# An Inter-Disciplinary Approach to Web Programming: A Collaboration Between the University Archives and the Department of Computer Science

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Computing in the Humanities, an undergraduate course at New York University, represents a unique collaboration between the Computer Science Department and the University Archives. The final assignment required students to select, digitize, and contextualize materials from the Archives' collections in an interactive website. The design and implementation of the course incorporates four current and important trends in both disciplines. First, the professor and archivist worked closely together before and during the course, integrating the archival research component into the core mission of the course. Second, the students' projects provided both increased subject access and dynamic Web content to the repository and meaningful work to the students. Third, this course produced students who "bridge" the needs of humanists with the capabilities of technology. Fourth, this course illustrated the growing importance of web programming in undergraduate computer science education.

## 1. Trend 1: Archives and archivists in the undergraduate classroom

Archiving journals and conference presentations have increasingly focused on the experiences of archivists at educational institutions who seek to integrate archival resources into the undergraduate curriculum. Notably absent from this literature, however, is any mention of collaboration between archivists and professors in computer science or related departments.

Before the course began, the professor, undergraduate librarian, and University archivists discussed the structure of the course. The librarian and assistant University archivist co-lectured for one class session. The students who elected to work in the University Archives for their final projects were also required to meet with the assistant archivist before embarking on their research. These meetings ensured that students would have sufficient resources at the Archives to conduct their primary (visual) and secondary (textual) research. Students from the class were also required to digitize photographs, documents, and audio materials as part of the assignment.

At the end of the semester many students who had used the University Archives for their project turned in their assignments for publication on the University Archives website. In doing so, the difference between a class project and a project published on the Internet under the authority of the University Archives became clear.

## 2. Trend 2: Projects increase access to archival materials and provide meaningful work for students

The projects produced by students in this course reflected the students' interests in the University Archives' collections—interests that do not necessarily coincide with the digitization and processing priorities of Archives staff. Archives staff can use this information to determine what researchers might look for in our collections and use this information to influence future digitization and processing priorities. Additionally, by digitizing materials from across collections centered on a particular theme, the students actually increased access for other users.

By allowing students to curate their own mini-collections, the repository opened up new opportunities to interpret these materials. This interpretation represents an instance of what Tom Nesmith describes as the "new description…a much more thorough contextual

mapping of pathways through the masses of records [that] add[s] evidential value to the records" (Nesmith, 2007). By juxtaposing student projects with finding aids prepared by the Archives, a viewer of the University Archives website can compare the students' interpretations and the context of the records that were digitized. This contextualization is essential to understand these projects and the records they feature rather than provide additional "background noise of the World Wide Web" (Eamon, 2006). Future collaborations might include students working with the Archives-generated XML itself to discover new methods of embedding information, or modifying the schema or stylesheets to include different information.

## 3. Trend 3: Nexus between computer science and archives

The course introduced new users to the repository and creates new areas of collaboration between archivists and faculty. Students enrolled in the course learned rudimentary archival research skills and, most importantly, were introduced to the same issues archivists wrestle with on a daily basis when providing materials to users.

Many articles written in the past decade mention how online digital collections and delivery of finding aids online have become rote rather than exceptional for most repositories. Yet at the same time there have been few overtures by archivists to bridge this digital divide at the undergraduate or even at the graduate level. In her 2005 survey of archival job postings, Michelle Riggs found that employers increasingly require knowledge of EAD and the markup languages HTML, XML, and SGML. She urges archival education programs and library science programs to offer instruction that matches employer demand (Riggs, 2005).

By introducing students with programming skills to research in an archive, this course also sought to create students who understand and can combine the capabilities of technology with the needs of a researcher. Corinne Jörgensen laments that the professionals who create access systems for digital resources, and those who access those resources, do not speak to each other or reference each other's research (Jörgensen, 1999).

## 4. Trend 4: Emerging importance of web programming in undergraduate computer science education

The Computer Science Department undergraduate program at New York University offers both a Computer Science major and minor as well as a minor in Web Programming and Applications. The department encourages faculty to create courses in web programming to meet the needs of students in both the CS major and minor programs.

Web programming has been increasing in importance in university Computer Science Education. "Despite its reputation in some circles, web programming is conceptually deep; it gives a simple way to learn event-driven programming, to become conversant in many languages, learn the client-server paradigm, interact with databases, and more" (Stepp, 2009). Students with only one semester of studies in implementing websites and one semester of a high-level programming language such as Java or Python can build complex and interactive websites. We can thus reach students across a variety of disciplines, as this project offers a rich opportunity for inter-disciplinary studies. Both early CS majors and CS minors have an opportunity to focus on the content of the sites as well as the technology and programming required to build them.

Programming and technology requirements for this project included:

1. XML and XSLT (using text editors without a WYSIWYG interface) for the collection catalogues

2. PHP and JavaScript as well as advanced XHTML and CSS for the user interface

3. Original podcasts and work with appropriate multi-media objects related to the collections

At the University of Houston, Clear Lake, faculty used the following goals to design programming assignments for web programming coursework (Yue, 2004):

- Realistic: the assignments should be similar to useful real-world projects.

- Complete and ready: the products of the assignments should be Web applications that can be deployed with no or little modification.

- Technically important: the assignments should use important concepts and technologies.

- Illustrative and interesting: the assignments should be intellectually appealing and interesting.

We believe that the project that we developed together for this course meets these criteria with the added benefit of the intellectual and research challenge posed to the students using primary source materials as the foundation of their work. This allowed us to expand on the criteria as follows for our projects:

- The assignments should provide a basis for substantive historical research.

- The assignments should provide a basis for inter-disciplinary discussion and research for dual-major students and students with majors outside of computer science.

- The assignments should provide real world experience with skill sets that students in the Humanities fields would use in future research and graduate studies.

- The assignment should provide the student with an opportunity to experience the complete life-cycle of a programming project: from inception, research and design through implementation and publication.

In conclusion, we believe that the current trends in archival research and computer science undergraduate education have converged in a way that provides rich opportunities for our students as well as for the university. Students were engaged in and enthusiastic about their projects, which represented real-world applications of the concepts that comprised the course's goals. Several students cited the course as their inspiration to attend graduate school in library and information science. We believe that the need for graduates with this combined set of skills will continue to grow.

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