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**Situating Student Learning in Rich Contexts: A Constructionist Approach to Digital Archives Education**

Anthony Cocciolo  
Pratt Institute School of Information and Library Science  
New York, New York, United States of America  
Email: [acocciol@pratt.edu](mailto:acocciol@pratt.edu)

**Received:** 28 Apr. 2011

**Accepted:** 09 May 2011

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**Abstract**

**Objective** - This paper sought to determine whether a constructionist pedagogical approach to digital archives education could positively influence student perceptions of their learning. Constructionism is a learning theory that places students in the role of designers and emphasizes creating tangible artifacts in a social environment. This theory was used in the instructional design of the Digital Archive Creation Project (DACP), a major component of a digital archives course offered to students enrolled in a Master's program in library science at Pratt Institute School of Library and Information Science.

**Methods** - Participants were the 31 students enrolled in the DACP during the fall and spring semesters of 2010. They were surveyed as to their perceived learning outcomes as a result of their engagement with the DACP.

**Results** - Results indicated that students perceived strong increases in their learning following 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.

**Conclusion** - The project demonstrated that a constructionist pedagogical approach to digital archives education positively impacted students' perceptions of their learning.

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*His entrance is quite undramatic according to conventional standards. Nevertheless, this is a subtly contrived, outrageously theatrical effect. No hush falls as George walks in. Most of the students go right on talking. But they are all watching him, waiting for him to give some sign, no matter how slight, that the class is to begin.*

-- Christopher Isherwood, *A Single Man*, pp. 56-57

## Introduction

Isherwood aptly captured the anticipation associated with the most common and well-known form of college teaching--the lecture. This teaching method predominates in both popular conceptions of college instruction as well as in practice. Despite its ubiquity, it has been criticized at best as a source of youthful boredom, and at worst as inhibiting individual thought and promoting rote learning (Brookfield, 2006). To address the potential pitfalls of lecture-based instruction, a host of teaching methods have been developed to engage students more actively in the learning process. Under such names as problem-based learning, active learning, and cooperative learning, students engage in instructional activities, rather than listening exclusively to the "sage on the stage" (King, 1993). Lectures—when used in these contexts—are short in duration and used to clarify the problems at hand, rather than merely transmitting knowledge (Hung, Jonassen & Liu, 2008).

Building further upon learner-centered teaching strategies, this project used a constructionist approach to digital archives education. Constructionism places the learner in the role of designer. It emphasizes the importance of having a tangible artifact that learners can bring with them to discuss with fellow learners and pertinent others in their social networks (Papert, 1980, 1991; Kafai, 2006).

Constructionism should not be confused with constructivism, a related learning theory that describes more generally how learners construct new knowledge from their

experiences (Dewey, 1910). Using constructionism as a theoretical model, the class was structured around the design of a tangible artifact—a digital archive—for a partnering institution. During the Digital Archive Creation Project (DACP), students developed a digital archive through engagement in a multitude of tasks, such as digitizing materials, designing and deploying a digital presence, creating metadata, and conducting research. In the final class, students presented the digital archive to the partner institutions for their continued use. This study investigated whether this pedagogical approach, where students solved authentic problems situated in meaningful activities, could positively impact student perceptions of their learning.

The project was guided by the notion that librarians and library science educators should regularly be "finding and using the best research possible to aid in our decision making" (Koufogiannakis & Crumley, 2006). Using this evidence-based library and information practice approach, the intent was to uncover the effectiveness of the DACP as an instructional method.

## Theoretical Background

### *Constructionism*

Constructionism, as described by Kafai (2006), "brings to mind the metaphor of learning by constructing one's own knowledge, and is contrasted to the more traditional 'instructionism,' which favors the metaphor of learning by transmission of knowledge" (p. 38). Seymour Papert, the father of constructionism, described the artifacts that learners create as "objects-to-think-with," where the designed artifacts "can become objects in the mind that help to construct, examine, and revise connections between old and new knowledge" (Kafai, 2006, p. 39). The use of tangible objects that can become objects in the mind is thought to be particularly effective at promoting appropriation, or the process by which "learners make knowledge their own and begin to identify with it" (Kafai,

p. 39). For example, disparate artifacts such as pieces of metadata, digitized and un-digitized materials, content management system source code, metadata schemas, or visual designs, become units that the learner can arrange and re-arrange. Understanding how each of these elements works, and assembling them into a coherent whole inspires a sense of “know how.” These real artifacts become objects in the mind, and new connections are formed by working with them.

Central to the theory of constructionism is the social nature of learning. Rather than isolating the learner to construct his or her own knowledge, constructionism “focuses on the connected nature of knowledge with its personal and social dimensions” (Kafai, 2006, p. 36). 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). Rusk, Resnick, and Cooke (2007) concur, noting that learners construct new knowledge with particular effectiveness when they are “actively engaged in creating something that is meaningful to themselves or to others around them” (p. 19). Under this theory, and in the case of the DACP, designing an artifact that was not perceived as socially relevant or personally meaningful to the students would be less efficacious at promoting learning.

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 making computer-based artifacts. More recently, constructionism has been used to reframe media education and engage young people in creative production. Peppler and Kafai (2007) noted that “creative artifacts can then be used in the classroom for encouraging a critical discussion of new media and the transparency concerns of software interfaces” (p. 7). Similarly, constructionist theory has been used to teach students computer programming by

designing artifacts using Scratch, a visual programming environment (Maloney, Peppler, Kafai, Resnick & Rusk, 2008). It has also guided the underlying theory of “The Computer Clubhouse,” Intel’s after-school program. In this program youth engage in creative technology production in a social environment (Rusk, Resnick & Cooke, 2009).

### *Situated Learning*

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). Like constructionism, situated learning implies that students should see their development as personally enriching and of value to the individuals with whom they are collaborating 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) drew attention to the collaborative aspects of work processes, particularly to legitimate peripheral participation, which describes a process by which a newcomer becomes a part of a community of practice by gradually taking on the role of the expert. This emphasis on collaborative work indicates that learners acquire new skills from each other as much as from experts, and in doing so they gradually become more adept.

Developing learning environments to support the formation of communities of practice has been used in a variety of contexts. For example, it has been used to reconceptualize teacher professional development to shift the focus from teachers acquiring new knowledge to focusing on teachers participating in shared practice (Barab, Barnett & Squire, 2000). In library and information science education, the theory has been used to support adult learning related to core library science concepts, practices, values, and leadership skills (Yukawa, 2010).

### *Problem-based learning*

Problem-based learning (PBL) is an instructional method where students learn by solving authentic, ill-structured problems (Barrows, 1985; Hung, Jonassen & Liu, 2008). PBL is student-centered, and “knowledge building is stimulated by the problem and applied back to the problem” (Hung, Jonassen & Liu, 2008, p. 488). Instructors act 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” (Hung, Jonassen & Liu, 2008, p. 489).

PBL has been used in a variety of contexts, most notably and extensively in medical education (Barrows, 1985). It has also been used in a variety of other contexts, such as teacher education and in developing problem-based learning curricula for use with children. Hung, Jonassen, and Liu (2008) reviewed the contexts and outcomes of problem-based learning implementations in K-12 education, noting that PBL has shown positive effects in a variety of content areas, including mathematics, science, literature, history, and microeconomics. They further noted that PBL has proved effective in urban, suburban, and rural communities, and with a variety of student groups, including both low-income and gifted students. In library and information science education, PBL has been used in the teaching of a basic reference course (Baker, 1999) and in an online course curriculum (Yukawa, 2007).

### **Instructional Design**

The DACP was used in two 15-week semesters during the year 2010, each with a different partner institution. For the first semester (Spring 2010), the partner organization was the Dalton School, a private K-12 school based in Manhattan, New York. The school had begun an oral history project to capture the school’s unique history and its grounding in progressive educational philosophy. The oral

history project included 35 interviews from faculty, students, and staff recorded on audiocassette. The project goal was to make this material available to the Dalton community via a web-based digital archive.

In the second semester (Fall 2010), the class partnered with the Lesbian Herstory Archive (LHA), the world’s largest and oldest archive of material about lesbians and lesbian communities, located in Brooklyn, New York. Again the goal was to digitize a collection of spoken word material available on 35 audiocassettes, and to make the content generally available on the Internet. Notable in this audio collection were oral history interviews with Mabel Hampton (1902-1989), a lesbian activist who was involved in the Harlem Renaissance and could speak of the lives of black women and lesbians during that period (Nestle, 1997).

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 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 interests of the partner organization for creating a digital archive. The use of context was further augmented in later weeks by a site visit to the archive. In the case of the Lesbian Herstory Archive project, one of the class sessions was held at the archive and included a tour. Similarly, a group of students visited the Dalton School to do further research in the archives. In these site visits, students gained an understanding of the potential benefits of the digital archives. Both organizations were concerned about the degradation of audiotape, especially as some of them were over thirty years old. Additionally, students learned how the archives hoped to make the material more widely accessible by having it available digitally over a network. In sum, 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, and each week students addressed a series of problems necessary to the continued development of the digital archive. The instructor would pose the problems or highlight what the students thought were problems, but the instructor would not give what could be perceived as “the right answer.” For both the students and the instructor, this was a challenging change of roles, especially in a college classroom where students are more familiar with “the sage on the stage,” and less so with the “guide on the side.” Maintaining the facilitator role was essential, because it required students to make use of their research skills to find the most appropriate answers. For students the process required more cognitive and personal investment than simply internalizing correct answers.

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 completing the project in a way that coincided with professional practices. Students could see how neglecting to keep up with course readings was not only a detriment to themselves, but could disappoint the collective effort and have a related impact on the quality of the project and the communities being served.

Students were divided into one of five groups (research, metadata, design, technology, or 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 (if any) to create, what standard (if any) to use, and whether to organize items at the item or collection level. The technology team had to determine what content management system (if any) to use,

how and where it would be hosted, how the technology supports the metadata schemes, 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 devised a plan to ensure the quality of the recordings, metadata, and overall site usability. Finally, the teams had to figure out how to work together to deliver a coherent product, as well as how to satisfy partner interests.

Each class session began with the students digitizing audiocassettes (five tape players were available in the classroom). The instruction lesson proceeded while the digitization process continued. By the end of the class instruction at each session, the digitization would be complete, and the students uploaded the files to a server. At the end of 12 weeks, all 35 tapes had been digitized.

As suggested by constructionist theory, the students iteratively built the digital archive and had a tangible artifact to discuss and demonstrate to their greater social network. For example, students shared their work with others using social media (Facebook and Twitter) and their own personal websites. By the end of the semester, the students had produced a professional quality attractive digital archive. Figure 1 is a screenshot of the Dalton project, and Figure 2 shows a screenshot of the LHA project. Both digital archives included .wav sound files for preservation, MP3 audio files for listening, and digitized photographs of the interviewees to visually augment the site. In addition, the students cataloged each oral history in detail to improve discovery efforts. For technology, the Dalton group chose the Omeka content management system, and the LHA project chose the CollectiveAccess content management system.



the Dalton oral history project

Search  
Advanced Search

Home Browse Items About

### FEATURED ITEM

**Interview with Anne MacKay, 1994 August 17.**

Anne MacKay, Class of 1945, was both a student and a faculty member at the Dalton School.



### RECENTLY ADDED ITEMS

**Interview with Margery Goldsmith Engel, 1994 March 11.**

Margery Goldsmith Engel, Class of 1928, was a student at the Dalton school. [see more](#)

**Interview with Pearl London, 1993 July 23.**

Pearl London, Class of 1933, was a student at the Dalton School from primary school (c. 1922/23) through to her high school graduation. [see more](#)

**Interview with Estelle Meadoff, 1995 April 12.**

Estelle Meadoff was a gym teacher at the Dalton school for 20 years. [see more](#)



### BROWSE BY TAG

[1910s](#) [1920s](#) [1930s](#) [1940s](#) [1950s](#) [1960s](#)  
[1970s](#) [1980s](#) [1990s](#) [faculty](#) [friend](#) [parent](#)  
[student](#)

Figure 1  
Digital archive created by students for the Dalton School.

My Sets Logout

**LESBIAN**

**HERSTORY**

**ARCHIVES**

# Digital Collections

BROWSE COLLECTION
HERSTORIES
ABOUT

mabel

SEARCH

**Featured Item:**



Welcome!

The Lesbian Herstory Archives' oral history collection brings the rich stories of the women who helped shape the Archives to life. This digitized collection features insightful audio recordings and iconic photographs which give us a look into the lives of many important Lesbians of our lifetime.

Standing out within this collection are stories of the life of Mabel Hampton, long-time activist who helped shape the Archives. Her youth, community involvement, and relationships with friends and loved ones are captured in these oral histories, which paint a vivid picture of a woman whose life has had a profound effect on so many around her.

Please browse and explore all that our collection has to offer.

Left: Joan at 38, Lesbian Life / Early Life Beginnings / Mabel Hampton; Joan Nestle (interviewer)

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Figure 2  
Digital archive created by students for the Lesbian Herstory Archive.

**Method**

*Research Questions*

This study addressed 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 (i.e., collaborative team work, facilitator/instructor involvement, individual effort, or past knowledge) influenced any perceived learning outcomes?

*Participants and Method of Analysis*

A *t*-test of independent samples was conducted to determine if there was a statistically significant difference between the two student groups. As there proved to be no difference, both groups were treated as a single group.

The participants of this study were all graduate library science students, 15 females and 2 males from the Dalton cohort and 13 females and 3 males from the LHA cohort. All students received a voluntary survey (Appendix) during the final session of the course, and the survey was completed and returned by all but one student in each cohort, yielding  $N=16$  and  $N=15$  responses. The goal of the survey was to collect student perceptions of their learning as a result of their engagement with the DACP. The instructor left the room while the students completed the paper survey.

The survey results addressed the project’s research questions. The mean value of students’ perception of their learning outcomes addressed the first research question, and correlations between the perceived learning outcomes and the factors that influenced those outcomes focused on the second research question.

The variable value for some categories was formed by student responses to multiple questions. In cases such as this, the value was computed by taking the average student responses across all questions within the category. For example, “skills” was the average value of student responses for questions 4-8 and 18-19. Similarly, “Overall confidence” was determined by responses to questions 1,16, and 17. “Confidence” was evaluated by questions 2 and 3; and “teamwork” was determined by questions 8-12.

The survey also allowed participants to add free-text comments. This qualitative data from these comments provided additional support for the quantitative analysis.

**Results**

There was no statistically significant difference between the Dalton and LHA cohort in any of the response categories ( $p > .05$ ). As a result, these groups could be treated as a single group of respondents who had received the

same instructional treatment, but during different periods of time ( $N=31$ ).

*Research Question 1: Student Perceived Learning Outcomes*

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

Table 1  
Student Perceived Learning Outcomes<sup>a</sup>

Categories	Mean	Std. Dev.
Confidence	3.75	0.45
Skills	3.53	0.44
Understanding of topics covered in other courses	3.52	0.81
Overall understanding	3.84	0.28

<sup>a</sup>Scale 1-4, with 4 being “strongly agree” with improvement.

*Research Question 2: Factors Influencing Perceived Learning Outcomes*

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

Table 2  
Student Perceived Factors Influencing Learning Outcomes<sup>b</sup>

Categories	Mean	Std. Dev.
Teamwork	3.59	0.47
Facilitator	3.84	0.45
Individual Effort	3.77	0.43
Prior Knowledge	1.76	1.02

<sup>b</sup>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 positively correlated with teamwork, facilitator involvement, and individual effort

(Table 3). Prior knowledge of creating digital archives was positively correlated with increased confidence, but not with the other perceived learning outcomes.

The quantitative findings were complimented by the qualitative findings, where students affirmed the importance of the collaborative teamwork (e.g., "I've never had such a great group [ . . . ] to work with," increased

confidence (e.g., "[it] will definitely help me in the future"), facilitator involvement (e.g., "Pratt needs more teachers like you"), the importance of producing a tangible artifact (e.g., "It's also awesome to have a final real-world product"), and engaging in meaningful activity (e.g., "Really felt like I was working towards something that actually matters") (Table 4).

Table 3  
Correlations Between the Perceived Learning Outcomes and Factors<sup>c</sup>

Factors:	Perceived Learning Outcomes			
	Confidence	Skills	Under- standing of topics covered in other courses	Overall Understanding
Teamwork	0.64**	0.48**	0.40*	0.53*
Facilitator	0.62**	0.64**	0.69**	.83**
Individual Effort	0.67**	0.69**	0.64**	.70**
Prior Knowledge	0.42*	0.34	0.15	0.26

<sup>c</sup>N = 31, \* p < .05 \*\*p < .01 (both two-tailed tests)

Table 4  
Complete Qualitative Feedback from Student Survey

Cohort	Comment
Dalton	The Digital Archives Creation Project is one of the best things I've done at SILS and you should definitely do one of these every semester—it was awesome and will definitely help me in the future.
Dalton	Great project – real world experience is always the best / even the problems we encountered were informative.
Dalton	Best, more applicable project ever. So well organized... it was great. I've never had such a great group (my team as well as the rest of the class) to work with. It's also awesome to have a final real-world product.
LHA	This was a wonderful class- especially having a real-world, group project! I can't really think of any suggestions... keep up the good work – Pratt needs more teachers like you.
LHA	I think formatting this project as a class project with teams having different areas of focus really allowed for a higher quality end product. I've had classes where each team is responsible with all aspects and it can lead to patchy results. Overall, this class was a success and I'm proud of the work we did. Thanks!
LHA	Great project. Overall thought it was wonderful + learned a lot. A few things I thought might help: - More structured project management (timeline, who does what) – Fewer people in research (it seemed like our bodies would have been helpful elsewhere, too) – not to say research wasn't awesome, it just seemed like tech was struggling a bit at times – ability to present the final project to LHA – ability to use Collective Access a bit more (just for experience)

## Discussion

The results indicate that a constructionist pedagogical approach to digital archives education, where students solve authentic problems situated in meaningful activity and produce tangible artifacts, can positively impact student reports of skills, confidence, understanding of topics covered in other courses, and overall understanding. These perceived learning increases are influenced by the collaborative teamwork, the facilitator, and the effort made by the individual.

Additionally, for students who already have experience creating digital archives, engaging in such a project was correlated with increased confidence. This finding makes practical sense: the more experience gained doing something, the greater the confidence. Results also indicate that the content of the digital collection was less important than the process of engaging in the collective building effort. This was made evident by the finding that there was no statistical difference between the groups who engaged in the LHA project and those who engaged in the Dalton project. In this case, students did not need to have prior interests in lesbian activism or in private schooling to eventually become engaged in the purposes of the project. Using the situated learning perspective, students become engaged in the purpose by engaging with the digitized content, collaborative teamwork, physically immersive site visits, and discussions with stakeholders from the partner institutions.

## Limitations

While this study had several strengths, there were also a number of limitations. The sample ( $N=31$ ) was small, especially for a study using statistical analysis. However, the qualitative feedback affirmed the quantitative results, which further supported the validity. Since the results were encouraging, the instructional method can be used again to generate additional data on how the instructional method impacts student perceptions of learning. A further limitation is that the learning outcomes were what the student

perceived them to be; that is, they were not measured against an objective standard. Further iterations of the study might include pre- and post-assessments of student understanding and skills.

## Conclusion

This study illustrated that a constructionist pedagogical approach, where students solve authentic problems in a meaningful context and produce tangible artifacts, holds great promise for library science education. The method can be used in other LIS courses as well, such as ones dealing with digital libraries and digital curation. More generally, it points to the efficacy of learner-centered instruction and the production of artifacts as a way of engaging students. It also suggests a new role for instructors creating environments where meaningful activities can occur.

In Isherwood's *A Single Man*, George surmised that his students' curiosity about the subject matter was limited: "Huxley, Tennyson, Tithonus. They're prepared to go as far as Tennyson, but not one step farther. There their curiosity ends. Because, basically, *they don't give a . . .*" (p. 63). He concluded that their lack of curiosity was a result of their not caring. The challenge for educators is to create a social and environmental context, using resources both inside and outside of the classroom, where it is nearly impossible not to care.

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### Acknowledgements

I would like to thank Maxine Wolfe and Bronwynne Pereira from the Lesbian Herstory Archives, and Adele Bildersee and Tobi Fineber from the Dalton School, for collaborating with my classes on these projects. I would also like to thank my colleagues at Pratt Institute for their help on various stages of this project, particularly Tula Giannini, Debbie Rabina, Cristina Pattuelli, David Marcinkowski and Jeffrey Hiban. And lastly, thank you to the students of my courses for their hard work in making these digital archives a reality.

## **Appendix**

### **Student Final Survey**

This anonymous and voluntary survey is intended to collect your feedback on the Digital Archive Creation Project (DACP). Your feedback will be used to influence successive iterations of the course and to assess the efficacy of the DACP as an instructional method. Scale 1-4 (4 = Strongly Agree, 1=Strongly disagree, or N/A). Please feel free to leave comments on the backside of this sheet. Thank you for your participation.

1. The DACP improved my understanding of digital archives.
2. I feel more confident to create digital archives from having worked on the DACP.
3. I feel more confident to create an oral history project from having worked on the DACP.
4. The DACP improved my understanding of how to digitize materials.
5. The DACP improved my understanding of how to organize information within a digital archive.
6. The DACP improved my understanding of metadata standards.
7. The DACP improved my understanding of Content Management Systems.
8. The DACP improved my understanding of Web-based systems.
9. Working with my team on the DACP improved my understanding of the subject matter.
10. I learned things from my DACP team members.
11. I feel that my DACP team members made an effort to advance the DACP.
12. I liked working with my DACP team.
13. Working with classmates outside of my team on the DACP improved my understanding of the subject matter.
14. I made an effort to advance the DACP.
15. The instructor, in the context of the DACP, improved my understanding of the subject matter.
16. The DACP increased my understanding of the complexities of digital archiving projects.
17. The DACP increased my understanding of the complexities of working with information technology.
18. The DACP improved my understanding of digital rights management.
19. The DACP improved my understanding of digital preservation.
20. The DACP was too hard.
21. The DACP offered a real-world problem.
22. The course materials (readings) improved my ability to complete the DACP.
23. I have already created digital archives before taking the class.
24. The DACP improved my understanding of topics covered in other courses I have taken at SILS (e.g., Information Technology, Knowledge Organization, etc.).