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A Digital Pathfinder for Historic Sites

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Introduction

The *Digital Pathfinder for Historic Sites Project* is a collaborative effort among Marist College's Departments of Computer Science and Communications and the Arts, its NEH-supported Hudson Valley River Institute (HRVI), and the Staatsburgh State Historic Site. We sought and received Level 2 start-up funding to create a reliable, economical supplement to self-guided educational tours for historical sites through the use of a global positioning system (GPS) enabled personal data assistant (PDA).

The project formally began as planned in January, 2010. We had high-level goals to produce "plugin" materials for the Digital Pathfinder pilot and deploy the handheld device in the field at Staatsburgh. The objective was to test the product through a series of field trials starting with project team members, selected individuals who were not part of the team, and finally the general public.

In summary, this project achieved its objective, enabling us furthermore to form new interdisciplinary relationships across otherwise seemingly disparate fields of the humanities, communications, and computer science. During a challenging fiscal period, we learned much about the process of creating a product for the outdoor environment and how to work together more effectively as a team where there were few or perhaps no models of such collaboration to our knowledge.

Project Activities

The major project activities were twofold: re-version of the existing, human-led landscape tour for the PDA device and deploy the mobile, device-led package in the field, which included the open source software and "plugin" digital content. There were various sub-activities involving both of these major activities. On the production side, the project digitized archival materials, shot footage of them and of the landscape at Staatsburg, recorded voice-over, and compiled these data into a series of mobile episodes which we loaded on the device for initial unit testing. For further testing and review, we deployed devices at gift shop of the Staatsburgh mansion and asked volunteers to take tours led by the device in the field.

The project got underway during the height of fiscal uncertainty in New York State which resulted in staff reductions and management changes at Staatsburg. This slowed and disrupted our original plans. The project weathered those challenges and nevertheless delivered the platform more or less in accordance with our vision, although without the luxury of more time to advertise and refine the product as we could have liked.

Project Accomplishments

The project had a number of accomplishments despite some challenges.

1. The project team held its kick-off with the advisory staff in January, 2010, as planned.
2. During the next eight months, the project team produced the digital content for the mobile device as we had planned. We had anticipated multiple “roll outs” starting in May, 2010. However, we put the device in service for unit testing at Staatsburgh in August, 2010 with “rough cuts” of the digital content. We believed it was more important to start the field trials rather than wait for all the script modifications and the final video production.
3. During the fall of 2010, the project conducted field trials with the device on-location at Staatsburgh. We had solicited and received help from volunteers, Marist faculty, students, Staatsburgh staff, and others to test the device live in the field.
4. During the winter season which is not favorable for using the device, we reviewed the data and saw opportunities for improvement and necessary changes, mainly in the protocol to manage the device’s power and distribute the device to visitors. The project team also continued to collect, refine, and produce digital content for the device which we deployed on a “rolling” basis.
5. In January 2011, the project team received notice of acceptance of our paper about the project we had submitted to the Third International Conference on Computer Supported Education. We travelled to the conference in The Netherlands in May 2011 to present the paper.
6. In July 2011, the project team participated in a conference, “Place & The Digital Native: Using Technology & Social Media to Teach the Hudson Valley,” organized by Teach the Hudson Valley (www.teachingthehudsonvalley.org). This outreach effort provided the project with additional testers and field trial experiences from which we learned further ways to improve the presentation and logistics. See Appendix 1 for response data.

Probably one the most important project activities we did not pursue adequately was outreach in the larger community. In August 2010 we produced a YouTube documentary, “The Gilded Age Meets the GPS Age in Staatsburgh” (see reference section), but we did not fully engage the local media and other community outlets. However, we don’t believe we were ready for the public-at-large to use the device given the extenuating circumstances and having found a number of different ways to improve the management and deployment of the PDA. In other words, the project was probably better off with less rather than more vigorous outreach.

Audiences

The project's main product, the digital mobile device, was designed foremost to offer Staatsburgh visitors a means to tour the site when tour guides were unavailable and/or tours was not being offered, for instance, on a seasonal basis. The device was not intended to replace human guides but rather to support them in promoting the site and interest in local history.

The project had envisioned attracting traditional visitors who might make a special or planned trip to Staatsburgh. We had furthermore hoped to reach out to other individuals who are not tourists in the traditional sense, namely, teachers, students, researchers, and others (e.g., hikers, campers, dog walkers, joggers, site employees, etc.) from the Staatsburgh community. While we had no specific age range or demographic, we anticipated visitors who were for obvious reasons accustomed to and/or comfortable with using touch-screen digital devices. The device could support multiple languages but this was not in scope for the project. Also, the device had no almost no support for the visually and/or hearing impaired and visitors with other physical disabilities as the landscape tour included carriage roads, forested hiking paths, etc.

We don't believe the visitor flow increased as a result of the device because, as we mentioned above, the outreach component of the project was not fully implemented due, in part, to time and budget constraints.

Evaluation

A formal evaluation of the project was not performed. However, we gathered different kinds of data. The results of personal interviews with volunteer field testers are attached as Appendix 1. We also collected survey feedback and other data which are reported in Coleman, et al (2011).

We also gathered user interaction data, namely, what inputs testers selected, whether they disabled the background music, how long they remained at a given stop, etc. Unfortunately, we believe this interaction information is not necessarily valid since we learned there may have been some confusion about how to interact with the device, particularly at the start of the tour. We had developed at the outset "how-to" charts and left them at the gift shop. However, this proved inadequate. For this reason, we developed a five-minute video tutorial and installed it on the device which walks the user through various use cases.

The primary strength of the program was its potential to offer tours without human guides. As such the site could in theory support more visitors, bring in more revenue, and revitalize interest in local history even during a period of declining state funding for the site.

The device could in principle offer a number of different types of tours. In fact, the standard landscape tour was over a mile, took an hour or more to complete, and consisted of various types of walking paths that were not necessarily suitable for everyone. Thus, we developed and deployed, as a proof of concept, an experimental

tour of the outside of the mansion that was only 0.10 mile and could be completed in just two stops or about 10 minutes. We subsequently realized that this experiment might have been an attractive alternative for a number of visitors.

The technology, the devices, proved to be far less expensive than we had budgeted. In fact, during the award phase the retail price of the devices tumbled to a fraction of our originally estimated cost.

We discovered a number of weaknesses in the program. Foremost of these was the surprising amount of time and effort to script, develop, and test the digital content. While the application of some forms of automation and advanced tools are productive, under even ideal circumstances, the process is nevertheless labor-intensive and thus, expensive. We dealt with this problem by continuously updating the device with the newest content whenever it was available which we believe worked reasonably well. The downside of this approach similarly required continuous testing in the field which was very time-consuming.

As the entire program was designed for outdoor application, use of the device depended very much upon the climate. Rain, snow, and cold days precluded the device. Sunny days caused display washout and we learned windy days along the Hudson River caused audio washout. Hot and humid days didn't affect the device but then, fewer people visited the site or wanted to be outside on these days. We compensated as best as possible for some of these challenges, i.e., increasing the color contrast in the navigation map and maximizing the audio volume.

The technology had other limitations. For one, the HTC P3470 Windows Mobile 6 PDA platform was becoming virtually obsolete by the middle of the award phase. At the time of this writing, the P3470 is a technological "dead-end," unsupported by the original equipment manufacturers.

First, this doesn't mean the devices are throw-away. On the contrary, they are fully functional and deployed as we had planned. Second, we fully anticipated this obsolescence. In fact, we designed the system to account for it by separating the digital "plugin" content from the software framework supporting it. In other words, the PDA is data-driven in a way that does not depend on the hardware. We even developed and tested in the field content built for the P3470 on a Google Android device as a proof of concept. It worked. Aside from transcoding the videos from WMV (Microsoft's standard) to MP4 (the open standard) format, we needed to make no other changes in the Staatsburgh "plugin" content.

Continuation of the Project

Our plan is to continue the project after the grant period. Specifically, the Geoplicity open source community will fix major bugs, if any, as long as the P3470 hardware we've stationed at Staatsburgh is functioning and actively in use in the field. Second, the project team will monitor the device usage and analyze its on-board diagnostics to periodically recover research data. See section, "Long-Term Impacts," for more information.

While we have released to the open source community an Android version of the software framework and Staatsburgh has expressed interest in the concept underlying this development, this effort was outside the scope of our original plans. Thus, we believe it would be premature to pursue new content and software development without additional funding to enhance the product given the lessons we've learned, including the designs and software for Android.

Long Term-Impact

The project has enabled us to lay the groundwork long-term impacts. The first of these is the potential to fully exploit the benefits of the product to educate the public in a new way on local history and also to attract and serve more visitors to Staatsburgh.

Second, the deployment of the P3470 devices at Staatsburgh will enable us to continue to collect data on their use. We have outfitted the devices with two gigabytes to eight gigabytes of flash memory and enabled the software to record virtually indefinitely date, time, location, usage, and survey statistics. We will periodically collect these data and mine them for future projects, research programs, and grant applications.

Third, as the technology had emerged initially from the classroom and independent study for a number of students, and as of the summer 2011 was still being developed and researched for Android applications, the project serves as a model for future software development instruction.

Grant Products

The grant has produced primarily three products. First, the devices are available for use at Staatsburgh. Second, a peer-reviewed research publication can be downloaded at <http://foxweb.marist.edu/users/ron.coleman/pubs/csedu2011-5.pdf>. Finally, the complete system source code is available at <http://code.google.com/p/cooltour/>.

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References

1. Coleman, R., Bass, J., Pryslopski, C., Johnson, J., Fraser, D., Moore, M., “The Digital Pathfinder: A Plug-and-Play Approach to Local History Instruction in the Field,” *Third International Conference on Computer Supported Education*, Noordwijkerhout, The Netherlands, 6 – 9 May, 2011
2. TheDigitalPathfinder channel, “The Gilded Age Meets the GPS Age in Staatsburgh,” <http://www.youtube.com/watch?v=tfOybE5-CqQ>, accessed: 2 Oct 2011

Appendix 1 – Teaching the Hudson Valley

Received from Emily Katz (Emily_Katz@partner.nps.gov) on 1 Aug 2011.

Digital Pathfinder at Staatsburgh

Participants reported:

The content met their needs/interests: 5 strongly agree, 1 agree

Technology enhanced the experience: 2 strongly agree, 3 agree

They would consider bringing students there: 3 strongly agree, 3 agree

They can use what they learned: 3 strongly agree, 3 agree

Facilitator was well prepared/organized: 5 strongly agree, 1 agree

Overall the experience was excellent: 6 strongly agree

Participants most valued: the tour guide, use of technology with a historical site, hands-on development discussion, hearing the challenges of development

Suggestions for Improvement: brightness of GPS must be easy to adjust or people will get lost.

Ideas for follow-up: pre and post visit materials for students, info on future changes.

Participants agree the content met their needs/interests, technology enhanced the experience, and the facilitators were well prepared/organized.