

Portfolios in Context: A Comparative Study in Two Preservice Teacher Education Programs

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Abstract

Portfolio authoring tools within teacher preparation institutions have changed dramatically as portfolios have moved from paper to electronic formats and now to the Web. This study used Engeström's Cultural-Historical Activity Theory (1987) to examine how portfolio tools, along with external influences and institutional contexts, mediate the experiences of preservice teachers creating program-required portfolios. The analysis revealed the networked nature of portfolio authorship and tensions arising from the network of activity. The findings can help accreditation officials, college administrators, and portfolio leaders better understand the impact of these programs on preservice teachers in order to inform policy and implementation. (Keywords: eportfolios, portfolios, CHAT, preservice teachers, accreditation)

LITERATURE REVIEW

Electronic portfolios are rooted in the traditions of their paper predecessors. Use of paper portfolios in education dramatically increased in the 1980s and 1990s (Elbow & Belanoff, 1997). In teacher education, performance-based assessment in the context of a portfolio allows preservice teachers to demonstrate what they know and what they are able to do. Portfolios, then, can provide a dual focus on basic knowledge retention as well as the application and demonstration of teaching-related skills that span an entire teacher education program and beyond. One strength of portfolios in teacher education is the connection that students make between their professional growth that occurs as a result of coursework and fieldwork during the process of learning to teach.

Early portfolio leaders suggested a portfolio should tell a learner's story and emphasized the role of the student as author of the portfolio (Paulson & Paulson, 1991). In contrast to the "portfolio as story" metaphor, Wilkerson and Lang (2003, 2004) offer the "portfolio as test" metaphor. In high-stakes environments like credentialing and accreditation, they argue standards of validity, reliability, fairness, and absence of bias are required to mitigate litigation risk, and stress the need to ensure "contents are rigorously controlled and systematically evaluated" (Wilkerson & Lang, 2003, paragraph 3). In higher education, portfolio adoption has been in response to accountability demands (Yancey & Weiser, 1997).

Electronic portfolios have become increasingly practical as student access to computers has improved and more student work has been submitted digitally. Since 1999, 441 Preparing Tomorrow's Teachers to Use Technology (PT3) grants totaling \$337.5 million have been awarded for technology-related activities (U.S. Department of Education, 2005), and more than one-half of grantees have used part of their allocation to initiate electronic portfolios (Britten, Mullen, & Stuve, 2003).

Accountability mandates have increased pressure for colleges of education to document achievement of standards. Many teacher preparation programs are turning to electronic portfolio systems to comply with the National Council for Accreditation of Teacher Education's (NCATE) requirements for aggregated data (Britten, et al, 2003). Two general approaches to electronic portfolio construction—customized assessment management systems (i.e. LiveText, Taskstream and others) and generic tools that include HTML editors, standard office productivity software, and portable document format (PDF)—are now widely in use. Each path has trade-offs in terms of capabilities and limitations (Gibson & Barrett, 2002).

The convergence of widespread Internet access and Web-enabled databases has made customized portfolio systems technically feasible, and software developers have been attracted to the educational market's offerings of systems that focus on accreditation and assessment demands (Barrett & Carney, 2005; ePort-Consortium, 2003). These systems use computer databases, servers, and custom programming to facilitate data aggregation and simplify security procedures.

The portfolio literature offers numerous contradictory findings. For example, portfolios are regarded as useful in promoting reflective practice among pre-service teachers (Avraamidou & Zembal-Saul, 2003; Borko, Michalec, Timmons, & Siddle, 1997; Shulman, 1998), but Carney (2001) warns that some preservice teachers are uncomfortable revealing too much of themselves in their portfolio entries. Zeichner and Wray (2001) urge us to move beyond "the obvious conclusions" of greater reflectivity in portfolio authors to examine how the context influences the nature and quality of reflections. The portfolio literature also suggests portfolios are valuable for developing teaching skills (Beck, Livne, & Bear, 2005; Hartmann, 2003; Klenowski, 2000; Lyons, 1998; Shulman, 1998), but portfolios may not be sufficient to document those skills (Shulman, 1988). Results are mixed as to whether portfolio authors develop technology skills (Britten, et al, 2003; McKinney, 1998; Piper, 1999; Wetzel & Strudler, 2006) or not (Placier, Fitzgerald, & Hall, 2001), but these differences might be attributed to whether or not portfolio authors use predefined templates. Carney (2002) highlights several dilemmas, including the "self-expression dilemma" (self-expression dilemma section, paragraph 2), and mentions templates as tools that enable some students to create more professional portfolios while constraining others from self-expression. In a similar vein, Borko et al. (1997) discuss how portfolio guidelines were perceived as flexible and helpful by some students and rigid and constraining by others. Perhaps the contradictions in the literature can be untangled after a closer look at the context of the activity. Zeichner and Wray (2001) offered a multidimensional framework to help situate

portfolio research and increase researchers' sensitivity to the context in which the portfolio is authored.

A few studies on portfolios and electronic portfolios have specifically examined the impact on preservice teachers (c.f. Carney, 2001; Placier et al., 2001; Wetzel & Strudler, 2006). An important weakness in the existing portfolio literature is that it is largely unconnected to broader theoretical frameworks. Numerous studies (Avraamidou & Zembal-Saul, 2003; Loughran & Corrigan, 1995; McKinney, 1998; McKinney, Perkins, & Jones, 1995; Piper, 1999; Richter, 1990; Snyder, Lippincott & Bower, 1998; Winsor, Butt, & Reeves, 1999) are atheoretical experience reports in which authors chronicled the progress of portfolio implementations in their classrooms or home institutions. Several (Borko, et al., 1997; Smith et al., 2001; Woodward & Nanlohy, 2004) reported on piloting a portfolio initiative. Others (Baume, Yorke, & Coffey, 2004; Derham, 2003) scrutinized assessment issues, and Strudler and Wetzel (2005, 2008; Wetzel & Strudler, 2005, 2006) examined the diffusion of electronic portfolios in teacher education programs and how programs were implemented from both faculty and student perspectives. Only a few researchers have connected their work to a theoretical framework. Robbins (2004) used Dewey's work to analyze reflection. Hartmann (2003) used grounded theory to trace portfolio innovations through the community of portfolio authors. Hoel and Hauglökken (2004) used a sociocultural perspective to examine the role of peer interactions in portfolio construction. Placier, et al. (2001) used a sociocultural frame to examine the effects of state and national reforms on the portfolio task, the challenges for authors to satisfy multiple, competing purposes within their required portfolios, and the confusion and frustration among portfolio authors as they worked within their changing institutional context.

For this study, the authors chose Engeström's (1987) Cultural Historical Activity Theory (CHAT) to explore the overarching research question "What are the preservice teachers' experiences using tools to create an electronic portfolio?" because it is a robust framework capable of capturing the context of the portfolio activity, including the external influences, the various tools employed, and the differing contexts of the institutions at which the study takes place. To our knowledge, CHAT has not previously been used to explore the preservice teachers' portfolio activity, and this study was, in part, an exploration of CHAT's utility to examine portfolio activity among preservice teachers and the complex context in which the preservice teacher's portfolio activity takes place.

THEORETICAL FRAMEWORK

Engeström's (1987) CHAT is a sociocultural framework appropriate for a complex and collaborative human act such as portfolio construction. CHAT is grounded in earlier work by Soviet psychologists including Vygotsky, Leontev, and Luria (Barab, Evans, & Baek, 2004) and is typically represented by one triangle embedded within another (see Figure 1, page 102).

CHAT models an activity as an interaction among the subject, the object upon which he or she is acting, the tools used for the activity, the community in which the activity is embedded, the rules that govern the subject and the

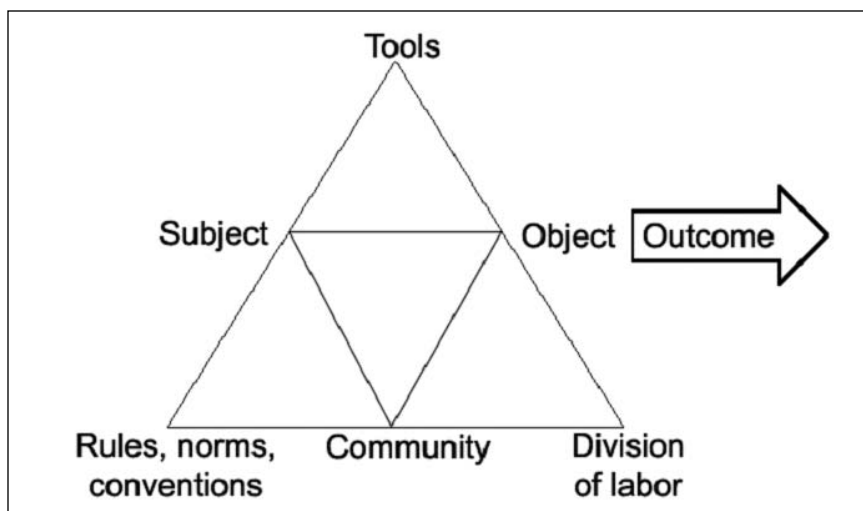


Figure 1: The structure of human activity developed in Engeström's (1987) Cultural Historical Activity Theory (CHAT).

community, and the division of labor that arises within the activity. CHAT also acknowledges that activity is purposeful and directed toward an outcome. Applying CHAT to portfolio activity involves researchers observing preservice teachers (Subjects) using computers and a variety of software products (Tools) to create digital portfolios (Objects). Often, portfolio activity is collaborative (Division of Labor), as portfolio authors engage with peers and professors (Community) to review their work (Division of Labor) or clarify portfolio requirements (Rules). The preservice teachers (Subjects) creating their program portfolio are required to complete (Rules) the portfolio (Object) in order to graduate (Outcome).

The framework also accounts for the influence other people and other activities have on an activity by exposing the network of activities surrounding and embedded within the activity of interest. This network gives rise to four layers of "tensions" that motivate those involved in the activity to make changes or to innovate. The first layer, a primary tension, is one that occurs within any specific node of the CHAT framework—for example, when one rule seems inconsistent with another or different tools don't work well together. A secondary tension results when there is a problem between any two nodes of the CHAT framework, as is the case when prescribed tools do not readily support a required task. A tertiary tension is one in which the current way of conducting an activity conflicts with how the activity was previously conducted—for example, when documentation is in hard copy format, because it is from a previous system but needs to be available electronically for the digital portfolio that is currently required. Finally, a quaternary tension exists when a conflict exists between two nearby activities, as is the case when a student ponders using his or her graduation portfolio for a subsequent job search.

CHAT has enjoyed increasing popularity in the English language research literature (Roth & Lee, 2007), and interested readers can learn more from

excellent treatments of the subject (Barab et al., 2004; Roth & Lee, 2007). For a robust discussion of tensions within activity systems, Holt and Morris' (1993) work is especially helpful. This study used CHAT as an organizing framework to examine portfolio authoring with its inherent complexity.

METHODS

The first author chose to join the portfolio community to examine the students' experiences as they created program-required portfolios. Her prolonged engagement in the community allowed her to interact with participants and observe the institutional contexts. She selected a multisite case study (Yin, 1994) as an appropriate strategy for this investigation.

Limitations and Delimitations

Although it would be ideal to examine the entire portfolio development process from beginning to end, such a longitudinal approach was not feasible. Consequently, this study is limited to a one-semester snapshot of the portfolio experience at the selected institutions. Visits to each institution lasted five weeks: a summer session at Large Midwestern State University (LMSU) in 2005 and five one-week visits spread across the fall 2005 semester at Small Liberal Arts College (SLAC). This research was conducted at only two institutions. Consequently, many more case studies at other institutions will be needed to fully explore this topic.

Portfolio authoring in teacher education programs has many stakeholders: students, professors, administrators, accreditors, prospective employers, and software vendors. This study was delimited to an examination of the student perspective and does not explore other perspectives. Such explorations will be vital to a better understanding of the complex activity of portfolio authoring.

Selecting Cases and Participants

Stake (1995) advises researchers to choose cases "to maximize what we can learn" (p. 4) and to choose sites that are both accessible and hospitable. With this advice in mind, the authors chose a number of selection criteria, based in part on the criteria Wetzels and Strudler (2005; Strudler & Wetzels, 2005) used to conduct their examination of electronic portfolio diffusion in teacher education programs. The central criterion was to visit an institution using a Web-enabled database portfolio tool (such as LiveText or Taskstream) and another using off-the-shelf tools such as Dreamweaver or Netscape Composer in order to examine the differential impact, if any, of the contrasting types of tools. In addition, the decision was made to examine mature portfolio initiatives to avoid the confounding factors introduced by challenges often present in new projects. In this study, both research sites had been using their portfolio systems for a minimum of three years. Each site was recommended as "best representative" of the portfolio approach in place by an expert in the field. The final criterion was that each site had portfolio initiatives that had been institutionalized for all teacher preparation programs on campus as the central hub for responding to accreditation requirements. Ideally, the two institutions would have been within

Table 1: Study Participants by Institution and Major

Student	Licensure Area	Gender
Large Midwestern State University		
Gabrielle	Social Sciences	F
Adah	Art Education and Graphic Design	F
Tiffany	Elementary Education	F
Amanda	Elementary Education	F
Monica	English Education	F
Sarah	Elementary Education	F
Small Liberal Arts College		
Mallory	Elementary Education	F
Phoebe	Social Sciences	F
Tucker	Art Education	M
Anne	Elementary Education and Exceptional Education	F
Cathy	Exceptional Education	F
Astra	English Education and Exceptional Education	F

the same accrediting environment, but this was not feasible. Instead, programs documenting similar standards were selected: one institution seeking NCATE accreditation and the other seeking state accreditation. Ultimately, LMSU and SLAC were selected as the research sites for this study.

The next task was to select individual preservice teachers to participate in the research. At each institution, the participant sample was six preservice candidates nearing the end of their teacher preparation program, but prior to student teaching. The first author recruited these participants from classes in session during her visits to the institutions. From those who volunteered, the authors purposefully selected final participants selected to represent a range of licensure areas. In addition to the principal participants recruited in this way, other students in the labs and classrooms were occasionally interviewed or observed to gain more perspectives on a particular matter and to triangulate the data. See Table 1 for more details about the principal participants.

Throughout this paper, pseudonyms are used to refer to the participating individuals and institutions. Additionally, Rubigrade and CommercialFolio are also pseudonyms for commercial products used in portfolio production and assessment.

Research Sites

LMSU is a comprehensive university with a rich tradition in teacher education. Primarily an undergraduate institution, LMSU enrolls approximately 4,000 students in its teacher education program. In fall 2002, LMSU instituted a new performance-based teacher education curriculum. One of the requirements for all teacher education majors was the creation of a digital portfolio. The digital portfolio model was shaped and refined with support from LMSU's

PT3 grant by teacher education faculty representing many colleges across campus (Britten, et al, 2003). The model is built around the Interstate New Teacher Assessment and Support Consortium (INTASC) principles, state developmental standards, specific content area curriculum standards, and the National Educational Technology Standards (NETS) and emphasizes reflective statements, written rationales, and performance-based artifacts. The portfolio is threaded throughout all teacher education courses. These individual courses contribute artifacts for possible inclusion, and faculty members review the preservice teachers' progress at four decision points throughout the program. By the final decision point, preservice teachers are required to have two student-selected artifacts for each of 10 INTASC principles. Individual student portfolios also include a reflective statement on their current understanding of the INTASC principle and a rationale explaining how each artifact demonstrates competence in the associated standard. The model provides for longitudinal development, continuous growth, and a theoretical framework for shaping ideas and accomplishments in learning to teach.

Students at LMSU choose from a variety of software tools to create their portfolios. Most relied on the free HTML-Lite Web page editor that professors introduce in classes. LMSU provides students with Web space for publishing their digital portfolio. The other major component of LMSU's assessment system is Rubigrade, a Web-based, rubric-driven data collection system. Designed and built in-house, Rubigrade allows professors to build rubrics aligned with various standards relevant to a variety of programs. Rubigrade administrators extract assessment data from the system as administrators and accreditors need it.

In contrast to LMSU, SLAC is a small private college with a focus on traditional undergraduate students. Of SLAC's 2,000 students, the Education Department, which is the school's second largest department, enrolls about 20% (or 450) in nine degree programs. Faculty work closely with the state to ensure students meet the State's Education Accomplished Practices Standards (SEAPS) in their program. Absent funding and expertise to design and build their own system, SLAC searched for a product they could use "out of the box" with little demand on already overworked faculty. They chose a commercially available portfolio system (CommercialFolio) because it allowed them to align students' artifacts with state and national standards, easily collected necessary data for program approval and improvement, and seemed user friendly. The funding model for the commercial product was another important factor in SLAC's adoption decision. The college administration incurred no cost to the college by choosing a product that charges students for a three-year subscription. At the time of adoption, SLAC did not find other programs that would meet their specific needs. They adopted the commercial system in its entirety with all levels of students.

Data Collection

Data collection involved a variety of individual and focus group interviews, informal interviews, observations, and document reviews. Six preservice teachers from each institution served as the principal participants. These 12 main participants were drawn from various programs across their respective institutions.

The principal participants met for focus group interviews throughout the semester of the study at each institution. The focus group protocol asked participants to respond to a variety of scenarios (speaking to software developers, advising portfolio leaders, and mentoring younger students) to elicit information about their portfolio experience. The planned protocol was to conduct one focus group interview with the key informants as early as possible in the semester. Although scheduling conflicts among students made the first focus group interviews impossible, students were able to meet individually or in smaller groups to answer the questions from the protocol.

At the end of the semester, another focus group interview was conducted with principal participants. For that interview, the protocol drew on data collected throughout the semester to clarify information participants had given and to test interpretations that were beginning to emerge from the data.

In addition to the focus group interviews, the six principal participants from both institutions participated in an hour-long think-aloud work session (Rubin, 1994) in the middle of the semester. During the session, most LMSU students brought their own laptops, and SLAC students used the researcher's laptop to work on their files. As they worked, each individual articulated what they were doing as they worked and their reasons for their actions. Individuals were specifically instructed to point out anything about the task that confused them, frustrated them, or made them happy. In all cases, the focus group interviews and think-aloud work sessions were digitally recorded and transcribed in their entirety so they could be added to a "hermeneutic unit" in Atlas.ti qualitative data analysis software. Each think-aloud work session was also videotaped so researchers could see what was happening on the computer screen as part of the data analysis.

In addition to the formal interactions, the researcher completed observations in computer labs and classrooms where portfolio activities took place at each site. In most cases, these observations led to informal and unstructured interviews about portfolio experiences with a variety of preservice candidates. In these instances, the researcher's questions were natural outcomes of the setting. Some were follow-up questions to things preservice teachers said, some were designed to elicit additional information about tasks students were performing at the time, and others were about events happening at the time. In addition to answering the researcher's questions, students in classes and labs sometimes shared additional information and insights they thought were interesting or important. For the informal interviews, the interviewer took notes that were later transcribed and added to the hermeneutic unit to form a substantial portion of the data.

Institutional document analysis was the final method of data collection for this study. Documents came from three categories: institutionally generated documents outlining requirements and providing guidance to students engaged in portfolio authorship; student work aids including notes, diagrams, and temporary documents such as checklists; and student portfolios at various stages of development. All were saved in electronic format for analysis.

Table 2: Partial List of CHAT-Related Codes Used for Data Analysis

CHAT Node	Sample Codes	Comments
Subject	LMSU Sarah	Included codes for data from each participant (Subject)
	SLAC Tucker	
Object	Object-Portfolio Object-CMP	Portfolio was central object with projects (classroom management plan) embedded within it
Community	Comm-Peers Comm-Family Comm-Professors	Highlights observations of community, their involvement, and their reactions
Tools	Tools-Commercial-Folio Tools-Like Tools-Dislike	Participants using or talking about their tools; also includes what they liked and disliked about their tools
Division of labor	Div-Sharing Div-Collaboration	Used for data about sharing work or ideas and collaboration
Rules	Rules-Published Rules-Professor Rules-WOM	Codes for published rules, professors' requirements, and norms shared by word-of-mouth
Purpose	Purpose-Reflection Purpose-Jobs Purpose-Graduation	Participants talked about the reasons for engaging in the portfolio task.

Data Analysis

Atlas.ti qualitative data analysis software served as the primary tool to maintain the chain of evidence and serve as the case study database Yin (1994) advocates for case study research. Engeström's (1987) CHAT served as the interpretive framework, and Creswell's (1998) "data analysis spiral" (p. 142) served as the analytic framework guiding repeated trips through the data to organize, read, memo, code, and interpret.

Codes were developed both inductively and deductively. Each node of the CHAT model had a corresponding code cluster. For example, the Subjects node of the CHAT model had a collection of codes representing each individual participant in the study (e.g., LMSU Sarah and SLAC Tucker). Codes such as Tools-CommercialFolio, Tools-HTML-Lite, and other specific pieces of software captured students' uses of the tools they were using to create their digital portfolios. The codes Tools-Like and Tools-Dislike marked statements they made about the tools they used. There was a similar cluster of codes for Purpose as participants talked about why they were creating a portfolio and for Community with codes related to peers, family, and professors. See Table 2 for more examples of CHAT-related codes.

Some code clusters related directly to the theoretical framework while others emerged primarily from participants' words. Other codes used in the analysis tracked such things as the advice students had given and received, dilemmas

they faced, support they wanted or received, emotions they experienced, skills they developed or wanted to develop, and their desire for creativity.

Once analysis was complete, the first author shared the findings with key participants and asked for their comments on the draft report. They confirmed the accuracy of the draft.

FINDINGS

The initial goal for this research was to focus on how Tools impacted the preservice teachers' portfolio experience, but CHAT facilitated the researchers' decision to also explore the broader context in which those tools were used. Influences from the broader context surrounding the portfolio activity had an impact on the preservice teachers' perceptions of their portfolio experience and influenced their decisions about how they would represent themselves in their portfolios.

Tensions and the Portfolio Authoring Tools

The discussion in this section is organized by a series of six snapshots from the field illustrating how the authoring tools were used and perceived at each institution. Five of the six snapshots were chosen to illustrate common conversations between and among the preservice teachers at the institution. Only Snapshot 2 was selected because the researchers found it surprising. Each snapshot is followed by a brief CHAT-informed analysis of the events and perceptions from the snapshot.

Snapshot 1: Authoring tools and limitations at LMSU. Preservice teachers at LMSU were given wide latitude in choosing software to use for their projects. Most opted to use HTML-Lite for its ease of use. Gabrielle explains:

HTML-Lite is really simple to use. I've played around with HTML-Pro, and it's really complicated. I'm just going to stick with Lite. ... There are not a lot of features. It has the basics.

Adah, an art education major, wanted more capabilities than HTML-Lite offered. She said, "I got Pro because, like I said, I wanted mine to be much more creative—artistic in appearance. So I felt I needed HTML-Pro to pull that off." Generally speaking, students at LMSU spoke favorably about the software tools they used for the portfolio task. To them, the tool set was not a constraining factor in their portfolio activity.

However, preservice teachers did talk about limitations based on their own skills. Tiffany knew she could create a movie or clip but didn't know how. Gabrielle wanted to make a concept map with pop-up menus to enhance her education philosophy but didn't know how. Amanda had heard about a popular animation tool and wanted to use it but didn't know how. At LMSU, students were conflicted by their own competing wishes: a desire for increased skills to represent their work in more sophisticated ways and a desire to minimize time spent on the portfolio task. Several students shared how they spent too much time working on their portfolios in an effort to "make it better"—sometimes to the detriment of their sleep, their social lives, and other classes.

LMSU students (Subjects) seemed satisfied with the Web page editing software (Tools) they used to complete their portfolio (Object) for graduation

(Outcome). Thus, the CHAT analysis suggests there were few primary tensions within the Tools node at LMSU. In contrast, the analysis of the Subjects node reveals some tension. At LMSU, preservice teachers (Subjects) often had ideas for their portfolio that they didn't know how to implement. Their competing wishes (more sophisticated portfolio presentation versus a desire to minimize time spent on the task) reflect a primary tension within the Subjects node as they determine whether or not to seek additional training to complete the more sophisticated tasks they identify as possibilities. Sometimes students resolved this tension by learning a new skill, and sometimes their ideas were unrealized because they did not take time to learn the new skill.

Snapshot 2: LMSU's Rubigrade. Recall that Rubigrade is the tool portfolio leaders at LMSU use to collect and manage data for their accreditation efforts. At the time of this study, the system had thousands of student assessments stored. Yet students at LMSU seemed not to associate Rubigrade with their portfolio activity. During observations in the portfolio support computer lab, students never logged in to the Rubigrade system. Likewise, none of the interviewees mentioned Rubigrade during their interviews. During the final focus group interview, the first author specifically asked participants about Rubigrade. One of the interviewees responded that Rubigrade "doesn't have anything to do with our portfolios. You don't need to worry about that." Two focus group participants had never heard of Rubigrade, including one who was graduating that semester. After more urging from the interviewer, two participants explained they could log in to Rubigrade to see how their professors had evaluated their portfolios against the rubric. They viewed Rubigrade as an electronic gradebook. None of the interviewees seemed to tie the Rubigrade system to their portfolio experience, reporting that they received feedback on individual artifacts from their professors in other ways.

From the preservice teacher (Subject) perspective, Rubigrade (Tool) had no influence on their portfolio task and did not introduce tension to the system. Indeed, it was almost transparent to LMSU students. Interviews and observations of other community members (professors, administrators, accreditors) would certainly have surfaced more data about Rubigrade, particularly as it related to accreditation efforts.

Snapshot 3: CommercialFolio tool's dependability. Preservice teachers at SLAC are very concerned about the reliability and capabilities of CommercialFolio, their portfolio authoring tool. At the time of this study, CommercialFolio was making efforts to improve their system and extend their capabilities. In fact, they upgraded their system midsemester. After the CommercialFolio upgrade, students reported a variety of problems, including erratic system behavior and excessively slow performance.

Mallory's think-aloud work session offers a clear picture of this problem. Her work session was scheduled shortly after the CommercialFolio upgrade but not during a planned system outage. She could log in to her account, navigate to her portfolio, and begin to enter her work. Nearly every time she clicked Save or Finish after completing a task, the system failed to respond. (Routine troubleshooting confirmed the computer had Internet connectivity and could

navigate to other sites on the Internet, so the problem seemed only to be with the CommercialFolio service.) For each task she tried to complete, Mallory lost the work she had entered into the text boxes or the formatting she tried to fix when the system did not respond. Despite having spent 60 minutes working on her portfolio, Mallory did not complete any tasks due to the system's non-responsiveness. Nancy, Tucker, Phoebe, and others reported similar problems with CommercialFolio throughout the semester, but especially after the upgrade.

The unresponsiveness of CommercialFolio represents a secondary tension—one between two nodes of the CHAT framework. In this snapshot, the secondary tension was between the Tools and Rules node. The preservice teachers (Subjects) were required to use (Rule) CommercialFolio (Tool) to work on their portfolio (Object) or they would not be permitted to graduate (Outcome). Because they were required to use the CommercialFolio service, they could not switch to another software tool to complete their tasks. They had to wait for the CommercialFolio system to begin functioning again. In a more flexible system, they might have resolved the tension by modifying the rule or changing to a different tool.

One might also argue that a primary tension within the Tool node was evident in that CommercialFolio appeared to work but did not actually work. The preservice teachers (Subjects) could begin their tasks but they could not save them. The tool only appeared to work. The software had a similar problem creating and displaying tables for portfolios in that the Table tool appeared to create tables but those tables were rendered in unacceptable ways (Fiedler & Kaner, 2007).

Snapshot 4: CommercialFolio changes. After the midsemester upgrade, preservice teachers noticed a variety of changes in their portfolios. For many, their previous work was reformatted in unexpected ways. They discovered that some tasks were no longer supported after the upgrade and other tasks had to be completed in new ways. Mallory complained, “One day it will work perfectly, and the next day I try to change the font and it won’t do anything. ... It’s just kind of rebellious towards me.” Another student commented in class that “the upgrade hasn’t really been an upgrade after all.”

Tertiary tensions are those between old and new ways of doing something. For SLAC’s students, the midsemester upgrade presented tertiary tensions as students discovered existing features had disappeared and tasks they once knew how to do now had to be done in new ways. Likewise, they were unhappy that their formatting had changed and that they now needed to redo work they had completed earlier to resolve the new formatting issues. In most cases, they gave up on the reformatting task. In some cases, the preservice teachers could not figure out how to undo the changes brought about by the CommercialFolio system upgrade. In other cases, the task of reformatting everything that had changed was too daunting.

Snapshot 5: CommercialFolio’s image handling. Preservice teachers were especially dissatisfied with how CommercialFolio handled images. Tucker explains the limits and offers suggestions for features he would like:

We can only have one image per section. You can't alter the image once it's in CommercialFolio. I don't know if it would be possible, but it would be nice if there were a way to have CommercialFolio—in CommercialFolio—to be able to a) use multiple images and b) alter the images to fit together and put them together where you want them instead of just having one in each section.

Preservice teachers (Subjects) used software (Tools) for a variety of tasks including work unrelated to their portfolios. Their expectations for how software should work were shaped by their other experiences. Thus, when CommercialFolio failed to offer the same capabilities available in other tools, students were surprised, disappointed, and frustrated. In CHAT terms, these users were coping with a quaternary tension – one between nearby activities.

Snapshot 6: CommercialFolio's look and feel. CommercialFolio maintains a consistent look and navigation structure across all portfolios. Student reaction to this forced consistency is mixed. Phoebe and Cathy liked the lefthand navigation menu because it made the portfolio easy to navigate. Others, like Anne, felt constrained by the uniformity imposed by the system. Anne explains:

Aesthetically, I think it's really ugly. [Giggles.] That's a major concern for me because, starting off—just because I did not like it at all—the way it's set up and it's very—I don't know—it's very cut-and-paste and not personal at all, even though we have a splash page. There wasn't a lot of room to personalize it. ... It makes it easier to do, but at the same time, it doesn't make me want to do it. It doesn't increase my motivation because it just doesn't feel like a part of me. I feel like I'm doing it just because I have to.

In Anne's work session, she revealed that she spent a lot of time using MySpace, a popular social networking site. Her activity there taught her a lot about how to customize the look and feel of HTML pages. She enjoyed using her skills in MySpace as a creative outlet and was frustrated that CommercialFolio didn't offer the same flexibility.

This snapshot is similar to Snapshot 5 in that it reflects a quaternary tension—one between Anne's portfolio experience and her MySpace experience. However, Anne appeared to feel her frustration more deeply and view CommercialFolio more systemically than most of her peers. She was considerably more persistent in finding a way to work around the limits of CommercialFolio so she could realize her personal goals for her portfolio. Although Anne's MySpace experience was the source of the quaternary tension she faced, she ultimately drew on that same experience to resolve the tension. Some of her efforts are chronicled in another work (Fiedler, 2007).

Discussion of Tool-Related Snapshots

When the CommercialFolio system works as intended, it fulfills the basic functions of portfolio creation, if not the most creative functions. During the semester data for this study was collected, the service suffered from severe

performance issues and extremely slow response times. For students, completing the portfolio task and meeting portfolio deadlines was frustratingly difficult as the service was, for all practical purposes, unusable at critical times. In a more flexible system, they could have changed or adapted their activity to work around this problem, perhaps by using a different tool. Because the students were required to use the CommercialFolio system, they did not have the flexibility to adapt and were forced to cope with the broader systemic tensions.

In contrast, students at LMSU had the option to use any software tool they wanted to use to publish HTML Web pages. Although all students hosted their digital portfolios on an LMSU Web server, they were not required to do so. When students had problems completing a task in a particular way, they were free to look for alternative tools and solutions.

Tensions, Portfolio Content, and Student Choice

Initially, the researchers in this study focused on portfolio authoring tools but quickly became interested in how requirements governing the portfolio activity influenced choices preservice teachers made regarding content. Snapshots 7–9 illuminate the impact of choice, or limited choice, on the preservice teacher experience.

Snapshot 7: Ethnography project at SLAC. At SLAC, faculty required preservice teachers to use an ethnography project in their portfolio to document competence working with diverse students. Most students completed the ethnography project early in their programs without understanding it would eventually become a portfolio artifact. When they came to understand it was a required portfolio artifact, they discussed two types of concerns they had. Some worried that if they showed their portfolios to prospective employers, they would be perceived as “shallow,” whereas others worried about perceptions of “inappropriateness.” Mallory shares her thoughts:

At the time, bingo was a perfectly fine option for what she [professor] told us in the class. It was just to go experience something that we’ve never done before. And so I thought, “None of my grandparents live around me, so I’m not around old people and I never go to bingo.” And now, especially for me because I’m applying to teach in Honduras, and so diversity is right there—I’ll be teaching Hispanic children. We write a paper in the ESOL [English for Speakers of Other Languages] Curriculum class . . . all about how to implement that, and it would be perfect because I would be teaching students whose first language is not English. I would like to use that ESOL paper to replace bingo and it wasn’t allowed. So, I have to—if I want to include it I have to—make another section for diversity.

In addition to including the ethnography project for the diversity standard, Mallory and preservice teachers at SLAC were required to write a reflection that demonstrated the artifact did indeed support the standard. Mallory shares her frustration trying to make that argument:

I think I probably spent three days writing about how my bingo experience taught me about diversity because I was just so frustrated trying to relate it [bingo project] to these things [indicators in the standards] that had nothing to do with it.

In the end, she couldn't make a compelling argument. One of the reflection prompts in the SLAC template was: "What would you do differently?" Mallory responded in her reflection:

If I could go back and start the ethnography process over again, I think that I would choose a different topic. While at the time bingo sounded like an interesting option, which fell under the guideline of a "new experience," I wasn't considering its implementation in my portfolio. As an artifact for diversity, this is a stretch.

Mallory was not the only preservice teacher who regretted her ethnography project choice. Other students told about their projects: a trip to a gay bar, an outing to a music festival where drugs and alcohol were present, a trip to a nudist colony, and a young man's attendance at a Mary Kay [cosmetics] party, where he learned "it isn't really much of a party at all."

The preservice teachers pointed out that few of the ethnography projects documented ability to work with diverse populations. Although most preservice teachers completed the ESOL project Mallory mentioned and talked about how it would offer compelling evidence of their ability to work with diverse populations, few made the extra efforts required to include it. No one successfully negotiated permission to replace their ethnography project with their ESOL project.

Most preservice teachers said they would have changed their ethnography project if they had understood it would eventually be in their portfolio. Several seniors warned younger friends of these problems and advised them to choose an ethnography project with awareness that it would become a portfolio artifact for diversity. They cautioned their younger peers to choose "safer" and "more conservative" experiences for their ethnography projects because the projects would eventually become a portfolio artifact that prospective employers might eventually see.

At first, this snapshot might appear to illustrate a secondary tension between the portrait preservice teachers (Subjects) wish to convey of themselves and the institution's rules (Rules) governing the activity with respect to artifact selection and the content of the reflections. Readers may wonder why the institution was not more flexible in what they would accept as evidence for the Diversity standard. To explain SLAC's stance, it's important to understand the accrediting context in which SLAC operates. The State Department of Education established policies consistent with Wilkerson and Lang's (2003, 2004) view that licensure and credentialing portfolios must have "rigorously controlled and systematically evaluated" (2003, paragraph 3) content to meet psychometric standards of validity, reliability, fairness, and absence of bias. Because SLAC must respond to SDOE policies, their policies and requirements governing

student portfolios are similarly rigid. This, in turn, shapes the student portfolio experience and portfolio content.

Originally, SDOE accreditors required three artifacts for each standard. SLAC faculty negotiated a reduction to one artifact per standard by specifying eight artifacts that were common to all programs and that offered evidence of satisfying multiple standards. Ultimately, faculty convinced the SDOE this combination of artifacts would provide multiple pieces of evidence for each standard and that they had met the requirement for consistent content across portfolios. As a result, students were required to file eight particular artifacts under specific standard with the ethnography project filed as the diversity standard.

Faculty discussed changing the diversity artifact from the ethnography project to the ESOL paper Mallory mentioned, but they could not do so until that project had been in place long enough to be a common experience for students across all programs. Simply put, the time was not yet right for this change despite what both faculty and students might have preferred. Although faculty might have preferred to make changes to their policies, they were responding to the broader pressures of accreditation. In other words, the portfolio authoring activity was in a quaternary tension with the nearby activity of program accreditation.

This snapshot reveals yet another quaternary tension, that between the requirements of the preservice teachers' "official" portfolios and the job searches they knew would follow their graduation. Most students reported that the portfolio was too much work to do another one specifically for interviews, and that they would likely not modify their graduation portfolio for use at interviews. Instead, several of the older students specifically warned their younger peers to make ethnography project selections with an awareness that potential employers might eventually examine their chosen projects.

Snapshot 8: Choosing portfolio artifacts at LMSU. Although professors at LMSU included suggestions for portfolio content on their syllabi, preservice teachers consistently reported they were themselves the primary decision-makers for their portfolio's content. The following quotes are representative responses to the question, "How do you choose the artifacts to include in your portfolio?"

Monica: I guess which ones best correlated with the standards, which ones made the most sense. ...

Sarah: I just chose the ones I thought were the best examples. ...

Like preservice teachers at SLAC, those at LMSU were also required to write reflections justifying the artifact selections they made. Beyond commenting on the time-consuming nature of writing reflections, LMSU's students had little to say about the reflections.

At LMSU, portfolio leaders responded to accrediting demands by requiring two artifacts for each INTASC principle in the completed portfolio but did not impose additional requirements or constraints. The need to respond to the

accrediting agency reflects some degree of quaternary tension (tension between the nearby activities of portfolio authorship and accreditation), but preservice teachers did not seem greatly affected by this tension.

Snapshot 9: Writing reflections at SLAC. In Snapshot 7, Mallory explained she spent three frustrating days writing the reflection justifying the ethnography project as evidence for the Diversity standard. Student after student, in interviews and work sessions, spoke about their difficulty writing reflections. To SLAC's students, writing reflections was an onerous task. Their challenges were rooted in two areas: the requirement to include specific artifacts as illustrated in Snapshot 7 and the requirement to use specific language as they write reflections as illustrated in this snapshot. The instructions from the portfolio template illuminate the students' predicament:

When you write your reflection be sure to use the preservice indicators as a guide to supporting your argument that this evidence or artifact does indeed reflect the Accomplished Practice. Use the language of the indicator and AP [Accomplished Practice] itself and either highlight it, underline it or bold it to indicate to the reader its source.

One SLAC student described the preservice indicators as "the worst part of the reflection. We just don't feel the indicators go with the projects." Similar discussions with a variety of SLAC students regularly turned to creativity. Cathy explains in her work session:

Before, when I heard the word portfolio, I thought more of making it a creative process and showing the creative process – like students' writing work. Something like that is what I associated with portfolio. And now, I associate it with this kind of drudging requirement and so I feel like all of the creativity has really been sucked out of the whole thing. So we're not really being creative. We're all turning in something that looks almost exactly the same and . . . there's really not a whole lot of room for a whole lot of creativity.

Similar to Snapshot 7, this illustration first appears to be a secondary tension between the preservice teachers' (Subjects') representations of themselves and the rules (Rules) they are required to follow. Instead, the preservice teachers (Subjects) were required (Rules) to use the language from an accrediting agency's document to express themselves. This influence of an accrediting agency document suggests a quaternary tension or a tension between the nearby activities of program accreditation and portfolio authorship.

Discussion of Content and Choice-Related Snapshots

Students at both institutions seemed aware of the external influences on their portfolio task. At LMSU, preservice teachers understood the portfolio requirement was not from their professors but did not specifically speak about an accreditor's role. LMSU's Sarah explained:

Professors require it [the portfolio] because they're required by the Teachers College to show that they are using technology in their courses, and so, in order to prove that that's what they're doing, they require us to post things on our Web site [portfolio]. So it's assessment for them—or showing that they're meeting the standards of Teachers College.

Although LSU's preservice teachers were aware of influence beyond their professors, they reported they were themselves the primary decision makers in the portfolio task. Their choices were sometimes influenced by what they thought a prospective employer might like, but most seemed to accept they would not use their digital portfolios as they interviewed for jobs.

Students at SLAC were considerably more aware of the accrediting agency's influence on their portfolio task. Anne explained her impressions:

I thought there was going to be somebody from the state board here [on Portfolio Presentation Night] at SLAC. I mean, that's what I had been told all my years in education—there's going to be someone from the State Board of Education who's going to come, and they're going to be in one of the classrooms, and that would have been amazing....

Although two of the three authors of this paper are surprised Anne had the impression a representative from the state would attend Portfolio Presentation Night, it is interesting to note how deeply involved she believed the accreditors were in the preservice teachers' portfolio task.

The CHAT-informed analysis of the SLAC context reveals the institution's accrediting activities and how the requirements of accreditors pervaded the requirements governing the portfolio activity. In addition to influencing the choice of portfolio authoring tools at SLAC, accrediting agency demands had a profound influence on portfolio content with respect to artifact selection and the language of the accompanying reflections.

Preservice teachers included required artifacts to satisfy accreditors rather than those they would have chosen to establish their own professional identities. Their reflections used language from an externally created document to address the standards and indicators rather than their personal reflections and observations about what they had learned and how they had grown. The interconnect-edness of the preservice teachers' portfolio activity and the institution's accrediting activity gave rise to tensions the preservice teachers perceived as part of their portfolio activity.

SLAC students spoke at length about the rigidity of their prescriptive requirements. Mallory summarizes, "I haven't really had very many options on this, and so I haven't really had to make good judgments. I think it's mostly like, 'Gosh, should I use green or pink?'"

CONCLUSIONS AND IMPLICATIONS

The cases described in this paper illustrate how the institutional context—particularly the accreditation context—influences implementation and policy

decisions, and how those decisions in turn affect the student experience. It is easy to attribute the policy differences between LMSU and SLAC to institutional decisions, when in reality many of the decisions were made in response to accrediting demands.

Overall, preservice teachers at both institutions talked about being “stressed out” because the portfolio task was both very time consuming and an essential milestone marking continued progress in their programs. Comparatively speaking, students at SLAC spoke more frequently about tensions and difficulties than did their peers at LMSU. They used more emotional words (such as hostile, anxiety, and hate) to describe their experiences and seemed more reliant on their peers for emotional support as they completed their tasks. Could this difference in attitude stem from the relative flexibility of the portfolio systems in use? How much of the relative flexibility of the system was dictated by the accrediting environment? The cases presented here suggest these questions merit further exploration.

Tensions in the portfolio activity are rooted in the stakeholders’ various perspectives on the portfolio and its purpose. Students at both institutions viewed the portfolio much like an artist’s portfolio. They expected a flexible system in both the capability of the tools they used and the rules governing their activity to make their portfolio an expression of themselves, their beliefs, and their accomplishments. LMSU students valued that aspect of their portfolio system as illustrated in Snapshots 1 and 8. SLAC students struggled against constraints that inhibited realization of their personal goals as illustrated in Snapshots 6, 7, and 9.

Other stakeholders in the activity of portfolio authorship do not place the same priority on self-expression and creativity that students do. Administrators often use the information collected from their institution’s portfolio initiative for accreditation and to make judgments for program improvement. Accreditors view the portfolio as an avenue to demonstrate performance-based competencies. Both administrators and accreditors believe that standardized data offer more validity, reliability, fairness, and absence of bias, as advocated by Wilkerson and Lang (2003, 2004). Standardization of data is consistent with the goals of administrators and accreditors but in conflict with the goals of students interviewed for this study.

To what extent did faculty at each institution believe they had the flexibility to design a portfolio initiative that accounted for student needs as well as the institution’s need to satisfy accreditors? This research did not specifically address that question, but interactions with faculty at SLAC suggest the feedback from accreditors had considerably more influence on the portfolio initiative than faculty might have preferred.

Clearly, student portfolios reside at the nexus of the various tensions that arise in the current milieu of teacher education, performance-based licensure systems, accreditation, and computer technologies. Tensions are inevitable as portfolio initiatives change in response to external pressures and teacher educators, and portfolio leaders can use the CHAT framework to examine the consequences of policy and implementation decisions to optimize the balance

of tensions the actors will face. (See Engeström [2000] for an example applying CHAT to redesign work in a Finnish hospital.)

In the cases presented here, accreditation requirements greatly influenced the portfolio task. At LMSU, portfolio leaders were allowed to design a system that permitted accrediting goals and student goals to coexist with relatively little tension. Students reported the portfolio task taught them valuable skills and sometimes motivated them to seek additional skills to represent their work (refer to Snapshots 1 and 8.)

At SLAC, accreditation requirements had privileged status, overriding goals, and concerns held by other stakeholders including faculty and students. The prescriptive nature of the content requirements (Snapshot 7) and language requirements for the reflections (Snapshot 9), coupled with the unreliability of the CommercialFolio system (Snapshots 3 and 4), distracted SLAC's students from focusing on the important content and learning goals. Instead, they called the portfolio task "busy work" and wondered, "What do they care more about—the fact that we can write a lesson plan and behavior management plan or the fact that we can attach it and add a pretty picture and reflect on it?" This insightful question from an SLAC student, along with Mallory's observation about not having the opportunity use her own judgment on important matters, illustrate how meeting the accreditors' demands for standardized content motivates portfolio authors to focus on the trivial matters of layout and graphics, thereby usurping the more important learning goals that typically undergird portfolio initiatives. These observations from preservice teachers capture the quaternary tension between the teacher-training mission of SLAC and the demands placed on the institution by their accrediting body.

Teacher educators, administrators, and accreditors must reflect on the issues and questions raised by these tensions and the forces that cause them. We must ask which tensions add value to the students' experience and which are unproductive. As professors, we wonder if the students achieved the learning goals intended for them or if they learned something that might have a long-term negative impact on their careers, such as disdain for accountability.

Conforming to the external requirements placed on the portfolio activity can push faculty and students to make decisions they might not otherwise make, as illustrated by the ethnography project requirement at SLAC. Though the ethnography project has since been changed, it nevertheless raises an important issue regarding the level of influence outsiders have on the overall student experience. At SLAC, outside influences had the unintended effect of forcing students to choose "safe," cookie-cutter experiences to satisfy outside reviewers instead of the diverse and meaningful experiences their instructors intended and the students desired. In other words, this quaternary tension between those engaged in the portfolio activity and the outside accrediting agency resolved in favor of the accreditors. Does that reflect the optimal balance of tensions between and among the stakeholders in the portfolio initiatives?

Cookie-cutter portfolio experiences can provide data about our students and programs. However, we believe that the issue is the quality of data and its usefulness in understanding our students, their potential as teachers, and the

quality of our programs. After all, it was the quest for meaningful aggregated data required by most accrediting bodies that set teacher education programs down this course in the first place. It will take time for many teacher education programs to situate themselves between the seemingly polar extremes of the affordances of digital portfolio pedagogies on one end and the current milieu of accreditation and accountability on the other.

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