

# Constructionist Learning in Digital Archives Education: Student Perceptions of Effectiveness

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## ABSTRACT

This paper explores if a constructionist learning approach to digital archives education can positively influence student perceptions of their learning. Constructionism is a learning theory that places students in the role of designers and emphasizes creating physical artifacts in a social environment (Papert, 1980, 1991; Kafai, 2006). This theory is used in the instructional design of the Digital Archives Creation Project (DACP), which is a major component of a new digital archives course offered to a class of students enrolled in a MSLIS program. Results indicate that students perceived strong increases in their learning because of their engagement in the DACP, particularly in terms of their skills, confidence, understanding of topics covered in other courses, and overall understanding. Factors that influenced these increases include the collaborative teamwork, the role of the facilitator or instructor, and individual effort. Results indicate that a constructionist pedagogical approach holds great promise for LIS education, yet further research is required.

## Keywords

LIS education, constructionism, digital archives

## INTRODUCTION

As I began designing a new course on digital archives, the old adage kept haunting me: “You can’t get a job without experience, and you can’t get experience without a job.” Teaching in Manhattan only a few miles from Wall Street, the setbacks facing the world economy were difficult to ignore and the job market for new LIS graduates felt perceptibly tight. I knew my students felt pressure to extract as much utility from their graduate education as possible, especially considering the cost of undertaking an advanced degree. I wanted to provide them with the best possible learning experience; one that would challenge their

creativity and strengthen their skills and confidence. I believed the most convincing way students could prove their capacities was to showcase a concrete, professionally produced product. This approach aligns particularly well with the archival community’s emphasis on “more product, less process” (Greene & Meissner, 2005 p. 208). Using a “more product” approach to digital archives education, I created the Digital Archive Creation Project (DACP) as a major component of the course. Partnering with a small archive, the DACP allows students to effectively construct an entire digital archive from scratch, involving such tasks as digitizing materials, designing and deploying a digital presence, creating metadata and conducting research. On the final class, the students would hand-off the digital archive to the archival organization for their continued use.

The DACP employs a constructionist pedagogical approach to digital archives education, where students solve authentic problems situated in meaningful activity. This paper will investigate if this pedagogical approach can positively impact student learning, as perceived by the student.

## LITERATURE REVIEW

As an instructional method, the DACP relies primarily on a constructionist educational approach and secondarily on situated learning and problem-based learning.

Constructionism places learners in the role of designer and emphasizes the importance of having a tangible artifact that learners can bring with them and discuss with fellow learners and others in their social network (Papert, 1980, 1991; Kafai, 2006). Papert (1991) describes how learning “happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it’s a sand castle on the beach or a theory of the universe” (p. 1). Constructionist theory has been employed in a variety of learning contexts. Papert (1980) initially employed constructionism in mathematics education by having students use the Logo programming language to engage in creative experimentation and the making of computer-based artifacts. More recently, constructionism has been used to reframe media education such that youth engage in creative production, and the “creative artifacts can then be used in the classroom for encouraging a critical discussion of new media and the transparency concerns of software interfaces” (Pepler &

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Kafai, 2007, p. 7). Similarly, it has been used to teach students computer programming through designing artifacts using the Scratch visual programming environment (Maloney, Peppler, Kafai, Resnick & Rusk, 2008).

Situated learning suggests that learning is best promoted by situating learners within a meaningful context where "cognition" is constituted in dialectical relations among people acting, the contexts of their activity, and the activity itself" (Lave, 1988, p. 148). Situated learning implies that students should see their development as personally enriching and of value to the individuals they are collaborating with and the communities they are serving. For the educator, the role becomes more focused on creating an authentic context where learners can readily see how their work is having an impact on their environment (Lave & Wenger, 1991). Lave and Wenger (1991) draw attention to the collaborative aspects of work processes, particularly to legitimate peripheral participation, which describes a process by which a newcomer becomes a community member by gradually taking on the role of the expert. This emphasis on collaborative work indicates that learners acquire new skills as much from each other as from the expert and in doing so gradually become more adept.

Problem-based learning is an instructional method where students learn by solving authentic, ill-structured problems (Barrows, 1985; Hung, Jonassen & Liu, 2008). Problem-based learning is student centered where "knowledge building is stimulated by the problem and applied back to the problem" (Ibid., p. 488). The instructor acts as "facilitators (not knowledge disseminators) who support and model reasoning processes, facilitate group processes and interpersonal dynamics, probe students' knowledge deeply, and never interject content or provide direct answers to questions" (Ibid., p. 489). The ways in which these theoretical commitments factor into the implementation of the DACP will be discussed in the following section.

## **INSTRUCTIONAL DESIGN**

The structuring of the DACP employed each of the three theoretical commitments, primarily constructionism and secondarily situated learning and problem-based learning.

Situated-learning was used from the onset of the project by creating a meaningful context for the students' work. This was accomplished during the initial class session by clearly communicating to students the needs and interest by the partner organization for creating a digital archive. The partner organization is the Dalton School, a private K-12 school based in Manhattan, that had began an oral history project that looked to capture the school's unique history and progressive educational philosophy. The oral history project included interviews from faculty, students, and staff, and was recorded on 55 cassette tapes. Our goal was to make this material available to the community via a web-based digital archive. Thus, a meaningful context was

created by making it clear to students that their work was needed and would be appreciated by a community of users.

Individual class sessions were organized around a problem-based learning approach where each week students would have to address a series of problems on how to move forward with the digital archive. As the instructor, I would pose the problems or highlight what the students thought were the problems and was careful never to give what could be perceived as "the right answer." This is a challenging role, especially within a college classroom context where students are more familiar with "the sage on the stage" and less so with the "guide on the side." The course components, such as discussions, course readings and collaborative work were oriented towards solving the week's problems. For example, the course readings on topics such as digitizing audio material or creating metadata became crucial to solving these problems. The collaborative work was also oriented towards advancing the project. Students were divided into one of five groups (research, metadata, design, technology, and quality assurance) based on interests, and teams would have to address important questions on how to proceed with the project. For example, the metadata team would have to decide what metadata to create (if any), what standard (if any) to use, would items be organized at the item level or collection level, among many other questions. The technology team had to figure out what content management system to use (if any), among many other questions. The research team considered the state of the art in digital archives and how to make the archive more engaging to the community. The design team considered how to make the site useable and visually appealing. The quality assurance team had to devise a plan to ensure the quality of the recordings, metadata, and overall site usability. And the teams had to figure out how to work together to deliver a coherent product.

In addition to solving problems, each class session would begin by students digitizing tapes (five tape players were available in the classroom), and class would proceed while the digitization occurred. By the end of the class session, the digitization would be complete and the students would upload the files to a server. After 12 weeks, all the tapes had been digitized.

As suggested by constructionist theory, the students iteratively built the digital archive and had a tangible artifact to discuss and to show to their greater social network. By the end of the semester, the students had produced a professional, attractive digital archive (see Figure 1). The digital archive included: WAV files for preservation and MP3 files for listening, a deployment of Omeka<sup>1</sup> with a customized theme, digitized photographs of

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<sup>1</sup> Omeka is an open source project led by the Center for History and New Media, available at <http://omeka.org>

the interviewees to visually augment the site, and each oral history cataloged in detail to improve discovery.

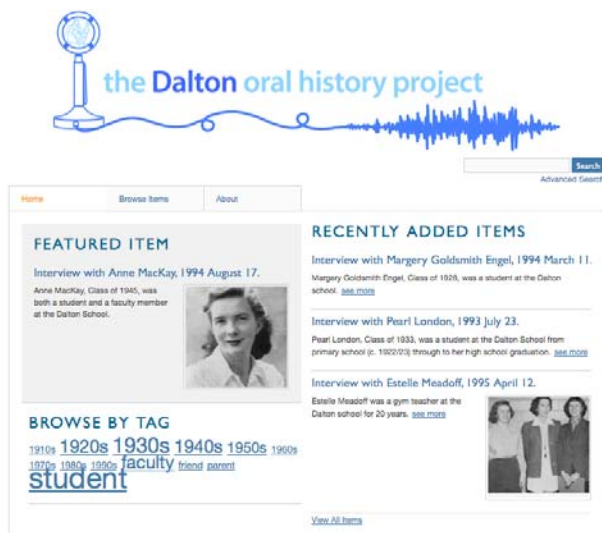


Figure 1. Completed web-presence of digital archive

## RESEARCH METHOD

### Research Questions

This study has the following research questions:

1. What gains in digital archive skills, confidence, understanding of topics covered in other courses and overall understanding did the participants perceive as a result of engaging in the DACP?
2. What factors (collaborative team work, facilitator/instructor involvement, individual effort or past knowledge) influenced which learning outcomes?

### Participants and Method of Analysis

All students are MSLIS students (15 female and 2 male). A survey was distributed to all students on the final session of the course, and returned by all but one student ( $N=16$ ).<sup>2</sup> The survey results are categorized by the students' perceived learning outcomes (skills, confidence, understanding of topics covered in other courses and overall understanding) and factors that influenced the outcomes (prior knowledge, individual effort, facilitator involvement, and collaborative team work).

The variable value for some categories was formed by student responses to multiple questions. In cases such as this, this value was computed by taking the average student responses across all questions within the category (e.g., "skills" is the average value of student responses for questions 4 to 8 and 18 to 19).

<sup>2</sup> The survey is available at [http://mysite.pratt.edu/~acocciol/da\\_2010\\_survey.pdf](http://mysite.pratt.edu/~acocciol/da_2010_survey.pdf).

## RESULTS

### Research Question 1: Student perceived learning outcomes

Students strongly to moderately agree that the DACP improved their skills, confidence, understanding of topics covered in other courses and overall understanding of digital archives, as indicated in Table 1.

Categories	<i>M</i>	<i>SD</i>
Confidence	3.63	.55
Skills	3.43	.54
Understanding of topics covered in other courses	3.31	.9
Overall Understanding	3.77	.36

Table 1. Student Perceived Learning Outcomes (scale 1-4, with 4 being "strongly agree" with improvement)

### Research Question 2: Factors influencing perceived learning outcomes

Participants strongly to moderately agree that their perceived learning outcomes were influenced by their collaborative teamwork, the involvement of the facilitator, and the individual effort made (see Table 2). Students moderately to strongly disagreed that they had prior experience creating a digital archive.

Categories	<i>M</i>	<i>SD</i>
Teamwork	3.47	.59
Facilitator	3.75	.58
Individual Effort	3.69	.48
Prior Knowledge	1.63	.89

Table 2. Student Perceived Factors Influencing Learning Outcomes (scale 1-4, with 4 being "strongly agree" with the role the factor played)

In addition, perceived increases in skills, confidence, understanding of topics covered in other courses and overall confidence were correlated with teamwork, facilitator involvement, and individual effort (see Table 3). Prior knowledge of creating digital archives is correlated with increased confidence, but not the other perceived learning outcomes.

Factors:	Perceived Learning Outcomes:			
	Confidence	Skills	Understanding of topics covered in other courses	Overall Understanding
Teamwork	.69**	.69**	.53*	.54*
Facilitator	.66**	.79**	.88**	.88**
Individual Effort	.71**	.70**	.67**	.72**
Prior Knowledge	.53*	.42	.47	.27

$N = 16$ , \*  $p < .05$  \*\* $p < .01$  (both two-tailed tests)

**Table 3. Correlations among the perceived learning outcomes and factors**

### DISCUSSION

The results indicate that a constructionist pedagogical approach to digital archives education, where students solve authentic problems situated in meaningful activity, can positively impact student reports of skills, confidence, understanding of topics covered in other courses, and overall understanding. Additionally, for students who already have experience creating digital archives, engaging in such a project can increase their confidence. These perceived learning increases are influenced by the collaborative teamwork, the facilitator, and the effort made by the individual.

### LIMITATIONS

Although this study has several strengths, there are a number of limitations. The first is that the sample ( $N=16$ ) is small, especially for a study that uses statistical analysis. However, since the results were encouraging, the instructor will use the instructional method again and will thus generate more data on how the instructional method is impacting student learning. However, comparison may prove problematic because the physical collection, and most likely the partner organization, will be different in every instance of the course, which is essential to maintaining the authenticity of the context (re-digitizing the same collection for the sake of cross comparison would not be sensible). A further limitation is that the learning outcomes are what the student perceives them to be, and not measured against an objective standard. Further iterations of the study could do pre-post assessments of student understanding and skills.

### CONCLUSION

This study illustrates that a constructionist pedagogical approach, where students solve authentic problems in a meaningful context, holds great promise for LIS education. The method can be used in other LIS courses as well, such as ones dealing with digital libraries and digital curation.

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