To the Graduate Council:

I am submitting herewith a dissertation written by Thillainatarajan Sivakuamran entitled "Analysis of Teacher Candidates' and Faculty Evaluations of the Utility of a Single Digital Portfolio System." I have examined the final paper copy of this dissertation for form and content and recommended that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Russell L. French, Major Professor

We have read this dissertation
and recommend its acceptance:

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Analysis of Teacher Candidates' and Faculty Evaluations of the Utility of a Single Digital Portfolio System

A Dissertation
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Thillainatarajan Sivakumaran
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Dedication

This dissertation is dedicated to my parents, Vimaladevi and Nadarajah Sivakumaran who unselfishly made many sacrifices for me to reach this point. To my friend Bill Wishart, thank you for the support, understanding and patience you showed me throughout this process. I thank God for each of you. I love you all.

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Abstract

The Virtual Anthology Shell, a digital portfolio shell, was piloted tested in four programs in the University of Tennessee's College of Education, Health and Human Sciences. The University of Tennessee teacher education program is a five year program in which pre-service teachers enter into their internship year already having completed their undergraduate degrees in other disciplines. The sample of participants for the research was taken from the intern teacher population and faculty at the University of Tennessee for the 2003-2004 academic year. There were eight faculty members using the VAS with their interns during the 2003-2004 academic year. From these eight faculty members, four were randomly selected to participate in this research study. These faculty members were from the areas of Special Education, Secondary English Education, Reading and Literacy, and the Urban Multicultural program. The pre-service teachers who participated in the study were those enrolled in the aforementioned program areas. Each of the four programs received different types and levels of support. The purpose of this study was threefold: 1) to identify the strengths and weaknesses of the VAS as perceived by both the faculty and student users, 2) to determine types and levels of support needed by students completing an electronic portfolio, and 3) to investigate the technology skills needed by students to use the VAS.

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Chapter 1
Introduction

Background

Professional Portfolios

In the current professional environment, prospective employers use portfolios to gain insight into an individual's skills, abilities, interests, and potential (Hartnell-Young & Morris, 1999). Portfolios allow an individual the opportunity to showcase creativity, originality, and individuality, and to demonstrate the acquisition of expertise gained through education and work experience. In areas where professional standards are widely varied, and an educational degree may not be indicative of one's talents, a portfolio can be used as a tool to promote or highlight an individual's unique capabilities and breadth of experience. Artists, graphic designers, and architects, for example, have used portfolios to showcase their best work for employers and also to demonstrate their strengths and their range of expertise and creativity (e.g., Adams 1989; Valencia 1990). Recently, portfolios have become a standard feature in many educational programs (district, school, and university level) and educational organizations at the national and state level (Wolf, 1996).

Portfolios in Teacher Education

An increasing number of universities across the country are adopting the pre-service teaching portfolio as an integral part of their teacher education programs. The portfolio not only serves to document accomplishments and demonstrate growth, but also provides an opportunity for assessment that can lead the student to a deeper understanding of philosophy, pedagogy, goals, reflections, and reasoning abilities (Carroll, Porthoff, & Huber, 1996). The portfolio offers teacher education

students the opportunity to consolidate all the aspects of their learning experiences together into one succinct, comprehensive package.

There are a variety of definitions detailing what a portfolio is and its purpose. Wolf and Dietz (1994) defined a portfolio as a structured collection of teacher and student work created across a diverse context over time, framed by reflection, and enriched through collaboration that has as its ultimate aim the advancement of teacher and student learning. While Edgerton, Hutchings, and Quinlan (1992) defined a portfolio as a structured collection of evidence of a teacher's best work that demonstrates a teacher's accomplishments over and across a variety of contexts. Another view of what a portfolio is comes from Abruscato (1993) who defined portfolios as a complete program of charting student's progress, allowing the instructor to diagnose academic strengths and weakness. The present study is guided by the definition given by Rels and Villaume (2001):

> Teacher portfolios are defined as purposeful collections of works that are individualized and include self selection; that include interrelated but diverse documents representing different aspects of growth and achievement; and that demonstrate reflection, self-evaluation and ongoing inquiry. (p. 10)

Many teacher educators are implementing portfolio assessment into their courses (McLaughlin & Vogt, 1996; Mokhatari, Yellin, Bull, & Montgomery, 1996), while some teacher education programs implement portfolios as a program-wide assessment tool (Barton & Collins, 1993; Darling, 2001; Klenowski, 2000; Snyder, Lippincott, & Bower, 1998).

Anderson and DeMulle (1998) reported on the perceived positive impact of portfolios noting that:

> We found that portfolios are impacting teacher educators and teacher education programs. Teacher educators report becoming learner centered, clearer about professional standards, and reflecting more on

> their practice. In terms of programs, portfolios are promoting dialogue with colleagues and assisting in clarification of program outcomes. (p. 7)

Recent research identifies several advantages of portfolios in education. Portfolio-oriented approaches provide individual students with a sense of ownership, accomplishment, and the capability to be expressive and creative in representing their work and themselves (Berlach, 1997). Portfolios also offer learners the opportunity to reflect on their work, encourage the knowledge acquisition process, and foster self-directed growth while helping them build the self-review habits necessary for good teaching (Berlach, 1997). Portfolios encourage collaborative dialogue and enriched discussions of teaching, and allow documentation of growth over time while taking into consideration each student's diverse experiences and their integration within their personal teaching preparation experiences. (Kaye & Morin, 1998). Finally, portfolios can be used as assessment instruments to evaluate the performance of teacher education students. This assessment aspect of the portfolio is a growing and dynamic area of application that has not been subject to in-depth research and analysis.

Performance-based Assessment

In terms of assessment, portfolios can provide instructors with a mechanism to view a comprehensive account of a student's work and educational growth over a period of time (Gellman, 1996; Shulman, 1988). According to Wolf (1996) portfolios can be used effectively to assess students' performance:

> Although portfolios can be time consuming to construct and cumbersome to review, they can also capture the complexities of professional practice in ways no other approach can. Not only are they an effective way to assess teaching quality, but they can also provide

> teachers with opportunities for self-reflection and collegial interactions based on documented episodes of their own teaching. (p.34)

Portfolios in teacher education programs can be viewed as performance-based assessment instruments. Performance-based assessment practices in general have been developed in response to the growing concern among educators that traditional assessment practices were not meeting the learning needs of students. By involving students as stakeholders in the assessment process and focusing the assessment on student learning, educators have made strides toward designing high quality, authentic assessment instruments.

Performance-based assessment allows teacher educators to combine instruction and assessment. Meadows and Dyal (1998) stated that this type of assessment represents "a new paradigm focusing on the performance of many effective strategies and practices required to become a successful and competent leader" (p.94). Moreover, according to Angelo and Cross (1993) this process should be student-centered, teacher-directed, and mutually beneficial. Performance assessment should also be multi-dimensional, measuring a broad range of abilities and interests (Courts & McInerney, 1993; Darling-Hammond & Falk, 1997; Peterson, 2000). Additionally, the assessment process should be linguistically appropriate and sensitive to multiple cultures and perspectives (Gordon, 2001; Linn, Baker, & Dunbar, 1991). Both faculty and students must become actively, continuously, and personally involved (Angelo, 1996). Finally, performance-based assessments should also be value-driven, on-going, and integrated into the learning process (Astin, Banta, & Cross, 1992; Peterson, 2000).

Performance-based assessments are multi-faceted tools that may be implemented in various forms depending on the needs of the institution or faculty members utilizing them. Various terms are used to denote performance assessment.

They include authentic assessment, direct assessment and developmentally appropriate assessment (Piper, 1999). There are several optional approaches to performance assessment, such as performance tasks, projects, structured interviews, and portfolios. Each option has different strengths and weaknesses in terms of assessing students' work. One's conceptualization of performance-based assessment greatly influences the type/format of portfolio system the faculty member or institution chooses to use, as does the purpose of the proposed assessment.

Types of Portfolios

Three distinct portfolio models have emerged in practice: teaching/learning (working), assessment, and employment (showcase) (Wolf & Dietz, 1998). In practice, no one portfolio is strictly categorized as one or the other of the three models, but rather a combination of elements. However, for purposes of this discussion, the three models will be examined individually.

Teaching/learning portfolios contain most or all of a student's work, including works in progress. They may not be formally or directly evaluated, but may be used to review the learner's progress over time. They allow the learner to monitor his/her own progress, and, ideally, they may also provide the teacher educator a way to assess instruction and help to determine future instructional strategies (Wolf & Dietz, 1998).

Assessment portfolios contain records and materials needed to evaluate a student's progress and learning. Typically, this means including more than "best efforts" in the portfolio, but rather several snapshots of the learners' work in order to afford a closer look at the depth and breadth of the student's overall progress. While instructors usually play a major role in the selection of entries, students may have

input in the selection process as well. The number and types of entries need to be standardized across the discipline the student is pursuing. Additionally, this type of portfolio requires rubrics, or some other standardized scoring procedure, to be applied across all student portfolios (Wolf & Dietz, 1998).

Showcase portfolios contain end products that reflect a student's best efforts. The student, with the guidance of the instructor, usually makes the selection of items to include. This type of portfolio may or may not be used for instructional purposes and is often shared with prospective employers as a means of highlighting skills and documenting knowledge and experience (Wolf & Dietz, 1998). In the case of a showcase portfolio, one must take into consideration the capability of the portfolio to provide a way for individuals to exhibit the range, quality, and depth of their learning and teaching experiences.

Digital Portfolios

As evidenced by these three definitions, each portfolio model—teaching/learning, assessment, and employment—is driven by a unique primary purpose, and as a consequence each has a different emphasis in terms of authorship, audience, structure, content, and process. Originally, portfolios were basically constructed as paper portfolios created from collections of work stored in boxes or three-ring binders (Barrett, 2002). The paper-based storage and retrieval process had several disadvantages: problems in storing and updating materials, difficulty in accessing portfolios, high costs for compiling portfolios in terms of time and resources, poor representation of the portfolio entries, and the impact of a portfolio's appearance on evaluation (Gellman 1996; Wheeler 1996; Wolf 1991).

However, advances in information technology have resolved some of these issues. Various hardware and software programs are presently being used to help

transform paper portfolios into what are called digital or electronic portfolios. New technologies allow the learner to showcase work in a variety of forms and to distribute samples to various recipients for examination in a manageable, user-friendly format. According to Barrett (2002), a digital portfolio can create a new kind of "container" and offer a more convenient and flexible method of evaluation. Elizabeth Gellerman (1994) stated:

> Assessment is greatly assisted by multimedia. Instructors can scan images of students' [sic] written work or art, capture audio or student reading, and include word processing and hypermedia files...instructors can digitize video of students' performance via computer. (p.14)

The digital portfolio provides a snapshot of the capabilities of pre-service teachers by enhancing the overall picture of student achievement and expertise. Pilar, Lemus, & Tejeda. (1996), in discussing the benefits of digital portfolios stated,

> When the time comes for the student and teacher to discuss the portfolio, all of the various materials must be gathered with the equipment needed to access them . . . (These) problems can easily be solved with electronic portfolios. (p.80)

There are currently some innovative applications of the electronic portfolio concept in teacher education programs. For example, at Michigan State University, electronic portfolios are being implemented in a pilot project with education students building an electronic portfolio as a web page. This page is accessible to anyone with a browser who wishes to view it, from faculty to potential employers (Ropp, 1997). At Western Kentucky University, an electronic portfolio system is being implemented in which teacher education students are entered into a portfolio system from the moment they are admitted into the program. They remain in the system until the end of their induction year. This online system allows administrators and faculty members to keep track of their students in each program and monitor their progress for a three-year period. At Virginia Tech University, where a portfolio database is

used for evaluation and assessment purposes, web page development software is used to create a showcase portfolio by the teacher education student. Such projects signal the beginning of a trend toward the use of technology to improve the use of portfolios in teacher preparation programs.

The University of Tennessee: The College of Education, Health, and Human Sciences

The College of Education, Health, and Human Sciences at the University of Tennessee has employed paper portfolios in selected teacher preparation programs. Both administrators and faculty have become interested in the idea of using digital portfolios within their programs. Several faculty began using either a commercial portfolio system or an in-house system in their courses. However, administrators were seeking a single portfolio system that could be used throughout all teacher education programs as a tool for evaluating comprehensive teacher candidate programs and students as required for accreditation. The portfolio format needed to contain tangible, authentic, quantitative and qualitative data; provide evidence needed to document pre-service accomplishment of teacher learning objectives and P-12 student outcomes; and, at the same time, promote self-reflection and collaborative practice. Since the college requires that pre-service teachers document their understanding of national and state standards, the format also had to have the capability to accommodate evidence of accomplishment of these standards.

Three graduate students in the department of Instructional Technology and Education Studies started developing a portfolio shell in an effort to meet the college's needs. The first step in this process was to research the various types of portfolio systems currently being used in other institutions. From this research, the designers developed basic ideas about which software to use and also what the

content of the portfolio would include. The next step was to meet with the Associate Dean for teacher education, technology director, and faculty from diverse areas of the college to assist in defining the purposes of the digital portfolio (i.e., assessment, showcase, etc). From these meetings, the designers determined what content needed to be incorporated (e.g., evidence of content knowledge, pedagogical skills, and impact of learning on students, meeting of state and national standards, teaching philosophy, and self-assessment).

The model under construction was dubbed the Virtual Anthology Shell (VAS). This model was presented to the dean, as well as several faculty members within the College of Education, Health, and Human Sciences. The VAS was created and piloted in eight programs in Secondary English Education, Deaf and Interpreting, Special Education, Individualized Education, Reading and Literacy, Science Education, the Lyndhurst program, and the Urban Multicultural program during the 2003-2004 academic year. This study which was initiated by Project Impact a PT3 grant (see acknowledgement) attempts to determine the effectiveness and acceptability of that model.

Statement of the Problem

In an attempt to find a performance-based assessment tool that will allow faculty the ability to comprehensively assess the knowledge and skills of pre-service teachers, colleges of education across the country are investigating various methodologies. One method that is currently being considered by many is the electronic portfolio. Among the questions that have been raised by administrators and faculty alike is the question, "Can an electronic portfolio system effectively document the pre-service teacher's knowledge, and skills, and provide a user friendly

means of doing so for a variety of purposes?" A related question is, "What are the technology skills required by both faculty and students to implement and use an electronic portfolio system." This study addresses those questions through investigation of the pilot test of a locally developed portfolio model in one university during the 2003-2004 academic year.

Purpose

The College of Education, Health, and Human Sciences at the University of Tennessee is one of the universities investigating the use of an electronic portfolio. As the college moves toward a final decision regarding which digital portfolio system to use, one of the options being considered for adoption is the Virtual Anthology Shell (VAS). However, before any decision can be made it is important to determine perceived strength and weakness of the VAS by both faculty and students. The second key aspect of this study is to investigate the types and levels of support needed by students completing an electronic portfolio. Finally, the study will investigate the technology skills required students to use the VAS.

Design of the Study

Research Questions

The following research questions provided the foundation of this study:

1. What do the users (pre-service teachers and faculty members) of the VAS perceive as the strengths and weakness of this particular digital portfolio shell?
2. To what extent did portfolio completion contribute to interns' confidence in their technology skills?

3. What are potential uses of the VAS other than that electronic data management system?
4. What types and levels of support are needed by students to complete their electronic portfolio? Did they perceive that they received this support and what effect did the support they received have on the quality of their portfolios?

Study Population

The pre-service teacher education program at the University of Tennessee (UT) begins with the selected student cohort attending a series of core courses to educate and orient them as upcoming interns. Courses in reading instruction, educational psychology, special education, cultural studies, mathematics education, English education, and/or social studies education, as well as a customized instructional technology course, attempt to equip the pre-service teacher with the foundation necessary to become a successful member of the education profession.

One aspect of the teaching internship that distinguishes the University of Tennessee's program from those of other teacher preparatory colleges is the completion of a nine-month internship (the regular Tennessee school year for public school students) by the teacher candidate in area schools. The UT program is a fifth-year program; all pre-service teachers enter into their education coursework and internship year already having completed their undergraduate degrees in other disciplines. In contrast to the 16-week requirement implemented by most educational institutions, the University of Tennessee's nine-month internship offers students the opportunity to become contributing members of the schools in which they are interning and to become valuable members of the educational community in general. Although this length of intern service is unusual, the University of

Tennessee believes this type of learning environment is the best way to lay a stable and encompassing foundation for the teaching professionals graduating from its programs.

The sample population for this research was taken from the pre-service teaching population and faculty at the University of Tennessee for the academic year of 2003-2004. There were eight faculty members who were using the electronic portfolio shell with their interns during the 2003-2004 academic year. There were 300 students under the supervision of these eight faculty members

From these eight faculty members, four were randomly selected to participate in this research study. These faculty members were from the areas of Special Education, Secondary English Education, Reading and Literacy, and the Urban Multicultural program. Faculty members were approached by the researcher to participate in this research study; upon verbal agreement to participate, each faculty member signed a consent form to participate in the study.

The pre-service teachers who participated in the study were selected by their enrollment in the aforementioned four program areas. The participating faculty members, representing each of the four program areas, informed the pre-service teachers that this portfolio pilot project was part of their internship year requirement and that the portfolio would be due at the assigned time. The pre-service teachers, however, had to voluntarily consent to participate in the data collection for the research study. They had to sign a consent form to be included in the study. Pre-service teachers were informed by their respective faculty member that not participating in the data collection process would in no way affect their grade in the class.

The interns of the four faculty members selected for participation were 53 in number. From this population a total of 50 student interns became actual survey

respondents (94% response rate), and all four faculty became respondents (100% response rate).

Portfolio Support

The pre-service teachers attended a one-hour workshop on the use of the VAS and were introduced to the VAS electronic portfolio. During the workshop, each student received a CD-ROM containing the VAS and instructions on how to use it. Additionally, the students were instructed on how to organize, maintain, and create their own individualized digital portfolios. During the course of the year, the three graduate student designers of the VAS provided technical support for these students. Technical support included help sessions at designated times, email responses to questions, meeting one on one, visits to the schools, and working with participating interns at their work sites. However, interns in the four selected programs did not all receive the same level of support. The instructors of the four programs determined the amount of class time that was allocated for students to receive support, or spend working on the portfolio. Another factor that influenced support received by interns was whether or not they had classes on campus, which made it easier for them meet with the support staff. Table 1.1 outlines each program and the type of support interns in each program received.

Instrument

In the spring semester of 2004, printed surveys were designed to measure various aspects of student and college faculty experiences with the electronic portfolio system. A cover letter explaining the scope and purpose of the project was created. The researcher's committee chair approved the survey and cover letter, and a request was submitted to the Institutional Review Board (IRB) for approval of the

Table 1.1: Program and level of support received.

Program	Support
Urban Multicultural Program	• Intro workshop • One-hour portfolio workshop • Monthly help sessions at school site • Class time allocated to work on portfolio for question and answers.
Secondary English Education	• Intro workshop • One hour portfolio workshop • Mid year review of required components of the portfolio • On campus access to support personnel
Reading and Literacy	• One hour portfolio workshop • Mid year review but no specific components required. • On campus access to support personnel
Special Education	• One hour portfolio workshop • Limited access to support personnel

research project. Upon approval of the project by the IRB, copies of the student/intern and faculty questionnaires were distributed to faculty and interns in the four programs selected by random sampling.

The two survey instruments contained questions seeking data pertinent to the four research questions forming the foundation of this study (copies of the surveys can be found in Appendix A). The survey items contained in the instruments came from a review or the literature and collaboration with experts in the field of portfolios. The instruments developed by the researcher were validated and pilot tested prior to their use as data collection devices. Items were reviewed and approved by three college faculty members knowledgeable of survey design and portfolio issues. The survey was piloted tested with three graduate students who had knowledge in both portfolio issues and technology in the College of Education, Health, and Human Sciences at the University of Tennessee. These graduate students assessed the sequences of the questions, their meaning and ease of understanding. They also examined survey the directions for clarity. The final

survey instruments were the result of the comments, edits, and suggestions resulting from faculty review and the pilot test.

Data Collection

A pre-approved consent letter was given to potential survey respondents prior to the administration of the questionnaire. The letter explained the purpose of the study as well as the questionnaire, and explained to the potential respondent that participation in the study was completely optional and in no way affected grade or program completion. Only sample respondents who agreed to participate in the study (i.e., those participants signing the consent form) completed the questionnaire, and only their responses are reflected in this research.

The participating faculty for each program distributed, administered and collected the questionnaires. A total of 30-minutes of class time were allotted for the completion of the survey instrument by student/interns, and faculty members. Data collection was completed on May 1, 2004

Analysis of Data

Data analysis for this study included triangulating the responses from the two surveys to answer the specific research questions (listed below) addressed by this study. Descriptive statistical analysis of the questionnaire results was conducted.

Question 1: What do the users (pre-service teachers and faculty members) of the VAS, perceive as the strengths and weakness of this particular digital portfolio shell?

This research question directly addressed the perceived strengths and weaknesses of the digital portfolio shell. Survey question 7 in the intern questionnaire and question 8 in the faculty questionnaire addressed this research topic. This question brought to light the respondent's perceptions of the overall

strengths and weaknesses of specific aspects of the digital portfolio. Frequencies and percentages were calculated for each item by group (interns and faculty). Percentages of responses (strength, neutral and weakness) were then calculated for each item for each program area sub-group. Sub-group percentages for each item were compared to determine if there were any differences between subgroups. A chi-square calculation was considered but due to the small number of responses in each cell. There, the response patterns (percentages) were simply compared for substantive differences. Finally, total sample perceptions of the strength and weakness of the VAS were calculated. Faculty data are reported in actual number, since only four faculty members were participating.

Question 2: To what extent did portfolio completion contribute to interns' confidence in their technology skills?

To answer this question, data from the questionnaire were analyzed in two parts. The first part involved Question 4 from the intern's survey. Question 4 addressed the issue of the interns' perception that working on the electronic portfolio actually improved their technology skill at the end of their internship year. The possible responses to this question were "yes" or "no". Each intern's response was recorded, and similar responses were added together. From these data, percentages of yes or no responses were calculated for each program area subgroups. An item percentage comparison was conducted to determine if there were differences among intern responses by program area sub-group.

The second part of research Question 2 involved Question 5 of the intern survey. This question provided data to determine the intern's perceived technology skill level prior to the internship year. Question 5 appeared as a checklist; students

could mark which skills they perceived they possessed. This question contained the following items:

1. Adding text to a PowerPoint slide
2. Using a master slide
3. Changing background color scheme
4. Adding pictures and movie clips
5. Creating hyperlinks
6. Managing the folder system
7. Downloading Flash Player
8. Viewing the standard matrix
9. Documenting meeting of the INTASC standards
10. Documenting work (i.e, lesson plan, work sample)
11. Burning a CD copy of the digital portfolio.

Question 6 allowed three possible responses: confident, neutral (neutral meant that students were neither confident, nor not confident) and not confident for each of 12 items:

1. Adding Text to a PowerPoint slide
2. Using a master slide
3. Changing background color scheme
4. Adding pictures and movie clips
5. Creating hyperlinks
6. Managing the folder system
7. Creating hyperlinks
8. Downloading flash player
9. Viewing the standard matrix
10. Documenting best work (lesson plan, work sample)
11. Documenting meeting of the INTASC standards
12. Burning a CD copy of the digital portfolio

Responses to items 10, 11, and 12 were not included in the analysis since there were no comparable items in Question 5, and thus, responses could not be accurately matched. For Question 5, when the intern marked an item, it was recorded as the student possessing that particular technology skill prior to the internship year, if he/she left an item blank, it was assumed that the intern did not have the technology skill. Marked or unmarked responses for each item were then added together, and percentages of marked and unmarked responses were calculated for each item. Each item in Question 5 was matched to an item in

Question 6. For Question 6, the student's confidence level responses were recorded. If an intern expressed confidence in a skill, it was assumed that he/she had competency in that skill. Neutral and not confident responses were assumed to be indicators of lack of skill for each intern. Data were analyzed to ascertain the post-internship confidence level for each item in Question 6. An item percentage comparisons of perceived pre-portfolio skills and post-portfolio confidence levels were developed for (a) each intern (b) interns in each program area sub-group, and (c) all interns.

Question 3: What are potential uses of the VAS other than that electronic data management system?

With regard to the question of the potential of further use of the portfolio system by the intern, Question 12 of the survey was utilized. This open ended question offered the respondents the opportunity to comment on other possible usages of their digital portfolios they foresee. Perceived usages were complied by program area and for the total intern sample. Comparisons of responses by program areas were done by content analysis of the usages listed by interns in each program area.

Question 4: What types and levels of support are needed by students to complete their electronic portfolio? Did they perceive that they received this support and what effect did the support they received have on the quality of their portfolios?

This particular research question addressed the overall assistance desired and available to the students, and faculty, when utilizing the VAS. Additionally, the question asked if the support personnel were effective in their service to the aforementioned groups of users. Responses to survey Questions 8, 9, and 10 directly speak to this topic. Question 8 on the intern's survey asked the student to

rate the overall importance of types of support to their overall success with portfolio usage.

Question 8 contained six items, and possible response categories were as follows: extremely important, very important, important, somewhat important and not important. The items were:

1. A "help desk"/person available
2. Workshop to learn how to use the portfolio
3. Weekly help sessions (during the day and evening)
4. Class time allocated by instructor to work on portfolio
5. Resource materials (e.g., tutorials)
6. Workshops held regarding state and national standards

Each intern's response to each item in Question 8 was recorded, and then added to similar responses. Responses, the responses from the categories of extremely important and very important were combined, as were the responses important and somewhat important. Response percentages were calculated first for each individual program area sub-group. A comparison was then made of the percentage of responses for each item to ascertain if there were any differences among sub-groups. A chi-square calculation was considered but not used due to the small number of responses in each cell. Finally, a total intern percentage was calculated and reported.

Question 9 of the intern survey, again addressed the topic of support, but, this time, the question concerned the actual assistance received, instead of the perception of the support's importance of a particular type of support. Question 9 of the intern survey contained the same items as Question 8. However, the possible responses were as follows: "great support", "some support", "no support", and "not needed." Each intern's response for each item was recorded, and then added to similar responses. Percentages for the several response categories were calculated by program area first. These percentages were then compared to discover if there

were differences between programs, as far as the support the interns perceived that they had received. Finally, responses percentages for all interns were calculated and reported.

Question 10 addressed the issue of the effect of support received on the quality of the portfolio. Question 10 contained the same items as Questions 8 and 9. However, the possible responses were as follows: great effect, minimal effect, or no effect. Each intern's response to each item was recorded and then added to similar responses. Response percentages were calculated for each item by program area sub-groups. The percentages for each item were then compared across programs, to ascertain if there were differences in what the interns perceived as the effects of the support they received on the quality of their portfolio. Finally, response percentages for all interns were calculated.

Significance of Study

This study contributes important information in several areas. First, the study provides foundational information concerning whether or not an electronic portfolio can be a useful tool in assessing a pre-service teacher's knowledge and skills. Second, the study informs teacher educators, administrators, and faculty at the University of Tennessee (and perhaps elsewhere) regarding the level of support actually needed for the implementation of a digital portfolio system. Finally, the study gives insight into the level of technological skill needed by both faculty and students to use a digital portfolio system. The findings of this study have implications well beyond the University of Tennessee. Since many teacher education communities are very involved in determining the utility and valid applications of electronic portfolios, this study can add to the national information base.

Assumptions

1. Pre-service teachers had the basic technology skills to use the portfolio shell.
2. Pre-service teachers completing their portfolios had basic understanding of the digital portfolio concept and its applications to their work.
3. Pre-service teachers in the study had adequately maintained and kept current their portfolios.
4. Administrators and faculty using the VAS were able to access and operate a PowerPoint presentation.
5. The one hour workshop provided to the pre-service teachers included enough time and instruction for them to learn how to use the VAS.
6. Data and information collected via the instruments and procedures used were adequate to answer the research questions posed.
7. Interaction among interns in the different sub-groups did not influence support responses.
8. Multiple roles by the researcher (designer of the VAS as well as one of the providers of support) did not influence the outcome of the study.

Limitations

1. Study participants were limited to 50 University of Tennessee interns in the areas of Secondary English Education, Reading and Literacy, Individualized, and Special Education departments, as well as from the Urban Multicultural program. Additional participants in this research study were four University of Tennessee faculty members from the College of Education, Health and Human Sciences who were in charge of the above mentioned interns.
2. Findings of the study can be generalized only to the VAS and its use with interns in the areas of Secondary English Education, Reading and Literacy,

Individualized, and Special Education departments, as well as from the Urban Multicultural program in the College of Education, Health, and Human Services at the University of Tennessee.

3. The VAS does not currently have a database system which can automatically compile student entries and score in accordance with various sets of national standards.
4. The VAS does not have an online workspace in which pre-services teachers can store their entries.
5. Could not control interaction that might have taken place between interns in the different sub-groups.
6. Researcher was also the designer of VAS and one of the providers of support.

Definitions of Terms

1. Showcase portfolio: Contains end products that reflect student's best efforts. Selection of entries can be by both instructor and student or by students only. May or may not be used for instructional purposes.
2. Assessment portfolio: Contains all records and materials needed to evaluate the student. Selection of entries is usually specified by instructor, but there can be options. Types and numbers of entries must be standardized across students. Primary purpose is assessment/evaluation.
3. Working portfolio: Contains most or all of a student's work in progress. Not directly evaluated; but used to review student progress over time and to determine future instructional strategies.
4. Jump drive: Portable data storage device.

5. Virtual Anthology Shell (VAS): An electronic portfolio shell created by three graduate students at the University of Tennessee. The shell was created using PowerPoint and Flash Macromedia.

Organization of Study

This study is organized in five chapters.

Chapter I provided the introduction, context in which the study was conducted, statement of problem, purpose of the study, overview of methodology and procedures, study assumptions, study limitations, importance of the study, definitions of terms, and an overview of the organizational format of the study.

Chapter II contains a review of literature organized around the use of professional portfolios, portfolios in teacher education, performance-based assessment, and digital portfolio.

Chapter III describes in detail the methods and procedures used in this study.

Chapter IV provides the findings of the study.

Chapter V presents a summary of the study, conclusions, implications, and recommendations.

Chapter 2
Literature Review

Introduction

The literature review in this study begins with a focus on portfolios as an assessment tool and then focuses of the different types of portfolios that are being currently used in the field of education. After addressing these issues the review focuses on how portfolios are used in both the P-12 systems and teacher education programs and finally concluding with a review of the use of digital portfolios specifically in teacher education programs.

Portfolio Assessment

Interest has been increasing in the development and use of performance assessments often referred to as authentic assessment (Arter and Spandel, 1992; Gifford and O'Connor, 1992). Portfolios have been gaining favor as a means of authentic assessment because of their ability to represent knowledge and growth over time in an instructionally relevant way (Reckase, 1995).

The focus on accountability in the field of education has redefined the role of portfolios to include the evaluation of student performance. This new role as an assessment tool is becoming part of the evaluation process prior to recommendation for licensure to work in the teaching profession. The profession is looking for individuals who can assess situations and develop appropriate solutions or strategies (Weiner, 2000). This goal may be accomplished "through the use of realistic situational problem solving and authentic assessment of outcomes from learning." (Young, 1995).

Grace (1992) supported the portfolio by describing it as "a realistic, instructionally and developmentally appropriate assessment tool." (Piper, 1999). The portfolio system can serve as a benchmark for the student when used to compare the student's current work to his or her earlier work. This type of evaluation indicates the student's progression towards a standard of performance consistent with a particular curriculum and appropriate developmental expectations. Additionally, it provides evidence of the pre-service teacher's performance as a thinking, problem-solving, and self-evaluating professional (Mokhartri, Yellin, Bull, & Montgomery, 1996).

As an assessment tool, portfolios can be used to relate student performance to professional standards and to make visible the maturity of academic decisions made by the educator in training. An example of this is how Dartmouth College is using of portfolios to assess professional growth against standards. Students begin by developing a working portfolio of artifacts selected to portray their professional growth. The working portfolio is then transformed into a presentation portfolio organized according to the Interstate New Teachers Assessment and Support Consortium (INTASC) standards with the basic goal of demonstrating qualitative growth as well as quantitative accomplishments (Reflecting on the Student Teacher: Experiences in Portfolios, 2001). Campbell and colleagues (1997) also provide support for the use of portfolios in pre-service assessment.

The Dartmouth venture is consistent with Campbell's recommendation. He recommends that portfolios be designed that specifically address INTASC standards and suggests that portfolios communicate a candidate's knowledge of subject matter, individualized instruction, as well as demonstrating their skills in classroom management, communication, instructional planning, and assessment of student learning.

A major consideration when using portfolios as an assessment tool is the reliability and validity of the assessment. Measures are considered reliable when there is evidence that the contents of the portfolio represent an accurate picture of a student's work as it relates to the goals and objectives of the program or standards of the profession (Bullock & Hawk 2001). In order for assessment results to be consistent among assessor's there must be clearly defined indicators of the performance that is desired or acceptable (Pitts & Thomas, 2001). Another key ingredient in the successful use of portfolios is the choice of artifacts to be included. These may be selected by the student or predetermined but in either case they must be representative of the goals and objectives of the particular program (Routledge & Wilson, 1997). While the entries must be representative of the criteria established within a program there must be a way of representing standardized levels of difficulty across the evidence or artifacts (Routledge & Wilson, 1997).

Formats for portfolios often vary but the traditional binding of documents is still commonplace. Today however, electronic and online format versions appear frequently in the literature (Lockledge & Weinmann, 2001). Several functions are typically found across the various forms or categories of portfolios.

Summary

- Portfolios can be used as an instructionally and developmentally appropriate assessment tool.
- Portfolios can be used to relate student performance to professional standards and to make academic decisions on these students.
- Portfolios can provide students the opportunity to demonstrate their knowledge and skills in several areas such as knowledge of subject matter, assessment of student learning, and classroom management.

- In terms of assessing student portfolios, there must be clearly defined indicators of the performance that is desired or acceptable.

Portfolios Types

Individuals in the field of portfolio development have identified three distinct models that have emerged in practice. The three portfolio models are: learning, assessment, and showcase portfolios. While it is possible, albeit difficult, for a simple portfolio to address all three purposes equally, what distinguishes these portfolios from each other is the primary purpose of each. Each purpose varies, and these differences determine the portfolio's author and audience. In addition to these factors, the portfolio's objective is instrumental in shaping the form, content, and process. Each portfolio model will be discussed in subsequent paragraphs.

Learning Portfolios

"Learning portfolios are personalized collections of a teacher's work that emphasize ownership and self-assessment." (Wolf & Dietz, 1998). In this type of portfolio, a pre-service teacher typically collects a variety of information that will illustrate a) accomplishments and progress, b) reflections on the development of his/her work and learning, and c) his/her goals as a learners. In some cases (found mostly where there are no assessment implications), pre-service teachers may use the portfolio to show where there are personal needs for improvement. Learning portfolios serve mainly to afford the teachers the opportunity for self reflection and exploration of their work. Examples in this category include portfolios that were prepared in teacher education programs or for individual growth plans. (Barton & Collins 1993, Bullock & Hawk 2001, Wolf & Dietz, 1998).

Pre-service teachers author their own learning portfolios and therefore have sole ownership of them. The learning portfolio serves mainly to advance the pre-service teacher's professional development and for this to occur teachers must be allowed to decide what they want to learn and must be given the chance to evaluate their learning personally. The structure of this portfolio is very loose and contains in it different works that the pre-service teacher selects to demonstrate how he or she is progressing toward the self-directed goals that have been set. (Barton & Collins 1993, Bullock & Hawk 2001, Wolf & Dietz, 1998).

Learning portfolios differ in content from one teacher to another and the personal teaching style utilized by the author is reflected. A basic learning portfolio typically contains pre-service teaching work, including student work samples, along with the pre-service teacher's periodic reflection on professional development. "A wide variety of additional materials such as photographs, letters from students, and other personally significant items are often added." (Wolf & Dietz, 1998). This type of portfolio focuses on goals specific to the ability and potential of the learner or related goals wherein the pre-service teacher's progress is followed and documented over a span of one or two school years. Additionally, this type of portfolio can be easily modified to meet the needs of an assessment or employment portfolio. (Barton & Collins 1993, Bullock & Hawk 2001, Wolf & Dietz, 1998).

Showcase Portfolio

Showcase portfolios are customized and attract collections of information given by teachers to prospective employers, intended to establish a teacher's suitability for a specific professional position (Wolf and Dietz, 1998). These portfolios generally contain a resume, certificates and letters of recommendation, a few eye-catching samples of teacher and student work, and brief reflective comments about

the teacher's philosophy or practices. The showcase portfolio is customized by the teacher, and tailored to the position being sought and the materials requested by the prospective employer. The intended audience is the school or district personnel receiving the portfolio. (Barrett 2002, Carroll, Potthoff & Huber 1996, Wolf & Dietz, 1998).

The purpose of the showcase portfolio is basically to help the teacher/pre-service teacher obtain a job. This portfolio is semi-structured, with a portion of the contents determined by the organization conducting the job search, and another portion selected by the teacher to fit the position requirements. The contents typically include standard job search materials (resume, etc.), as well as materials prepared by the teacher (e.g., lesson plans and student work samples). This portfolio might also contain unique information requested by the organization conducting the job search. (Barrett 2002, Carroll, Potthoff & Huber 1996, Wolf & Dietz, 1998).

When utilized as an employment portfolio, this tool usually has a slicker, more visually appealing appearance than either of the other two types of portfolios. Since many times, principals and hiring committees are likely to judge the appearance of a candidate's work along with its substance, the slick, showcase portfolios can work well for the applicant, placing him/her in the best possible light. The showcase/employment portfolio is usually less extensive than either the learning or assessment variety because busy administrators and teachers are not likely to spend hours reviewing an applicant's materials. (Barrett 2002, Carroll, Potthoff & Huber 1996, Wolf & Dietz, 1998).

Assessment Portfolio

"Assessment portfolios are selective collections of teacher work and standardized assessments, submitted by teachers or teacher candidates according to the structured guidelines set by professional organizations, state agencies, school districts, or teacher education programs." (Wolf and Dietz, 1998). Samples of teacher work and criteria specific work can generally be found in an assessment portfolio. Letters of recommendation, results of standardized performance assessments, and information presented in the form of formal evaluations can also be found in an assessment portfolio. (Arter & Spandel, 1992, Barton & Collins, 1993, Wolf & Dietz, 1998).

Assessment portfolios serve primarily to evaluate a teacher's performance to determine if he or she is qualified for certification, licensure, or professional advancement. The design of the assessment portfolio is generally sent out by whatever organization requests the portfolio and is compiled by the pre-service teacher or teachers according to the given guidelines. This portfolio serves mainly to provide formal assessment of the performance of individual teachers ergo the primary audience is the organization conducting he evaluation. (Arter & Spandel, 1992, Barton & Collins, 1993, Wolf & Dietz, 1998).

The assessment portfolio is highly structured with a significant portion of the contents externally mandated. However, even with this prescribed formula of presentation, teachers still have considerable freedom in selecting work samples they believe best represent their personal teaching effectiveness. This type of portfolio is tightly constrained so that teacher performance can be fairly, efficiently, and reliably evaluated. (Arter & Spandel, 1992, Barton & Collins, 1993, Wolf & Dietz, 1998).

Summary

- Instructional Portfolio – a storage/retrieval system for work in progress. Its primary use by teachers/instructors is to monitor student progress over time and supply instructional assistance. Its primary uses by students are to provide a means of storing work in progress, improving it and reflecting on it.
- Showcase Portfolio – a means of storing and displaying artifacts that will display a student's "best" performances. Its primary purpose is to impress someone – a potential employer, a critic, other. This type of portfolio is also likely to contain information about the student that someone might want or need to know.
- Assessment Portfolio – a means of collecting artifacts and data that will be used to evaluate a student's knowledge, skills, performances. Its primary purpose is to evaluate a student's performance at one or more points in time in relation to one or more performance criteria.

Portfolios in the P-12 System

The current trends and policies in education at both the state and national level promote and even require the use of "challenging standards for all students" (Shapley & Pinto, 1997). Title I legislation requires that alternative assessment measures be used to assure that all students meet rigorous performance standards. One option for assessment adopted by some school districts is the development and use of portfolios that have been aligned with state and national standards. (p.4).

> The Dallas Public Schools developed and implemented a portfolio system as one means of assessment. The School Systems Title I LEA plan included portfolios as an option for PK-2 student assessment. A study was conducted to examine the portfolio process within Title I schools. The study was designed to identify student outcomes as measured through portfolio assessment and to explore the criterion-related validity of the student portfolio scores. The Title I reading/language arts portfolio assessment looked at four key areas. These

> included: (a) the instructional goals and performance criteria, (b) the scoring rubrics, (c) to identify student outcomes as measured by the portfolio assessment and (d) the contents of the portfolio. (p. 4).

Three main types of data were collected: monitoring data on portfolio implementation, portfolios assessment instructional goal ration for fall, winter, and spring rating periods, and students' ITBS and Spanish Assessment of Basic Skills (SABE) scores. These were used to determine the concurrent validity of portfolio scores for individual schools. (p.4).

> Portfolio assessment was used in 71 of 118 Title PK-3 schools (62%). Participating schools monitored between February and March 1996 to determine whether the schools were implementing assessment type portfolios and following the guidelines in the 1995-96 Title I Reading/Language Arts Portfolio Assessment Teacher's Manual. The visits were also used as an opportunity to provide feedback and assistance, where needed, so teachers could make adjustments to their program. The monitoring team consisted of evaluation specialists and other retired teachers that were contracted for the study. Twenty-five percent of the portfolios from randomly selected class sections in each grade level and school were reviewed. This sampling procedure yielded a sample of approximately 8% of all Pre-kindergarten (PK), Kindergarten (K), and Grades 1and 2 students. The review focused on the implementation of the portfolio, procedural information, work samples and contents of the portfolio. (p. 17).

The results of the study showed that the assessment of student portfolios reflected the growth and progress of students in these schools. The district mean instructional goals ratings for the fall (1.57), winter (2.02), and spring (2.51) showed that students made gradual progress toward grade-level performance throughout the school year. Nonetheless, the mean instructional goal ratings for the spring showed that many students failed to achieve proficiency (3.00). Approximately 45% of the Title I students in the district mastered the portfolio. Portfolio mastery percentages indicated that teachers were rigorously assessing their students' performance as compared to established grade-level standards. An excellent variety of work samples was found in the portfolios including student-generated work samples (e.g., dictated stories, word/sentence writing, creative writing) and diagnostic/evaluative

work samples (e.g., anecdotal records, Alphabet Knowledge, high-frequency, vocabulary, letter/sound correspondence). (p. 18).

The results of the study suggested that they continue using the Title I Portfolio Assessment in Grades PK-2 and that those 71 schools continue to refine the portfolio assessment process. The study also indicated a need for more teacher training and support. (p. 19).

According to several studies the successful implementation and performance of a portfolio system depends on the amount of student/teacher training and on the attitude of teachers toward the process (Salinger, Terry & Chittenden, Edward, 1994). Jerry Johns and Peggy Van Leirsburg (1992) conducted a study to target concerns of two teacher populations, those who have implemented portfolios and those who have not implemented portfolios. Both groups indicated their greatest concerns revolved around planning, managing the contents of portfolios, time management, use of portfolios in parent/teacher conferences, and criteria and procedures for evaluation of portfolios (p. 6). Those teachers who had gone through portfolio training and also had used them in the classroom tended to feel more favorably toward portfolios as an assessment tool when compared to the group that had not received training. Teachers felt that portfolios were a very worthwhile experience for students and provided a non-threatening method of testing. One-third of teachers reported that time management was a major concern. Training was also noted as of major importance. It was suggested that training take place early in the school year and that a network of teachers should be established to provide support. (p. 8).

A similar study was conducted at Bowling Green State University. That study addressed the following questions: (1) Do teachers feel they have adequate training to implement portfolios; (2) Do teachers favorably respond to portfolios; (3) Do

teachers feel one of the major obstacles in implementing portfolios is the lack of adequate time? (Bushman & Schnitker).

The percentages provided by the study showed that only 48% of the sampling felt they had received adequate training while 52% felt they had not received enough training. Eighty-eight percent responded that they favored the use of a portfolio. Fifty-three percent felt that the largest obstacle when it came to working with the portfolio was the inadequate training. Thirty-one percent indicated time management affected their attitude towards the use of a portfolio. 9% cited the following issues as obstacles to implementing the portfolio: unsure of criteria used to evaluate portfolio content, not recognized by administration as the preferred method of assessment, and inconsistent interval of employment. Eighty-three percent said they would use the portfolio in all areas across the curriculum, while eight percent said they would use it only in language arts. Three percent said they would only use it in math and three percent said they would use it in both language arts and math. (p. 8).

Summary

- Portfolios used as an assessment tool represent a collection of work chosen by students and teachers that reflect the effort, progress, processes, and achievements of the student.
- The portfolio can be an assessment process that takes into account the individual differences and learning styles which formal testing does not.
- However, the issue of teacher training remains an obstacle to the effective and widespread use of portfolios.

Portfolios in Teacher Education

The use of portfolios is becoming increasingly widespread in teacher education programs, helping educators to examine their own personal beliefs as well as to provide documentation of their educational growth and development. Although a fairly recent phenomenon, portfolios are becoming more popular in assessing the professional development of preservice teaching interns (Barton & Collins, 1993). Exposing preservice interns to the process of portfolio development encourages these teachers-in-training to reflect upon their knowledge, skills and classroom practices, as they evaluate their capabilities. Ownership comes through the intern's ability to reflect and place within the portfolio, those items they feel best reflect their knowledge and skills.

There is also support for professional portfolios as a marketing tool for pre-service teachers, displaying tangible evidence of their knowledge and skills, and documenting their achievement through a collection of evidence. This might include curricular units, writing samples, photographs, videos and other artifacts of teaching and learning.

Furthermore, the process of creating a portfolio can be useful as a product. Creating portfolios help students develop marketable technical skills as they learn to reflect on their own strengths and weaknesses (Kilbane & McNergeny, 2001).

As with many things in education, it would be difficult for everyone to agree on one definition or version of what a portfolio is. Paulson, Paulson & Meyer (1991) provide a working definition:

> "A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection includes student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self reflection. The portfolio communicates what is learned and why it is important (p.60). "

Along these lines, some teacher education programs are examining the potential of portfolios as an assessment tool. Preliminary application of portfolios suggests an improvement in teacher training evaluation, and in practice, guides pre-service teachers in their professional development. Teaching educators have found that well-constructed portfolios may help capture the complexities of acquiring knowledge, teaching, and learning to become an educator when used as authentic assessment tools within courses and programs in Colleges of Education, Health, and Human Sciences (Carroll, Pothoff, & Huber, 1996; Hansen, 1996; Krause, 1996; McLaughlin & Vogt, 1996; Stahle & Mitchell, 1993; McKinney, Perkins & Jones, 1995; Ohlhausen, & Ford, 1992). Kenneth Wolfe (1991) suggests that portfolios "make it possible to document the unfolding of both teaching and learning over time" (p.129). Portfolios themselves may foster an inquiry approach, and help shift ownership and responsibility of actual learning over to the learner (Graves & Sustein, 1992). In addition, they promote a reflective stance during which pre-service teachers may be engaged in "revisiting and revising their ideas over time" (Wade & Yarbrough, 1996). Such a stance allows the learner to not only step back from experiences, form connective links, rethink past experiences, and ideally, develop ways of applying those insights to future endeavors.

The utilization of portfolios offers the potential to improve the teacher education process on several levels. First, they enable faculty to assess a student's progress in developing the complex skills necessary for effective teaching practices (Barton & Collins, 1993; Mokhtari et al., 1996; Robbins et al., 1996;). Secondly, portfolios serve to evaluate any attainment of a program's goal (Carroll, Potthoff, & Huber, 1996). Finally, portfolios reflect national trends in performance assessment for career placement as well as serving as aiding in the demonstration of competency

in regard to teaching standards at both state and national levels. (Carroll, Potthoff, & Huber, 1996).

Wolfe (1996) described a teaching portfolio as a "collection of information about a teacher's practice" (p. 86). He stated that the collection should be more than a scrapbook of miscellaneous artifacts and lists of professional activities. The introductory section should include the student's teaching philosophy and goals. The concluding section should include evidence of ongoing professional development and formal evaluations. At the heart of the portfolio, however, should be a combination of real teaching artifacts and written reflections. He emphasized that artifacts should be framed with clear identifications, contextual explanations, and reflective commentaries that examine the teaching documented in the portfolio. These reflections should go beyond describing the contents and take the time to focus on what the teacher and students learned (p 88). Wolfe suggested that students include an informal or formal self-assessment of the portfolio as well. He stated that a formal assessment should be tied to specific criteria or performance standards such as those provided by state or national standards.

Anderson and DeMuelle (1998) surveyed 127 teaching educators throughout the United States to examine portfolio practices in teacher preparation programs. Findings of this survey indicated that specific purposes for usage of a portfolio included; promoting student learning and development (96%), encouraging student self-assessment and reflection (92%), providing evidence for assessment and accountability (88%), and documenting growth of pre-service teachers (88%). Ninety-two percent of study participants stated that portfolios had a positive impact on pre-service teachers because portfolios were student-focused, defined by professional standards, and increase collaboration among faculty and agreement about program outcomes (pp. 26-28). Portfolios were viewed as "self-empowering

tools that encourage pre-service teachers to assume more responsibility for their learning" (p.26). Anderson and DeMeulle reported that faculty respondents demonstrated a growing interest in the use of state and national professional standards as a part of portfolio development/documentation (p. 27).

Research on electronic portfolios was conducted at a state university in the Midwest by Dutt-Donner and Personett in 1997. Their study involved 300 undergraduate teacher education students using portfolios. The study had two main focuses "... to understand student experiences in developing a portfolio as a class assignment at midterm and final points in the semester ... to document the instructor's process of incorporating and refining the use of portfolios into her course." (p. 3-4). Data were collected from student reflections, portfolio conferences, final course evaluations, and evaluations completed after each portfolio review. The course instructor also kept a journal noting any observations, ideas about implementation of portfolios, and concerns that arose.

Student responses on questionnaires and conversations during the portfolio conferences indicated the portfolio was beneficial to them in a variety of ways. However, initially almost all students were somewhat anxious about the process of developing a portfolio. Generally students indicated concern about three main areas: time, confidence, and interaction with an instructor. Some, students (56 out 283) were concerned about the amount of time it may take to put together their portfolio (p. 6). They indicated a high level of stress and feelings of being overwhelmed with the process. Next, many students (72 of 283) felt, at first, they lacked confidence that they were capable of accomplishing "something like that" (p. 7). Finally, students were most concerned with having a conference with their instructor (75 of 283) because most had not met with a professor individually to discuss their learning performance (p. 7).

Almost all students (275 of 283) reported a great experience at the end of the semester. Students felt satisfaction by developing a portfolio and conferencing with their instructors. (p. 7). Students indicated satisfaction on a number of levels. First, students indicated high levels of satisfaction in their portfolios because it was designed specifically to evaluate what they had learned (58 of 283) (p. 7). These findings were similar to those described by Biddle (1992), Dutt, et al (1997), and Olhausen & Ford (1992). Second, students reported that the portfolios reflected individuality (42 of 283) (p. 8). They allowed students to decide what pieces to include that best reflected their learning. Third, students indicated that the portfolios made them think back over the semester to everything they had completed (60 of 283) (p. 8). Fourth, students felt that conferencing with their instructor individually allowed the instructor to gain a better understanding (99 of 233) (p. 10). Students felt given the opportunity to discuss with their instructor explanations about their work provided the instructor with a clearer understanding. (p. 10).

Based on the findings from this study, there were four major themes that emerged. First, the development and sharing of portfolios offers students an opportunity to develop self-knowledge about their learning. Second, using a portfolio to evaluate students' learning allows for a certain amount of individuality. While the structure of the portfolio may be explicit, students can more easily demonstrate what they felt was most important. Students must be involved in the process of decision-making. Third, it is normal to receive some negativity from the students prior to actually putting the portfolio together and even as the process is ongoing during the semester. Finally, it is important to remember that teaching practices and assessment practices will influence each other. Ultimately, it is this relationship that can become the basis for a student's acceptance, comfort and

maximum usage of the portfolio as a pre-service teacher and a professional educator.

Summary

- Portfolios enable faculty to assess a student's progress in developing the complex skills necessary for effective teaching practices.
- Portfolios serve to evaluate any attainment of a program's goal.
- Portfolios reflect national trends in performance assessment for career placement as well as serving as an aid in demonstrating competency in regard to teaching standards at both state and national levels.
- Portfolios promote student learning and development, encourage student self-assessment and reflection, providing evidence for assessment and accountability, and documenting growth of pre-service teachers.
- Concerns about portfolio use included time required, confidence level of the users and interaction with an instructor.

Digital Portfolios

Bennett and Hawkins (1993) discussed the use of technology "as having "unique capabilities" that would make crucial contributions to the creation of workable and meaningful forms of alternative assessment." (Piper, 1999). They state that computers and video recordings offer unlimited potential for collecting and storing records of students' work. Lankes (1995) discussed the use of computer technology "as a "likely solution" to the problem of creating, managing, and storing portfolios." (Piper, 1999). Electronic or computer-based portfolios could be considered similar to traditional paper portfolios. The information was handled electronically with computerized text, graphics, sound and video. (p.5). Lankes also

stated that "computer-based portfolios provide an authentic demonstration of accomplishments and motivate students to take responsibility for their own work." (p. 5).

The International Society for Technology in Education (ISTE) prepared a report for The Road Ahead (1995-1997), a program of the National Foundation for the Improvement of Education (NFIE). Technology was described as providing new assessment tools, including computer-based self-scoring tests, electronic grade books, and computer-based student portfolios. In addition, it was suggested that multimedia databases provide a more compact, storable, and retrievable tool for student portfolios (pp. 7-8). ISTE reported that information technologies added "new dimensions to portfolio assessment" (p. 17). It was also perceived, computer editing could facilitate the arrangement of the portfolio items, allowing for one presentation to be used for a variety of purposes, while evidence in the form of pictures, graphics, sound, and text could be digitized and stored as well.

Sheingold and Frederiksen stated that technology could provide "the media through which students and teachers can have conversations that lead to shared understandings of the values and standards for student performance" (Cited in Means, 1994, p. 112). They indicated that technology can help link assessment with reform by providing the following functions: support for students with regard to work in extended, authentic learning activities; portable, accessible and repayable copies of performance in multiple media; libraries of examples and interpretive tools; greater participation in the assessment process; and publication of work recognizing student accomplishments (p.121). They also suggested that technology can provide evidence of assessment beyond products that are text-based or activities requiring the physical presence of the evaluator. Student work can be captured and preserved

using interactive multimedia formats that integrate many forms of information on one computer disk (p. 122).

Georgi and Crow (1998) discussed the problems with the traditional paper portfolios such as storage, maintenance, access, ownership, and transportation. Additionally, they noted problems with losing or misplacing items, indexing items, hauling bulky projects around, and retrieving certain types of exhibitions for display. Due to the technological advances, these authors stated, "the advent of multimedia, telecommunications tools, and electronic storage media can serve educators at all levels in the design and implementation of digital portfolios" (p. 77). Georgi and Crow recommend that teacher educators help students identify instructional and assessment techniques and "seek ways to have technology strengthen these successful experiences" (p. 82).

McKinney (1998) stated that "the shared potential of hypermedia technology and portfolio self-assessment presented a challenge for teachers due to the lack of time, little support, and limited and always changing resources" (Piper, 1999). He stated that schools were responsible for providing potential teachers with the opportunity to experience environments flush with technology. (p. 6). Therefore, McKinney studied five students and examined what effects the incorporation of technology had on the process by which their portfolios were developed. Two different portfolios were compiled by students as they progressed through the stages of their teacher preparation program. Portfolio analysis, survey questionnaires, and focus group interviews were used as the multiple research methods.

The following categories were used to examine the portfolios: organization, evidence of integration, evidence of reflection, evidence of growth in content knowledge from individual courses, evidence of focus on the individual child and changes between the first and second portfolio (p. 9). Each of the five portfolios was

reviewed by McKinney and three of the five were reviewed independently by outside consultants. An additional survey of the five participants was administered to determine computer usage skills. Questions on the importance of self-assessment in portfolios, the effect of technology on the process of developing portfolios, personal views about inclusion of technology over time and with experience, necessary support structures needed for developing electronic portfolios, impediments of the technological portfolio process, and the potential future of portfolios in teacher preparation programs were all methods of assessing the participants computer skills. The focus groups were audio taped and subsequently transcribed for analysis. (p. 10).

Analysis of the information gathered in the interviews revealed that each student organized information in personally unique ways. These portfolios included more reflective commentary with fewer artifacts and demonstrated "evidence of growth in confidence in their ability to help children learn" (p. 13). A greater feeling of confidence and understanding of the purpose of compiling portfolios and in the advancement of their respective technological expertise was found following the various experiences with technology. The use of technology in the process of compiling portfolios yielded positive results including the use of more effective ways to show connectivity through the "nonlinear nature of multimedia software." The potential utilization of multimedia in the formulation of portfolios and projects in teaching rendered a positive attitude from the interviewees. Additionally, an increase in confidence in their ability to incorporate technology into teaching was also found in each student. The system was limited in its lack of storage space associated with the computer hardware and software. It was indicated that students could have utilized more time and access to the scanner, recorder, and camera. McKinney indicated "that there was a need for more longitudinal research to

determine the effectiveness of electronic portfolios, but it appeared there was "value in scaffolding the development of portfolios over time" " (p. 21).

Chapman University also conducted research on the potential usage of electronic portfolios in their teacher preparation program. The electronic portfolio project was developed to explore the possibilities of using computer technology to store artifacts as evidence of achievement of course objectives. Two successive groups of teacher candidates were involved in the electronic portfolio project: the spring group of six students (Group I) and the fall group of six students (Group II). The study was guided by the following questions:

> What effect does incorporating technology have on the development of a portfolio for teacher candidates? To what extent does the electronic portfolio process encourage self-assessment and reflection? In what ways does the electronic portfolio provide evidence of student learning and achievement in line of course objectives? What are the problems encountered in putting together the portfolio electronically? What do students perceive as the strengths and/or weakens of 6creating a portfolio electronically? What are the course professor's perceptions concerning the effectiveness of the electronic portfolio as a tool for assessment? (Piper, 1999, p. 7)

From interviews, portfolio reflections, and field records emerged patterns that were examined through *Ethnograph*, a qualitative data software analysis program. These examinations served to compile information concerning experiences encountered by teacher candidates while collecting and preserving digital artifacts. The perceptions of strengths and weaknesses given by the teacher candidates of the portfolio were examined, as well as the problems of the hardware and software. Insight into the student's process of self reflection and assessment were examined through written reflections. In order to determine previous attitudes toward and experiences with technology, a computer literacy questionnaire was administered prior to the study.

Generally, students felt they were able to present their artifacts as evidence of meeting course objectives based on standards within the electronic portfolio framework. Students demonstrated that they were guided by the course objectives throughout the electronic portfolio process and believed they were able to demonstrate achievement, competency, and proficiency in the course subject matter. All twelve of the students in the study clearly indicated that they viewed the purpose of the electronic portfolio as a way of demonstrating that they had met the objectives (p. 9). Results of the study indicated that students "were engaged in self-assessment and self-reflection as they described, explained, and defended the evidence they chose to include within the electronic portfolio." (p. 9).

The students' comments supported the researcher's belief that, not only were course objectives considered significant to students, but that the electronic portfolio project stimulated reflective practice. One student indicated "I could demonstrate competency by matching artifacts with competencies. I believe I was very careful in selecting evidence to be certain it was adequate" (p. 9). Another student stated: "I really felt that the electronic portfolio was a great way to organize evidence and artifacts" (p. 9). Another student explained that the process of reflection meant, "critically examining your work to determine which way you have met the selected criteria, and how you can best example or highlight your work." She had described the process of developing the portfolio as "a constant self-assessment" (p. 10).

In terms of assessment, students in the Chapman University study generally felt that the electronic portfolio was valid and useful. One student referred to the electronic portfolio as a "viable measure of assessment" (p. 10). The course professor indicated that she thought students selected artifacts more carefully for the electronic portfolio because they had to "go through the mechanics of digitizing their artifacts" (p. 10). In her assessment, she said she examined students' choices of

artifacts, the explanations regarding their choices, and indications of personal reflection upon their learning.

Results indicated "that the primary effect of incorporating technology into the portfolio process was that students gained knowledge of computers and technical skill with software and hardware, particularly in graphics and multimedia" (p. 10). From the students comments the primary strength of the electronic portfolio was that students' could include multimedia artifacts in the form of graphic, audio, video, animation, as well as text to provide a more complete picture of their achievement. Students regarded the aesthetic qualities and the possibilities for personal creativity as strengths of the portfolio. According to the students the weaknesses included "the demands on their already busy schedules, the lack of pervious experience with computers, the lack of time to learn the technology required for multimedia, and the need to work within the school computer lab setting." (p. 11). Other problems mentioned were lack of time needed to work on the technology, difficulty with the availability of the lab, broken equipment, cross-platform capability, technical difficulties, student's lack of computer skills, insufficient experience, and the need for technical support (p. 11).

One of the patterns that emerged unexpectedly from this study was the pleasure students reported in being able to express themselves through technology. Prior to this study, the research indicated that "multimedia technology incorporated powerful tools for creativity, particularly in performance areas that are difficult to document through the traditional verbal linguistic modes of expression typically used in academic settings." (p. 11). Many students indicated that they enjoyed being able to express themselves more easily through the use of multimedia. In addition to student satisfaction of expression, the students also believed that new technology would allow them to further enhance classroom instruction. The course professor

reported attitudes changing as students began to witness the finished product. She stated "students appeared to get excited about the portfolios, particularly in terms of being able to show their individuality." (p.11). She went on to state they (the students) "demonstrated personal pride in their final product and indicated that they appeared to see "the benefits of the electronic format" "(p. 11).

Summary

- Using digital portfolios, students gained knowledge of computers and technical skills with software and hardware, particularly in graphics and multimedia.
- Portfolios provided the opportunity to present their artifacts as evidence of meeting course objectives based on standards within the electronic portfolio framework.
- Problems that arose from using a digital portfolio included lack of previous experience with computers, access to computers and software, lack of time to work on the portfolio, and need for technical support.

Chapter 3
Methods and Procedures

Purpose

The purpose of this study was threefold: 1) to identify the strengths and weaknesses of the VAS as perceived by both the faculty and student users, 2) to determine types and levels of support needed by students completing an electronic portfolio, and 3) to investigate the technology skills needed by students to use the VAS.

Research Questions

The following research questions provided the foundation of this study:

5. What do the users (pre-service teachers and faculty members) of the VAS, perceive as the strengths and weakness of this particular digital portfolio shell?
6. To what extent did portfolio completion contribute to interns' confidence in their technology skills?
7. What are potential uses of the VAS other than that electronic data management system
8. What types and levels of support are needed by students to complete their electronic portfolio? Did they perceive that they received this support and what effect did the support they received have on the quality of their portfolios?

Context

The pre-service teacher education program at the University of Tennessee (UT) begins with the selected student cohort attending a series of core courses to

educate and inform them as upcoming interns. Reading education, educational psychology, special education, cultural studies, a core teaching course in the areas of math, science, secondary English education and social studies, as well as a customized instructional technology course, equip the pre-service teacher with the foundation necessary to become a successful member of the education profession.

One aspect of the teaching internship that distinguishes the University of Tennessee's program from other teacher preparatory colleges, is the completion of a nine month (the regular Tennessee school year for public school students) internship by the teacher education student in an area school. The UT program is a fifth year program; pre-service teachers enter into their internship year already having completed their undergraduate degrees other disciplines. In contrast to the 16-week requirement implemented by most educational institutions, the University of Tennessee's nine month internship offers the student the opportunity to become a real contributing member of the school in which they intern as well as a valuable member of the educational community in general. Although this length of intern service is unusual, the University of Tennessee believes that this type of learning environment is the best way to lay a stable and encompassing foundation for the teaching professionals graduating from this program.

Sample

The sample of participants for the research was taken from the intern teacher population and faculty at the University of Tennessee for the academic year of 2003-2004.

There were eight faculty members who were using the VAS with their interns for the 2003-2004 academic year. There were 300 students under the supervision of these eight faculty members.

From these eight faculty members, four were randomly selected to participate in this research study. These faculty members were from the areas of Special Education, Secondary English Education, Reading and Literacy, and the Urban Multicultural program. Upon verbal agreement to participate, the faculty members signed an informed consent form prior to participating in the study.

The pre-service teachers who participated in the study were those enrolled in the aforementioned, four program areas. The participating faculty members, representing each of the four program areas, informed the pre-service teachers that the portfolio was part of their internship year requirement and that it was due at an assigned time. The cover letter handed out to the interns during data collection informed them that participation in the data collection for the study was voluntary, and in no way affected their grades if they chose not to participate. The pre-service teachers agreeing to participate signed an informed consent form prior to participating in the study.

The interns of the randomly selected four faculty members totaled 53 in number. From this population a total of 50 student interns became actual survey respondents (94% response rate), and all four faculty were respondents (100% response rate).

Virtual Anthology Shell

Three graduate students in the Department of Instructional Technology and Education Studies began development of a portfolio shell in an effort to meet the

college's needs. The first step in this process was to research the various types of portfolio systems currently used in other institutions. From this research the designers developed basic ideas relating to format, which software to use, and content of the portfolio. From subsequent meetings with the Associate Dean as well as faculty, the designers were given direction regarding the content that the college felt that teacher candidates need to incorporate into the digital portfolio: the evidence of teacher candidate content knowledge and pedagogical skills, impact of instruction on their students, evidence of meeting state and national standards, teaching philosophy, and self-assessment.

With the content defined, the designers were ready to create the actual portfolio shell. The first thing to be considered was the software that was to be used. Several factors needed to be kept in mind with relation to the software: 1) the cost, 2) technology skill required, and 3) flexibility to enable customized design. In addition, members of the design team and some faculty members believed that a key component in a showcase portfolio is that the visual design of the portfolio must represent the personality of the individual creating the portfolio. To meet these requirements the designers of the Virtual Anthology Shell (VAS) used Microsoft PowerPoint.

There were several additional reasons for using PowerPoint, including the user-friendly nature of the software and the fact that the learning curve associated with PowerPoint would not be as steep for the interns as other software options. PowerPoint software's drawing capability allows individuals to creatively designing their own slide backgrounds. Microsoft's online PowerPoint website provides many background templates that students can use for creative design. PowerPoint also allowed the creation of a professional looking interface and provided the capacity to include images, videos, hyperlinks, and the capability to embed spreadsheets,

charts, graphs, etc. Additionally, PowerPoint can be saved in a web format allowing online viewing without requiring students to master web development software, and yet it is completely portable and can be transferred to a laptop or CD. Finally, in terms of the students learning how to use PowerPoint, it is currently being taught in the Introduction to Computing course that all pre-service students are required to take.

Concerns of faculty participating in the study were the technology skill required by users and the support to be provided students to implement and maintain an electronic portfolio system. Since most faculty members were familiar with PowerPoint it seemed a logical choice to the designers and there are ample tutorials available online on how to use the PowerPoint software.

One of the requirements imposed by faculty members was that the shell be able to show evidence that students have met both state and national standards. At the time of creation of the portfolio shell, there was an available matrix demonstrating both state standards, (i.e., The Tennessee Teacher Framework and Tennessee Teacher Licensure standards) and national standards (NCATE, NETS, and Special Education) correlated to the Interstate New Teacher Assessment and Support Consortium (INTASC) standards. Using Flash MX, an electronic version of the matrix was created and then incorporated into the PowerPoint slides. Each of the eleven INTASC standards had a separate slide. On each slide, students were asked to describe the activities they were presenting to meet the standard, as well as to complete a reflection form. The purpose of the form was to provide the instructors a better understanding of the student's knowledge and reflection on the activity and standard they met, while simultaneously implementing the performance-based assessment opportunity that the college desired.

Support

All pre-service teacher participants attended a one-hour workshop where they were introduced to the VAS (electronic portfolio). During the workshop, the students received a CD-ROM containing the VAS and instructions on how to use it. Additionally, the students were instructed on how to organize, maintain, and create their own individualized digital portfolios. During the course of the year, the three graduate students (designers of the VAS) provided technical support for these students. Technical support included help sessions at designated times, quick email questions, one-on-one meeting, and school visits to work with participating interns. However, support differed for different sub-groups of the students.

No follow-up support or workshops were given to the thirteen Special Education students during the course of the academic year. The faculty for this cohort of students did not make a request for any additional support. Students in this program did not meet for additional classes on the campus of the University of Tennessee; additional coursework was conducted at the intern's primary school.

The ten Secondary English Education interns, as well as faculty, were given an introductory workshop, as well as a one-hour workshop concerning basic operation and usage of the electronic portfolio. In the introductory workshop the designers demonstrated the shell's features and capabilities. There was no instruction on how to use the shell until the one-hour workshop. No follow-up support or workshops were given during the course of the academic year; however, the faculty representative for this cohort of students collected the portfolios mid-year to review actual usage, basic understanding and to assess if any additional instruction for interns was needed. Specific areas of the electronic portfolio were required to be completed by assigned deadlines and were reviewed by the faculty at different points during the academic year to monitor the students' work samples and

overall compliance. This group of students did meet for additional coursework on the campus of the University of Tennessee, and, therefore, were able to personally contact support personnel for assistance with the portfolio system.

The nine Elementary Reading and Literacy interns received no follow-up support or workshops during the course of the academic year, but the faculty representative for these interns made a mid-year collection of the portfolios to review for actual usage, basic understanding and to determine if any additional instruction for interns was needed. However, there were no specific areas of the portfolio that were due at the mid-year collection. This group of students did meet for additional coursework on the campus of the University of Tennessee, and therefore, were able to personally contact support personnel for additional assistance with the portfolio system.

The eighteen interns in the Urban Multicultural Program, as well as faculty, were given an introductory workshop, as well as a one-hour workshop concerning basic operation and usage of the electronic portfolio. In the introductory workshop the designers demonstrated the shell's features and capabilities. There was no instruction on how to use the shell prior to the one-hour workshop. Additionally, once a month, support/help sessions covering specific topics related to technology skills and overall implementation of the electronic portfolio were conducted at a school site. Question and answer sessions were also conducted to offer the members of this program quick response to any problems that were encountered during portfolio set-up and operation. This cohort of students did not meet for additional classes on the University of Tennessee campus; additional coursework was conducted at the intern's school.

Because of the variation in the amount of support given to each cohort, the researcher assigned a number to each program and each participant in that program

based on the support actually received. The participants in the Urban and Multicultural Program were assigned the number four (4). The participants from the Secondary English Education cohort were assigned the number three (3). The amount of support given these groups was not as extensive as that given the Urban and Multicultural group. Therefore, Secondary English Education cohort members were assigned a lesser number. The participants from the Reading and Literacy cohort were assigned the number two (2). The support to this group was not as extensive as that given the Secondary English Education, or the Urban Multicultural group, thus, the lower number. Finally, the Special Education cohort was assigned the number one (1). The number was given in accordance with the limited support given to this cohort of participants. Table 3.1 displays this information.

Instruments

In the spring semester of 2004, printed surveys were designed to measure various aspects of the student and college faculty experiences with the electronic portfolio system. The survey instruments contained questions designed to create data pertinent to the five research questions forming the foundation of this study (copies of the surveys can be found in Appendix A).

The survey items contained in the instruments came from a review of the literature and working in collaboration with experts in the field of portfolios. The instruments developed by the researcher were reviewed and pilot tested prior to their use as data collection devices. Items were reviewed and approved by three college faculty members knowledgeable in survey design and portfolio issues. The survey was pilot tested with three graduate students who had knowledge in both portfolio design and technology in College of Education, Health, and Human Sciences at the University of Tennessee.

Table 3.1: Programs and the level of support received by each.

Group #	Program	Number of Students	Support
4	Urban Multicultural Program	18	• Intro workshop • One-hour portfolio workshop • Monthly help sessions at school site • Class time allocated to work on portfolio for question and answers.
3	Secondary English Education	10	• Intro workshop • One hour portfolio workshop • Mid year review of required components of the portfolio • On campus access to support personnel
2	Reading and Literacy	9	• One hour portfolio workshop • Mid year review but no specific components required. • On campus access to support personnel
1	Special Education	13	• One hour portfolio workshop • Limited access to support personnel

The graduate students examined the sequence of the questions, as well as their meaning and clarity. They also examined the directions for clarity. The final survey instruments were the result of the comments, edits, and suggestions from the faculty review and pilot test.

The intern survey was the first to be designed, keeping in mind the research questions and ultimate goals of the study. The printed questionnaire, when complied, consisted of the following:

- Two check list questions concerning the primary areas of teaching and program of study.
- Two yes or no questions concerning previous use of this particular electronic portfolio system in another course.
- One yes or no question about previous experience creating an electronic portfolio.

- One checklist question with 5 items (very easy, easy, fair, difficult, and very difficult) concerning ease of portfolio usage.
- One yes or no question concerning whether creating the electronic portfolio improved technology skill level.
- One question in checklist format to determine technology skill level prior to the internship year. The check list contained the following items: adding text to PowerPoint slides, using a master slide, changing background color scheme, adding pictures or movie clips, creating hyperlinks, managing the folder system, downloading flash player, using pack and go in PowerPoint, and burning a CD copy of the digital portfolio.
- One three-point scale (confident, neutral and not confident) question to ascertain the respondent perceptions of their confidence level with use of technology after the internship year. The items contained in this question were: adding text to PowerPoint slides, using a master slide, changing background color scheme, adding pictures or movie clips, creating hyperlinks, managing the folder system, downloading flash player, viewing the standard matrix, documenting best work (lesson plan, work sample), documenting meeting of the INTASC standards and burning a CD copy of the digital portfolio.
- One four-point scale (strength, neutral, weakness and not applicable) question addressing the strengths and weaknesses of the portfolio system. The items addressed in this question were as follows: using PowerPoint to create the portfolio, managing the folder system to maintain files, customizing the template for individuality, documenting best work (lesson plan and work samples, etc.), documenting meeting INTASC standards, updating information in the portfolio, receiving feedback from the instructor

on the portfolio and showcasing portfolio on CD for assessment or employment purposes.

- One five-point scale (extremely important, very important, important, somewhat important, and not important), question concerning the importance of support options. The items under this question were as follows: A "help desk"/person available, workshop to learn how to use the portfolio, weekly help sessions (during the day and evening), class time allocated by instructor to work on the portfolio, resource materials (e.g., tutorials) and workshops held regarding state and national standards.
- One five-point scale (great support, some support, no support and not needed) question addressing the actual receiving of support by the student/intern. The same items were used as in the previous question.
- One three-point scale (great effect, minimal effect, and no effect) question to determine perception of the usefulness of the support received. The students who answered that they received great or some support (the previous question) answered how that support affects the quality of their portfolio in this question. The categories in this question were the same as the previous two questions.
- Three open-ended questions were asked of the student/intern concerning suggestions about possible changes to the electronic portfolio system, potential uses for the electronic portfolio after graduation, and other miscellaneous additional comments.

The faculty questionnaire mimicked the intern survey in most regards with the exception of the following areas: omission of the degree of difficulty in creation of the electronic portfolio, support actually received and effect of that support on the overall quality. Also, only two open-ended questions were asked of faculty, one was

concerning suggestions about possible changes to the portfolio in the future and one eliciting additional comments.

Each hard copy intern questionnaire was color-coded for ease of data analysis. Special Education surveys were green; Reading and Literacy were blue; Urban and Multicultural were gold; and Secondary English Education was pink.

Data Collection

The researcher established a time to meet with each of the participating faculty members and at this time handed them a cover letter, consent form and survey instrument. The cover letter explained the purpose of the study. The faculty members were given a week's time to complete the survey and return it in a self addressed envelope to the researcher.

During the meeting with the faculty members, the researcher also gave the faculty members the interns' cover letter, consent form and survey instruments. The faculty member administered the questionnaire to the interns at a prearranged time. The completion of the survey took the respondent approximately 30 minutes. The interns' cover letter explained the purpose of the study as well as the questionnaire, and explained that participation in the study was completely optional and that an unwillingness to participate in no way affected their grades or the completion of their course of study.

Both faculty and intern data collection were completed by May 1, 2004. Fifty of the 53 interns in the sample completed the interns' survey, a 94 percent response rate. All four faculty completed surveys, a 100 percent response rate.

Analysis of Data

Data analysis for this study included compiling the survey responses according to the specific research questions addressed by this study. Table 3.2 illustrates the connections between research questions and the survey questions. Survey questions 1, 2, 3 and 11 were not used in the data analysis.

Question 1: What do the users (pre-service teachers and faculty members) of the VAS, perceive as the strengths and weakness of this particular digital portfolio shell?

This research question directly addressed the perceived strengths and weaknesses of the digital portfolio shell. Survey question 7 in the intern questionnaire, (question 8 in the faculty questionnaire) addressed this research topic. Question 7 of the intern survey and question 8 of the faculty survey contained the following items:

1. Using PowerPoint to create the Portfolio
2. Managing folder system to maintain files
3. Customizing the template for individuality
4. Documenting best work (lesson plan and work samples, etc.)
5. Documenting meeting INTASC standards
6. Updating information in the portfolio
7. Receiving feedback from instructor on the portfolio
8. Showing Portfolio on CD for assessment or employment purposes.

The possible responses for each item were as follows: strength, neutral, weakness, and not applicable. Each intern's responses for each item was recorded and then added to similar responses. Percentages of responses (strength, neutral and weakness) were then calculated for each item for each program area sub-group. Sub-group percentages for each item were compared to determine if there were any differences between subgroups. A chi-square calculation was considered but due to the small number of responses in each cell. There, the response patterns (percentages) were simply compared for substantive differences. Finally, total sample perceptions of the strength and weakness of the VAS were calculated.

Table 3.2: Comparison of research questions and survey questions.

Research Questions	Questionnaire Items	
	Interns	Faculty
What do the users (pre-service teachers and faculty members) of the VAS, perceive as the strengths and weakness of this particular digital portfolio shell?	7	8
To what extent did portfolio completion contribute to interns' confidence in their technology skills?	4,5,6	
What are potential uses of the VAS other than that electronic data management system?	12	
What types and levels of support are needed by students to complete their electronic portfolio? Did they perceive that they received this support and what effect did the support they received have on the quality of their portfolios?	8,9,10	

Faculty data are reported in actual number, since only four faculty members were participating.

Question 2: To what extent did portfolio completion contribute to interns' confidence in their technology skills?

To answer this question, data from the questionnaire were analyzed in two parts. The first part involved Question 4 from the intern's survey. Question 4 addressed the issue of the interns' perception that working on the electronic portfolio actually improved their technology skill at the end of their internship year. The possible responses to this question were "yes" or "no". Each intern's response was recorded, and similar responses were added together. From these data, percentages of yes or no responses were calculated for each program area subgroups. An item percentage comparison was conducted to determine if there were differences among intern responses by program area sub-group.

The second part of research Question 2 involved Question 5 of the intern survey. This question provided data to determine the intern's perceived technology skill level prior to the internship year. Question 5 appeared as a checklist, on which students could mark which skills they perceived they possessed. This question contained the following items:

12. Adding text to a PowerPoint slide
13. Using a master slide
14. Changing background color scheme
15. Adding pictures and movie clips
16. Creating hyperlinks
17. Managing the folder system
18. Downloading Flash Player
19. Viewing the standard matrix
20. Documenting meeting of the INTASC standards
21. Documenting work (i.e, lesson plan, work sample)
22. Burning a CD copy of the digital portfolio.

Question 6 allowed three possible responses: confident, neutral (neutral meant that students were neither confident, nor not confident) and not confident; for each of 12 items:

13. Adding Text to a PowerPoint slide
14. Using a master slide
15. Changing background color scheme
16. Adding pictures and movie clips
17. Creating hyperlinks
18. Managing the folder system
19. Creating hyperlinks
20. Downloading flash player
21. Viewing the standard matrix
22. Documenting best work (lesson plan, work sample)
23. Documenting meeting of the INTASC standards
24. Burning a CD copy of the digital portfolio

Responses to items 10, 11, and 12 were not included in the analysis since there were no comparable items in Question 5, and thus, responses could not be accurately matched. For Question 5, when the intern marked an item, it was recorded as the student possessing that particular technology skill prior to the internship year, if he/she left an item blank, it was assumed that the intern did not

have the technology skill. Marked or unmarked responses for each item were then added together, and percentages of marked and unmarked responses were calculated for each item. Each item in Question 5 was matched to an item in Question 6. For Question 6, the student's confidence level responses were recorded. If an intern expressed confidence in a skill, it was assumed that he/she had competency in that skill. Neutral and not confident responses were assumed to be indicators of lack of skill for each intern. Data were analyzed to ascertain the post-internship confidence level for each item in Question 6. Item percentage comparisons of perceived pre-portfolio skills and post-portfolio confidence levels were developed for (a) each intern (b) interns in each program area sub-group, and (c) all interns.

Question 3: What are potential uses of the VAS other than that electronic data management system?

With regard to the question of the potential of further use of the portfolio system by the intern, Question 12 of the survey was utilized. This open ended question offered the respondents the opportunity to comment on other possible usages of their digital portfolios they foresee. Perceived usages were complied by program area and for the total intern sample. Comparisons of responses by program areas were done by content analysis of the usages listed by interns in each program area.

Question 4: What types and levels of support are needed by students to complete their electronic portfolio? Did they perceive that they received this support and what effect did the support they received have on the quality of their portfolios?

This particular research question addressed the overall assistance desired and available to the students, and faculty, when utilizing the VAS. Additionally, the question asked if the support personnel were effective in their service to the aforementioned groups of users. Responses to survey Questions 8, 9 and 10 directly speak to this topic. Question 8 on the intern's survey asked the student to rate the overall importance of types of support to their overall success with portfolio usage.

Question 8 contained six items, and possible response categories were as follows: extremely important, very important, important, somewhat important and not important. The items were:

7. A "help desk"/person available
8. Workshop to learn how to use the portfolio
9. Weekly help sessions (during the day and evening)
10. Class time allocated by instructor to work on portfolio
11. Resource materials (e.g., tutorials)
12. Workshops held regarding state and national standards

Each intern's response to each item in Question 8 was recorded, and then added to similar responses. Responses, the responses from the categories of extremely important and very important were combined, as were the responses important and somewhat important. Response percentages were calculated first for each individual program area sub-group. A comparison was then made of the percentage of responses for each item to ascertain if there were any differences among sub-groups. A chi-square calculation was considered but not used due to the small number of responses in each cell. Finally, a total intern percentage was calculated and reported.

Question 9 of the intern survey, again addressed the topic of support, but, this time, the question concerned the actual assistance received, instead of the perception of the support's importance of a particular type of support. Question 9 of the intern survey contained the same items as Question 8. However, the possible

responses were as follows: "great support", "some support", "no support", and "not needed." Each intern's response for each item was recorded, and then added to similar responses. Percentages for the several response categories were calculated by program area first. These percentages were then compared to discover if there were differences between programs, as far as the support the interns perceived that they had received. Finally, responses percentages for all interns were calculated and reported.

Question 10 addressed the issue of the effect of support received on the quality of the portfolio. Question 10 contained the same items as Questions 8 and 9. However, the possible responses were as follows: great effect, minimal effect, or no effect. Each intern's response to each item was recorded and then added to similar responses. Response percentages were calculated for each item by program area sub-groups. The percentages for each item were then compared across programs, to ascertain if there were differences in what the interns perceived as the effects of the support they received on the quality of their portfolio. Finally, response percentages for all interns were calculated.

Summary

Chapter three has presented the methodology used in this study. It included descriptions of the research questions, the sample selection process and procedures for instrument development, analysis of the data. The findings of the study are reported in chapter four.

Chapter 4
Findings

Purpose

The purpose of this study was threefold: 1) to assess whether the Virtual Anthology Shell (VAS) has the capability to support both the showcase, and assessment aspects of a digital portfolio; 2) to investigate the support required by faculty to assist in the implementation of an electronic portfolio system; and 3) to investigate the technology skills needed by both faculty and students to use the Virtual Anthology Shell.

Sample

The interns working with the four, randomly selected faculty members, yielded a total of 53 possible intern respondents. From this population, a total of 50 student interns became actual survey respondents (94% response rate), and all four faculty became respondents (100% response rate).

Support

The four programs received different levels of support. The highest level of support was provided to the students within the Urban Multicultural program. They received an introductory workshop, a one-hour portfolio workshop, monthly help sessions at the public school sites where intern's classes were held, and they also received class time allocated to work on the portfolio. There were a total of 18 interns in this program.

The Secondary English education program had the second highest level of support. There were a total of ten interns in this particular program. These interns

received an introductory workshop, and a one-hour portfolio workshop. In addition, the interns had to turn in their portfolios with certain requirements fulfilled at the mid year point, they also had classes on the University of Tennessee at the Knoxville campus. By having classes on campus, easier access to the support staff was provided.

The Reading and Literacy program had nine interns. These students received the third highest level of support. The interns in this program received a one-hour workshop, had to turn in their portfolios (no specific requirements) at mid-year for review and had classes on campus.

The thirteen Special Education program interns received the least support. They received only a one-hour workshop on how to construct the portfolio. The interns met for classes at a public school.

Research Questions

Question 1: What do the users (pre-service teachers and faculty members) of the VAS, perceive as the strengths and weaknesses of this particular digital portfolio shell?

This research question directly addressed the perceived strengths and weaknesses of the digital portfolio shell. Survey question 7 in the intern questionnaire, (question 8 in the faculty questionnaire) addressed this research topic.

The possible responses for each item were as follows: strength, neutral, weakness, and not applicable. Each intern's responses for each item were recorded and then added to similar responses. Percentages of responses (strength, neutral and weakness) were then calculated for each item of each program area sub-group. Sub-group responses for each item were compared to determine if there were any

differences between subgroups. A chi-square calculation was considered, but, due to the small number of responses in each cell, it was decided not to conduct a chi-square calculation. Therefore, the response patterns (percentages) were simply compared for substantive differences. Finally, total sample perceptions of the strengths and weaknesses of the VAS were calculated. Faculty data are reported in actual numbers, since only four faculty members participated.

Interns

For this study, there were a total of 50 interns who returned the survey. Inspection of the data in Table 4.1 reveals areas that interns perceived as strengths and weaknesses of the portfolio system.

Over 50 percent of the interns perceived that six of the eight key features were strengths of the VAS. These features included *using PowerPoint to create the portfolio* (88%), *documenting best work* (80%), *customizing the template for individuality* (76%), *updating information in the portfolio* (74%), *managing the folder system to maintain files* (68%), and *showcasing portfolio to future employers (54%)*. In three categories 40 percent or more of the interns perceived that these items were neutral or weaknesses of the VAS. Those items were d*ocumenting meeting state and national standards (68%), communicating with faculty in terms of feedback (48%)* and *showcasing portfolio to future employers (40%)*.

Due to the differences in support received by each of the different programs the data were disaggregated by the different sub-groups and reported in Table 4.1. In the aforementioned key features, the Secondary English Education program interns awarded the greatest number of strengths in seven of the eight categories (*item number from the highest percentages to the least percentage 1, 2, 3, 4, 7, 8, 5*).

Table 4.1: Perceived strengths and weaknesses of the VAS disaggregated by total group and sub-groups.

Item #	Items	Total Group	Urban Multicultural Program (most support)	Secondary English Education (second most support)	Reading and Literacy (second lowest level of support)	Special Education (lowest level of support)
1	PowerPoint to Create Digital Portfolio	S = 88% N = 6% W = 4%	S = 100% N = 0% W = 0%	S = 100% N = 0% W =0%	S = 78% N = 0% W =22%	S = 69% N = 23% W =0%
2	Managing folder system to maintain files	S = 68% N = 28% W = 2%	S = 67% N = 33% W =0%	S = 90% N = 10% W =0%	S = 78% N =11% W =11%	S = 46% N = 46% W =0%
3	Customizing the template for individuality	S = 76% N = 18% W = 4%	S = 72% N = 28% W =0%	S = 90% N = 0% W =10%	S = 89% N = 0% W =11%	S = 62% N = 31% W =0%
4	Documenting best work samples	S = 80% N = 14% W = 4%	S = 78% N = 22% W =0%	S = 90% N = 10% W =0%	S = 67% N =11% W =11%	S = 85% N = 7% W =0%
5	Documentation meeting state and national standards	S = 24% N = 38% W = 30%	S = 11% N = 39% W =44%	S = 50% N = 40% W =10%	S = 44% N =11% W =44%	S = 7% N = 69% W =15%
6	Updating information in the portfolio	S = 74% N = 22% W = 2%	S = 61% N = 39% W =0%	S = 80% N = 20% W =0%	S = 89% N = 0% W =11%	S = 77% N = 15% W =0%
7	Communicating with faculty in terms of feedback	S = 44% N = 40% W = 8%	S = 39% N = 50% W =11%	S = 70% N = 20% W =0%	S = 56% N = 22% W =11%	S = 23% N = 54% W =7%
8	Showcasing Portfolio to future employers	S = 54% N = 22% W = 18%	S = 50% N = 28% W =22%	S = 70% N = 10% W =20%	S = 44% N =22% W =22%	S = 54% N = 23% W =7%

Interns in the Secondary English Education program received the second highest level of support, which included an introductory workshop, a one-hour portfolio workshop, and easier access to support staff since their classes were held on campus. Interns from this program also had to turn in their portfolio during the mid year.

The interns in the special education program recorded the fewest strengths in five of the eight categories (*item number from the highest percentages to the least percentage 1, 3, 2, 7, 5)* in terms of perceived strength of the VAS. These interns received the lowest level of support, having only one introductory workshop. Their classes were also held off campus, which did not allow easy access to support staff.

Reading and Literacy interns (2nd least amount of support) had the lowest percentages for items 4 and 8 in terms of strength of VAS. These interns received a one-hour workshop, had to turn in their portfolios (no specific requirements) at mid-year for review and had classes on campus.

In six of the eight *(1, 4, 3, 2, 6, 7)* categories, 50 percent or more of the interns from the Urban Multicultural program thought these items were a strength of the VAS. This program did have the highest level of support, which consisted of one introductory workshop, on hour workshop, in class time allocated for support by instructor, and workshops on state and national standards.

There were a total of four faculty respondents. Inspection of the data in Table 4.2 reveals several areas in the portfolio system that were viewed as areas of strength by those faculty.

Table 4.2 shows that three (75%) of the faculty surveyed considered six of the eight *(1, 2, 3, 4, 5, 6)* attributes as strengths of the VAS. There was one faculty member who gave a neutral rating to these categories. Three fourths of the faculty

Table 4.2: Faculty members perceived strengths and weaknesses of the portfolio system.

Items	Strength	Neutral	Weakness
PowerPoint to Create Digital Portfolio	3(75%)	1(25%)	0(0%)
Managing folder system to maintain files	3(75%)	1(25%)	0(0%)
Customizing the template for individuality	3(75%)	1(25%)	0(0%)
Documenting best work samples	3(75%)	1(25%)	0(0%)
Documentation meeting state and national standards	3(75%)	1(25%)	0(0%)
Updating information in the portfolio	3(75%)	1(25%)	0(0%)
Communicating with faculty in terms of feedback	1(25%)	2(50%)	0(0%)
Showcasing Portfolio to future employers	2(50%)	1(25%)	0(0%)

members picked the five categories that the students also picked as strength of the VAS; i.e., categories *1, 2, 3, 4,* and *6.* The one category that these faculty and students most often disagreed about was documentation of meeting state and national standards. Only 24 percent of the interns perceived this as strength of the VAS, while three of four of the faculty members perceived this feature as strength.

Only half the faculty respondents' perceived items *8* (showcasing portfolio to future employers) as a strength of the VAS, and only 54 percent of the interns perceived this feature as a strength of the VAS.

Fifty percent of the faculty members felt neutral about the topic, communicating with faculty in terms of feedback, and only one perceived it as strength. Similarly, 48 percent of the interns perceived this feature to be a weakness or neutral.

Question 2: To what extent did portfolio completion and technology support provided contribute to interns' confidence in their technology skills?

To answer this question, data from the questionnaire were analyzed in two parts. The first part involved Question 4 from the intern's survey. Question 4

addressed the issue of whether or not interns perceived that working on the portfolio actually improved their technology skills. The possible responses to this question were "yes" or "no". Each Intern's response was recorded, and similar responses were summed. From these data, percentages of "yes" or "no" responses were calculated for each program area sub-group.

The second part of the analysis for research Question 2 involved Questions 5 and 6 on the intern survey. This question provided data to determine interns' perceived technology skill levels prior to the internship year. Question 5 appeared as a checklist, on which students could mark which skills they perceived they possessed. For Question 5, when the intern marked an item, it was recorded as the student possessing that particular technology skill prior to the internship year. If he/she left an item blank, it was assumed that the intern did not have the technology skill. Marked and unmarked responses for each item were then summed, and percentages of marked and unmarked responses were calculated for each item. Each item in Question 5 was matched to an item in Question 6.

Question 6 allowed three possible responses: confident, neutral (neutral meant that students were neither confident, nor not confident) and not confident, for each of 12 sub-items. For Question 6, the students' confidence level responses were recorded. If an intern expressed confidence in a skill, it was assumed that he/she had competency in that skill. Neutral and not confident responses were assumed to be indicators of lack of skill for an intern. Data were analyzed to ascertain the post-internship confidence level for each item in Question 6. An item percentage comparison of perceived pre-portfolio skills and post-portfolio confidence levels was developed for (a) each intern (b) interns in each program area sub-group, and (c) all interns.

Responses to items 10, 11 and 12 were not included in the analysis since there were no comparable items in Question 5, and thus, responses could not be accurately matched.

There were a total of 50 interns who returned the survey. In terms of creating the electronic portfolio having improved their technology skills, 76 percent of the interns indicated that the process did improve their technology skills (Table 4.3).

When analyzing subgroup responses (Table 4.3), 94 percent of the interns from the Urban Multicultural program perceived that they improved their technology skills. This was the highest percentage. The second highest percentage (80%) was among interns from the Secondary English Education program. These two programs had the highest and second highest level of support respectively. The other two programs Reading and Literacy and Special Education had the substantially lower percentages of interns (56%, 67%) who perceived that working on the portfolio improved their technology skills.

Inspection of the data in Table 4.4 reveals the interns' perceived technology skills before and after their internship year. If an intern indicated that he/she felt confident about a particular item, it was recorded as possessing that technology skill. If the intern marked felt neutral or not confident, it was recorded as not possessing that particular skill.

Table 4.3: Perceived technology skills improvement due to working on the portfolio.

	Total Group	**Urban Multicultural Program** (most support)	**Secondary English Education** (second most support)	**Reading and Literacy** (second lowest level of support)	**Special Education** (lowest level of support)
Yes	76%	94%	80%	56%	67%
No	22%	6%	20%	44%	33%

Table 4.4: Interns' pre-internship perception of technology skills and their post-internship technology confidence levels.

Item #	Items	Pre-Internship Perceptions of Technology Skills	Post-Internship Confidence In Technology Skills		
			Confident	Neutral	Not Confident
1	Adding Text to a PowerPoint	Marked = 45 (90%)	49 (98%)	1 (2%)	0 (0%)
		Unmarked = 5 (10%)			
2	Using a Master Slide	Marked = 23 (46%)	40 (80%)	8 (16%)	2 (4%)
		Unmarked = 27 (54%)			
3	Changing background color scheme	Marked = 37 (74%)	47 (94%)	3 (6%)	0 (0%)
		Unmarked = 13 (26%)			
4	Adding picture or movie clips	Marked = 32 (64%)	35 (70%)	11 (22%)	4 (8%)
		Unmarked = 18 (36%)			
5	Creating Hyperlinks	Marked = 25 (50%)	41 (82%)	5 (10%)	4 (8%)
		Unmarked = 25 (50%)			
6	Managing the folder systems	Marked = 17 (34%)	31 (62%)	12 (24%)	7 (14%)
		Unmarked = 33 (66%)			
7	Downloading Flash Player	Marked = 7 (14%)	11 (22%)	17 (34%)	22 (44%)
		Unmarked = 43 (86%)			
8	Burning a CD copy of the digital portfolio	Marked = 19 (38%)	27 (54%)	16 (32%)	7 (14%)
		Unmarked = 31 (62%)			

Inspection of the data in Table 4.4 reveals the interns' perceived technology skills before and after their internship year. If an intern indicated that he/she felt confident about a particular item, it was recorded as possessing that technology skill. If the intern marked felt neutral or not confident, it was recorded as not possessing that particular skill.

At the start of the internship year, *adding text to PowerPoint, changing background color scheme and adding picture or movie clips* were three skills areas in which over 60% of students perceived that they already possessed skills. At the end of the internship year there was a six to 20 percent increase in the number of students who perceived they were confident in those three categories. At the start of the internship year, the percentage of interns possessing skills of *using a master slide, creating hyperlinks, and managing folders,* was lower than those who did not possess these skills. After the internship year, in each of these categories, there was an increase of 25 percent in the percentage of students who perceived they were confident in those skills levels. In two areas *(7, 8)* there was change but a substantial number of students did not express confidence at end of the year. Over 45% interns perceived they were neutral or not confident in both items *7* and *8*.

Over 50 percent of the interns from the Urban Multicultural program showed an increase in confidence level in every skill after the internship year except for downloading the flash player (Table 4.5). However in items *6, 7, 8* there were more than 30% of the interns who reported neutrality or lack of confidence in these skills. Urban Multicultural program interns received the highest level of support, including in class time to work on the VAS. During this time, support was provided by the VAS staff to help the interns.

Secondary English Education program interns reported an increased level of confidence in skills levels *1, 2, 3, 5, 6, 7*, and *8*. Fifty percent or more of the interns

Table 4.5: Intern's perceived technology skill before internship year and confidence level on technology skill after internship year by program sub-groups. *(m=marked, um=unmarked, SP=Special Education, RL=Reading and Literacy, SE=Secondary English Education, UMP=Urban Multicultural Program)*

Item #	Items	Pre-Internship Perceptions of Technology Skills	Post-Internship Confidence In Technology Skills		
			Confident	Neutral	Not Confident
1	Adding Text to a PowerPoint	SP: *m=85%, um=15%* RL: *m=100%, um=0%* SE: *m=90%, um=10%* UMP: *m=89%,um=11%*	SP= 100% RL= 100% SE=100% UMP=94%	SP= 0% RL= 0% SE=0% UMP=6%	SP= 0% RL= 0% SE=0% UMP=0%
2	Using a Master Slide	SP: *m=46%, um=54%* RL: *m=89%, um=11%* SE: *m=40%, um=60%* UMP: *m=28%,um=72%*	SP= 69% RL= 100% SE=80% UMP=78%	SP= 23% RL= 0% SE=10% UMP=22%	SP= 7% RL= 0% SE=10% UMP=0%
3	Changing background color scheme	SP: *m=100%, um=0%* RL: *m=78%, um=22%* SE: *m=70%, um=30%* UMP: *m=56%,um=44%*	SP= 92% RL= 100% SE=90% UMP=94%	SP= 8% RL= 0% SE=10% UMP=6%	SP= 0% RL= 0% SE=0% UMP=0%
4	Adding picture or movie clips	SP: *m=62%, um=38%* RL: *m=67%, um=33%* SE: *m=60%, um=40%* UMP: *m=67%,um=33%*	SP= 76% RL= 56% SE=50% UMP=84%	SP= 23% RL= 44% SE=20% UMP=11%	SP= 0% RL= 0% SE=30% UMP=5%
5	Creating Hyperlinks	SP: *m=46%, um=54%* RL: *m=56%, um=44%* SE: *m=50%, um=50%* UMP: *m=50%,um=50%*	SP= 77% RL= 78% SE=100% UMP=78%	SP= 8% RL= 22% SE=0% UMP=11%	SP= 15% RL= 0% SE=0% UMP=11%
6	Managing the folder systems	SP: *m=23%, um=77%* RL: *m=56%, um=44%* SE: *m=40%, um=60%* UMP: *m=28%,um=72%*	SP= 38% RL= 89% SE=80% UMP=56%	SP= 67% RL= 11% SE=10% UMP=27%	SP= 20% RL= 0% SE=10% UMP=17%
7	Downloading Flash Player	SP: *m=15%, um=85%* RL: *m=22%, um=78%* SE: *m=20%, um=80%* UMP: *m=6%,um=94%*	SP= 30% RL= 22% SE=40% UMP=5%	SP= 54% RL= 33% SE=40% UMP=17%	SP= 23% RL= 44% SE=20% UMP=78%
8	Burning a CD copy of the digital portfolio	SP: *m=54%, um=46%* RL: *m=33%, um=67%* SE: *m=30%=, um=70%* UMP: *m=33%,um=67%*	SP= 54% RL= 67% SE=40% UMP=56%	SP= 38% RL= 33% SE=40% UMP=22%	SP= 8% RL= 0% SE=20% UMP=22%

felt confident in skills *1* through *6*. Thirty percent or more of the interns from this program reported neutral or not confident in items *4, 7*, and *8*. Interns from this program received the second highest level of support, which included one additional workshop. They also had classes on campus creating easier access to support staff.

In the Reading and Literacy programs there was an increase in the number of interns who were confident in five of eight (*2, 3, 5, 6,* and *8*) skills after the internship year. Like the Urban Multicultural program interns 50% or more of these interns perceived that they were confident in skills *1-6* and *8*. However, over 30% of the interns marked neutral or not confident *4, 7* and *8*. . Interns from this program received the second lowest level of support, which included easier access to support staff on campus, since classes were held on campus.

In the Special education sub-group a greater number of interns at year's end expressed confidence in their skills in all six skill areas than had indicated that they possessed these skills prior to working on the portfolio. Over 50 percent of the interns perceived they were confident in skill areas *1* through *5* and *8*. However in skills levels *2, 6, 7, 8* there were over 30 percent of interns from the Special Education program who marked neutral or not confident on the survey. The only support received by the interns from this program was a one-hour workshop.

Question 3: What potential uses of the portfolio, beyond fulfilling program requirements, do stakeholders (pre-service teachers, faculty) see?

Question 12 of the interns' survey was utilized to assess interns' perception about further use of the portfolio system. This open-ended question offered the respondents the opportunity to comment on other possible usages of their digital portfolios. Perceived usages were complied by program area and the total intern

sample. Comparisons of responses by program areas were created by content analysis of the usages listed by interns in each program area.

In their responses, more than half of the interns (29 of 50) indicated that they would use the portfolio for future employment. One intern stated, "I will take this for a job interview; it will help me in the interview process." Two interns in this category had already taken it to a job interview, and one wrote, "It helped me a great deal with the principal." Analysis of all interns' responses can be found in Appendix A.

A minimal number of interns (Eight of 50) stated that they felt there was no purpose in creating an electronic portfolio. These interns perceived that principals would not look at the portfolios. One of these interns stated, "Principals have stated they won't look at an electronic portfolio," and, "It's a waste of time."

When examining each program sub-group with regard to this question perceptions differed somewhat Special Education interns (69%), Reading and Literacy interns (44%), Secondary English Education interns (50%) and 78% of the Urban Multicultural programs interns all responded in this way.

A relatively small number of respondents in three of the four subgroups stated they did not see any purpose for the electronic portfolio. Specifically, 23 percent of the Special Education interns, 30% of the Secondary English Education interns, and 17 percent of the Urban Multicultural interns did not see a purpose for the electronic portfolio.

There were some interns who did not respond to the question. A total of nine interns fit into this category: one in Special Education, two in Secondary English Education, one in the Urban Multicultural program and five (of 13) in the Reading and Literacy sub-group.

Question 4: How much, and what kinds of assistance, did the students need in the implementation, of this portfolio system? Did they perceive that they received this support?

This particular research question addressed the overall assistance desired, and available to the students when utilizing the Virtual Anthology Shell. Additionally, the question asked if the support received had an effect on the quality of their portfolio. Responses to survey Questions 8, 9 and 10 directly speak to this topic. Question 8 on the intern's survey asked the student to rate the overall importance of types of support to their overall success with portfolio usage.

Survey Question 8 contained six items, and possible response categories were as follows: "extremely important, very important, important, somewhat important and not important."

Each intern's response to each item in Question 8 was recorded, and then added to similar responses. The responses from the categories of "extremely important" and "very important" were combined, as were the responses "important" and "somewhat important." Response percentages were calculated first for each individual program area sub-group. A comparison was then made of the percentage of responses for each item to ascertain if there were any differences among sub-groups. A chi-square calculation was considered but not used due to the small number of responses in each cell. Finally, a total intern percentage was calculated and reported.

Review of the data (Table 4.6) for all interns showed that over 75 percent of the interns perceived that the following types of support were extremely or very important: *Workshop to learn how to use the portfolio (86%), a "help desk"/person available (82%), class time allocated by instructors to work on the portfolio (80%) and resource materials (i.e., tutorials) (78%).* In the remaining two categories

Table 4.6: Perceived importance of support types: all interns. (*EV=Extremely or Very important, IS =Important or Somewhat Important, NI=not important)*

Items #	Items	Total Group	Urban Multicultural Program (most support)	Secondary English Education (second most support)	Reading and Literacy (second lowest level of support)	Special Education (lowest level of support)
1	A "help desk"/person available	EV= 82% IS=16% NI=0%	EV= 84% IS= 17% NI= 0%	EV= 70% IS= 30% NI= 0%	EV= 100% IS= 0% NI= 0%	EV= 77% IS= 15% NI= 0%
2	Workshop to learn how to use the portfolio	EV= 86% IS=12% NI=0	EV= 89% IS= 11% NI= 0%	EV= 80% IS= 20% NI= 0%	EV= 44% IS= 44% NI= 11%	EV= 77% IS= 15% NI= 0%
3	Weekly help sessions (during the day and evening)	EV= 54% IS=36% NI=12%	EV= 61% IS= 33% NI= 0%	EV= 40% IS= 50% NI= 10%	EV= 78% IS= 22% NI= 0%	EV= 61% IS= 23% NI= 8%
4	Class time allocated by instructors to work on the portfolio	EV= 80% IS=18% NI=0	EV= 94% IS= 6% NI= 0%	EV= 80% IS= 20% NI= 0%	EV= 78% IS= 22% NI= 0%	EV= 61% IS= 30% NI= 0%
5	Resource Materials (e.g., tutorials)	EV= 78% IS=20% NI=0	EV= 83% IS= 17% NI= 0%	EV= 80% IS= 20% NI= 0%	EV= 78% IS= 22% NI= 0%	EV= 69% IS= 23% NI= 0%
6	Workshops held regarding state and national standards	EV= 52% IS=38% NI=8%	EV= 61% IS= 39% NI= 0%	EV= 20% IS= 60% NI= 20%	EV= 55% IS= 44% NI= 0%	EV= 61% IS= 15% NI= 15%

(weekly help sessions and workshops held regarding state and national standards) the percentage of interns who perceived the availability of these type of support to be extremely or every important was in the mid 50's.

Taking a closer look at each of the aforementioned categories by sub-groups reveals certain differences. First, 70 percent or more of interns from each sub-group perceived that having *a "help desk"/person available* was extremely or very important. None of the other categories had such a high percentage. In three of four subgroups (Special Education, Secondary English Education, Urban Multicultural Program) over 75 percent of the interns perceived that *workshops to learn how to use the portfolio* were extremely, or very important. However, only 44 percent of the Reading and Literacy interns shared that view. Over 65 percent of the interns

from each sub-group perceived that resource materials were extremely or very important.

The sub-group data reveal that interns from three programs (Special Education (61%), Reading and Literacy (78%) and Urban Multicultural program (61%)) were decisive with regard to the importance of the availability of a *weekly help session.* The Secondary English program interns perceived this type of support to be extremely or very important (40%) and important or somewhat important (50%).

In the case of workshops held regarding state and national standards, the subgroups wavered between perceiving this type of support to be extremely or very important to important or somewhat important. For example, in the case of the Reading and Literacy program 55 percent perceived this type of support to be extremely or very important, and 44 percent perceived this type of support to be important or very important. In the Urban Multicultural Program 61% of the interns perceived this type of support to be extremely or very important and 39% of perceived this type of support to be important or somewhat important.

Among the interns from the Secondary English Education program only twenty percent perceived this type of support to be extremely or very important and twenty percent perceived this type of support to be not very important. Fifteen percent or more of the interns from the Reading and Literacy and Special Education programs perceived workshops on state and national standards to be "not important."

Question 9 of the intern survey, again addressed the topic of support, but, this time, the question concerned the actual assistance received. Question 9 of the intern survey contained the same items as Question 8. However, the possible responses were as follows: "great support", "some support", "no support", and "not needed." Each intern's response for each item was recorded, and then added to similar responses. Percentages for the several response categories were calculated

by program area first. These percentages were then compared to discover if there were differences between programs, as far as the support the interns perceived that they had received. Finally, response percentages for all interns were calculated and reported.

A review of the data (Table 4.7) from all interns, regarding support available, reveals that 46 percent of all interns perceived they received great support through *workshops to learn how to use the portfolio*. All other categories had less than 35 percent of interns who perceived that they had received great support. Over 35 percent of the interns perceived that they received some support in all categories. A substantially high percentage (40% or more) perceived that they did not receive support in the form of *Weekly help sessions (40%)* and *workshops held regarding state and national standards (46%)*. Two other categories, *class time allocated by instructors to work on the portfolio (20%)* and *resource materials (24%),* had a small percentage of interns who perceived they received no support.

Analysis of sub-group responses revealed that 50 percent or more of the interns from the Urban Multicultural program perceived that they received some support in all the categories. The interns from this program officially received all six forms of support. Seventy two percent of the interns from this program indicated they received some support through the *workshops on state and national standards*; this program was the only program that officially had a workshop on state and national standards.

A majority of interns from the Secondary English Education program perceived that they received great support (60%) through *workshops to learn how to use the Portfolio*, and forty percent of the interns from this program perceived that they received some support from the *workshops to learn how to use the portfolio.* Another category where a substantially high percentage (60%) of interns from this

Table 4.7: Perceptions of support received: all interns. *(GS=great support, SS=some support, NS=no support, NN=not needed)*

Item #	Items	Total Group	Urban Multicultural Program (most support)	Secondary English Education (second most support)	Reading and Literacy (second lowest level of support)	Special Education (lowest level of support)
1	A "help desk"/person available	GS= 28% SS= 60% NS= 6% NN= 12%	GS= 17% SS= 61% NS= 0% NN= 0%	GS= 40% SS= 40% NS= 10% NN= 10%	GS= 33% SS= 67% NS= 0% NN= 0%	GS=31% SS= 46% NS= 15% NN= 8%
2	Workshop to learn how to use the portfolio	GS= 46% SS= 52% NS= 0% NN= 2%	GS= 39% SS= 56% NS= 0% NN= 6%	GS= 60% SS= 40% NS= 0% NN= 0%	GS= 67% SS= 33% NS= 0% NN= 0%	GS= 31% SS= 69% NS= 0% NN= 0%
3	Weekly help sessions (during the day and evening)	GS= 10% SS= 36% NS= 40% NN= 14%	GS= 11% SS= 56% NS= 28% NN= 6%	GS= 10% SS= 20% NS= 40% NN= 30%	GS= 0% SS= 11% NS= 78% NN= 0%	GS= 15% SS= 38% NS= 31% NN= 15%
4	Class time allocated by instructors to work on the portfolio	GS= 32% SS= 44% NS= 20% NN= 4%	GS= 39% SS= 50% NS= 6% NN= 6%	GS= 30% SS= 30% NS= 30% NN= 10%	GS= 0% SS= 33% NS= 67% NN= 0%	GS= 46% SS= 54% NS= 0% NN= 0%
5	Resource Materials (e.g., tutorials)	GS= 8% SS= 60% NS= 24% NN= 6%	GS= 0% SS= 83% NS= 6% NN= 6%	GS= 20% SS= 60% NS= 10% NN= 10%	GS= 0% SS= 22% NS= 78% NN= 0%	GS= 15% SS= 54% NS= 23% NN= 8%
6	Workshops held regarding state and national standards	GS= 2% SS= 36% NS= 46% NN= 14%	GS= 0% SS= 72% NS= 11% NN= 11%	GS= 0% SS= 10% NS= 60% NN= 30%	GS= 0% SS= 11% NS= 89% NN= 0%	GS= 8% SS= 23% NS= 54% NN= 15%

program perceived that they received some support was *resource materials*. Thirty percent or more of the interns from this program perceived that they received no support in three categories, these categories were *weekly help sessions* (40%), *class time allocated by instructors to work on the portfolio* (30%), and *workshops held regarding state and national standards* (60%).

A majority of interns from the Secondary English Education program perceived that they received great support (60%) through *workshops to learn how to use the Portfolio*, and forty percent of the interns from this program perceived that they received some support from the *workshops to learn how to use the portfolio*. Another category where a substantially high percentage (60%) of interns from this program perceived that they received some support was *resource materials*. Thirty percent or more of the interns from this program perceived that they received no support in three categories, these categories were *weekly help sessions* (40%), *class time allocated by instructors to work on the portfolio* (30%), and *workshops held regarding state and national standards* (60%). Unlike the Urban Multicultural program, interns from Secondary Education program were not given support in the form of *class time allocated by instructor* or a *workshop on state and national standards*.

A substantially high percentage (67%) of the interns from the Reading and Literacy program perceived that they received great support from *workshops to learn how to use the portfolio*. Thirty three percent of the interns also perceived some support of this type. Another category in which a substantially high percentage (67%) of interns perceived they received some support was a *"help desk"/person available*. However the Reading and Literacy program had four categories (*3, 4, 5,* and *6*) where more than 65% of the interns perceived they received no support. Interns from this program did have access to *weekly help sessions*, and *resource*

materials, but they did not receive support in terms of *class time allocated by instructor* or *workshops on state and national standards*.

A majority of Special Education interns (69%) perceived that they received some support from *workshops to learn how to use the portfolio*. Thirty one (31) percent of the interns from this program also perceived that they received great support in this area. Fifty-four (54) percent of the Special Education interns perceived that they received some support from *class time allocated by instructor to work on portfolio* as well as *resource materials*. Over 30% of these interns perceived that they received no support from *weekly help sessions* and *workshops on state and national standards*. The Special Education interns officially received a one-hour *workshop on how to use the portfolio* but they had access to the *resource materials*, *weekly help sessions* and a *"help desk"/person*.

Survey Question 10 addressed the issue of the effect of support received on the quality of the portfolio. Question 10 contained the same items as Questions 8 and 9. However, the possible responses were as follows: great effect, minimal effect, or no effect. Each intern's response to each item was recorded and then added to similar responses. Response percentages were calculated for each item by program area sub-groups. The percentages for each item were then compared across programs, to ascertain if there were differences in what the interns perceived as the effects of the support they received on the quality of their portfolio.

Finally, response percentages for all interns were calculated.

Table 4.8 reveals the interns' perception of the effect of various types of support on the quality of their portfolio. In three categories, over 50 percent of all interns perceived that the support received had great effect on the quality of their portfolio. These categories were: *a "help desk"/person* (56%), *workshop to learn how to use the portfolio* (62%) and *class time allocated by instructor to work on the*

Table 4.8: Perceived effect of support received on the quality of the portfolio: all interns. *(GE= great effect, ME= minimal effect, NE= no effect, DNA= did not respond)*

Item #	Items	Total Group	Urban Multicultural Program (most support)	Secondary English Education (second most support)	Reading and Literacy (second lowest level of support)	Special Education (lowest level of support)
1	A "help desk"/person available	GE= 56% ME= 20% NE= 8% DNA= 16%	GE= 28% ME= 39% NE= 11% DNA= 22%	GE= 80% ME= 0% NE= 0% DNA= 20%	GE=78% ME=22% NE= 0% DNA= 0%	GE= 62% ME= 8% NE= 15% DNA= 15%
2	Workshop to learn how to use the portfolio	GE= 62% ME= 24% NE= 8% DNA= 10%	GE= 61% ME= 28% NE= 0% DNA= 11%	GE= 60% ME= 20% NE= 0% DNA= 20%	GE= 67% ME= 22% NE= 11% DNA= 0%	GE= 62% ME= 20% NE= 8% DNA= 8%
3	Weekly help sessions (during the day and evening)	GE= 24% ME= 28% NE= 20% DNA= 28%	GE= 44% ME= 33% NE= 17% DNA= 5%	GE= 20% ME= 20% NE= 10% DNA= 50%	GE= 11% ME= 22% NE= 22% DNA= 44%	GE= 8% ME= 31% NE=31% DNA= 31%
4	Class time allocated by instructors to work on the portfolio	GE= 54% ME= 18% NE= 10% DNA= 18%	GE= 79% ME= 11% NE= 5% DNA= 5%	GE= 50% ME= 0% NE= 10% DNA= 40%	GE= 11% ME= 22% NE= 11% DNA= 56%	GE= 54% ME= 31% NE= 8% DNA= 8%
5	Resource Materials (e.g., tutorials)	GE= 26% ME= 30% NE= 16% DNA= 28%	GE= 28% ME= 50% NE= 11% DNA= 11%	GE= 40% ME= 20% NE= 10% DNA= 30%	GE= 0% ME= 11% NE= 22% DNA= 67%	GE= 31% ME= 20% NE= 20% DNA= 20%
6	Workshops held regarding state and national standards	GE= 8% ME= 30% NE= 28% DNA= 34%	GE= 17% ME= 50% NE= 22% DNA= 11%	GE= 10% ME= 10% NE= 30% DNA= 50%	GE= 0% ME= 11% NE= 22% DNA= 67%	GE= 0% ME= 31% NE= 38% DNA= 31%

portfolio (54%). *Weekly help sessions* and *resource materials* were two categories where the interns were undecided about how support received through this method affected the quality of their portfolios. The support received through *workshops held regarding state and national standards* had the highest percentage of interns who perceived that this type of support had no effect on the quality of their portfolios (28%). This category also had the highest percentage (34%) of interns who perceived that this item did not apply to them. These are interesting findings since some of the sub-groups did not have some of these support structures available to them.

Over 40 percent of the interns from the Urban Multicultural program perceived that class time allocated by instructors to work on the portfolio (79%), *workshop to learn how to use the portfolio* (60%) and *weekly help sessions* (44%) were the three categories that had great effect on the quality of their portfolios. Fifty (50) percent of the interns from this program also perceived that *workshops held regarding state and national standards* had minimal effect on the quality of their portfolios. This was the highest percentage in all subgroups. The Urban Multicultural program interns, as stated previously, had the highest level of support. This was the only group that had *class time allocated by the instructor to work on the portfolio*, as well as a *workshop regarding state and national standards*.

Forty percent or more of the interns from the Secondary English Education perceived that the support they received from a *"help desk"/person* (80%), *workshops to learn how to use the portfolio* (60%), *class time allocated by instructors to work on the portfolio* (50%), and *resource materials* (40%) had a great effect on the quality of their portfolios. Forty percent or more of the interns from this program did not respond to items 3, 4, and 6. Unlike the Urban Multicultural program whose interns had classes off campus and had a *workshop regarding state and national standards*,

the interns from the Secondary English education program had classes on campus which made it easier for them to access VAS help staff located on campus and did not have *workshops regarding state and national standards*.

A *"help desk"/person available* and *workshops to learn how to use the portfolio* were the only two categories in which more than over 40 percent of the interns from the Reading and Literacy program perceived the support that they received had great effect on the quality of their portfolios. In terms of support received, the interns from this program received the *workshop to learn how to use the portfolio,* and they also had classes on campus which allowed them easier assess to VAS support staff located on campus. In this program, more than 40 percent of the interns did not respond to items 2, 3, 4 and 5. Interns in this program did not officially have assistance in the form of *class time allocated by instructor*, and *workshops held regarding state and national standards*. However, they did have access to the *weekly help sessions* and *resource materials*.

Over 50 percent of the interns from the Special Education program perceived that support received from *"help desk"/person available* (62%), *workshop to learn how to use the portfolio* (62%) and *class time allocated by instructors to work on the portfolio* (54%) had a great effect on the quality of their portfolios. *Weekly help sessions* and *workshops held regarding state and national standard* are two categories where more than 30 percent of the interns from this program perceived the support they received had no effect on the quality of their portfolios or did not respond to the question. The Special Education interns received the lowest level of support. Officially they had a *workshop to learn how to use the portfolio*, and they also had limited access to the *"help desk"/person available*. However, their classes were located off campus and the support person was located on campus. Like the

Secondary English Education and Reading Literacy programs, the Special Education interns did have access to the *resource materials* and *weekly help session*. They did not have workshops *regarding state and national standards*.

Summary

The most important findings related to each research question are summarized below.

Question 1: What do the users (pre-service teachers and faculty members) of the VAS perceive as the strengths and weaknesses of this particular digital portfolio shell?

The following patterns were discovered during analysis of data:

- More than 50 percent of all interns surveyed rated the following as strengths of the VAS: *PowerPoint to create digital portfolio, documenting best work sample, customizing the template for individuality, updating information in the portfolio, managing folder system to maintain files, and showcasing portfolio to future employers.*
- More than 40 percent of all interns surveyed rated the following as neutral elements or weaknesses of the VAS: d*ocumenting meeting state and national standards, communicating with faculty in terms of feedback* and *showcasing portfolio to future employers.*
- Within each of the four sub-groups, more than 50 percent of the interns rated the following as strengths of the VAS: *PowerPoint to create digital portfolio, customizing the template for individuality, documenting best work samples, and updating information in the portfolio.*
- Components of the VAS most often perceived as weaknesses or neutral components by sub-group members were:

- *Documenting state and national standards* (Urban Multicultural program (83%), Secondary English education (50%), Reading and Literacy (55%), and Special Education (84%)).
- *Communicating with faculty in terms of feedback* (Urban Multicultural program (61%), Secondary English education (20%), Reading and Literacy (33%), and Special Education (61%)).
- *Showcasing portfolio to future employers* (Urban Multicultural program (50%), Secondary English education (30%), Reading and Literacy (44%), and Special Education (30%)).

- Three of the four faculty considered six of the eight (*PowerPoint to create digital portfolio, managing folder system to maintain files, customizing the template for individuality, documenting best work samples, documenting meeting state and national standards and updating information in the portfolio*) attributes as strengths of the VAS.
- Three fourths of the faculty members picked the same five categories (*PowerPoint to create digital portfolio, managing the folder system, customizing the template for individuality, and updating information in the portfolio*) that the students picked as the strengths of the VAS.

Question 2: To what extent did portfolio completion and technology support contribute to interns' confidence in their technology skills?

The following patterns were discovered during analysis of data:

- In terms of working on the portfolio improving their technology skills;
  - Seventy six percent of the interns indicated that the process of working on the digital portfolio did improve their technology skills.

- In the Urban Multicultural program and Secondary English education program whose interns received the highest and second highest level of support, had 80 percent or more of interns from each program indicate that working on the portfolio improved their technology skills.

- Looking at all interns perceived technology skills before internship year and confidence level on technology skills after the year for all interns:
  - There was only a small increase in the number of interns who perceived they were confident in the skill areas of adding *text to PowerPoint, changing background color scheme* and *adding picture or movie clips* after the internship year compared to before the internship year. In these three categories over 60% of the interns possessed the skills before the internship year.
  - There was a 25% or more increase in the number of interns who indicated they were confident in the skill areas of using a *master slide, creating hyperlinks* and *managing folders* after the internship year compared to before the internship year.
  - In the skill areas *downloading flash player* and *burning a CD copy of the portfolio* there were over 45% of the interns who perceived they were neutral or not confident in both skills.
- Looking at perceived technology skills before internship year and confidence level on technology skills after the year by sub-groups:
  - Each subgroup showed a gain in the number of students who perceived they possessed these skills after the internship year:
    - *Using a master slide*
    - *Changing background color scheme*
    - *Adding picture or movie clips*

- *Creating Hyperlinks*
- *Managing the folder system*
- *Downloading Flash Player*

- In each subgroup over 30 percent of the interns perceived they either felt neutral or not confident when it came to *downloading a flash player* or *burning a CD copy of the their portfolio*.

Question 3: What potential uses of the portfolio, beyond fulfilling program requirements, do pre-service teachers see?

Two overall categories emerged from responses to this question: 1) being able to use the portfolio in a job interview for employment purposes (29 of the 50 interns), and 2) no need or purpose for the portfolio system (8 interns).

Question 4: How much, and what kinds of, assistance did the participating students need in the implementation of this portfolio system? Did they perceive that they received this support?

The following patterns were discovered during analysis of data:

- In terms of importance of support perceived by for all interns:
  - Seventy five percent or more of the interns perceived that the following types of support were extremely or very important: A "help desk"/person available, workshop to learn how to use the portfolio , class time allocated by instructors to work on the portfolio, and resource materials (i.e., tutorials).
  - Weekly help sessions and workshops held regarding state and national standards. (The percentage of interns who perceived the availability of

these type of support to be extremely or every important was in the mid 50's.)

- In terms of importance of support perceived by all interns:
  - Over 65% of the interns from the subgroups perceived that a "help desk"/person available, workshops to learn how to use the portfolio and resource materials were extremely or very important. None of the other categories had such high percentages.
- In terms of support received by all interns:
  - The highest percentage (46%) of interns perceived that they received great support through workshops to learn how to use the portfolio. All other categories had less than 35% of interns who perceived that they had received great support.
  - Over 35% of the interns perceived that they received some support in all categories (even when their sub-groups may not have received certain types of support).
  - Weekly help sessions (40%), and workshops held regarding state and national standards (46%) were the two categories where interns perceived they received no support (many of these interns were in sub-groups which did not receive these types of support).
- In terms of support received the sub-groups perceived the following:
  - Seventy percent or more of the interns from Urban Multicultural program indicated that they received some support from the resource materials and workshops on state and national standards; this program was the only program that officially had a workshop on state and national standards.

- Over 65% of the interns from the Reading and Literacy program perceived that they did not receive support in the follow categories: weekly help sessions, class time allocated by instructor to work on the portfolio, resource materials and workshops held regarding state and national standards. (This sub-group did not receive support through workshops held on state and national standards and in class time to work on portfolio.)

- In terms of support received and the effects of the support on the quality of their portfolio:
  - In three categories, over 50% of all interns perceived that the support received had great effect on the quality of their portfolio. These categories were: a "help desk"/person (56%), workshop to learn how to use the portfolio (62%) and class time allocated by instructor to work on the portfolio (54%). Only the Urban Multicultural Program's interns received all these of these supports.
  - The support received through workshops held regarding state and national standards had the highest percentage of interns who perceived that this type of support had no effect on the quality of their portfolio (28%). This category also had the highest percentage (34%) of interns who perceived that this item did not apply to them. Only the Urban Multicultural program interns received this form of support.

Chapter 5
Conclusions, Implications, and Recommendations

Purpose

The purpose of this study was three fold: 1) to identify the strengths and weaknesses of the VAS as perceived by both the faculty and student users, 2) to determine types and levels of support needed by students completing an electronic portfolio, and 3) to investigate the technology skills needed by students to use the VAS.

Conclusions

Findings of the study were summarized at the end of chapter 4. Conclusions are presented below. They are grouped by research questions.

Question 1: What do the users (pre-service teachers and faculty members) of the VAS, perceive as the strengths and weakness of this particular digital portfolio shell?

Conclusion: Both student and faculty users of the VAS agreed that four features of the VAS are its major strengths: using PowerPoint to create the digital portfolio, managing the folder system, customizing the template for individuality, and updating information in the portfolio.

Fifty percent or more of the interns and three of the four faculty members perceived that using PowerPoint to create the portfolio (88%), documenting best work (80%), customizing the template for individuality (76%), updating information in the portfolio (74%), and management of the folder system to maintain files (68%) were strength of the VAS.

Conclusion: Students agreed that three features of the VAS are its major weaknesses: documenting accomplishment of state and national standards, communicating with faculty in terms of feedback, and showcasing portfolio to future employers.

Forty percent or more of the interns surveyed rated *documenting and meeting state and national standards (68%), communicating with faculty in terms of feedback (48%)* and *showcasing their portfolio to future employers (40%)* as neutral elements or weaknesses of the VAS.

Conclusion: Support levels within of the different sub-groups had an effect on these program interns' perceptions of the strengths and weaknesses of the VAS.

In the Urban Multicultural program which received the highest level of support, over 50 percent of its interns listed six of the eight categories as strengths of the VAS. Interns in the Secondary English program received the second highest level of support, and this group contained the highest percentage of interns rating seven of eight skill areas as strength.

In contrast, in five of the eight categories the Special education program whose interns received the lowest level of support had the lowest percentage of interns who perceived these features as strengths of the VAS. The Reading and Literacy program (2nd least amount of support) had the lowest percentages of interns rating items 4 and 8 as strengths of VAS.

Question 2: To what extent did portfolio completion contribute to interns' confidence in their technology skills?

Conclusion: A majority of the interns agreed that completion of the portfolio increased their technology confidence levels in several areas.

There was an increase in the number of students who perceived they were confident in the following categories after the internship year: add text to PowerPoint (8%), changing background color scheme (20%), adding picture or movie clips (6%), using the master slide (34%), creating hyperlinks (32%) and managing folders (28%) after the internship year. Additionally, 76 percent of the interns perceived that by working on the digital portfolio, their technology skills improved.

Question 3: What are potential uses of the VAS other than that electronic data management system?

Conclusion: A majority of the interns perceived that they would use the portfolio for future employment purposes. However, a substantial number did not perceive the portfolio to be of great value in the employment process.

Twenty nine of the fifty interns indicated they would use the portfolio for future employment. Forty percent or more of the interns from each subgroup perceived that they would use the portfolio for future employment purposes, Special Education interns (69%), Reading and Literacy interns (44%), Secondary English Education interns (50%) and 78% of the Urban Multicultural programs interns all responded in this way. However, 40 percent (20) of the student participants rated the showcase potential of the portfolio as a neutral or weakness features.

Question 4: What types and levels of support are needed by students to complete their electronic portfolio? *Did they perceive that they received this support and what effect did the support they received have on the quality of their portfolios?*

Conclusion: Based on the results of this study, one can conclude that users of the VAS need several types of support, if they are to produce a quality portfolio.

In terms of perceived importance of support, over 75 percent of the interns perceived that workshops to learn how to use the portfolio (86%), a "help desk"/person (82%), class time allocated by instructor to work on the portfolio

(80%), and resource materials (e.g. tutorial) (78%) were considered extremely or very important.

In the sub-group analyses, over 70 percent of the interns from each subgroup perceived that a "help desk"/person available was extremely or very important. Workshops to learn how to use the portfolio also had a substantially high percentage (three of the four programs had over 75%) of interns who perceived this type of support as extremely or very important. Resource materials were another item that a substantial number of interns (65%) from each subgroup perceived as extremely or very important. Over 60 percent of the interns from each subgroup perceived that class time allocated by the instructor to work on the portfolio was extremely or very important.

Forty percent or more of the interns perceived they received some support in the form of a "help desk"/person (60%), workshop to learn how to use the portfolio (52%), class time allocated to work on the portfolio (44%) and resource materials (60%). Thirty percent or more of the interns from each sub-groups perceived they received some support from the above mentioned categories.

Conclusion: Interns needed more support than they received to acquire the necessary skills to download the Flash player and burn a CD copy of their portfolio.

A substantial number of interns (45%) perceived that they did not possess the necessary skills after the internship year for downloading flash player and burning a CD copy of the digital portfolio, both skills necessary to completing and using their portfolios. Thirty percent or more of interns from each subgroup indicated "neutral" or "not confident" when it came to downloading the flash player and burning a CD copy of their portfolio at the end of the internship year.

Conclusion: If a portfolio is to be standards-based, students need to understand the standards and how portfolio entries demonstrate their performance in relationship to those standards. National and state standards were not adequately addressed with students in this study in preparation of their portfolio.

Forty six percent or more of the interns perceived that they received no support from workshops held on state and national standards. In three programs 50 percent or more of the interns from each sub-group perceived that they did not receive this support. These programs did not officially have workshops on state and national standards. The Urban Multicultural program was the only program that had a workshop on state and national standards, and 72 percent of these interns perceived that they received some support in this area. The data strongly suggest that this dimension of the portfolio development should not be taken for granted.

Discussion

PowerPoint

In terms of strengths of the VAS, an item that stood out was the use of PowerPoint to create the digital portfolio. One reason that PowerPoint was perceived as a strength by interns may be that these students had all taken a required technology course in which a component was how to use PowerPoint. One can assume that a student's previous experience using PowerPoint had the potential to influence their use of the software to create the digital portfolio. One of the key features of PowerPoint is the ability to use Microsoft design templates (that come with the software or are downloadable from the Microsoft website), to create background color schemes and design. This may be a reason why 76 percent of the interns perceived that customizing the template for individuality was a strength of the VAS. Eighty percent of the interns indicated that documenting best work

samples was a strength of the VAS. This perception could be attributed to using PowerPoint, because PowerPoint allows the user to hyperlink to files or websites. Interns can use the hyperlink feature to attach artifacts from their student teaching, projects, or course work. The findings of the study together with this background information suggest that PowerPoint maybe an excellent choice for portfolio formats.

Documenting Standards

The one item that a high percentage of interns perceived as a weakness of the VAS was *documenting meeting state and national standards*. Thirty percent of all the interns perceived *documenting meeting state and national standards* as a weakness. One possible reason for the interns' perceptions could be that they did not know what artifacts to use for this documentation process. It was left up to the intern supervisors to explain what the standards were and how to document them and only one subgroup of interns received a workshop in this dimension of the portfolio.

Technology Skill Enhancement as a Benefit

At the beginning of the internship year, interns indicated that they possessed skills in three categories (*adding text to PowerPoint, changing background color scheme and adding picture or movie clip*). However, upon completion of the internship year, interns indicated they possessed skills in seven of eight categories (*adding text to PowerPoint, using a master slide, changing background color scheme, adding picture or movie clips, creating hyperlinks, managing the folder systems, and burning a CD copy of the digital portfolio*). In examining the aforementioned categories (except for the burning a CD copy of the digital portfolio), the interns had to repeatedly use these skills throughout the year, giving them constant practice.

This could have been one reason for the increase in technology skill indicated by the interns and an added benefit of completing a digital portfolio.

Consideration In Choice of Portfolio Design

Downloading Flash Player was one item where a high percentage (78%) of interns perceived that they did not possess the necessary skills until even after the internship year. Several factors could have lead to this outcome, the first being that this could have been the first time that interns had heard about the Flash player. Second, if they had been using a recent operating system (all labs in the College of Education, Health and Human Sciences had the Flash player already pre installed) they might not have had to download the Flash player. Finally, if they had a Macintosh, it might have been more difficult to download and install the Flash player.

One interesting fact that arose from the sub-group analysis was the high percentage of interns from the Urban Multicultural program (95%) who perceived that they did not possess the necessary skill to download the Flash player. Six of the interns from this program had an ibook computer and had difficulty installing a Flash player. Some of them could not install it. The findings suggest that these must be a close match between students' technology education and the demands of a digital portfolio.

Value of A Showcase Portfolio

Twenty-nine of the fifty interns indicated that they would use the portfolio for employment purposes. Interns could have submitted a burned CD copy of the digital portfolio as part of their application during job fairs held at the University of Tennessee. As indicated in chapter 4, several interns indicated that they used their digital portfolio to get their "foot in the door" or a job interview. However, 16

percent did not see the portfolio as an asset in the employment process. Perhaps not enough effort was made to show or teach students how to use in their portfolios in this way. Also, there maybe need to help school administrators understand what they can learn from an applicant's portfolio.

Support Structure

Workshops to learn how to use the portfolio, a "help desk"/person, class time and resources materials were four categories that the interns perceived were important in terms of support needed. These four categories were also perceived by interns to have been the categories where they received the most support and as having a great effect on the quality of their portfolio.

The initial workshop was a key factor because it was the first time the interns learned how to use the portfolio. It covered the basic concept of what a digital portfolio is, what type of artifacts could be used, how to use PowerPoint to create the digital portfolio, and it also introduced them to the designers of the portfolio and their contact information if they wanted to ask further questions. An available "help desk"/person provided interns with one-on-one support or group of interns' time to work with a help person. This type of support provided interns time to ask specific questions and have more hands-on support. Class time provided by instructors could have allowed the interns the opportunity to work on the portfolio, ask questions or receive feedback. During the internship year the interns had to teach, and thus, any time provided in their coursework during the year could have helped them focus and work on the digital portfolio. Finally, resource materials such as tutorials on how to use PowerPoint (adding text, master slide and changing background color scheme) could have been useful. These findings suggest that a program or institution of higher education must give careful attention to providing an

appropriate support structure to students who will be required to develop digital portfolio.

What can we learn from this study?

Assessment & Showcase Portfolio

As institutions are moving towards electronic portfolio systems, the trend is to use web based electronic portfolio systems. Both commercial and in house systems have features that can be used for learning and assessment. However, because they are web based, there is limited capability for students to develop a creative individualized showcase portfolio. Students may select what artifacts go into their portfolio but the ability to customize the design in terms of background color or images is limited. There seems to be a need to create a system or process that combines both systems. Institutions benefit in terms of data gathered through an assessment portfolio system that can be used for program improvement. However, in terms of students using the system for job employment, assessment portfolio systems are limited in their capacity to show the unique individual qualities of any given student.

Suggestion for Support Needed

In terms of supporting online based assessment systems, there are several support types and levels that could be used. First might be initial workshops for students to introduce them to the system and its basic features. Secondly, if the institution requires an instructional technology course, it should be used to familiarize students with the system. Faculty members could have an initial workshop where the basic features are covered and monthly workshops to go over more advanced features and to allow follow up questions that may arise during the

semester. Not all faculty may take full advantage of the different capabilities of the system but by having the workshops they can at least be made aware and then use the options they choose.

Importance of Building Relationships

During support sessions it is important to create a comfortable and friendly environment. This allows both faculty and students to feel safe asking questions that they think others may see as stupid. Building this type of environment allows stakeholders to comfortably seek support, or even take the skills and knowledge learned back to their fellow colleagues. If faculty and students feel that there is a person or a resource that will provide help when they run into a problem, they may be more likely to use the system and maintain a positive attitude.

Recommendations

From the findings and conclusions of this study and the conditions discussed, the following recommendations can be made for future research:

1. Conduct further study on digital portfolio systems at a variety of universities. Studies should focus on the following areas:
    - What type of portfolio (learning, assessment or showcase portfolio) is being implemented and how?
    - What type of support is available; how is it made available, and is the support received by faculty and students effective?
    - How is student work in the system being evaluated?
    - How are student data (course grades, rubrics, artifacts) being inputted, collected and aggregated?

2. Studies conducted at institutions that use digital portfolio systems for accreditation purposes should focus on how the portfolio system complements the accreditation process as well as student and faculty development, what needs be put into such a system and what types of support are needed to make the system work achieve multiple purposes.
3. Modifications are needed in the survey instruments used in this study, if it is to be replicated at the University of Tennessee. They include the following:
    - Students are required to take ITES 486 in the Teacher Education program, and in this course the digital portfolio shell is introduced and used. A question pertaining to the students' comfort level in using the digital portfolio shell at the end of this course should be added to the survey.
    - Technology skills indicator questions regarding students perceived technology skills should be the same in the pre - and pose phases of the study. The findings would then be more clearly based on an intern's perceived gains in confidence or skills.
4. Additional questions should be added to the faculty survey:
        - How much emphasis do the faculty members who are using the portfolio put on it?
        - What are their expectations of students? How often do they collect or review portfolio contents.

- How are portfolio entries scored or rated? How are results used in evaluating a student's competence or performance?
- How do they address state and national standards, how is it covered in their programs?

5. It would be useful to determine how school administrators really see the use of electronic portfolios in employment discussions and what they would like to see included. This information could be gained through a survey, interview or focus group.

Answers to these questions would be very helpful in determining the importance of electronic portfolios, how they are used and support (faculty, other) needed if they are to be employed in teacher preparation programs.

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Appendices

Appendix A

Faculty Member's Electronic Portfolio Experiences

Please choose only **one** response for each question unless noted.

My primary area teaching is:

Special Education

Reading and Literacy

Urban Multicultural Development

Language Arts

1. Were you introduced to the electronic portfolio template prior to this year?

Yes No

2. If **yes**, did the prior experience with the portfolio help in using the electronic portfolio system this year?

Yes No

3. Before this academic year, did you know how to create an electronic portfolio?

Yes No

4. Has working with the electronic portfolio system improved your technology skill?

Yes No

5. Before this year which of the following tasks did you know how to do? Please check all that apply.

a. Adding text to a PowerPoint slide

b. Using a Master Slide

c. Changing background color scheme

d. Adding pictures or movie clips

e. Creating Hyperlinks

f. Managing the folder systems

g. Downloading Flash Player

h. Using Pack and Go in PowerPoint

i. Burning a CD copy of the digital portfolio

6. After your experience with the portfolio system this year, how confident are you in doing each of the following?

a. Adding text to a PowerPoint slide	Confident	Neutral	Not Confident
b. Using a Master Slide	Confident	Neutral	Not Confident
c. Changing background color scheme	Confident	Neutral	Not Confident
d. Adding pictures or movie clips	Confident	Neutral	Not Confident
e. Creating Hyperlinks	Confident	Neutral	Not Confident
f. Managing the folder systems	Confident	Neutral	Not Confident
g. Downloading Flash Player	Confident	Neutral	Not Confident
h. Viewing the standard matrix	Confident	Neutral	Not Confident
i. Documenting meeting of the INTASC	Confident	Neutral	Not Confident
j Burning a CD copy of the digital portfolio	Confident	Neutral	Not Confident

7. Do you think the following statements represent strength or weaknesses of the portfolio system?

a. Using PowerPoint to create the portfolio	Strength	Neutral	Weakness	N/A
b. Managing folder system to maintain files	Strength	Neutral	Weakness	N/A
c. Customizing the template for individuality	Strength	Neutral	Weakness	N/A

d. Documenting best work (lesson plan and work samples, etc.)

Strength Neutral Weakness N/A

e. Documenting meeting INTASC standards Strength Neutral Weakness N/A

f. Updating information in the portfolio Strength Neutral Weakness N/A

g. Receiving feedback from instructor on the portfolio

Strength Neutral Weakness N/A

h. Showcasing Portfolio on CD for assessment or employment purposes

Strength Neutral Weakness N/A

Support

8. Below are a series of sources of support that students sometimes need to develop a "good" portfolio. Please indicate **how important you think each support is.**

a. A "help desk"/person available

Extremely Important Very Important Important Somewhat Important Not Important

b. Workshop to learn how to use the portfolio

Extremely Important Very Important Important Somewhat Important Not Important

c. Weekly help sessions (during the day and evening)

Extremely Important Very Important Important Somewhat Important Not Important

d. Time allocated during class to work on the portfolio

Extremely Important Very Important Important Somewhat Important Not Important

e. Resource materials (e.g., tutorials)

Extremely Important Very Important Important Somewhat Important Not Important

f. Workshops held regarding state and national standards

Extremely Important Very Important Important Somewhat Important Not Important

9. What , if any changes to the digital portfolio shell would you like to see?

Please feel free to offer additional comments.

_____

_____

_____

_____

_____

Appendix B

Intern's Electronic Portfolio Experience

Please choose only **one** response for each question unless noted.

My Primary area/level of teaching responsibility is:

K-2

3-5

6-8

Other

My program of study is:

Special Education

Reading and Literacy

Urban Multicultural Development

Language Arts

1. Were you introduced to the electronic portfolio templates in coursework prior to the internship?

Yes No

1.a. If yes, did the prior experience with the portfolio help in using the electronic portfolio system?

Yes No

2. Before the internship, did you know how to create an electronic portfolio?

Yes No

3. In terms of technology/computer use, how easy/difficult was it for you to create your portfolio?

Very Easy

Easy

Fair

Difficult

Very Difficult

4. Has creating the electronic portfolio improved your technology skill?

Yes No

5. Before the internship year, which of the following tasks did you know how to do? Please check all that apply.

a. Adding text to a PowerPoint slide

b. Using a Master Slide

c. Changing background color scheme

d. Adding pictures or movie clips

e. Creating Hyperlinks

f. Managing the folder systems

g. Downloading Flash Player

h. Using Pack and Go in PowerPoint

i. Burning a CD copy of the digital portfolio

6. Upon completion of the internship year, how confident are you in doing each of the following tasks?

a. Adding text to a PowerPoint slide Confident Neutral Not Confident

b. Using a Master Slide Confident Neutral Not Confident

c. Changing background color scheme Confident Neutral Not Confident

d. Adding pictures or movie clips Confident Neutral Not Confident

e. Creating Hyperlinks Confident Neutral Not Confident

f. Managing the folder systems Confident Neutral Not Confident

g. Downloading Flash Player Confident Neutral Not Confident

h. Viewing the standard matrix Confident Neutral Not Confident

i. Documenting best work (lesson plan, work sample Confident Neutral Not Confident

j. Documenting meeting of the INTASC standards Confident Neutral Not Confident

k. Burning a CD copy of the digital portfolio Confident Neutral Not Confident

7. Do you think the following statements represent strength or weakness of the portfolio system?

a. Using PowerPoint to create the portfolio Strength Neutral Weakness N/A

b. Managing folder system to maintain files Strength Neutral Weakness N/A

c. Customizing the template for individuality Strength Neutral Weakness N/A

d. Documenting best work (lesson plan and work samples, etc.) Strength Neutral Weakness N/A

e. Documenting meeting INTASC standards Strength Neutral Weakness N/A

f. Updating information in the portfolio Strength Neutral Weakness N/A

g. Receiving feedback from instructor on the portfolio

Strength Neutral Weakness N/A

h. Showcasing Portfolio on CD for assessment or employment purposes

Strength Neutral Weakness N/A

Support

8. Below area a series of sources of support that students sometimes need to develop a "good" portfolio. Please indicate **how important you think each support is.**

a. A "help desk"/person available

Extremely Important Very Important Important Somewhat Important Not Important

b. Workshop to learn how to use the portfolio

Extremely Important Very Important Important Somewhat Important Not Important

c. Weekly help sessions (during the day and evening)

Extremely Important Very Important Important Somewhat Important Not Important

d. Class time allocated during class to work on the portfolio

Extremely Important Very Important Important Somewhat Important Not Important

e. Resource materials (e.g., tutorials)

Extremely Important Very Important Important Somewhat Important Not Important

f. Workshops held regarding state and national standards

Extremely Important Very Important Important Somewhat Important Not Important

9. Below are a series of statements regarding support that students sometimes need to develop a "good" portfolio". Please indicate the level of **support you received for each statement.**

a. A "help desk"/person available

Great Support Some Support No Support Not Needed

b. Workshop to learn how to use the portfolio

Great Support Some Support No Support Not Needed

c. Weekly help sessions (during the day and evening)

Great Support Some Support No Support Not Needed

d. Class time allocated during class to work on the portfolio

Great Support Some Support No Support Not Needed

e. Resource materials (e.g., tutorials)

Great Support Some Support No Support Not Needed

f. Workshops held regarding state and national standards

Great Support Some Support No Support Not Needed

10. If you received support, please indicate to what extent it effected the quality of your portfolio.

a. A "help desk"/person available

Great Effect Minimal Effect No Effect

b. Workshop to learn how to use the portfolio

Great Effect Minimal Effect No Effect

c. Weekly help sessions (during the day and evening)

Great Effect Minimal Effect No Effect

d. Class time allocated during class to work on the portfolio

Great Effect Minimal Effect No Effect

e. Resource materials (e.g., tutorials)

Great Effect Minimal Effect No Effect

f. Workshops held regarding state and national standards

Great Effect Minimal Effect No Effect

11. What , if any changes to the digital portfolio template would you like to see?

12. What potential uses of your digital portfolio, other than completing course requirements, do you see?

Please feel free to offer additional comments.

Appendix C

Virtual Anthology Portfolio Shell Informed Consent Letter
(The University of Tennessee Faculty Members Survey Letter of Support)

Dear Faculty Member:

The purpose of this letter is to request your participation in a survey for the Virtual Anthology Portfolio study. Enclosed is a consent form from the researcher, Thilla Sivakumaran at the University of Tennessee (UT), explaining survey procedures and safeguards.

This form provides important information that can aid in your decision to join the survey group. To be an eligible participant in this activity, please return the form, signed by you, to the Mr. Thilla Sivakumaran's office (440 Claxton Complex) within the next week. Participants will be contacted regarding the date and time these surveys will be conducted.

The main purpose of the study is to ascertain the following:

9. To what extent does the Virtual Anthology Portfolio Shell enable students to demonstrate their best work, individual creativity, and to provide evidence of their knowledge and skills?
10. To what extent does the Virtual Anthology Portfolio Shell enable students to demonstrate knowledge and skills pursuant to national (NETS, INTASC, NCATE), and state standards (TNTF) while offering the opportunity for faculty to analyze learner knowledge base within the context of those standards?
11. What do the users, pre-service teachers, faculty, and K-12 administrators, perceive as the strengths, and weaknesses of this particular digital portfolio shell?
12. How do users (pre-service teachers and faculty) technology skill levels and experience affect the quality of the digital portfolios they create?
13. What potential uses of the portfolio, beyond fulfilling program requirements, do stakeholders (pre-service teachers, faculty, P-12 school personnel) see in a portfolio system?
14. How much, and what kind of assistance, does the participating faculty need in the implementation, and management of a portfolio system?

The survey will take approximately 30 minutes to complete. Should you have any questions regarding this request, please feel free to contact the researcher Mr. Thilla Sivakumaran (865-803-3795). I greatly appreciate your assistance in this project and look forward to working with you.

Sincerely,

Thilla Sivakumaran,
Graduate Teaching Assistant

INFORMED CONSENT STATEMENT FOR: Virtual Anthology Portfolio Project

A. INTRODUCTION You are being invited to voluntarily join in a survey of faculty members who are participating in the Virtual Anthology Portfolio project. The basic purpose of this research study is to evaluate the effectiveness of the Virtual Anthology Portfolio Shell.

B. INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY Your involvement in the study would include participation in a 30 minute survey during the last two weeks of April under the following circumstances:

1) The dissertation committee has approved the evaluation, and will invite your voluntary participation.
2) The survey will be scheduled/conducted at your office during a time suitable to all participants.
3) Mr. Thilla Sivakumaran (researcher) from the University of Tennessee (UT) will conduct the survey.

C. RISKS There is minimal risk to your participation in this evaluation.

D. BENEFITS Benefits to your participation include the collection of information that could be used to improve the Virtual Anthology Portfolio Shell. Participants may also gain a better understanding of the shell and the concept of digital portfolios.

E. CONFIDENTIALITY Confidentiality of survey results (participant comments) will be maintained. Participant comments will not be attributed to specific individuals. Data will be stored securely and only made available to the researcher at the University of Tennessee. Selected survey comments may be included in the dissertation, but not attributed to individuals.

F. CONTACT INFORMATION If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Thilla Sivakumaran, Claxton Complex 440; Knoxville; TN 37996-3400, or call (865) 803-3795. If you have questions about your rights as a participant, contact Research Compliance Services of the Office of Research at (865) 974-3466.

G. PARTICIPATION Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled.

CONSENT

I have read the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Virtual Anthology Portfolio Shell Informed Consent Letter
(The University of Tennessee Pre-Service Teacher Survey Letter of Support)

Dear Pre-Service Teacher:

The purpose of this letter is to request your participation in a survey for the Virtual Anthology Portfolio study. Enclosed is a consent form from the researcher, Thilla Sivakumaran at the University of Tennessee (UT), explaining survey procedures and safeguards.

This form provides important information that can aid in your decision to join the survey group. To be an eligible participant in this activity, please return the form, signed by you, to the Mr. Thilla Sivakumaran's office (440 Claxton Complex) within the next week. Participants will be contacted regarding the date and time these surveys will be conducted.

The main purpose of the study is to ascertain the following:

15. To what extent does the Virtual Anthology Portfolio Shell enable students to demonstrate their best work, individual creativity, and to provide evidence of their knowledge and skills?
16. To what extent does the Virtual Anthology Portfolio Shell enable students to demonstrate knowledge and skills pursuant to national (NETS, INTASC, NCATE), and state standards (TNTF) while offering the opportunity for faculty to analyze learner knowledge base within the context of those standards?
17. What do the users, pre-service teachers, faculty, and K-12 administrators, perceive as the strengths, and weaknesses of this particular digital portfolio shell?
18. How do users (pre-service teachers and faculty) technology skill levels and experience affect the quality of the digital portfolios they create?
19. What potential uses of the portfolio, beyond fulfilling program requirements, do stakeholders (pre-service teachers, faculty, P-12 school personnel) see in a portfolio system?
20. How much, and what kind of assistance, does the participating faculty need in the implementation, and management of a portfolio system?

The survey will take approximately 30 minutes to complete. Should you have any questions regarding this request, please feel free to contact the researcher Mr. Thilla Sivakumaran (865-803-3795). I greatly appreciate your assistance in this project and look forward to working with you.

Sincerely,

Thilla Sivakumaran,
Graduate Teaching Assistant

INFORMED CONSENT STATEMENT FOR: Virtual Anthology Portfolio Project

A. INTRODUCTION You are being invited to voluntarily join in a survey of Pre-Service Teachers who are participating in the Virtual Anthology Portfolio project. The basic purpose of this research study is to evaluate the effectiveness of the Virtual Anthology Portfolio Shell.

B. INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY Your involvement in the study would include participation in a 30 minute survey during the last two weeks of April under the following circumstances:

4) The dissertation committee has approved the evaluation, and will invite your voluntary participation.
5) The survey will be scheduled/conducted at your office during a time suitable to all participants.
6) Mr. Thilla Sivakumaran (researcher) from the University of Tennessee (UT) will conduct the survey.

C. RISKS There is minimal risk to your participation in this evaluation.

D. BENEFITS Benefits to your participation include the collection of information that could be used to improve the Virtual Anthology Portfolio Shell. Participants may also gain a better understanding of the shell and the concept of digital portfolios.

E. CONFIDENTIALITY Confidentiality of survey results (participant comments) will be maintained. Participant comments will not be attributed to specific individuals. Data will be stored securely and only made available to the researcher at the University of Tennessee. Selected survey comments may be included in the dissertation, but not attributed to individuals.

F. CONTACT INFORMATION If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Thilla Sivakumaran, Claxton Complex 440; Knoxville; TN 37996-3400, or call (865) 803-3795. If you have questions about your rights as a participant, contact Research Compliance Services of the Office of Research at (865) 974-3466.

G. PARTICIPATION Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled.

CONSENT

I have read the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix D

Responses to Question 12 on Student Survey

Urban Multicultural Program

No Purpose

- I might not use it after I get a job.

Accomplishments

- Scrap book/ documentation, Will save future lessons and artifacts on it, take to interviews
- Use it to document what I accomplish as a teacher.
- Keeping up with experiences to add to your portfolio

Future Employment

- Hopefully I will use it during interviews.
- Showing it to all potential employers. Keeping up with it as my teaching career goes on.
- Impressing potential employers
- Using it to attain a job
- I can see using this on job interviews. I plan on updating my portfolio regularly for future reference.
- Job interviews
- I have given my portfolio to my future employer. They were very excited to see it and it proved my knowledge of technology.
- Being able to email is to prospective employers!
- I have already used my portfolio in my job search. I have shared it with possible employers in interviews, and turned in CD copies of it with job applications.
- Maybe with potential employers, but I have had so many difficulties with the links and compatibility, I'm afraid I would look foolish.
- Marketing

Secondary English Education

No Purpose

- None! Employers don't want it.
- Not many
- None

Future Employment

- Employment opportunities
- Job interviews
- Great for interviews, can edit easily- unlike paper portfolios
- I have used it in my employment search and it has been very helpful.

- When searching and applying fir jobs- lets job interviewers know that we're technologically savvy- it's a great edge.

Reading and Literacy

Future Employment

- To give to principals during potential and future interviews.
- It would be beneficial if in the future, I have to search for another job in an increasingly technologically savvy society.
- Using it for professional interviews.

No Purpose

- I do not see that the digital portfolio is very helpful in securing a teaching position. I can imagine that this may change in the future.

Special Education

Future Employment

- Future employers
- Using for employment purposes
- Possible use w/ employment
- Only if school systems ask- but none have
- For jobs and resumes. Will reflect a knowledge of tech.
- Turning it in to future employers
- Employment purposes, tenure
- Present to a job interview

No Purpose

- They did not require digital format for job.
- None
- None
- None, interviews didn't ask for them. Course does not require a complete one.

Vita

In May 2005 I will earn my doctorate in Instructional Technology with a specialization in evaluation and curriculum. I also hold a MS in Secondary Science and a BS in molecular and cellular biology. Since August 2004 I have been assistant professor in curriculum and instruction at the University of Louisiana—Monroe where I teach courses in instructional technology, classroom management, and teaching methods. While a graduate student at the University of Tennessee I was responsible for teaching an introductory technology course required of interns.

Although I gladly devote a large amount of time to my teaching, I maintain an active research and scholarship agenda. In my four years at the University of Tennessee, I have collaborated on three grants and presented at national conferences such as AACTE, SITE, and Ed Media. In regard to publishing, I have contributed to several guides and have one peer-reviewed manuscript in press. Currently my research projects include the development of an overall assessment data management system for both the University of Tennessee and University of Louisiana Monroe Colleges of Education. This process will help both institutions with the accreditation process. I am also working on a comparative study of four different portfolio systems at different universities, as well as doing comparative study on the performance of fast tracked teacher education graduates versus regular four-year teacher education program graduates on value added evaluations. Finally, in conjunction with Dr. Lisa Scherff and Bill Wishart, I am examining teacher use of and professional development with computers using the latest released data from NCES.

Even though I remain busy with teaching and research, I still devote a large portion of my time to service-related activities. As my vita shows, I serve on departmental and college assessment and evaluation committees (including

assessment and NCATE); have spoken at school and district professional development workshops; and, provide consulting services for several groups such as Urban Impact, Phi Delta Kappa, Project Impact, and the Teacher's Resource Network.

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