorial
Export Zotero Bib
Zotero Syncing

Your Latest Badge

Contact Us
Edit Profile
Log Out

Welcome back, Demo Guy (Level 3)!

You are currently in 10th place overall in the group "English 102" with a score of 10500. The game topic is **Digital Writing**.

Play the current bout: Rating and Tagging

Now	Bout	Begin	End
	Donor	9/182010	9/22/2010
	Closer	9/18/2010	9/23/2010
➡	Rating and Tagging	9/24/2010	9/29/2010
	Best Bibliography	9/30/2010	10/3/2010
	Post-Game Library	10/3/2010	

Recent Announcements

The Rating and Tagging Bout is Open
by Instructor Person at 9/24/2010 8:03 am

Recent Zotero Downtime Fixed
by Instructor Person at 9/19/2010 2:38 pm

Your Scoring Breakdown

Donor/Closer	10500
Rating & Tagging	0
Best Bibliography	0
Total	**10500**

Your Closed Sources
Click a source to view its details

Source (Rating | Times picked in BB)

Re-designing Graduate ... (83% | 2)
Recovering Delivery for ... (73% | 1)
The Effectiveness of a ... (67% | 0)

Overall Leader Board
Updated every 15 minutes.

1. tanager   260429
2. Cal   252755
3. brjennin   230706
4. UMBARMAN   213723
5. Fritz   205737
6. BBTest   145641
7. Kaymbre   27410
8. Cool Guy   20450
9. Purple Duck   12029
10. Demo Guy   10500
11. Averill   5257
12. Vic   3975

View all rankings ...

Improvements and enhancements to the BiblioBouts homepage include:

• New logo and matching layout. An arrow tacking documents onto the bullseye of a target graces the new BiblioBouts logo. The project team is keen on this design because it conveys the idea that with BiblioBouts, one plays in a documents space where one can pinpoint desired documents swiftly and accurately. The matching layout uses colors, borders, and lines to complement and balance the logo.

• Navigation bar. On the left is a navigation bar that gathers several "Help" links under the "Help" heading and features a new link to display the badges one has earned for satisfactory and less-than-satisfactory game play. This navigation bar is featured on all BiblioBouts' web pages.

• Bouts timetable and links. Players can click on the link following the "Play current bout" heading or on the yellow-colored current bout row in the timetable to connect to the current bout.

• Recent announcements. Announcements posted by game owners are listed under the timetable. Click on an announcement to view the news item in its entirety.

• Your closed sources list. When players progress to the Closer Bout, BiblioBouts populates the list with the donations they have closed. During and after the Rating

& Tagging Bout, BiblioBouts includes a percentage summarizing credibility and relevance ratings other players have given to each of the player's closed donations. During and after the Best Bibliography Bout, BiblioBouts specifies the number of times opponents have added each of the player's closed donations to their Best Bibliographies.

Donor Bout

Figure 2 displays the new web page for the Donor Bout. Because most Donor Bout action takes place in Zotero, this page directs players to their library's database portal and suggests databases and keywords to them. This Donor Bout web page and the web pages of all other bouts display bout name, dates, objective, game topic, and links to instructions and a demo video. This Donor Bout web page and the web pages of all other bouts feature a scoring header that displays the player's progress completing the bout, current score, and recent actions that have earned him or her points and/or badges.

Figure 2. Web page for the Donor Bout

Improvements and enhancements to the Donor Bout web page include:

- New truncated logo and matching layout. The truncated logo displays a double BB for BiblioBouts. Using the truncated instead of full logo enables us to feature the scoring header atop the web page. The truncated logo and matching layout are featured on the web pages of all bouts.
- Scoring header. The scoring header displays the player's score, a calculation link

that displays how BiblioBouts awards points to players, a scoring log link that displays a log describing every action for which the player earned points (see figure 13), and the player's most recent actions that earned him points and/or badges. The header includes a progress bar informing the player of his progress toward completion of the current bout. This scoring header is featured on the web pages for all bouts.

- Enhanced instructions. Because the Donor Bout takes place almost entirely in Zotero, BiblioBouts features more instructions for this bout, including: (1) a link to the library's database portal, (2) instructor-suggested databases and keywords, (3) databases from which fellow game players are donating sources, (4) keywords (designated as "tags" on this page) that are frequently-occurring index terms in donated citations, and (5) brief instructions with a link for displaying more detailed instructions on saving citations and full-texts.

Closer Bout

Figure 3 displays the new web page for the Closer Bout. On this page, players review their donations, learn which ones have no attached full-texts, link to Zotero to attach full-texts, and close sources.

Figure 3. Web page for the Closer Bout

Improvements and enhancements to the Closer Bout web page include:

- Donations scrolling list. Replacing the successive pages of donations list is a Donations scrolling list players can use to review all their donations in one fell swoop instead of being limited to 5 per page.

- Reducing donations to the Donor Bout. Although there is no cap on Donations, players do not receive points for donations exceeding twice the quota. Because there is little incentive to exceed the quota, players are not likely to exceed it which should reduce the length of the scrolling list on the Closer page.

- Maximize-minimize donations capability. Players click on the plus (+) and minus (-) signs to maximize and minimize citation information. This capability may be useful for players to differentiate between donations they are and are not inclined to close.

Rating & Tagging Bout

Next is the Rating & Tagging Bout that processes players through 6 steps: (1) checking a randomly selected closed donation for the correct full-text, (2) judging the completeness of the donation's citation, (3) tagging the donation, (4) rating the donation's credibility, (5) rating the donation's relevance, and (6) optionally, reviewing how their opponents rated the same donation. In the alpha version of BiblioBouts, players accomplished steps 2 to 5 in one single long web page requiring them to scroll down and respond to multiple pop-ups asking for comments. The BiblioBouts project team heard complaints from players and instructors across all data collection methods—questionnaires, diary forms, and interviews—about the need to simplify the rating and tagging task. Players told us about the bout's cumbersome interface and how they responded mechanically or mindlessly to it.

The Rating & Tagging Bout's interface for the beta version of BiblioBouts puts steps 3, 4, and 5 on web pages separate from steps 1 and 2. Web pages present the subtask above the fold, freeing players from having to scroll down except to enter lengthy comments. For steps 4 and 5, we consolidate rating bars, sliders, and comments dialog box into a single page. Added are definitions that give players explanations to facilitate the subtask.

Figure 4 displays the new web page for the Rating & Tagging Bout's full-text check (step #2). Not shown is the immediately preceding page that asks players whether the donation bears the correct full-text (step #1). In response to players choosing "No," BiblioBouts randomly chooses another donation and asks the same question. In response to players choosing "Yes," BiblioBouts asks players to judge the citation's completeness and reminds them what data elements they should expect in a complete citation (figure 4).

Figure 4. Web page for the Rating & Tagging Bout's full-text check

Suggested by players of the alpha version of BiblioBouts, citation judging (step #2) is new to BiblioBouts. Players receive bonus points when their assessment of the completeness of the displayed citation agrees with the majority of their opponents' assessments. We will also add pop-up definitions to citation data elements, i.e., title, author, publication title, etc., for clarification.

Figure 5 displays the web page for the Rating & Tagging Bout's tagging subtask (step #3). On a single page, the player responds to questions that add content tags to the donation describing its subject terms, format, and sponsor.

Figure 5. Web page for the Rating & Tagging Bout's tagging subtask

Improvements and enhancements to this bout's tagging web page include:

- Big ideas dialog box. The "big ideas" dialog box replaces the "tags" dialog box from the alpha version of the game. Not shown in figure 5 is the type-ahead feature that displays big ideas other players have submitted that are in the alphabetical neighborhood of the one that the player is typing in. The BiblioBouts Project team hopes that by asking players for "big ideas" instead of "tags," players will respond with words and phrases that describe concepts instead of single words and phrase fragments. Players can click on "big ideas" for a pop-up bearing definitions and examples.

- "What is this source?" question. This question replaces the flawed "donation type" question from the alpha version of the game that listed a combination of information-format and editorial-process terms. From a pull-down menu, players choose from a list of information-format terms extracted from the Five-Faceted Taxonomy for Classifying Citations to Digital Information (see the section entitled "Step 3. Conduct Baseline Study #1" above).

- "Who published it? question. This question also replaces the flawed "donation type" question from the alpha version of the game. From a pull-down menu, players choose from a list of editorial-process terms extracted from the Five-Faceted Taxonomy for Classifying Citations to Digital Information (see the section entitled "Step 3. Conduct Baseline Study #1" above).

Figure 6 displays the web page for the Rating & Tagging Bout's credibility rating subtask (step #5). On a single page, the player pulls sliders to answer 3 questions and, for bonus points, tells why he gave these ratings.

Figure 6. Web page for the Rating & Tagging Bout's credibility rating subtask

Rating bars, sliders, and comments dialog box are consolidated on a single page and visible above the fold. We also added pop-up definitions to questions to give players explanations to facilitate this subtask.

Figure 7 displays the web page for the Rating & Tagging Bout's relevance rating subtask (step #4). On a single page, the player pulls sliders to answer 3 questions and, for bonus points, tells why he gave these ratings.

Figure 7. Web page for the Rating & Tagging Bout's relevance rating subtask

Improvements are the same as the credibility rating subtask. Rating bars, sliders, and comments dialog box are consolidated on a single page, they are visible above the fold, and pop-up definitions are added.

Figure 8 displays the web page for the Rating & Tagging Bout's new feedback statistics page (step #6). The BiblioBouts Project team planned to implement feedback into the alpha version of BiblioBouts but failed to do so due to time constraints. We received many requests from players and instructors across all data collection methods— questionnaires, diary forms, and interviews—asking for this feedback. Players especially told us they wanted to see how their fellow players rated and tagged the same sources they were asked to evaluate so they could become better evaluators.

Figure 8. Web page for the Rating & Tagging Bout's feedback statistics

The feedback page puts a player's credibility and relevance ratings side-by-side opponents' ratings. At the bottom are tabs players can click to see detailed feedback including written comments telling why players (identified by their alias) gave the ratings they did. We deliberately included players' levels, points, and badges so that a player could be choosey about his or her acceptance of fellow players' evaluations based on the quality of their game play as indicated by their badges and scoring in the game to date.

Best Bibliography Bout

Best Bibliography is the final bout. In the evaluation of the alpha version of BiblioBouts, players complained about having to choose from a short-list of research paper topics. They preferred instead choosing their own topic. Some told us they chose a topic from the short-list, but they chose sources that they would use for the paper they were writing for the course rather than their selected short-list paper topic. We responded to their criticism by redesigning the Best Bibliography Bout so that it accommodates their desire

to choose their own topics. The redesigned Best Bibliography Bout features separate web pages for processing players through 2 steps: (1) formalizing their research paper's topic and (2) choosing the best sources for their Best Bibliography.

Figure 9 displays the new web page in which players formalize their research paper's topic in the Best Bibliography Bout. This page is entirely new. Students enter their paper's topic into a dialog box, choose 3 big ideas from the list on the right that they expect their paper to discuss, and describe their paper's argument.

Figure 9. Web page for formalizing one's topic in the Best Bibliography Bout
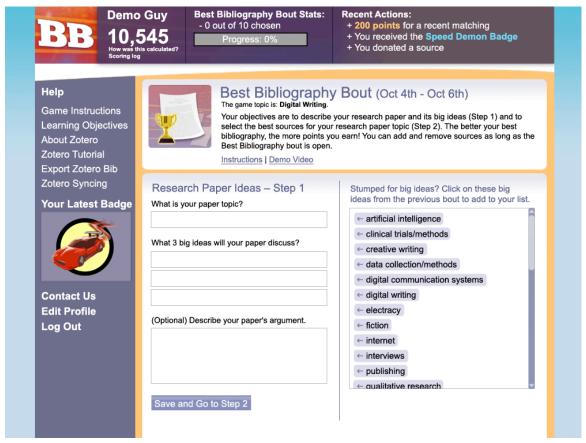

Figure 10 displays the web page for choosing sources for one's Best Bibliography. Players search the source library on the left center. When they click on the "+Add to Bibliography" link under a source, the source pops into one of 10 slots in the Bibliography on the right.

Figure 10. Web page for choosing sources in the Best Bibliography Bout

Improvements and enhancements to this bout's web page include:

- Closed-sources scroll list. Replacing the successive pages of the closed-sources list is a closed-sources scroll list allowing players to review all sources in one fell swoop instead of being limited to 5 sources per page.

- Search and/or sort closed sources. Players can search sources by title and big idea

and sort results by publication date, relevance rating, credibility rating, combined relevance-credibility ratings, or source donor (themselves versus someone else). They can also sort *all* sources by one of these approaches.

- Research paper topic editing capability. After searching, sorting, and/or selecting sources for the Best Bibliographies, players might want to edit their paper topic so they can click the "Edit Ideas from Step 1" button to do so.

Incorporating Sorter Bout Attributes into Other Bouts

Our analysis of evaluation data disclosed multiple problems with the Sorter Bout:

- Students did not understand the role of the Sorter Bout which required them to sort sources into categories that were different from the keywords they assigned to sources in the Rating & Tagging Bout, which preceded the Sorter Bout.

- Priorities unrelated to game play competed for instructors' attention at the same time Sorter categories were due.

- Students told us some Sorter categories did not adequately describe their donated sources and other sources fit two or more categories.

- Students told us the Sorter's easy-to-use interface tempted them to mindlessly pop sources into categories instead of placing them into relevant ones.

- Students told us that because they tired of scrolling down to place sources into categories beneath the fold, they mindlessly popped sources into the easy-to-reach categories.

Pondering these problems, we eliminated the Sorter Bout and incorporated elements of it into the new versions of the Rating & Tagging and Best Bibliography Bouts. Rating & Tagging requires students to think about the intellectual contents of sources, eliciting from them three big ideas per closed source. Best Bibliography requires students to think about the intellectual contents of their papers, eliciting from them three big ideas that their papers will cover. The 10 sources they add to their Best Bibliographies should have attached the big ideas they and other students assigned to sources during the Rating & Tagging Bout. When their Best Bibliography's big ideas and the big ideas attached to their selected sources match, BiblioBouts awards students bonus points. Due to the elimination of the Sorter Bout, BiblioBouts is a shorter game featuring four instead of five bouts.

Post-Game Library

Because students and instructors wanted to access donated sources after the BiblioBouts game ended, the BiblioBouts Project team added the Post-Game Library page. Figure 11 shows Post-Game Library functionality similar to the Best Bibliography Bout in which students can search closed sources by title and big idea and sort results by publication date, relevance rating, credibility rating, combined relevance-credibility ratings, or source donor. They can also sort all sources by these criteria. Clicking on the Post-Game Library page's "Print my Bibliography" button, players can print their Best Bibliography.

Figure 11. Post-Game Library page

Students told us they wanted to search the Post-Game Library for more sources for their papers without the pressure or distraction of BiblioBouts game play. Instructors told us that because students searched in different ways, students found new sources that were new to them, and instructors wanted to use these new sources for teaching or research or share them with their colleagues. Thus, we expect both students and instructors will benefit from the Post-Game Library.

BiblioBouts' New Game-Like Features

In response to students who wanted more game-like features in BiblioBouts, we made these three enhancements to the game: (1) badges for satisfactory and less-than-satisfactory game play, (2) levels based on points earned, and (3) an increased emphasis on scores and scoring.

Players earn badges for satisfactory game play such as Roadrunner Badges for being the first to donate, close, or rate and tag, Speed Demon Badges for being the first to reach the bouts' quotas or caps, Cornucopia Badge for adding the most comments during the Rating & Tagging Bout, and Bullseye Badges for being closest to one's opponents' ratings. BiblioBouts awards Bomb Badges for less-than-satisfactory game play such as being farthest from one's opponents' ratings, being the highest or lowest rater in the Rating & Tagging Bout, and closing sources that are the least chosen by one's opponents in the Best Bibliography Bout.

The navigation bar on the BiblioBouts homepage (see figure 1) and all bout pages (see figures 2 to 11) displays the player's latest badge. Clicking on the navigation bar's "Your Latest Badge" link reveals the web page shown in figure 12 bearing the player's earned badges. As an incentive to play BiblioBouts more, the page greys out badges that the player can earn but has not earned to date. In figure 12, the badges list is brief because it is given for the sake of example in this report.

Figure 12. Badges page

Players reviewing the Rating & Tagging Bout's feedback statistics (see figure 8) can click on tabs that identify players who have rated the source by alias. We deliberately included players' badges on tabs so that they might be choosey about their acceptance of a fellow player's evaluations based on the quality of their game play (represented by their badges) and standing in the game to date (represented by their score). For example, a player may be circumspect about heeding an evaluation from an opponent who has

several Bomb Badges (for less-than-satisfactory play) and whose score is not on the leader board.

The beta version of BiblioBouts features Levels that advance as a player's score increases. All players start with 0 points—the Novice Level. When they earn 3,000 points, players reach the Apprentice Level. Thereafter, they increase one level when their score doubles. Table 4 names levels and the minimum number of points needed to reach the level. Inspiration for level names came from archery proficiency levels, a theme that is in keeping with the BiblioBouts logo.

Table 4. Levels

Level	Level name	Minimum # of points
1	Novice	0
2	Apprentice	3,000
3	Archer	6,000
4	Marksman	12,000
5	Master Marksman	24,000
6	Grand Master Marksman	48,000

To ascertain one's current level, players can check the BiblioBouts homepage (see figure 1). The Badges page (see figure 12) is explicit about the player's current level also, citing the player's current level and displaying medallions for the levels the player has reached. The Rating & Tagging Bout's feedback statistics page reveals the level of players whose rating statistics it displays (see figure 8).

In the evaluation of the alpha version of BiblioBouts, we learned that scoring was important to players. The beta version of BiblioBouts will display scoring information on the homepage (see figure 1) and on all bout pages (see figures 2 to 11). The scoring header displays the player's score, a calculation link that displays how BiblioBouts awards points to players, a scoring log link that displays a log describing every action for which the player earned points, and the player's most recent actions for which he or she earned points and/or badges. At any time, players can click on the scoring banner's Scoring Log link to review their scoring history for all or one particular bout. Figure 13 shows the Scoring Log for a player who opens scoring detail for the Rating & Tagging Bout.

Figure 13. Scoring Log

Under each bout is the "Detailed Scoring" link bearing a plus (+) or minus (-) to open or close the detail. In figure 13, Rating & Tagging scoring detail is brief because it is given for the sake of example. If scoring detail was given for an actual game, it would be lengthy and, assuming the player meets quotas, scores for individual bouts would be much higher than is shown on the figure.

Changes to BiblioBouts' Scoring Algorithm

The team's analysis of game-play data revealed our misconceptions about how students would play the game. When programming the alpha version of BiblioBouts, we purposely awarded bonus points to players who exceeded the Donor Bout's quota rather than just meeting its quota. Our intent was to encourage players to submit as much information as they could find on the topic in play. Instead, players who wanted to amass points were not choosey about the donations they made, donating many less-than-relevant and off-topic donations to the Donor Bout to earn bonus points. Thus, some players took the lead for shoddy game play.

In the beta version of BiblioBouts, players will receive 10 points per donation and a 140-point bonus for reaching quota. The player's first, second, and third donations above quota receive 3, 2, and 1 points, respectively. Additional donations earn zero points. This approach should discourage payers from flooding BiblioBouts with less-than-useful donations.

The alpha version of BiblioBouts awarded players more points for playing later bouts such as the Sorting and Best Bibliography than earlier bouts such as Donor, Closer, and Rating & Tagging. Our intent was to maintain students' interest in game play but it was lost on players who told us performing tasks connected with earlier bouts were harder than later bouts. Thus, players put more effort into later than earlier bouts. For example, they sorted *all closed sources* in the Sorter Bout to boost their scores to astronomical levels (over 200,000 points). They also found shortcuts to minimize the work effort required by the Sorter Bout (see the section entitled "Incorporating Sorter Bout Attributes into Other Bouts" above).

The BiblioBouts Project team's elimination of the Sorter Bout from BiblioBouts should solve some problems connected with scoring. To predict how player behavior will affect scoring in the beta version of BiblioBouts, team members built a spreadsheet enumerating the game's many point-scoring events. We use the spreadsheet to calculate bout and final scores based on the amount and quality of efforts players put into the game. Based on spreadsheet calculations, we are confident players who donate quality sources, meet quotas, reach caps, and donate sources that their opponents subsequently add to their Best Bibliographies will place high on the final leader board in the beta version of BiblioBouts. Players who do all these things plus exceed the Rating & Tagging Bout's quota with quality game play that agrees with the game-play efforts of their fellow game players should win BiblioBouts.

Staffing the BiblioBouts Project Team

BiblioBouts Project Team staffing remained stable throughout the period. Master's student Meredith Raymond finished most of her work coding bibliographic citations in student papers, a task that pertains to the evaluation of baseline and actual study data, prior to her graduation in May 2010.

Graduating from the U-M in May 2010, Programmer and Interface Designer Brian Jennings started working two new jobs in addition to BiblioBouts. He helped transition our new Programmer and Interface Designer, U-M graduating senior Michele Wong, to BiblioBouts programming and design work. Starting in September, Wong assumed all interface design and programming duties.

For the period May through September 2010, these are the members of the BiblioBouts Project team:

- PI: Professor Karen Markey
- Co-PI: Associate Professor Soo Young Rieh
- Co-PI: Associate Professor Victor Rosenberg
- Project Consultant: Fritz Swanson
- Lead Programmer-architect: Greg Peters

- Programmer and Interface Designer: Michele Wong and Brian Jennings
- Graduate Student Research Assistant: Christopher Leeder
- Doctoral Student Assistant: Beth St. Jean
- Graduate Student Assistant: Andrew Calvetti

Project Dissemination Activities

The BiblioBouts Project web site debuted in January 2009 at
http://bibliobouts.si.umich.edu. Team members keep its BiblioBouts Progress to Date
page up-to-date adding new entries that tell exactly what tasks occupy the project team
and participating libraries.

BiblioBouts was one of five recipients of the 2010 Provost's Teaching Innovation Prize
(TIP) at the University of Michigan. Winners received $5,000 and were honored at the
Enriching Scholarship program on May 3, 2010 where they participated in a poster
session that showcased winning innovations.

BiblioBouts team member Chris Leeder attended the Games, Learning and Society
Conference 2010 in Madison, Wisc., in June 2010. He will present the paper entitled
"College Student Perceptions of Learning Academic Research Skills through an Online
Game" at the IMLS-sponsored 5th Library Research Seminar (LRS-V) in College Park,
Md., on October 6–9, 2010. To complete the 1st-year paper requirement of the School of
Information's Doctoral Program, Chris took the lead on the analysis of baseline data,
drafting the paper entitled "Developing a Faceted Taxonomy for Rating Student
Bibliographies" which he will soon finish and send to a peer-reviewed journal for review
and possible publication.

BiblioBouts team members will submit proposals to the Cyber Zed Shed Presentations at
the ACRL 2011 annual conference in Philadelphia. The team will also submit a paper
proposal to the 30th Annual Conference on the First-Year Experience in Atlanta and
EDUCAUSE 2011 in Philadelphia.

Having spent summer 2010 analyzing data, the BiblioBouts Project team is poised to
write more papers based on the evaluation of data from the winter 2010 testing of the
game.

Readers who want to play the alpha-version demonstration BiblioBouts game can do so
at http://www.bibliobouts.org. Using the Firefox browser, enter the following information
to log in:

Email: demo@bibliobouts.org

Password: demo

This login allows users to experience all but the Donor bout through the demonstration
game. Because the demonstration game was designed for classroom demonstrations, it is
a one-person game. Multiple simultaneous sign-ons may result in unpredictable game
behaviors.

Future Plans (October 2010 to April 2011)

Now that game design tasks are complete and game development is in the hands of the programmers, the BiblioBouts Project team will focus on game pretesting and testing activities during the period October 2010 to April 2011. Important subtasks connected with the 3 steps that will occupy the BiblioBouts Project team for the next 7 months are:

Step 8: Conduct Baseline Study #2

• Plan for baseline data collection. Over the weekend of October 23, the BiblioBouts Project team will host library liaisons Catherine Johnson (Baltimore), Alyssa Martin (Troy-Montgomery), Averill Packard (SVSU), and Gabrielle Toth (Chicago State) in Ann Arbor to help the team pretest the beta version of BiblioBouts, become familiar with the game's new registration process, anticipate registration problems and needed instruction, and discuss strategies for recruiting instructors and their classes to test the game in 2011. This includes the collection of baseline study #2 data—papers written by students in a current class that is not playing the game now but that will play the game next year.

Step 9. Test BiblioBouts II

• Pretest BiblioBouts in an SI class. Principal investigator Karen Markey has incorporated BiblioBouts game play into her course syllabus for SI 665, Online Searching and Databases. Primarily the BiblioBouts Project team wants students to identify problems with registration, interface, and scoring, and prevent show-stoppers that disrupt the game. The team will invite students to "game the game," that is, trying to find shortcuts that place them high on the leader board or enable them to win the game. Students will be invited to complete pre- and post-game questionnaires and participate in focus group interviews.

• Pretest BiblioBouts with BiblioBouts veteran players. The BiblioBouts Project team will invite U-M students who played the alpha version of BiblioBouts to test the beta version.

• Recruit instructors and classes at Baltimore, Chicago State, SVSU, Troy-Montgomery, and the U-M to play BiblioBouts in 2011. To get this task started at the U-M, BiblioBouts Project team members visited the U-M's Comprehensive Studies Program (CSP) in mid-August to explore CSP's interest in incorporating BiblioBouts into CSP classes in winter 2011. Team members will follow up with CSP. They will also call on library liaisons to recruit classes for participation in both baseline and test studies.

• Recruit additional instructors and classes. The team's conference presentations and journal articles that showcase BiblioBouts typically result in inquiries to the BiblioBouts Project team from instructors, administrators, and librarians. We encourage people who inquire about BiblioBouts to play the demo game and tell them we will be ready to test BiblioBouts in classes in 2011. We will contact them in fall 2010 to determine their interest in BiblioBouts game play in 2011.

Step 10. Evaluate Game Play II

• Revise data collection instruments. In the first evaluation of BiblioBouts game

play, data collection instruments were focused on improving and enhancing the game. In the second evaluation, we want to determine BiblioBouts' effectiveness for teaching information literacy skills and concepts, and thus, we will make changes to reflect this new focus.