Interim Performance Report Narrative for LG-07-11-0339-11

The Student/Library Collaborative: Toward Transformative Mobile Library Service

As stated in the grant proposal, the main purpose of this grant is to coordinate a two-year student collaboration program that will co-design mobile applications with students that provide location-based services to assist users in finding and locating library resources, collections, and services. This collaborative program will document best practices for working with student design teams, as well as lessons learned and the benefits of student mentoring.

As a preface to this report, due to University hiring procedures, it took us 6 months to hire our programmer, and after that the project manager and our two graduate assistants, so we were not able to begin actual work on the grant until June, 2012, rather than December 2011. We will most likely ask for an extension next year to make up those 6 months. However, in these six months we have made good progress on our goals.

Goals of the grant are to:
1. Increase student collaborations and input into library software design;
2. Improve the abilities of libraries of all types to provide services for location-specific information needs;
3. Broaden access to library collections;
4. Create connections between changing student computing uses and library resources and services

Compare actual accomplishments with goals established for the report period. Whenever possible, describe activities or services in both quantitative and qualitative terms. If interim project goals have not been met, explain why, describe what steps have been taken to get the project back on schedule, and discuss the likelihood that the project will be completed by the expiration date of the grant.

Goal 1: Increase student collaborations and input into library software design
Accomplishments:
- We have established partnerships with a Computer Science class to develop mobile location-aware applications. Initial proposals have been received, with prototypes expected at the end of the calendar year and final products in April 2013. Highlights of this collaboration include:
  - Weekly meetings with students to discuss ideas and progress
  - 12 code modules have been prototyped (6 for Android and the same 6 for iOS) to support the students' work and app concepts
  - 7 web services based on these modules have been deployed to support student prototypes
- We developed a Universal iOS (iPad, iPhone, iPod touch, etc.) modular infrastructure + 5 modules approved by iTunes Store that can be used as a base for many other Apps that can be modified by Libraries.

- Additionally, the team has established the parameters for a student mobile application development competition and begun advertising for student teams, with a January 2013 kick-off meeting planned. Highlights of the competition include:
  - Designing Contest rules and student information packets, based on a similar case study competition in the School of Business.
  - Developing a license agreement with Campus Legal and the Office of Technology Management. This agreement is vital to making the ideas and applications resulting from the competition available for further development and sharing with the general library mobile development community.
- Finalized IRB documentation for user studies as part of both the Computer Science class and the competition

Goal 2: Improve the abilities of libraries of all types to provide services for location-specific information needs.

Most of the results for this goal will be realized after the Student App competition concludes in March 2013. At that time the team will be able to continue development of those apps and prepare infrastructures that can be adapted by other libraries. Progress to date includes development of:
- An initial list of suggested groups, courses, departments on campus to consult for collaboration on these services.
- Initial documentation of best practices, including documents for consulting with faculty and courses for student involvement in App development, documentation for IRB approval, documents for licensing approval and documentation (16 pages) for App development.
- The code infrastructure for modules, the iOS modular framework and the five iOS modules mentioned above, will allow libraries to use the infrastructure and modify/customize it according to their needs. Also completed are initial library staff-facing applications consisting of 1 module with write up.

Goal 3: Broaden access to library collections.

Although most of the deliverables for this goal will occur after the Apps from the upcoming Student Competition are designed, two Apps have been developed already that will be useful to accessing library collections: the *Minrva* App and the Virtual Shelf App.
- *Minrva*: an App that includes a search feature for students to either type in a book of interest or scan a barcode to get information from the Library catalog about the book. It also includes a locater for where to find items in the library. Additionally, a feature (tied into the library catalog) is to list loanable technology items currently available. The initial design (RESTful webservices, Android modules, and modular conceptualization) of *Minrva* (https://play.google.com/store/apps/details?id=edu.illinois.ugl.minrva) began prior to the beginning of this grant, but, with the hiring of the research programmer for this grant, the team was able to continue to modularize and extend the modular conceptualization to the iOS system. In addition, Minrva 1.1 is being developed for the Android operating system to target the expansion of the app to other libraries. One of the critical components is that the infrastructure used here can be adapted to modules that can be used for other libraries.
- Minrva Builder: The modular infrastructure of the Minrva Apps has allowed for the development of Minrva Builder. Minrva Builder is currently being designed to generate

library specific apps (Android and iOS) from prebuilt modules. Libraries will be able to generate apps by downloading the builder along with their favorite modules. The steps to generate an app involve a few simple clicks. In addition, since every library has different data sources, Minrva Builder allows Libraries to easily change the source of the data feeds that provide data to the apps generated. We are currently using the modules previously created for Minrva iOS and Android as test modules for Minrva Builder.

- Virtual Shelf App: Virtual Shelf generates real-time shelf lists from a start and an end barcode number. The initial idea for this App resulted from Michael Doran's ShelfLister program. Due to the initial Web service and Modular codebase that had been previously built for the *Minrva* App, it was a quick process to make the Virtual Shelf app operational. For example, the "Search" module and the "Scan" module provide the barcode inputs for the Virtual Shelf App. In addition, the "Home" module can provide detailed information about a book that is chosen from the Virtual Shelf list. One of the main reasons the development time could be kept to a minimum is because the Minrva framework emphasizes modular development revolving around library items. The modules are very analogous to content management modules revolving around web pages and can build upon each other's functionality. The first round of user experience research for the Virtual Shelf app began in November 2012 with the goal of exploring features that could be added in 2013.

- CS492 Modules: Our work with the computer science class has also produced fruitful results.
  - The CS 492 group has created a Citation Generator module that will automatically create an APA or MLA formatted citation from a digital book record or from user input. The group has included the ability to e-mail the generated citation to an e-mail address.
  - In addition, the CS 492 group has created five apps to integrate library account access into the mobile device. The features the new apps provide include access to a user's favorite books, checked out items, requested items, fines, and holds.
  - If the group finishes the projects ahead of schedule, the group plans to begin work on a Room Reservation module and a Bus Route module. The Room Reservation module will help keep track of meeting room availability, and the Bus Route module will help guide users to the nearest library and/or other academic resource.
  - Other ideas from CS 492 group include an Ask the Librarian module and an Hours and Events module.

- Once the student App competition concludes the team will have student generated ideas to develop during summer and fall 2013.

Goal 4: Create connections between changing student computing uses and library resources and services
- We are now in the process of conducting usability studies to gain insight into the use of the Virtual Shelf app. Although this is essentially an App that will aid in collection maintenance at the library, the studies will also elicit further suggestions (by undergraduate students) of what would be useful in finding library materials.
- Once the computer science class students complete their work, we will be able to do usability studies on those apps as well to learn from the students who created the Apps about their views on importance for the design of those Apps in relationship to finding library materials.

- Although not initially part of the plans for the grant, after hearing a student suggestion, the team implemented an augmented reality sandbox using an already existing codebase from UC Davis found here: http://idav.ucdavis.edu/~okreylos/ResDev/SARndbox/MainPage.html. This development could be beneficial in our further exploration of tools that might be useful for libraries to provide access to special collections materials, especially any collections that have been photographed with 3D software.

Describe any significant findings or accomplishments in this period.
- A significant accomplishment is the development of Universal iOS (iPad, iPhone, iPod touch, etc.) modular infrastructure + 5 modules approved by iTunes Store that can be used as a base for many other Apps that can be modified by Libraries.
- Another accomplishment is the planning, documentation and successful recruiting of 35 students for the Student App Competition that will take place in February 2013.

Include other comments or anecdotal information that shows project achievements or lessons learned in this period.
- It took about three months to get Institutional Review Board approval for the various interactions planned with students (work with computer science class students, student competition, and general usability studies with students and the Apps). It may have been prudent to submit three separate proposals, rather than to put them altogether in one review, because of the complexities involved. Developing the student contracts for licensing, rights, and intellectual property for Apps being developed added an extra month to the process, but we now have some good examples for other libraries to modify.
- When working with classes, it is helpful to have some tie-in with grades or course expectations. Direct involvement with professors is a good way to provide students with motivation to complete work. For example, a potential group of students from CS 465 backed out of their volunteer work obligations after encountering the first potential technical issue. Conversely, the CS 492 group has remained because of the tie-in with a grade.
- Small cash rewards seem to be a large motivation for student participation. When trying to reach out to student ACM (Association for Computing Machinery) groups, they were very reluctant to work on projects for the library in fear that their work would be overshadowed by the library's name. On the other hand, when we sent news of a competition with small cash rewards, the ACM group was more than happy to advertise for our project.

From our timeline for year one, our goals were to:
- Hire a programmer
- Work with partners to gather input for tools
- Create initial APIs from ideas
- Plan the student competition to select teams
- Train and mentor students
- Do usability testing
- Create documentation

Although we have only had 6 months, rather than the full year, we have accomplished all we planned for the first year, except to create initial apps from ideas and fully complete documentation. That will occur in Spring/Summer 2013 following the completion of the student

competition. However, the development of a Universal iOS was not initially planned, but will be very significant for development of future modules.