

An Example of Utilizing Students' Reflections in e-Portfolios for Program Evaluation:  
A Qualitative Content Analysis

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**Abstract**

As the growth of online programs in higher education accelerated across the nation, concerns have been addressed regarding the quality of online programs. The evaluation of programs for quality assurance has become an important component of successful online programs (Kindgren, Nilsson, & Wiklund, 2012; Martinez, Liu, Watson, & Bichelmeyer, 2006). Deggs and Weaver (2009) stated that student perception is “essential to improving the quality of instruction in higher education” (p. 41). In the online program evaluation literature, majority of evaluation studies commonly collected students' perceptions of their learning outcomes and their learning experiences through survey questionnaires. Few studies had been conducted on using students' reflections in e-portfolios for program evaluation in higher education. The purpose of this study was to explore how students' reflections in their e-portfolio can be used as a mechanism for program evaluation. This study employed a qualitative content analysis method. Seventy students' reflections in their e-portfolios of an online master's program were collected. Three types of reflections in e-portfolios have been reviewed and analyzed: (1) students' reflections on their previous approaches to the five tasks of instructional design including design, development, utilization, management, and evaluation; (2) the students' reflections on their current approaches to these five instructional design tasks; and (3) the perceptions on their learning experiences in this online master's program. Two overarching themes emerged from the students' reflections including students' perceptions on their learning outcomes and their learning experiences in the program. The results of the study indicated that students' reflections in their e-portfolios

provide another dimension of qualitative information for program evaluation with respect to students' perceptions, and this qualitative data can be used in conjunction with other methods of data collection to conduct a comprehensive evaluation of online programs.

## **Dedication**

This dissertation is dedicated to  
my mother, Lianshu Xuan,  
my mentors, Lee and Norma Nichols.

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## Chapter 1: Introduction

In the last two decades, there has been a movement to use comprehensive evaluation techniques that provide meaningful information to teachers and learners. Today, a growing number of educators use portfolios to monitor students' professional development and assess students' achievements. Meyer and Latham (2008) point out that 90% of teacher education programs use some types of portfolio system and the majority are electronic. Portfolios are seen as an alternative assessment as they show students' learning outcomes, as well as their learning progress (Woodward, 1996). Portfolios provide an authentic documentation of professional achievement as an alternative to traditional assessment (Cole, Ryan, Kick, & Mathies, 2000) because they allow students to collect, select and reflect on artifacts that demonstrate their professional competencies (Topp, Clark, & Goeman, 2002; Yancy, 2001).

With the emergence of technology, the paper-based traditional portfolio have transformed into digital format, which is known as e-portfolio. Topp, et al. (2002) state that the process (collect, select, reflect) is greatly enhanced through the use of technology in the portfolio development. The electronic portfolio uses various media and technology to create, collect and present students' achievements. The most popular type of electronic portfolios is the web-based portfolio that can be developed within course management system such as Sakai and Blackboard (Stefani, Mason, & Pegler, 2007). Many graduate education programs used electronic portfolios for the final assessment of their students (Kear & Bear, 2007; Haffling, Beckman, Pahlmblav, & Edgren, 2010) because of their authentic assessment characteristics that value both the students' learning process and their final products.

There is a growing numbers of studies discussing the successful practice of portfolio assessment in various fields, and indicating that electronic portfolios have distinct advantages

compared to the traditional paper-based portfolio or comprehensive exams (Swain & Ring, 2000; Tartwijk & Driessen, 2009; Topp, et al., 2002). When students add multimedia entries that contain video, audio, graphic, and text, as well as reflections, portfolios present a richer source of students' knowledge and skills than a traditional assessment (Topp, et al., 2002).

There are different views in defining portfolios in general. Paulsen, Paulsen, and Meyer (1991) define a portfolio as

“a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merits, and evidence of student self-reflection” (p. 60).

MacIsaac and Jackson (1994) state that portfolios visualize learning as it occurs across time, as well as products of one's learning. The entries included in portfolios show readers a realistic picture of a student's ongoing professional growth (Campbell, Cignetti, Melenzyer, Nettles, & Wyman, 2001). Yancy (2001) states the key piece of portfolios is reflection. Cole et al. (2000) also emphasize that portfolios must contain students' reflections on both their learning progress and the chosen entries. The central advantage of a portfolio is that it provides the opportunity for students to reflect on their learning in depth and allows teachers to track the process of learning, as simply opposed to the end result (Cole et al., 2000).

There are three basic process that comprise the portfolio development: collection, selection, and reflection, with reflection being the most important key component (Yancy, 2001; Zubizarreta, 2009). Schön (1983), Boud, Keogh, & Walker (1985), and Brookfield (1995) have all stated that reflection is a vital learning tool for the teaching-learning process. Without reflection, a portfolio is merely a compile of works developed over time (Nakonechny

& Ellis, 2012). Portfolios generally include students' reflections that can be regarded as a reference to understand learners' professional competencies and learning process (Johnson, Mims-Cox, & Doyle-Nichols, 2006). Wellington (1991) highlights several reflective questions to engender a professional practice: "What do I do? What does it mean? How did I come to be this way? How might I do things differently?, and What have I learned?" (p. 5).

Reflection is a form of self-assessment that is fundamental to personal growth (Paris & Ayres, 1994). Zubizarreta (2004) defines reflection as the "deliberate and systematic attention to a student's self-reflective, metacognitive appraisal of why and how learning has occurred" (p. xii). Students' reflections could not only allow students to assess and analyze their own learning and growth (Cole et al., 2000), but also provide instructors information to evaluate the effectiveness of a program (Kear & Bear, 2007). Reflective practices also help stakeholders evaluate how learning, instruction, curriculum, and assessment are interworked (Paris & Ayres, 1994).

An online instructional technology master's program in the School of Education at Virginia Tech is one of the well-known online programs in the instructional technology field. In 1998, this master's program started offering professional development courses to K-12 educators, students in higher education and corporate trainers in an online learning environment via the World Wide Web. The program requires all students to develop web-based e-portfolios as their overall graduate program assessment. E-portfolios are used to measure students' learning outcomes, as well as aid the program evaluation. The e-portfolios provide an opportunity for students to reflect on their personal and professional growth throughout the online master's program, and document the competencies in the standards set by the Association for Educational

Communications and Technology (AECT) (Seels & Richey, 1994), as well as four standards required by the program (research, resources, reflection, and resume).

The e-portfolio course, one of courses taken in the last semester in this online master's program, incorporated reflective practice as an instructional strategy to promote the student's learning. Electronic portfolios require students to reflect on their knowledge and skills acquired over time. In this online master's program, reflections in the e-portfolios serve as a form of communication between faculty and students. These reflections in e-portfolios provide an opportunity for students to look longitudinally at their learning process and to comment on their learning outcomes. These reflections also provide a window into the students' thinking for the faculty, and through the reflections, faculty can see students' strengths, weaknesses, and achieved competencies throughout the program.

### **Statement of the Problem**

The increasing awareness that e-portfolios are one of authentic measurements and can provide a comprehensive picture of students' achievement and growth has initiated the use of a portfolio assessment in various programs, including programs for teacher preparation and professional development.

Studies conducted in the field of education emphasize the importance of students' reflections as part of the portfolio process (Haffling, et al, 2010; Kear & Bear, 2007; Oner & Adadan, 2011; Routman, 1991; Wolf, 1994), and the above researchers believe that reflection is an essential element in portfolios. Reflection is often mentioned as a crucial component of the portfolio process (Hansen, 1994), and it gleans students' feedback to faculty and stakeholders with respect to students' learning achievement and effectiveness of program. Kear & Bear (2007) state that students' reflections can be analyzed "for patterns, themes or causal links" to inform

faculty about the students' learning experiences in the program and to use for program improvement (p. 114).

With the growing enrollment in online education and online programs in higher education, concerns have been addressed regarding the quality of online programs. The evaluation of programs for the quality assurance has become an important component of successful online programs (Kindgren, Nilsson, & Wiklund, 2012). Deggs and Weaver (2009) stated that student perception is "essential to improving the quality of instruction in higher education" (p. 41). They note that the majority of evaluation studies commonly collected students' perceptions of their learning outcomes and their learning experiences through survey questionnaires.

Although students' reflections in e-portfolios are a rich source of data to understand students' learning processes and their learning experiences in programs, there is an absence of literature focused on developing insight into students' experiences in the program through the lens of students' reflections in the electronic portfolio and utilizing these reflections as data for program evaluation. This research was designed to address some of the gaps existing in the current body of literature regarding the use of students' reflections as a mechanism for program evaluation.

### **Purpose of the Study**

The purpose of this study was to explore the usefulness of students' reflections in e-portfolios as a mechanism of program evaluation. The study aimed to demonstrate the use of students' reflections for the purpose of program evaluation and to examine what kind of information these students' reflections can contribute for a comprehensive evaluation of online programs.

## **Research Question**

This qualitative content analysis study was guided by the following research question: how might analysis of students' reflections in e-portfolios inform online program evaluation?

## **Importance of the Study**

Electronic portfolios are used as a means of evaluating students' academic performance, as well as their professional growth and development in various university departments. This study discussed the utility of students' reflections in e-portfolios as an evaluation tool for program evaluation. These reflections allow faculty and administrators to understand more fully about students' performances and attitudes, as well as the strengths and weaknesses of the program.

This study provided a careful analysis of students' reflections within e-portfolios, as well as several recommendations for utilizing these reflections for online program evaluation. This would be beneficial for evaluators who are interested in using additional qualitative data to complement other evaluation tools such as surveys or interviews for program evaluation. Finally, this research will expand the existing body of literature in evaluation practices regarding the use of students' reflections as a mechanism for online program evaluation.

## **Organization of the Dissertation**

This dissertation continues with Chapter 2, which is the literature review that offers further support the study. Chapter 3 describes the methodology of the study, Chapter 4 presents the analysis and findings of the study, and Chapter 5 discusses the findings, provides several recommendations for using students' reflections for program evaluation and limitations of the study. The Appendices and references are added at the end of this paper.

## **Chapter 2: Review of Literature**

This study followed a review of research related to three major areas: online program evaluation practices in higher education, use of e-portfolios for students' learning assessment and program evaluation, and the importance of reflection as an essential part of e-portfolios.

Six questions guided this literature review:

1. What are current trends in online education in higher education?
2. What kinds of models and methods have been used for online program evaluation?
3. How have e-portfolios been used in higher education?
4. What are standard features of e-portfolios?
5. What has been the value of reflections in e-portfolios?
6. What were the theoretical underpinnings of reflective practice?

The review began with an overview of online learning in higher education, followed by trends of online education and discussions on evaluation practices in online programs. The second section focused on historical overview of using e-portfolios in education. Features and strengths of e-portfolios had been reviewed. The third section discussed importance of reflections in e-portfolios along with theoretical underpinnings of reflection.

### **Online Learning in Higher Education**

Online education is not new in the higher education arena. Online education relies on Internet-based communication technology to mediate course materials and interactions, whereas people interact directly in face-to-face classroom settings. Ally (2008) defines online learning as using “the Internet to access learning materials; to interact with the content, instructor, and other learners; and to procure support during the learning process, to acquire knowledge, to construct personal meaning, and to grow from the learning experience” (p. 17).

Over the past twenty years, the growth of Internet access and communication technologies have resulted in higher education institutions' evolving at unprecedented speed to accommodate student requests for online courses (Dykman & Davis, 2008). With the integration of theoretical frameworks and the appropriate technologies, online modes have become a popular alternative mechanism for educational delivery beyond the traditional modes. The distinctions of time, space, and ways of communication have changed the way people learn and communicate in the online environment.

Two primary attributes of online learning are flexibility and convenient accessibility that can be arranged asynchronously (Holmberg, 2004). The asynchronous environment allows enough time for students to read instructional content, interact with the content, reflect on them, and speculate about their ideas (Palloff & Pratt, 2001; Petrides, 2002; Vonderwell, 2003). Bray, Aoki, & Dlugosh (2008) report in their research that the largest number of student responses regarding the advantages of distance learning focused on the convenience of being able to study at times and places chosen by the students. Due to this flexibility, adult learners are able to enroll in graduate education without having to give up their work and family obligations (Bray et al, 2008). Paulsen (1993) notes that adult learners in online education environments not only choose the format they desire, but want to control the time, place, pace, media and curriculum contents they desire as adult learners.

### **Trends of Online Education**

In the last two decades, the number of online courses and online degree programs has rapidly increased. Online education is currently one of the fastest growing instructional delivery systems in higher education (Dykman & Davis, 2008). For example, survey data from the Sloan Consortium regarding online learning indicates the continued growth of online enrollments with

more than 6.7 million students enrolled at least one online course in U.S. higher education institutions in fall 2011, which is 32% of total enrollment in that semester. For comparison, 1.6 million students enrolled at least one online course in fall 2002, which is only 9.6% of total enrollment in that semester (Allen & Seaman, 2013).

The majority of higher education institutions in the U.S. believe that online education is a critical long-term strategy for their institutions (Allen & Seaman, 2013). Allen and Seaman (2013) reported that 62.4% of the higher education institutions offered online courses and full programs in 2012, which is 27.9% increased compared with 2002. According to U.S. News and World Report, 62.4% of colleges in the U.S. offered fully online degree programs in 2012 that was a dramatic increase compared with 32.5% in 2002 (Sheehy, 2013). The growth rate of online course enrollments has provided further evidence of the expansion of online education (Gambescia & Paolucci, 2009).

Due to the popularity of online education, consequently, the number of enrollments in higher education was increased dramatically. The U.S. Department of Education's National Center for Education Statistics (NCES) recently reported that from 1996 to 2010, the total enrollment in postsecondary degree-granting institutions increased 46%, and it is expected to increase to 24 million which is 15% of total enrollment from fall 2010 until fall 2021 (Hussar & Bailey, 2011). The number of adult learners enrolling in higher education increased considerably. NCES 2011 report showed that the enrollments in postsecondary degree-granting institutions of students who are 25 to 34 years old increased 45% from 1996 to 2010 and 32% increased for students who are 35 years and over. The projection of NCES also indicated that the enrollment for students of this range of age is expected to increase about 20% between 2010 and 2021 (Hussar & Bailey, 2011).

## **Online Program Evaluation in Higher Education**

Mizikaci (2006) defines program evaluation as “a systematic operation of varying complexity involving data collection, observations and analyses, and culminating in a value judgment with regard to the quality of the program being evaluated, considered in its entirety, or through one or more of its components” (p. 41).

With the growth of online programs in the higher education sector, it has been noted that evaluation of programs is an essential element of successful programs (Rovai, 2003). Before 1990, many evaluation studies were conducted to compare the differences between face-to-face and online distance courses (McGorry, 2003). However, later, many studies were dedicated to understanding the effectiveness of online programs by focusing on the pedagogical tools used in online education (McGorry, 2003).

The purposes of program evaluation are vary. Thompson (2004) summarized five common purposes of online program evaluations as (1) justification of investment; (2) measuring progress toward objectives; (3) ensuring quality and effectiveness; (4) providing a basis for improvement; and (5) informing strategic planning and decision-making.

**Models and methods used for online program evaluation.** The primary goal of program evaluation is for continuous improvement of programs. Expert-oriented evaluation is a popular model (Fitzpatrick, Sanders, & Worthen, 2004). Using this approach, experts evaluate programs using relevant standards. These standards consist of many benchmarks, guidelines and standards have been developed to promote quality of online education (see Appendix A). Benchmarks developed by the Institute for Higher Education Policy (IHEP) is the one most commonly used to examine quality of online education. In 2000, IHEP published “Quality on the Line” (IHEP, 2000) which summarize twenty-four benchmarks around seven categories of

quality assurance for Internet-based distance education. In the same year, Bates (2000) develops the ACTIONS model that contains seven indicators to be considered for quality of a program with respect to the effectiveness of instructional technologies. After reviewing distance education and information technology literature, McGorry (2003) develops a model to measure the quality of online programs, which includes seven indicators. Kidd (2005) identifies five aspects of instructional quality that students perceived as affecting their perception of the online courses. Chao, Saj, and Tessier (2006) believe the quality of a program is based on the quality of courses. They developed a quality framework for online courses to define the quality of an online course. The Department of Education developed the Quality Matters Rubrics in 2006 with forty-one standards for course design structured around eight categories that affect quality of online courses from a faculty-centered peer review approach (Parscal & Riemer, 2010). Based on the twenty-four benchmarks developed by the Institute for Higher Education Policy (IHEP), the Sloan Consortium (2010) publish a quality scorecard for the administration of online programs which indicated seventy standards structured around nine factors to use for evaluating the quality of online education program. Shelton (2011) identifies six common themes for indicating the quality of online programs based on the review of thirteen studies and articles regarding the existing paradigms addressed in the quality evaluation of online education: (1) institutional commitment, support and leadership; (2) teaching and learning; (3) faculty support, student support, and course development; (4) technology, evaluation, and assessment; (5) cost effectiveness, management and planning; and (6) student and faculty satisfaction. These themes are organized from the most cited theme to the least cited one.

Another approach is a participant-oriented evaluation that portrays different aspects of program from the participant's perspective (Fitzpatrick, et al, 2004). It is popular to collect

perceptions from participants of the program in the evaluation process such as students and faculty. Faculty and students' satisfaction survey is one of the common methods used to evaluate effectiveness of online courses and programs (Hirner & Kocktanek, 2012). This kind of survey often involves the following research variables such as usability of course management system, availability of online courses and support services for students, and performance of the learning management system (Hirner & Kocktanek, 2012).

In program evaluation practices in higher education, both quantitative and qualitative methods were used for the program evaluation. Rovai (2003) addresses that comprehensive program evaluation with respect to the effectiveness of program should be measured "based on multiple sources of evidence and the convergence of different measures" (p. 111). Evaluators often use qualitative measures to determine learning process and program impact on the learners, such as interviews, focus groups, and direct observations (Simonson, Smaldino, Albright, & Zvacek, 2011). These researchers acknowledge that the collection of longitudinal data is a key element of measurement of program impact. E-portfolios and learning journals are two evaluation tools commonly used for course and program evaluation with respect to program outcomes and students' experiences in the program (Kear & Bear, 2007; Lockee, Moore, & Burton, 2002; Shamim, 2012).

### **The Concept and Features of Electronic Portfolios**

**Definition of portfolios.** The idea of a portfolio has long history in many fields outside of education. The concept of a portfolio is utilized in many professions such as art, architecture, photography, and other fields to document and demonstrate professional accomplishment (Kear & Bear, 2007). The term portfolio is initially associated with a collection of documents or a display of works that have been compiled over a period of time. However, there is a lack of

consensus among educators on the definition of portfolios. (Haffling, et al, 2010; Parsons, 1998; Tartwijk & Dressen, 2009).

In reviewing the literature, different definitions of portfolios are provided. In the educational arena, portfolio usage is far more involved than simply collecting student works in a folder. Generally, the purpose of a collection of work is intended to document learners' progress and achievement over a period of time and provides a means of assessment for their learning outcomes (Solomon, 1993). Paulsen, et al. (1991) define a portfolio as "a purposeful collection of student work that exhibits the students' effort, progress, and achievements in one or more areas" (p. 60). They indicate that the collection process must (1) allow students to select contents that they want to show readers; (2) provide guidelines to select the contents; (3) provide clear criteria for assessment of works, and (4) include student self-reflection on the works displayed in the portfolio. Arter and Spandel (1992) also adapt this definition and agree that a portfolio should be a purposeful collection of works because "different purposes could result in different portfolios" (p. 37). Porter and Cleland (1995) emphasize the importance of reflections in portfolios. They define a portfolio as "a collection of artifacts accompanied by a reflective narrative that not only helps the learner to understand and extend learning, but invites the reader of the portfolio to gain insight about learning and the learner" (p. 154). Yancey (2001) also views reflection as a key component of portfolio. She lists seven essential features of portfolios: (1) a collection of work; (2) a selection of work; (3) reflections; (4) presumption of development; (5) diversity of content; (6) a communication tool; and (7) an evaluation tool (Yancey, 1996).

Barton and Collins (1997) delineate seven essential features of education portfolios that distinguish portfolios from other forms of assessment. First, portfolios are multi-sourced, which provide a variety of evidence of learner competency. The second feature is authenticity. The

multiple pieces of student works included in the portfolio are directly linked to the classroom instruction. Third, portfolios are a form of dynamic assessment that allows teachers to capture students' learning process over time. Fourth, purpose of portfolios must be explicitly defined and communicated with students. The fifth feature is integration. Students have to show the evidence how they linked knowledge learned in their academic courses to their real world experiences. The sixth feature is student ownership. It requires self-evaluative reflection on the pieces of evidences included in the portfolios. The seventh feature is its multi-purposed nature. Portfolios can be used to evaluate students' achievement, as well as assess the effectiveness of instructions.

Despite there is no universally accepted definition of a portfolio, it is commonly agreed that in portfolio development, students need to actively engage in: 1) collecting and selecting the works to be included in the portfolio, 2) assessing the quality of the work based on the provided criteria, 3) demonstrating self-reflections that communicate their personal and professional learning experiences with readers. When students are involved in these experiences, the portfolios can truly become a purposeful and self-reflective collection of student achievements. It implies that portfolio implementation is a student-centered approach that places more authority, control of assessment and accountability of learning in the hands of the learner.

**Types and contents of portfolios.** Portfolios consist of diverse contents depending on their different purposes. Generally, portfolios containing work samples to demonstrate one's professional competencies should provide a comprehensive picture about a person's learning achievement (Moss, 1998). There are various types of portfolios based on their needs in different context.

Mandell and Michelson (1990) introduce eight approaches to portfolio development for adult learning based on their learning projects and goals in various contexts (Table 1).

Table 1

*Eight Approaches of Portfolio Development by Mandell and Michelson (1990)*

Approaches	Purpose of portfolios
Academic skills	To identify students' strengths and weaknesses and to demonstrate specific academic skills they achieved.
College orientation	To transfer students' prior knowledge into the categories of academic disciplines in an unfamiliar college environment.
Personal exploration	To explore students' personal development through self-reflection process and to articulate their personal and professional goals.
The meaning of education	To allow students to reflect on their learning and education experiences and to identify knowledge acquisition.
Careers	To bridge academic knowledge and workplace activity.
Introduction to a field	To pursue a specific exploration of educational needs in a conceptual and professional context.
The experience of work	To specify one's skills and to broaden one's perspective on work and the role of work in human life.
Degree design	To articulate students' own individual goals and translate them into a program design.

Valencia and Calfee (1991) define two types of educational portfolios: student portfolios and teacher's class portfolio. They classify three models of student portfolios: showcase, documentation, and evaluation. The showcase portfolio displays a collection of best samples of a student's works that illustrate the student's learning achievement. The documentation portfolio contains ongoing records of a student progress at various points in the student's learning rather than the best work samplings. The evaluation portfolio is used for assessing a student's performance. This type of portfolio requires students to collect and select entries based on the pre-determined criteria established by teacher, administrator, or district.

For the teacher's class portfolio, they state three sections should be included in the class portfolio:

1. Summary sheets describing student performance for all students in the class.

2. The teacher's detailed documentation for each individual student.
3. The teacher's curriculum and instructional plans for the school year with comments for revision and extension (p. 340-341).

Gredler (1995) extended Valencia and Calfee's (1991) categories of educational portfolios by adding another type of portfolio, the "ideal" format. The ideal format portfolios consist of three components: biographies of works, a variety of work and documents, and student reflections.

Yancey (2001) categorizes student portfolios as classroom portfolios and program portfolios. The classroom portfolios are used for students to document and interpret their own learning in a specific class. Students can archive various pieces of work they have done in the classroom portfolios such as homework, class project, class notes, and presentation notes, etc. Compared with the classroom portfolios, the program portfolios are "more cumulative in nature" (p. 18). Students are required to provide evidence of their competencies and skills achieved throughout the program. She emphasizes that reflection is the key piece in these two types of portfolios.

Cole, et al. (1995) divide portfolios into two types: process portfolio and product portfolio. The process portfolio can incorporate completed and incomplete works that can illustrate the student's learning progression. The product portfolio can be developed at the completion of a program. In this type of portfolio, students can share materials that reflect the evidence of mastery of the learning tasks.

Smith and Tillema (2003) identify four different types of portfolios based on their purposes and settings of use. The four types of portfolios include dossier portfolio, training portfolio, reflective portfolio, and personal development portfolio. The purpose of the dossier

portfolio is for promotional purposes required for professions or program. The training portfolio is used to document professional competencies that a person acquired during a program. The reflective portfolio is a purposeful collection of works that demonstrate a person's growth and accomplishment. Lastly, the personal development portfolio records one's professional growth and personal evaluation during a long period of time.

Flanigan (2012) highlight four types of student portfolios used in career preparation: learning and assessment portfolio, initial job inquiry portfolio, interview presentation portfolio, and career growth portfolio. The learning and assessment portfolio documents achievements to demonstrate a student's growth and professional competencies. The initial job inquiry portfolio is an introductory portfolio that contains some work examples that portray the type of experiences and skills that employers sought. The interview presentation portfolio contains much more materials that can demonstrate specific skills and competencies required to meet particular need of the company for the position sought. The career growth portfolio is an ongoing collection of works used to demonstrate work performance and achievement.

To sum it up, portfolios serve four main purposes: for learning and assessment, for personal and professional development, for employment, and for accountability. Table 2 presents a summary of portfolio types and purposes.

Table 2

*Portfolio Types and Purposes*

Authors	Types of Portfolio
Mandell and Michelson (1990)	Academic skills, college orientation, personal oration, the meaning of education, careers, introduction to a field, the experience of work, and degree design
Gredler (1995)	Ideal format (biographies of works, a variety of work and documents, and student reflections.)
Valencia and Calfee (1991)	Showcase, documentation, evaluation, teacher's class portfolio
Cole, et al (1995)	Process portfolios, product portfolios
Yancey (2001)	Classroom portfolio, program portfolio
Smith and Tillema (2003)	Dossier portfolio, training portfolio, reflective portfolio, and personal portfolio
Flanigan (2012)	Learning and assessment portfolio, initial job inquiry portfolio, interview presentation portfolio, and career growth portfolio

**Uses of portfolios.** The primary use of portfolios is for both instructional and assessment purposes. Portfolios help teachers keep track of students' learning process as well as their achievements (Arter, Vicki, & Culham, 1995). These researchers state portfolios focus on students' improvement in learning from the initial to the final stage. It pictures students' learning process throughout the program, which help instructors have a better understanding on their students' strengths and weaknesses.

Portfolios are used as a formative or a summative assessment tool to analyze and evaluate student works (Yancey, 2001). With the multiple evidences that students provide, portfolios tend to offer the instructor a richer picture of students' achievement than the traditional standardized test. Portfolios provide an opportunity for students to demonstrate their understanding of knowledge and skills in multiple ways using diverse entries. It not only helps instructors evaluate students' performance in comprehensive ways, but also provides students an opportunity to do self-evaluation on their work and reflect upon it (Stefani, et al, 2007). In addition to using the

portfolio as an assessment strategy, portfolios allow students to participate in peer reviews. It offers students an opportunity to share their work, view others' work, and give and receive comments among peers (Stefani, et al., 2007).

The essence of using a portfolio as instructional strategy is to encourage students' reflective learning. Reflection is the most essential component in portfolio development process. Without reflection, a portfolio is merely a compile of works developed over time. (Nakonechny & Ellis, 2012; Smith & Tillema, 2001). The portfolio development process requires students to reflect on their work and analyze it in order to understand their strengths and weaknesses in a domain of knowledge. Paris and Ayers (1994) state reflective activities occur through written evaluation and self-assessment. Self-assessment involves reflecting upon the choice made, analyzing the reasons for those choices, as an act of understanding (Paris & Ayers, 1994). Reflection allows students to step back from the active involvement and provide the distance they need in order to observe what they were doing as learners. Therefore, reflection can help learners highlight what goal has been achieved, as well as what has not been achieved.

**Benefits of portfolios.** Various benefits of portfolios are noted in numerous studies. Portfolios place responsibility for learning in the hands of the students (Zubizarreta, 2009). Students have a high level of autonomy in development of portfolios. Students play an active role in selecting representations to demonstrate what they learned and the process of a portfolio development encourages dynamic interactions among teachers and students (Johnson, et al, 2006).

The reflection in portfolios facilitates students to be reflective learners (Gordon, 2003). Through reflection, students analyze the evidence of their own learning. However, it requires higher-order thinking skills (Savery & Duffy, 1996), so it is difficult for students to learn the

reflection skill on their own (Latta & Lauer, 2000). It is necessary to provide a framework and guided question prompts to guide students to develop meaningful reflections (Woodward & Sinclair, 1998).

Portfolio development has been noted as a process of promoting students' internalization of professional learning (Mason, Pegler, & Weller, 2004). Gordon (2003) contends that portfolio development activities can build a clearer understanding of personal and professional values of practice that is difficult to achieve through traditional assessment. From a psychological perspective, Pitts, Coles, & Thomas (1999) believe that portfolio development increases students' self-esteem due to the realization of their strengths and weaknesses and of ways to overcome the latter.

Besides these benefits discussed above, portfolio-based learning is beneficial to both students and teachers. Students receive study progression evaluation and teachers obtain evidence about students' development of skills and competences, and monitor outcomes of the program (Ryan & Carlton, 1997). Therefore, portfolio evaluation has a potential to be an effective strategy to objectively demonstrate the accomplishment of program objectives using students' perceptions of their academic experiences.

Barootchi and Keshavarz (2002) indicate that a portfolio system allows teachers to be aware of students' needs, their interest, potential and abilities, and to monitor students' performance. Compared to the traditional assessment, portfolio assessment can reveal not only the students' learning process but also strengths and weaknesses of teaching through rich information derived from students' reflection and self-evaluations in different areas. It supports teachers to improve good teaching practices (Stefani, et al., 2007).

**Portfolio assessment.** The method of assessing student knowledge has always been an essential issue in instructional design. In this ever changing and increasingly complex world, standardized tests are becoming a less accurate measure of student knowledge. Traditional assessments often use one-unit test, quizzes, homework assignments and standardized tests (Burke, 1999). Student achievements often are presented through their scores and ranks. An alternative method, which can comprehensively assess students' achievement and growth, is needed in education (Hamp-Lyons & Condon, 2000). Also, students' accountability on their learning is emphasized in higher education. In order to respond to the needs of comprehensive assessment and learners' accountability, higher education moves from a standardized test to the portfolio assessment era that is concerned with learners' responsibility on their learning and improvement of authentic assessment (Yancey & Weiser, 1997).

Porter and Cleland (1995) indicate the differences between traditional assessment and non-traditional assessment and discuss the advantages of using alternative assessment as follows (Table 3): first, the traditional assessment uses a traditional test to measure how much and to what degree student have learned that has been taught. The tests often focus on memorization of knowledge. Compared to the traditional assessment, the alternative assessment allows learners to focus on their learning process. Second, the traditional assessment merely focuses on the test while the nontraditional assessment determines the growth and changes based upon analysis of learning. Third, in the traditional classroom, score of tests represent students' learned skills and their achievement and comparisons are made among students based on the test scores. However, in the nontraditional classroom, students are not compared to each other and their skills are not determined by the correctness of their answers to the questions in the test. The nontraditional assessment values the individual growth in knowledge and the development of abilities. Fourth,

teachers take responsibility for students' learning in the traditional classroom, but in the nontraditional classroom, the teacher's role is facilitator and students learn through self-evaluation. Fifth, the traditional assessment allows students an opportunity for one-time answer within a limited time frame of the test. However, in nontraditional assessment, the learners' can include a great deal of information regarding their learning process. Sixth, the learning is translated into a test score or grade in the traditional assessment, while the nontraditional assessment view learning as an ongoing event and it is used to guide learning.

Table 3

*Traditional vs. Nontraditional Assessments*

Traditional Assessments	Nontraditional Assessments
Focus on skill performance	Focus on process
Students acquire objective knowledge	Students thoughtfully judge their own work
Achievement matters	Development matters
Teacher's responsibility	Shared responsibility
First and only draft work valued	Multiple drafts valued
Used to determine a grade	Used by student and teacher to guide learning

*Note.* From Porter & Cleland, 1995, p. 23

Compared to traditional assessment, the portfolio assessment attempts to evaluate a complex performance that represents a student's abilities instead of giving a test that contains a number of items believed to measure students' knowledge and skills. Portfolio assessment in the education became as an alternative assessment model for authentic assessment (Wolf, 1991; Yancey & Weiser, 1997; Cole, et al, 2000). Valeri-Gold, Olson, & Deming (1991) also believe portfolio assessment helps students become active learners and thinkers. Harlin, Lipa, & Phelps (1992) assert portfolio assessment consists of a multidimensional system which "provides teachers with a complete picture of student's abilities" (p. 203).

Portfolio assessment is the process of reviewing and evaluating a cumulative collection of

students' works. Ryan & Miyasaka (1995) state the purposes of portfolio assessment as:

1. Determining students' current level of achievement or growth over time;
2. Understanding how students think, reason, organize, investigate and communicate;
3. Communicating student achievement and progress to students and parents;
4. Improving teaching and learning;
5. Evaluating curriculum and instruction (p. 6).

The portfolio assessment values both the quality of final outputs and the process used by students to achieve their final outcomes (Solomon, 1993). Valencia (1990) describes portfolio assessment values the process and the product of learning, as well as the active involvement of instructor and students in their own evaluation of achievement and growth. From administrative perspective, Bowers (1989) addresses that portfolio assessment can determine strengths and weaknesses of the curriculum and help teachers define and adjust standards and goals.

Prus and Johnson (1993) highlight ten advantages of portfolio assessment that are beneficial for both faculty and students:

1. Portfolios can be used to view student learning and development longitudinally.
2. Multiple components of curriculum can be measured.
3. Samples in a portfolio are more likely to reflect student ability.
4. Provides opportunity for faculty to review curriculum and program.
5. Portfolios are economical in terms of student time and effort.
6. Faculty have a control over interpretation and use of results.
7. Results are more likely to be meaningful to the individual student, program, and institution.

8. Avoids or minimizes test anxiety
9. Increases the power of maximum performance measures over more artificial measures on test or in-class sample.
10. Increases student participation in the assessment process (p. 81).

In short, one of the major underpinnings in use of portfolio assessment is based on the concept of helping students take on great accountability and responsibility for their learning. Compared to traditional tests, portfolio assessments reflect student growth and development over time and require students to take a responsibility in assessing and evaluating their own works. This is the major shift from a traditional test to portfolio assessment.

**Traditional portfolios to electronic portfolios.** Traditional paper portfolios collect hard-copy of students' works organized to show the evidence of learning. Paper portfolios collect hard copy artifacts based on students' judgment based on the provided guiding criteria and they are generally arranged in time order sequence and show learners' academic growth over time (Love, McKean, & Gathercola, 2004). Paper portfolios are usually held in double pocketed folders, large boxes, accordion files, and three-ring binders (Wetig, Topp, & Clark, 2005). However, at the end of the portfolio development, if the students keep all the documentation, the folders bulge. So the paper-based portfolios can be very cumbersome to manage for both teachers and students because of its bulk (Rogers & Williams, 2001; Tartwijk & Driessen, 2009). It causes difficulties for teachers to manage and review a large volume of paper-based documents and many portfolios end up in the recycle bin after students graduate (Diehm, 2004). It is also hard to keep up to day, duplicate paper portfolios, and share them with more than one person (Tartwijk & Driessen, 2009).

With an increase in the use of information and communication technology, traditional

paper-based portfolios are transformed into electronic format as facilitating authentic assessment. Aided by technology, students can use electronic means and create, store, and manage their works for inclusion in their portfolios. The various emerging technologies make it possible for learners to represent their diverse learning by allowing them to demonstrate their achievement in multiple ways, which are not available in paper-based portfolios (Tanner, 2001). In e-portfolios, the collection of artifacts can use multi-media such as images, text, audio, and video to represent learning (Moon, 2005).

In summary, there are four obvious differences between electronic portfolios and traditional paper based portfolios. First, with an electronic portfolio, it is easy to organize, revise, update, and combine materials. Computing functions are integrated in e-portfolios: for example, sorting, searching, editing and duplicating are helpful to manage a large amount of contents in the portfolios (Bridge & Eddy, 2006; Kimball, 2005). Second, e-portfolio is a bundle of connected documents (Stefani, et al., 2007). Elements in the portfolio and external resources can be connected using hyperlinks (Avraamidou & Zembal-Saul, 2006). Students can use hyperlinks to connect documents in the portfolio and link external resources as well. Third, portability is another feature of the electronic portfolios that does not exist in traditional portfolios. Fourth, electronic portfolios support new approaches to peer assessment. Through email, discussion board, and chat room, students can exchange ideas interactively, collaborate with peers, provide prompt feedback and comments, and share a variety of resources (Stefani, et al., 2007).

**Electronic portfolio.** Electronic portfolios collect, store and manage portfolio artifacts in digital formats using diverse media. Thomas, et al. (2001) define an e-portfolio as “a collection of evidence and/or artifacts and reflective statements that demonstrate intellectual and professional development in relation to competency-based education program outcomes in a multimedia format” (p. 4).

Portfolios created using multi-authoring programs or web tools have commonly been called electronic portfolios, e-portfolios, or web portfolios. Baron (1996) emphasizes some attributes of electronic portfolios such as easy to update and distribute to a larger amount of readers, portability, and cost-effectiveness. In early days of developing e-portfolio, many universities developed their own e-portfolio systems (Stefani, et al, 2007). With new generation of e-learning technology, course management systems such as Sakai and Blackboard added e-portfolio development tools, which help students develop an e-portfolio with less technical skills (Stefani, et al, 2007).

E-portfolios are presented in both online and offline digital formats. Love et al. (2004) distinguish e-portfolios and web-folios. According to them, e-portfolios saved in transportable media such as disk and CD-ROM and are not available to access online. Web-folios reside online and consist of collection of web-based multimedia documents. Twenty years ago, the most popular offline format was a floppy disk that accommodates multimedia file formats such as digital documents, images and videos (Campbell, 1996). However, due to the limited storage capacity and the advancement of technology, a floppy disk format was transformed to CD, DVD, and a thumb drive format. In the early 1990s, educators realized the difficulties of supporting collaborative learning among students through sharing portfolio resources and information. Educators also identified the shortcomings of the offline format of electronic portfolio, which

made it difficult to link among the artifacts in e-portfolio in order to review it as a whole object (Wall & Peltier, 1996). With the development of the Internet in the mid 1990s, educators applied Internet and World Wide Web (WWW) technology to the electronic portfolio and called it the web portfolio (Kimball, 2005). One of the major features of Internet is the WWW, which allows users to access a huge numbers of web pages and resources online (Laudon & Traver, 2004). Therefore, nowadays, it appears that the web portfolio is the most popularly practiced electronic portfolio in the education field (Bridge & Eddy, 2006).

Portfolios encompass learning evidence from a variety of sources of evidence may include text, graphics, and videos (Zubizarreta, 2009). Martin (1999) introduces over thirty sources of evidence including autobiographies, personality and learning style rating scales and analysis, learning logs, reflections, students plans, and goals. Because e-portfolios offer such “ease of storage and accessibility, they open wide the possibilities for reflections of all types: in solitude, in consultation with peers, in consultation with instructors, coaches, and advisors, written, spoken, videotaped, or graphically represented” (Riedinger, 2006, p. 93).

However, electronic portfolios do not merely transform traditional paper-based portfolios to the digital format using technologies and World Wide Web infrastructure. The most important feature of electronic portfolios is an authenticity of assessment materials (Stefani, et al., 2007) that addresses a variety of modalities of learning (Heise, 1998). In short, electronic portfolios show a complex learning process and allow students to demonstrate their professional growth in diverse ways.

### **Reflection in Education**

Reflection is a vital component of learning and reflective practice is a learning process. Over time reflection has been defined from many different perspectives. Mezirow (1998) describes that reflective activities mean “letting one’s thoughts wander over something, taking

something into consideration, or imagining alternative” (p. 185). Moon (2005) views reflection as a form of mental processing that one uses to achieve an anticipated outcome. Qualley (1997) defines reflection from a slightly different perspective. She believes reflection helps learners themselves through self-critical eyes to assess what was accomplished. In her view, stepping outside one’s self and looking at his or her work helps learners revisit their experiences from a different perspective and construct more experiences. Johnson et al. (2006) define reflections in portfolios as “captions or small statements and explanations that are used to give voice to the various artifacts that are collected in the portfolio” (p. 40).

Woodward (1996) suggests that reflection should be truly reflective instead of merely being descriptive. Hatton and Smith (1995) classified reflections into four types: “descriptive writing, descriptive reflection, dialogical reflection and critical reflection” (p. 40). According to them, descriptive writing is not a true reflection, but merely a list of event reports. The descriptive reflection is the one that provides reasons for how the decisions are made. The dialogical reflection is “a form of discourse with one’s self” to explore different approaches to solve a problem. Lastly, the critical reflection involves thinking about the event and the activity as part of its “historical, social and/or political contexts” (p. 41).

To support effective reflective practices, instructional strategies for reflective activities might be considered for inclusion into instructional design. Instructors need to monitor students’ learning process and stimulate students’ reflection process (Quintana, Reiser, Davis, Krajcik, Fretz, & Duncan, 2004). Stefani, et al. (2007) suggest three crucial factors that teachers need to consider when they design reflective activities in a portfolio:

1. The reflective activities need to be directly related to the learning outcomes of the course;

2. The reflective activities need to be appropriate to the level and content of the course;
3. Students need to receive adequate preparation and feedback from the teacher about the reflection process (p. 62).

Jonassen (2004) suggests self-explanation as one of reflection methods which not only help students make sense out of what is being learned but also can help instructor capture students learning process. A learning journal is another commonly recommended method for reflective practice (Herrington & Oliver, 2002; Shamin, 2012; Wagner, 1994). Shamin (2012) describes the evaluation data provided through learning journals specifically regarding students' perceptions of the course content, instruction, workload and assessment.

From these definitions it can be concluded that reflection provides a broad field on which many different sorts of activities can take place. Under this meaning, a general definition of reflection involves a thoughtful thinking process, analysis or critique, coming to better understanding about some topic and to change or improve one's behavior, attitude, or action.

**Reflection in educational theory.** To better understand the definition of reflection, and to further clarify how reflection relates to education and the portfolio process, it is useful to understand the theoretical underpinnings of reflective practice.

***Dewey's perspective.*** A review of underpinning theory of reflection must start with John Dewey's (1933) extensive exploration of reflective thinking. In his book, *How we think: A restatement of the relation of reflective thinking to the educative process*, he defines reflections as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it leads constitutes reflective thought" (p. 9).

Dewey (1910) defines two elements in reflective thinking: (1) “a state of perplexity, hesitation, doubt”; and (2) “an act of search or investigation” to resolve the doubt (p. 9). Dewey (1910) believes that reflection occurs as the result of a problematic situation and he proposed an act of inquiry as to what would resolve the doubt. This act of inquiry would be grounded in the individual’s knowledge and experiences. Dewey’s concept of reflection is very focused on the goal and these steps of reflective thinking imply a type of problem-solving process. He states, “demand for a solution of a perplexity is the steadying and guiding factor in the entire process of reflection” (p. 11). Dewey (1910) believes the reflection process means to search for additional evidence or new information that will develop the suggestion and lead to a conclusion that makes some ideas worthy of belief. He emphasizes that education should provide learners opportunities to practice and improve reflective thinking.

Dewey (1910) conceptualizes five steps of reflective thinking that imply a problem-solving process, which consist of

The occurrence of a problem or a puzzling phenomenon; then observation, inspection of facts, to locate and clear up the problem; then the formation of a hypothesis or the suggestion of a possible solution together with its elaboration by reasoning; then the testing of the elaborated idea by using it as a guide to new observations and experimentations (p. 203).

Rodgers (2002) distilled four criteria for the purpose of reflection to make Dewey’s thinking more accessible:

1. Reflection is a meaning-making process that moves a learner from one experience into the next with deeper understanding of its relationships with and connections to other experiences and ideas.

2. Reflection is a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry.
3. Reflection needs to happen in community, in interaction with others.
4. Reflection requires attitudes that value the personal and intellectual growth of oneself and of others (p. 845).

*Schön's perspective.* Schön is another well-known theorist in the area of reflective practice. Schön (1987) introduces two forms of reflection: reflection-in-action and reflection-on-action. These two forms of reflection are defined differently based on when reflection takes place. Reflection-in-action occurs during the action, he states, it is the process to “reshape what we are doing while we are doing it” (p. 26). A reflection-in-action helps practitioner to make “new sense of uncertain, unique or conflicted situations of practices” while existing knowledge does not adequate to solve the problem. According to Schön (1987), reflection-in-action consists of five steps of a process. Reflection process begins with knowing-in-action that is defined as "strategies, understandings of phenomena, and ways of framing a task or problem appropriate to the situation" (p. 28). In other words, knowing-in-action refers to spontaneous routine responses without conscious speculation. In the next following step, those routine responses are accompanied by unexpected outcomes. In the third step, the unexpected outcomes and the knowing-in-action lead to reflection within an action present. In the fourth step, reflection-in-action occurs. It is a process of critically questioning the knowing-in-action by seeking different approaches or alternative actions to accommodate different phenomena. In the fifth step, the reflection is transformed to “on-the-spot experiment” to test new understanding (p. 28).

While reflection-in-action occurs during an action, reflection-on-action refers to the reflection made after the action is completed. Eraut (1995) call it time-out reflection. Reflection-

on-action requires looking back the completed action to review and analyze what has been accomplished (Killion & Todnem, 1991). Ghaye & Ghaye (1998) state that reflection-on-action is an essential part of professional development in the education field, and it can improve teaching and learning practice.

Killion and Todnem (1991) add another type of reflection to Schön's classification of reflection, reflection-for-action. This type of reflection occurs upon an action in order to guide future action for more practical purposes. Reflection-for-action makes reflection "a process that encompasses all time designations, past, present, and future simultaneously" (p. 15).

***Brookfield's perspective.*** Brookfield (1995) emphasizes critical reflection as one particular aspect of the process of reflection. Brookfield (1995) states that reflection involves recognizing the assumptions that underlie one's beliefs and behaviors. It is the process of justifying ideas and actions, then testing the rationality of these justifications. Brookfield (1995) affirms that the most distinctive feature of critical reflection is to hunt assumptions. Assumptions have been defined as obvious beliefs that give meaning and purpose, yet have been taken for granted without the need to be stated explicitly (Brookfield, 1995). He writes, "In many ways, we are our assumptions, assumptions give meaning and purpose to who we are and what we do" (p. 2).

Brookfield (1995) has distinguished between three categories of assumptions: paradigmatic, prescriptive, and causal. Paradigmatic assumptions are "the conceptual frameworks one uses to order the world into fundamental categories" (King & Hibbison, 2000, p. 55). It is maybe hard to recognize these axioms as assumptions and they are usually examined critically only after a great deal of resistance (Brookfield, 1995). Prescriptive assumptions are defined as "assumptions about what we think ought be happening in a particular situation" (p. 3),

and causal assumptions help one “understand how different parts of the world work and the conditions under which processes can be changed (p. 3).

Brookfield (1995) explains six reasons why learning critical reflections is important. He states that critical reflection help teachers (1) take informed actions; (2) develop a rationale for practice; (3) avoid self-laceration; (4) ground emotionally; (5) enlivens classrooms, and (6) increases democratic trust (p. 22-25).

Brookfield (1995) also develops four critically reflective lenses through which to view teaching. These lenses include (1) Autobiographies as learners and teachers. Teachers look at their practice from outside themselves to revisit their previous experience. Through self-reflection, teachers “become aware of the paradigmatic assumptions and instinctive reasonings” to frame how they work (p. 29); (2) Students’ eyes. Teachers see themselves through students’ eyes to aware of their teaching practice and help them teach more responsively; (3) Colleagues’ experiences. Engaging in critical conversation with colleagues to discuss common problems. It helps teachers see their practice in different perspectives; and (4) Theoretical literature. Studying theory helps teachers interpret familiar situation from multiple perspectives.

Brookfield (1991) introduces five phases for successful critical reflection:

1. Trigger event;
2. Appraisal of assumptions;
3. Exploration of alternatives to current assumptions;
4. Developing alternative perspectives;
5. Integration of new perspectives into daily life (p. 25-27).

**Process in reflection.** A number of different ways of using reflective practices have been suggested. Kitchener (1986) studies seven stages of reflective process and found that at the initial stages of learning, learners accept knowledge from authorities and their perception to the knowledge is absolute. In the next stages, learners view knowledge as relative and they build knowledge personally. In the last stages, learners apply their knowledge obtained into a new context.

Van Manen (1997) identifies three levels of reflection that indicate the process of thinking: (1) technical application of knowledge and skills; (2) examination of the assumptions underlying practice; and (3) moral and ethical issues such as justice and equity. Zeichner and Liston (1987) expand the description of reflectivity to five levels. They found that reflection could be for various purposes. A teacher may reflect for academic reasons, for social efficiency, for developmental purposes, for social reconstruction, or for generic reasons that encourage reflective practice in general as central to teaching and teacher education.

Pugach and Johnson's (1988) approach to the reflective process focuses on mental representation. They propose that the reflective learning process includes (1) self-questioning and clarification; (2) summarizing the situation; (3) developing three action plans, prediction regarding each and selection of one, and 4) developing an assessment plan.

Boud, et al. (1985) state three stages involved in reflective learning. The first stage is mentally returning to an experience in order to recapture detail. At this very early stage, the learners just simply review the experience as objectively as possible and avoid any interpretations and analysis. The second stage is attending to feelings attached to the experience. At this stage, emotional reactions can help learners see events more sharply and facilitate learning while it may override rationality with blurred perceptions. The last stage is reevaluating

the experience. It is not recommended to move directly from experience to its evaluation, in which case learners might come to false assumptions or reflect insufficiently. They claim that reflection is a crucial component in any form of learning, and instructors need to consider how they can incorporate some forms of reflection in their courses.

**Benefits of reflection in portfolio.** Reflection involves self-assessment. Many studies show the value of reflection in the portfolio in light of self-assessment (Brown & Irby, 1997; Falls, 2001; Marcoux, 2002). There are numerous benefits for students of reflective activity in the form of self-assessment. Self-assessment involves reflecting upon the choice made, analyzing the reasons for those choices, as an act of understanding. This process increases the student's complexity of thinking, resulting in new connections and multi-layered awareness (Costa & Kallick, 2000).

Reflection bridges students' prior knowledge and new knowledge they learn, to build a new learning identity for themselves (Crosswhite, 1996). Yancey (1996) states that reflection enables students to integrate the self and knowledge in terms of their past, present, and future.

Stefani, et al. (2007) assert that reflections encourage learners to be "more self-aware and self-critical" and gradually become independent learners (p. 62). According to Paris and Ayres (1994) reflections help motivate students achieve positive results and realistically evaluate students' weakness as well.

Porter and Cleland (1995) generate a list of advantages of reflection based on the analysis on students' reflections. They state that reflection allows learners to

1. Examine their learning process;
2. Take responsibility for their own learning;
3. See gaps in their learning;

4. Determine strategies that support their learning;
5. Celebrate risk-taking and inquiry;
6. Set goals for future experiences;
7. See changes and development over time (p. 37-50).

In addition to students benefiting from reflection, teachers realize some benefits when students actively reflect. Rief (1990) points that students' self-reflections in her class help her see more depth and diversity of students' ability and give her a better idea of what the students know and what they don't know. She also adds that the reflective discussions can create mutual criteria for assessing students' learning outcomes. Murphy and Smith (1992) note that through reflection teachers not only become aware of each student's goal and achievements, but also gain insight into the student's learning process. Moreover, the process of student reflections provides teachers with insight into which aspects of the curriculum are successful and which are not.

Johnson et al. (2006) state reflections in portfolios transform artifacts into evidence of learning. They categorize four types of portfolio reflections: (1) goal-setting statement that articulate educational and professional goal; (2) reflective statements that provide general responses to the artifacts included in the portfolio; (3) caption as statements that explain a rationale for artifacts included in the portfolio; and (4) authentic assessment and evaluation statements that indicate students' growth and accomplishment in the targeted level of learning.

### **Chapter 3: Methodology**

This chapter introduces the methodological framework used for this study. The purpose of this study was to explore how students' reflections can be used as a mechanism for program evaluation. To provide appropriate context for this inquiry, the study selected a program for best practices in higher education that was using student e-portfolios as part of a program-wide assessment tool to measure students' learning outcomes. More specifically, the study collected, analyzed, and interpreted students' reflections in students' e-portfolios from an online master's program in instructional technology at Virginia Tech to capture overall student perceptions on their growth and experiences in the program. This research study was guided by a research question: how might analysis of students' reflections in e-portfolios inform online program evaluation?

This chapter is comprised of seven sections that describe the methodology in this inquiry: research design, the researcher background, research setting for the study, the program, reflective activities in the program, data collection strategies, and data analysis techniques.

#### **Research Design**

This study employed a qualitative research approach. Qualitative research is an umbrella concept (Punch, 2000) covering several forms of inquiry that help investigators understand and interpret the meaning of social phenomena with as little disruption of the natural setting as possible (Merriam, 1998). Qualitative researchers study people, things and events in their natural settings (Punch, 2000), and attempt to make sense of or interpret phenomena in terms of the meanings people bring to them (Guba & Lincoln, 1994).

Specifically, this study is qualitative content analysis. Content-analysis is one of the research methods that originated from the communication sciences. It is an empirical method that

can be used to examine text and images in order to identify messages and meanings (Krippendorff, 2004), which is popular in social sciences research (Hartley & Morpew, 2008). A useful contemporary definition of content analysis, therefore, is: “a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh & Shannon, 2005, p. 1278).

In content analysis, data is “taken as givens” (Krippendorff, 2004. p. 30). Most content analysis starts with data that are not intended to be collected to answer specific research questions. The data often consist of “texts that are meant to be read, interpreted, and understood by people ” instead of analysis (p. 30). Weber (1990) states that one of advantages of content analysis is that it can enable researchers to generate indicators from documents exist over long period of time to make valid inferences messages of interest (Weber, 1990). Fraenkel, Wallen, & Hyun (2014) assert that content analysis can be a useful technique to discover and describe learners’ perceptions and experiences in their learning context and it “enables researchers to study human behavior in an indirect way, through an analysis of their communications” (Fraenkel et al., 2014, p. 476). Content analysis is often used for the exploration of trends, patterns and differences among similar components (Krippendorff, 2004). One of the major reasons for using content analysis is to formulate themes out of large amounts of descriptive information and obtain information useful in dealing with educational problems (Fraenkel, et al., 2014). This technique provides researchers a systematic method to organized large amounts of text to a list of categories that help to make sense out of the observed text and represent phenomena expressed from the analyzed text.

Content analysis can use both qualitative and quantitative operations (Weber, 1990). White and Marsh (2006) discuss the differences between quantitative and qualitative content

analysis and summarize that qualitative content analysis is inductive in its approach and the process of quantitative content analysis is deductive. Qualitative content analysis is mainly inductive and it involves a process including open coding, creating categories to condense raw data into themes (Elo & Kyngas, 2008). Through careful examination and constant comparing, themes and categories can be formulated by inductive analysis.

Qualitative content analysis enables researchers to study human behavior in an indirect way and analyze the written contents, which reveals “a person’s or group’s conscious and unconscious beliefs, attitudes, values, and ideas” (Fraenkel et al., 2014, p. 476). A qualitative content analysis allows the researcher to form a rich picture of the phenomenon under study and uncover latent characteristics of text and create personal interpretations of the data.

Hsieh and Shannon (2005) discussed three distinct approaches to qualitative content analysis, based on different coding schemes: conventional content analysis, directed content analysis, and summative content analysis. Conventional content analysis is generally used when there is insufficient theories or literature on the phenomenon. It uses an inductive category approach in which codes are derived from word-by-word reading and eventually organized into meaningful categories. Directed content analysis is mostly used to validate or extend existing theoretical frameworks or theories in which key concepts or variables are identified as initial coding categories, which will be defined using determined theory. Summative content analysis begins exploring usage of words by quantifying words or contents. Also, this approach includes the interpretations of underlying meanings of latent words or contents. In this study, a summative content analysis approach was applied to analyze the written documents because “it is an unobtrusive and nonreactive way to study the phenomenon of interest” (Hsieh & Shannon, 2005 p. 1285).

Table 4 summarizes the research questions, data sources, data collection methods, and data analysis techniques used in this qualitative content analysis study.

Table 4

*Overview of Research Design*

Research Design	Content
Research question	To what extent can analysis of students' reflections in e-portfolios inform online program evaluation?
Data sources	Three types of reflections from students' e-portfolios submitted during 2005 to 2011 academic years in an online instructional technology master's program.
Data collection strategy	Random sampling strategy
Data analysis technique	Map coding: three iterations of analysis

**Researcher Background.**

In qualitative study, the researcher is the “key instrument” (Creswell, 2007, p38). The researcher has to ensure the quality of data and the interpretation of results (Richards & Morse, 2012). Therefore, this study used a qualitative approach. The researcher's background information is presented as she conducted the current study based on her experiences of working in the instructional technology master's program at Virginia Tech. First person is used to describe the researcher's background.

While I was enrolled in the instructional design and technology doctoral program at Virginia Tech, from 2009 to 2011, I had a graduate assistantship. As part of my assistantship I worked as a course instructor and technical support person in the online instructional technology master's program at Virginia Tech. I taught two courses each semester, and reviewed e-portfolios for many students before they submitted their e-portfolios to the faculty for final assessment. In this capacity, I became familiar with the curriculum and structure of the program and also was able to obtain access to view students' e-portfolios that had been archived in last

fifteen years. I went through a number of students' e-portfolios and in essence students' reflections in their e-portfolios really caught my attention. In these reflections, students described their individual perceptions on their personal and professional growth as well as their learning experiences in the program. Students accounted for what they learned, how they applied knowledge acquired in the program to their profession, how they had been taught, what they considered as the positive aspect of the program, and how they modified their learning style in an online learning environment. While reading the reflections, I realized students' reflections were invaluable documents that contained great insight into students' learning experiences throughout the program. These experiences led me to believe that analysis of reflections in these e-portfolios could produce useful benefits for program evaluation and ultimately helped me conduct the current research study.

### **Research Setting for the Study**

This study sought students' reflections in e-portfolios of an online master's program in order to explore the usefulness of students' reflections as a means of collecting data for online program evaluation. The instructional technology master's of arts (ITMA) degree program within the School of Education at Virginia Tech was chosen for this study. According to Peter Macedo (2013), director of the institute for Distance and Distributed Learning at Virginia Tech, the university offers more than 800 distance-learning courses at both the undergraduate and graduate levels. He reported that 560 distance-learning courses are offered at the graduate level and more than 30 master's and certificate programs are currently offered at Virginia Tech (Macedo, 2013).

In 1998, the university started offering an online instructional technology master's program that was initially designed specifically for public school teachers in the state of Virginia.

The program was intended to prepare learners to become instructional technologists utilizing new communication tools, teaching techniques, and technology to enhance learning environments. In the last fifteen years, the program has gone through several iterations. The program was first opened to cohort groups in different regions of Virginia such as Abingdon, Franklin, and Northern Virginia, and provided a limited number of on-campus course meetings along with online course (Saenz & Lockee, 2004). Later, the program broadened its scope and offered a wide array of online courses applicable to higher education, professional organizations, and to governmental and non-profit professionals who wished to enhance their knowledge and application of instructional theory and technological skills in their professions. It is now being offered on a national level. The program staff consists of four instructional technology faculty who have over twenty-years of experience in the instructional technology field, as well as four course facilitators who have been working in the program for several years.

The online master's program became well known in the instructional technology field. The first cohort graduated in Spring 2000, and hundreds of students across the country graduated from the program in the last fifteen years. All graduates completed e-portfolios as one of the graduate requirements. Consequently, the program produced hundreds of students' e-portfolios, and they have been used for data collection for this study.

### **The Program.**

The program consists of thirty credit hours of study with sixteen courses offered in each semester via web-based online modules. All course materials and resources were provided through an online course management system, and all project submissions and learning activities were completely asynchronous.

The students were required to start to develop an e-portfolio at the beginning of the program. Throughout their enrollment, they contributed evidence of their learning from each course to their e-portfolios. After completing fifteen courses in the program, students were required to finalize their electronic portfolios as they prepared for program completion. The e-portfolios then served as a culmination of student work to portray the development of a student's competency. Students' demonstrated their learning outcomes through their provision of artifacts and reflections. First, the artifacts student-generated activities such as projects, products, and papers provided evidence of students' abilities corresponding to five professional standards (design, development, utilization, management, and evaluation) established by the Association for Educational Communications and Technology (AECT) as well as four standards required by the program (research, resources, reflection, and resume). Appendix B provides detailed guidelines of each standard.

Second, the extensive written reflections in the e-portfolios presented both their growth as an instructional technologist and their learning experiences in the program. These reflections aimed to capture the students' final thoughts regarding their learning outcomes, perspectives on their learning experiences, as well as program outcomes.

As one of the requirements for graduation, the completed students' portfolios are submitted to the faculty committee for final review. According to Lockee, et al. (2002) who are the program's founding faculty members, The committee reviews the artifacts and the reflections included in the students' e-portfolios as evidence of their growth in the program and to determine whether students successfully met the professional standards of AECT.

## **Reflective Activities in the Program**

As part of the development of the e-portfolio, students were required to include three reflection activities in their e-portfolios, and these reflections have been used to answer the research question of this study. To give the reader an overview of the reflective activities in the program, appendix C describes the guided questions and grading criteria used for these three reflective activities.

The question prompts in these three reflective activities were designed to probe students' reflections in two major areas: Growth in the instructional technology profession and overall program experience. For example, questions in Reflection One intended to examine the students' thinking about their previous knowledge and experiences in the instructional technology field. Questions in Reflection Two aimed to reveal the students' professional competence developing instruction after finishing the program. Finally, Reflection Three attempted to expose students' perspective about their learning experiences in the program. These three reflective activities demanded greater self-evaluation on learning outcomes and presented students' subjective perspectives toward the program experiences.

These reflections were in the form of several pages of written texts. Students were given great freedom in choosing how to write reflections with respect to the length, style, and the structure of each reflection.

## **Data Collection**

Merriam (1998) stated that in judging the value of data, the researcher should ask whether the data contains information related to the research questions and whether it can be acquired in a reasonably practical and systematic manner. The research question of this study did not directly involve students in the online master's program, but focused on the analysis of the aforementioned three types of students' reflections in their e-portfolios.

**Method of Selection.** Once permission was given to access the students' e-portfolios and IRB approval were received, the researcher obtained permission from a program leader of the ITMA program to access the program database. First, the researcher generated a list of graduates from 2005 to 2011 and retrieved their e-portfolios from the program database and saved them in the researcher's computer. Initially, there was a total of 191 graduates' e-portfolios retrieved and then seventy student' e-portfolios were selected based on the following three criteria: (1) e-portfolios that were accessible in the program database using university personal ID and password; (2) e-portfolios that contained the aforementioned three types of reflections; and (3) a random sample of ten students' e-portfolios was drawn from those students that graduated in each academic year from 2005 to 2011. The random sampling strategy was used to choose students' reflections from e-portfolios. This type of sampling allowed the researcher to select samples that represented a diversity of perspectives or characteristics. Each e-portfolio was numbered in numerical order and a free online research randomizer tool, Research Randomizer, was used to randomly select ten portfolios from each year. The seventy students' reflections in this study represent 1282 pages of students' reflective writing. To prevent identification of an individual student's reflection, the researcher numbered the seventy students' reflections in numerical order.

## Data Analysis Techniques

Fraenkel, et al. (2014) define the qualitative data analysis as “an iterative and continuously comparative process that involves reducing and retrieving large amounts of written information (p. 436). According to them, content analysis procedures involve two levels: (1) organizing data and (2) generating categories and themes.

These two levels of data analysis were used to organize and analyze the data in this study. The first step of data analysis in this study was to organize and display the data in a way that was easily sorted and readable. The researcher copied students’ written reflections from the selected seventy e-portfolios and pasted them into seven Excel files based on the year of graduation. In each of these files, three reflections were organized under different tabs to make it easy to identify and retrieve the data.

The second stage of data analysis involved coding, generating categories and looking for themes. Within the qualitative research framework, there are numerous methods and strategies for coding qualitative data. A three-step code mapping technique was used to analyze and interpret the data, as outlined by Anfara, Brown, and Mangione (2002). In the first iteration, analysis began with word frequency counts to identify words and phrases in each of the three units of analysis by each year as well as developing a list of common codes. The researcher analyzed the resulting list of codes, made diagrams of the related codes, and created a list of sub-categories that emerged in students’ reflection of each year based on patterns in the interpreted meaning of the words. In the second round of analysis, the researcher generated a list of categories based on the lists of common sub-categories developed from the students’ reflections of each year. Through the third iteration of analysis, overarching themes were identified based on the categories. Nvivo 10 was used at the third iteration of analysis.

Data analysis began with organizing the students' reflections from e-portfolios that were selected from seventy students. The students' profiles were developed based on basic descriptive characteristics including gender, age, and the grade of e-portfolio evaluation. Then, the individual student's reflection documents were transferred to the Excel spreadsheet and reorganized based on categories including year of graduation, reflection on previous and current approaches in the five AECT domains, and reflection on the student's learning experiences in the Instructional Technology Master's program. The researcher carefully read each student's reflections multiple times. In the initial reading, the frequency of common words was counted, and notes were taken to identify key phrases and issues related to the research question. Eleven categories were extracted through careful analysis of these phrases and they were then collated into two overarching themes as they related to the research question. The following chapter presents the data analysis in two sections. The first section provides students' variables of gender, age, and grade of the e-portfolio evaluation, as well as a descriptive overview of students' reflections since it is important to understand the feature of these written reflections in terms of length, quality of reflection and level of reflection; the second section reports the findings of the study according to the emergent themes from the data analysis.

### **Summary**

The purpose of this qualitative study was to explore the contribution of students' reflections to online program evaluations. Students' reflections in seventy e-portfolios from the ITMA program were used for the study. The study applied the summative content analysis approach for the data analysis. Data analysis and interpretation were conducted through a three-step code mapping technique to generate sub-categories, categories and overarching themes. The research findings were identified based on these emerging themes.

## Chapter 4: Data Analysis and Findings

As previously noted, the purpose of this study was to explore the contribution of students' reflections to program evaluation in an online master's program. To accomplish this, the study was guided with the following research question: how might analysis of students' reflections in e-portfolios inform online program evaluation?

As noted in the previous chapter, a summative content analysis was conducted on seventy students' reflections from the student e-portfolios in the online Instructional Technology Master's program at Virginia Tech. Three types of reflections have been reviewed and analyzed: (1) students' reflections on their previous approaches to the five tasks of instructional design including design, development, utilization, management, and evaluation; (2) the students' reflections on their current approaches to these five instructional design tasks; and (3) the perceptions on their learning experiences in this online master's program. A total of seventy students' reflections from their e-portfolios were reviewed and analyzed for this study.

Data analysis began with organizing the seventy students' reflections from their e-portfolios. Students' profiles were developed based on basic descriptive characteristics including gender, age, and the grade of the e-portfolio evaluation. Next, the individual student's reflection documents were transferred to an Excel spreadsheet and reorganized based on categories including year of graduation, reflections on previous and current approaches in the five AECT domains, and reflections on the student's learning experiences in the ITMA program. The researcher read each student's reflections multiple times. In the initial reading, the frequencies of common words were counted, and notes were taken to identify key phrases and issues related to the research question. Eleven themes were extracted through careful analysis of these phrases as they related to the research question. What follows is the result of the data analysis and it is

presented in two sections. The first section provides information pertaining to the gender, age, and grade of the e-portfolio evaluation, as well as a descriptive overview of the students' reflections since it is important to understand the features of these written reflections in terms of length, quality of reflection and types of reflection; the second section reports the findings from the each type of students' reflections along with the emergent themes.

### **Students' Reflections: A Descriptive Overview**

The seventy students' reflections used for this study represented 1282 pages of written reflections from their e-portfolios submitted during the years 2005 to 2011. First of all, the basic descriptive characteristics of the data, including gender, age and grade of the e-portfolio evaluation were reviewed so that reader would get a picture of students' basic information. Secondly, an analysis of the students' reflections was performed in the areas of length, quality of reflection, and types of reflection. The purpose of reviewing of these areas was to illustrate the level of commitment and effort put forth by students and to show the expected quality of reflection. The statistical analysis of data is only for descriptive purposes, not for determining the correlation among these variables.

Of the seventy students, 27 (38%) were male, and 43 (62%) were female. The age range of the students whose portfolios were selected for this study was 36 years of age. The youngest was twenty-five years old and the oldest one was sixty-one years old. The grade range of the portfolio evaluation was from A to B. The majority of students received A (see Appendix D). Sixty-four students out of seventy (91%) had no experience in taking any online courses prior to the ITMA program.

**Length.** The length of the reflection document may indicate a level of effort put forth by students. Such information can indirectly imply whether students thought carefully about what to write and how to write in their reflections.

Although students were provided with guiding questions for their reflections and criteria used to assess their reflections, students were given free reign in choosing how to write reflections in terms of format, style, and approach. There was no character limitation for the length of their reflections.

In determining the length of each reflection of a student, the number of words used to respond to given questions in each reflection was determined. The range of length of each reflection document was from 944 words to 3294 words. There was no obvious correlation between length and quality of reflection.

**Quality of reflection.** The quality of students' reflections was determined by a reflection assessment rubric used formally by faculty to assess the reflection in the student's e-portfolio. This rubric consists of six indicators: (1) careful thought, (2) self-assessment, (3) critical thinking skills, (4) indication of personal growth, (5) description, and (6) analysis. Three criteria were used to measure each indicator: unacceptable, approaching and target. Given students opportunities to resubmit until they reach the target level, all of the students' reflections were able to meet the target level for each indicator included in the rubric (see Appendix E).

**Types of reflections.** In analyzing the students' reflections, Youssef (2012) categorized students' reflective learning journals into three types based on students' contributions to the assessment of learning and instruction: descriptive, analytical, and evaluative.

Descriptive: simple reflections that outline the class meeting

Analytical: reflection on the tasks or activities, engaged in comparing how the

different tasks related to their learning, and indicated how much they learned from the task, how well they performed, how to improve their performance on the task, and/or how they used what they learned in class in their everyday lives.

Evaluative: students engaged in all of the above and provided evaluative feedback that indicated their perceptions of the instructor and the learning environment (p. 248).

Based on this classification of students' reflections, the researcher categorized all seventy students' reflections into one of the three categories, but each category was defined slightly differently. The descriptive reflection contained narrative description of what they did not know before and what they know now, and a description of how their approaches to the five tasks of instructional design changed before and after the program. In the analytic reflection, students analyzed how the new knowledge and skills gained through the program helped him or her improve performance in the five tasks of instructional design, and how they successfully applied new knowledge in their professional context to solve problems with evidence. In the evaluative reflection, students provided his or her perception of strengths and weaknesses of the program with respect to the different aspects of the program.

After reviewing all seventy reflections, the researcher found that all of the reflections were descriptive in general, but sixty-two reflections were analytic, and fifty-eight reflections were analytic and evaluative as well.

### **Findings from the Students' Reflections**

This section discusses the analysis of the students' reflections presented in the student e-portfolios. In these written reflections, they reflected on: their previous approaches to instructional design prior to the program (Reflection One); their current approaches to instruction

changed near completion of the program (Reflection Two); and perceptions of learning experiences in the program (Reflection Three).

**Reflection One: Previous Approaches.** In order to write about what has been improved, students must be able to describe their past and present experiences and distinguish the difference between the two. This activity was designed for students to reflect and analyze the problems of their previous approach to the five domains of instructional technology with regard to design, development, utilization, management, and evaluation. The primary goal of this reflection was to encourage the students to describe their starting places.

The average length of the reflections was five-pages. They were single-spaced with twelve-point font size. Most students spent considerable time trying to describe previous knowledge and approaches about instructional technology. The comments in this reflection included: (1) identifying problems encountered in performing each of the five tasks and (2) the approaches they used to solve the problems, and knowledge and skills they felt they lacked.

Following the analysis and interpretation of the written reflections, two major categories emerged: identification of gaps in learning and awareness of problems with previous approaches. These themes were determined by examining words or phrases used by the students.

***Identification of gaps in knowledge.*** The analysis of the data revealed that students were able to identify gaps in their learning. Most students commented about a general lack of knowledge or skills with respect to the five tasks. The comments indicated that students recognized their weaknesses with respect to performing instructional design tasks and technology skills. Some generic comments included,

I had no adequate understanding of how to create a successful learning environment (#26),

I have never considered instructional design process (#31);

I had very limited understanding of the complexity of instruction (#37);

I never conducted a thorough analysis of my learners or the learning and performance contexts. (#40);

I did not have knowledge of the supporting principles to utilize technology in an efficient and effective manner (#58);

I have never considered evaluation in my instructional design (#62).

***Awareness of problems with previous approaches.*** Students commented on a wide range of problems with previous approaches in the five tasks. As shown in Table 5, student comments revealed various patterns of problems. These patterns illustrated concerns, difficulties and challenges students experienced prior to the enrollment in the program with respect to each task.

Table 5

*Patterns of Problems with Previous Approaches*

Tasks	Patterns of problems
Design conditions for learning	Unfamiliarity with learner characteristics (81%) Absence of instructional design process (69%)
Develop instructional materials and experiences	Lack of technology skills (91%) Lack of hardware and software available (54%)
Utilize processes and resources for learning	Lack of instructional material fit for specific instructional need (84%) Inappropriate use of media (77%)
Manage (plan, organize, coordinate, and supervise) instruction	Lack of time management skills (33%) Lack of control over the resources (23%)
Evaluate the adequacy of instruction and learning	Poorly Designed (46%) Inappropriate measurement for evaluation (34%)

*Design.* Fifty-seven students (81%) indicated that their approaches to instruction were content-oriented, but not learner-oriented. Students indicated that they had clear instructional

goals to work towards based on the standards but did not take into consideration their ability and learning style. Student #62 stated, “I tended to focus on the visual and not include channels for other types of learners. Students noticed that with no thought of an instructional strategy, nor understanding of students’ characteristics and needs, the instructional design was merely focused primarily on getting them through content of instruction. Student #51 commented,

“I did not investigate the characteristics of my learners and use that information to guide my instruction. Rather, I simply made sure that my content and lesson was age appropriate.”

Forty-eight students (69%) commented that their design of instruction was based on existing curriculum materials and lesson plans, and the process of design with respect to creating instruction had never been considered. One student wrote, “I really did not have a well thought out plan, instructional strategy, or instructional materials” (#52). Another student (#23) also commented that she had no idea what instructional design was and never considered things like “gaining attention, stimulating recall of prior learning, eliciting performance, feedback” when it came to designing instruction. Almost all students indicated that they had not put emphasis on design other than the content, and analysis of learner characteristics was absent in their instructional design. Student #34 stated that she never considered analyzing learner characteristics “other than to take a snapshot of the intended audience and adjust my demeanor, vocabulary, and focus to them.”

*Development.* Sixty-four students (91%) felt that the lack of technology resources and skills to develop instructional materials resulted in making their instruction ineffective. Student #56 commented, “the learners got bored with my training sessions because they would only watch a presentation slide about whatever the subject was on.” Student #48 noted that she used

PowerPoint “as the all-purpose vehicle for briefings, presentations, and instruction” because she found herself without skills of using other software, equipment and the other resources to present her instructional material. Student #53 tried to “create new types of lessons that were more interactive and would engage the students”, but she found that “without the knowhow of the technologies and their capabilities” she failed at creating more interactive lessons.

Thirty-eight students (54%) also claimed that, due to the lack of hardware and software provided at work, it was difficult for them to develop and present instructional materials. Student #57 complained, “the school in which I taught was very weak in technology resources, so I mostly used word processing or desktop publishing software to develop print materials.” Student #43 commented that she “felt naked” without supporting software and hardware to deliver the instruction. She had to choose a direct instruction method “using nothing more than some notes that she scribbled down on a piece of paper.” Several students mentioned that they attempted to search for free resources and get training for themselves on using different software to develop instructional materials.

*Utilization.* Fifty-nine students (84%) expressed frustration over the lack of resources to use for their teaching practices. Student #67 wrote, “Lack of access to processes and resources was the biggest barrier I faced to technology utilization.” Students had to be bound by what resources were available to them, so it was difficult for them to vary the resources they had for utilization. Student #45 noted that when resources were purchased and delivered, “they were chosen by someone else” and did not fit their instructional need. Student #57 mentioned the lack of consistent access to the online file servers at school caused “disruption of the class, student anger issues and utter frustration.” Student #41 also realized that the students were not actively

engaged in learning because “the worksheets and book assignments were often not challenging” for the students.

Fifty-four students (77%) commented that they attempted to utilize some available media in their instruction, but the use of the different media was not always based on instructional design specifications. Student #44 stated, “as media that fit my lessons was found, it was included if time allowed or in lieu of some other non-media activity” but the question if the media is the best design for the specific instruction was not considered. Student #69 made a similar comment, he tried to embrace the media resources that came in his path, but he “lacked the depth of understanding that could answer whether the process or resource was appropriate to the learning situation.”

*Management.* The common points of management that students had were time, supplies, organizing, and utilizing instructional resources. Twenty-three students (33%) were concerned with the challenge of time management in their instructional activity. According to student #49, not only was time precious when it came to making the most of instructional time but also it had to be considered when designing instruction because “there were just so many things that had to be taught and planning time always ran into personal family time.” Student #51 pointed out that supplies and instructional resources often had to be shared between classrooms so that it created some management issues. She stated, “some teachers refuse to share lessons, materials and supplies ... so it was difficult to make sure students are learning the same information.”

Sixteen students (23%) indicated that they did not have much control over the availability of delivery systems. Some of them tried to organize and utilize the instructional resources and materials online, but consistent access to the resources online was the biggest consideration. Student #16 wrote, “I made the most of internet resources with my kids. There are fabulous

games and activities available in increasingly large varieties. I used these when I could but of course, access was a consideration.” Student #39 noted the difficulty of collaboration among colleagues made it very difficult to “manage and deliver resources” online and offline.

*Evaluation.* Thirty-two students (46%) indicated they never performed an evaluation as a function of instructional design to determine the adequacy and effectiveness of their instruction. Twelve students (17%) reported that they attempted to evaluate their courses but their evaluations had not been thoroughly designed. One student wrote,

“In looking at the evaluation itself, it did a poor job of evaluating the objectives of the lesson...they were very superficial questions, and responses would not assist in determining if the learners learned what they were supposed to” (#68).

Twenty-four students (34%) also reported that they used the end of the year standardized test to measure their student performance, as well as their instructions. However, they realized this type of assessment was requiring students to simply recall information, not assessing if their students had internalized the information.

**Reflection Two: Current Approaches.** If the students claimed in Reflection I that they were lacking knowledge and skills prior to the program, then Reflection Two described the process of their professional growth. Students were asked to write a reflection on any similarities and differences between their past and current approaches to instruction. This reflective document, in conjunction with Reflection I, was intentionally structured to help the students think through the previous approach and address the growth they had in the five areas of instructional design as a result of the program.

To understand the specific nature of the learning that was demonstrated in this reflection, it is necessary to present a more detailed individual description and analysis of the growth that occurred. All students showed evidence of cumulative learning and transitional change, and all of them referred to growth in their knowledge of professional competency and skills, as well as growth in their self-confidence. Students laid claim to what new concepts, knowledge, and skills they achieved along with the evidence to indicate their professional growth. Four main categories emerged from the analysis of comments in this reflection to inform their professional growth: knowledge acquisition, knowledge application, skills acquired, and self-confidence. Table 6 presents the frequencies of comments regarding their professional growth.

Table 6

*Themed Frequency of Four Categories*

Categories	Frequency (%)
Knowledge acquisition regarding five instructional tasks	74%
Knowledge application	86%
Skills acquired:	
Multimedia skills	69%
Reflective skills	83%
Problem-solving skills	53%
Evaluation skills	81%
Self-confidence in performing five instructional tasks	100%

**Knowledge acquisition.** As part of their culminating experiences, all students described acquisition of new knowledge and skills regarding the five tasks in instructional design (design, development, management, utilization, and evaluation) in their reflections. The five major standards consist of numerous sub-components that were used to assess students' accomplishments as an instructional technologist and demonstrate students' competency according to the AECT standards (see Appendix F). The written reflection provided adequate evidence of knowledge acquisition concerning these components of each standard through comparing past and current approaches regarding the five domains. Students addressed their accomplishments with corresponding evidence that aligned with the indicators of competencies of the five domains.

Students addressed what they learned about the five tasks of instructional design either by claiming what they learned as new knowledge, or by developing a direct contrast to the prior knowledge. All students generally stated what they could do now that they couldn't do prior to the program by comparing and contrasting their previous and current work. The general statements found in the reflections are similar "before I didn't know how to do... but now I

know how to...”, or “before I didn’t do...but I do...”. The comments comparing current to previous approaches implied both a change from a previous practice and an awareness of change, and that this made up learning that can be acknowledged. The following quotes illustrated this:

With my previous approach I didn’t know how to develop instructional materials so that I had to use ones that were already created, but now I develop my own teaching materials that were specifically developed for my learners based on their learning needs” (#67); Development is an important aspect of my work. The ITMA program has given me so many more avenues in regards to development. Before the program, I was basically developing materials without including the design process. I now am able to utilize technology in ways that enhance my instructional materials and Team Member development (#53).

Fifty-two students (74%) even went beyond the simple description on their improvement in light of what they can do now to analyze what they could do differently in their professional context as a result of learning. They provided specific examples to back up their argument. For example, students wrote,

When I first started developing training programs before the ITMA program, most of my instruction consisted of poorly designed PowerPoint presentations. As a result of studies and thinking about the tools that are available, my instruction today can be provided in a variety of delivery formats. For example, today I develop learning that incorporates paper, audiovisual, Computer-based Training (CBT) and integrated technologies incorporating hands-on activities, with text and accompanying visual graphics for explanation that can meet the needs for a variety of learning styles (#63).

I now apply different approaches to instruction design. Currently I pay much closer attention to the learner characteristics of the group I am teaching. Teachers are a very diverse group. Teachers vary in age from young to old and have extremely different comfort levels and abilities when it comes to using and incorporating technology in their instruction. So I differentiate instruction by offering classes at a beginner and advanced level. Many reluctant technology users have become very competent and comfortable technology users (#54).

The reflections revealed that students carefully reviewed and reflected on their work, articulated what they had learned, reconstructed current knowledge and understanding in terms of previous understanding, and recognized a difference.

***Knowledge application.*** Students identified their learning outcomes by specifying an insight or some way that they applied the new knowledge and skills in their profession. Sixty-two students (86%) described in detail how they applied the knowledge obtained in the program in a real world setting. Most students demonstrated their ability to grasp key knowledge areas and appropriately applied this knowledge to work, training and learning contexts. The following quotes illustrated this.

Recently, a business teacher asked me to create an economics lesson on budgeting. I asked the teacher for her students' learning characteristics, special needs, time allotment, and the CTE Competencies. Then, I proceeded to design the lesson and develop the instructional materials. Based on students' learning characteristics and needs, I created a budgeting lesson entitled *Build Your Dream Room*. ... The teacher told me it was a great success, and the students were enthused about the lesson (#51).

Having had opportunities to implement the design process as an ITMA student, I became effective at utilizing an instructional design model to guide my decisions. In doing so, I am better able to focus on instructional technology and design as a whole, thus providing a far more valuable and purposeful learning experience for students (#57).

***Skills acquired.*** In addressing learning outcomes, in addition to new knowledge acquisition, the three most common skills identified were multimedia technology skills, reflective skills, and problem-solving skills.

***Multimedia Skills.*** The multimedia technology skill was the most prevalent one discussed in the students' reflections. Forty-eight students (69%) expressed that they felt confident in using various technologies to teach students. Twenty-six students (37%) discussed the specific multimedia technology skills they have gained throughout the program such as the use of audio, video, images, website development, and the use of various web 2.0 tools. Student #24 wrote, "The program has given me opportunities to learn new technologies and programs. I have used my skills in editing digital video and audio to create enthusiasm in the classroom." One student wrote, "I design and develop interactive training materials with various multimedia authoring tools to accommodate self-learners and provide resources for learners" (#57). All students discussed one or more specific multimedia-authoring tool that they used to develop and deliver instruction. For instance, student #47 reported, "I have the skills to create my own websites using Adobe Dreamweaver, develop interactive activities and interactive lessons on the Smartboard, and detailed plans that support a variety of different learners".

Twenty-one students (30%) mentioned that the program provided opportunities for them to learn various multimedia-authoring tools to develop instructional materials and evaluate the use of multimedia in their classes. One student wrote, "I actively seek and evaluate new

technologies to discover innovative and better ways to enhance instruction and because of this I am utilizing the newest technologies possible and experimenting with new technology regularly” (#51).

Sixteen out of twenty-one students (76%) reported that they learned from the program how to effectively integrate technology and plan for its use. Student #64 indicated that he managed the implementation and evaluation of new technologies in his classroom for the use of enhanced instruction. Student #34 noted, “In the past the little bit of technology I used was poorly planned for and seemed to almost be a side note instead of being integrated into what I was teaching. I now feel I’m able to determine when it is appropriate to use technology and which technologies are best to use.”

*Reflective skills.* Out of the skills, reflective skills were most explicitly identified in the students’ reflections. All students conducted a self-assessment of their skills and abilities prior to the program and afterwards. In the same self-assessment, students were critical of their professional work prior to the program, what about they have learned from the program, and what they would have done differently given their new knowledge and skills.

Fifty-eight students (83%) reported that the program helped them become reflective practitioners. One student wrote that throughout the program, her reflections had become more critical and this critical nature helped her thoroughly look at every aspect of the instructional design process in order to make sure every instructional need of the learners in her classroom was met (#67). Students also pointed out that they would apply the reflective skills in their teaching and training because it helped them “look at different ways to achieve better student performance” (#59) and to “determine whether or not the information was delivered efficiently for the learners” (#64). Several of them stated that through the program they got into the habit of

reflection and used reflection daily for their professional work and personal life. One student wrote,

I conduct reflections everyday in my job as I am making important changes to the mentoring program that I teach. My colleagues and I discuss what changes have been positive and what things didn't work. I also reflect on how my students did on their work and if it was appropriate for them. I also ask the mentors and students to reflect on the daily lessons and report back to me about it (#63).

Another comment on the reflective practice was,

I now reflect upon everything I do whether for work or for personal life to ensure that I am maximizing my learning experience and making sure whatever it is I am doing is meeting the identified need and those involved. I will no longer continue to implement new ideas, process, or projects without reflecting upon it throughout the process and after it is completed (#56).

*Problem-solving skills.* Thirty-seven students (53%) reported that they acquired a new set of creative strategies for problem-solving when developing instructions and implementing various technologies into their courses to benefit learners. The researcher observed from the comments in the students' reflections that prior to the program, students tended to use a single approach to solve problems they had in teaching, but after the program students used multi-dimensional and systematic approaches:

ITMA has enhanced my problem solving abilities by giving me a new set of strategies that go hand-in-hand with the creative component. These strategies involve making sure that the necessary elements such as learners, objectives, context, and technology in order

to solve the problem of making instruction and technology are included and go up into a higher unit that will be of the most benefit to the learners (#61).

Problem-solving is useful in my courses when I need to figure out why a student is having difficulty with content or certain software; I attempt to use multiple ways of figuring out the exact problem in order to work towards a solution (#37).

*Evaluation skills.* All students acknowledged the importance of evaluation and fifty-seven students (81%) attempted to employ different types of evaluation that they learned from the program. Twenty-one out of fifty-seven students indicated that they were capable of developing their own evaluation instruments to evaluate their instructions and resource materials. These evaluations include portfolio, self-evaluation, and peer evaluation:

In my own classroom, I am evaluating resources determining what works and what needs modification or what needs to be left behind based on the state standards for language learning (#24).

Through the ITMA program, I have learned evaluation skills that have allowed me to improve educational programs and to provide more informed recommendations for technology resources. I have used formative evaluation techniques to make recommendations for assessing comprehension during live workshops (#49).

I was able to learn to correct mistakes and evaluate my own work. This has been the most valuable lesson learned throughout the course, feedback and evaluations (#62).

“I have learned how to best utilize the resources I have available by evaluating programs and software”

**Self-confidence.** “Confidence” and “confident” are the two most commonly used words in all the students’ reflections. All students reported a growth in their self-confidence. Students indicated that they gained strong self-confidence after the program in performing the five tasks of instructional design, as they realized that they were capable of applying the knowledge learned in their professional field, and also confident enough to share their skills with their colleagues. General comments included,

I feel more confident in designing and developing resources and materials that can actually be used in the classroom (#24).

The skills I have gained during ITMA have given me confidence that I am the school’s expert in the field and can effectively help other teachers in that area (#47).

Throughout this program, I have gained confidence in using different technologies to develop various instructional materials that can be specifically used for my students (#62).

The experience of designing and developing these units has given me the knowledge and confidence to create other instructional units, both for myself and for other teachers (#65).

**Reflection Three: Perceptions of learning experience in the program.** In this reflection, students were asked to reflect upon how their experiences in the program affected them both personally and professionally. These reflections on their learning experiences offered insights regarding various aspects of the program. Five categories emerged from the analysis of the reflections: program choice, curriculum and course instruction, learning support and resources, pedagogical approaches in the program, and the overall learning experiences. Table 7 presents the frequency of comments regarding these five categories.

**Program Choice.** Students’ reflections revealed three major reasons why they chose

Virginia Tech's ITMA program. These reasons were identified in the reflections. The first reason was the convenience that distance education offers. Thirty-six students (51%) reported that they selected the ITMA program because it was a complete asynchronous online program designed for students who wished to remain fully employed while pursuing their graduate studies. Student #54 stated, "Distance education proved to be the best option to me because I was able to work on a degree without having to sacrifice my job or relocate to the campus."

The second reason was the program curriculum. Twelve students (17%) reported that they had researched a number of programs prior to choosing the ITMA program. They indicated that they chose the ITMA program because the program curriculum was well aligned with their jobs and learning goals. Several students reported that the courses in the ITMA program were well related to their learning goals that were aimed at learning new technology and computer programs, as well as new ways of integrating technology into their instruction. A student indicated that she thought the ITMA program was a perfect match to her because the program consisted of "practical applications and hands-on learning instead of courses concentrating mainly on theory" (#62).

Table 7

*Frequency of Comments of Five Categories*

Categories	Frequency (%)
Program choice	
Curriculum	17%
Asynchronous modules	51%
Curriculum and course instruction	
Quality of course	17%
Structure of curriculum	24%
Learning support and resources	
Timely feedback	77%
Access to academic resources	24%
Pedagogical approaches	
Reflective learning activities	87%
Flexibility	63%
Authentic learning approach	73%
Overall experience	
Career transition	30%
Personal growth	66%
Lack of peer interaction	16%
Lack of hands-on guidance	5%

***Curriculum and course instruction.*** The sub-categories classified under the curriculum and course instruction category included quality of course instruction and structure of course in the program.

In the students' reflection, twenty-nine students (41%) mentioned that the curriculum of the program and course instructions were well designed with a high quality. Student #55 indicated that she "fell in love with the curriculum for the ITMA program" while she came across the program and it was the one of the most important reasons that she chose the program. Another student indicated that she could not have improved professionally without "high expectation" from such a "high caliber program" (#59). Some other comments were,

I learned a lot about instructional design through this program. It had been 15 years since I had graduated with my degree in education, and we never really got this much intense instruction in curriculum and design (#33).

The goals and assignments were clear, the assessment criterion was fair and very objective and for the most part the turn around time for grading was good (#42).

Twelve students (17%) emphasized that the quality of course content and instruction in this program was at least equivalent to that of the face-to-face if not better: one student wrote I have mastered a wide variety of skills and objectives, and am definite that I have learned as much, if not more, as a distance learner versus other traditional on campus students (#61).

I know some individuals feel that an online degree does not equate to a degree earned in a traditional classroom setting. I must say I wondered if this was true before I began the program. However, I would argue with anyone that an online degree equals a degree earned in a traditional classroom. The ITMA program in my opinion is an excellent program and the course content and assignments demonstrate that it is an excellent program. I would match this program with any traditional classroom program (#56).

Seventeen students (24%) highlighted that the structure of the courses in the program was interconnected, so that they could apply knowledge and resources gained in one course to other courses. For example, one wrote,

I found the program to be rigorous in structure and in volume of work. Ultimately this allowed me to connect the previous knowledge I had gained with new information and comprehension, thereby forming a foundation of which each subsequent course would build (#70).

***Learning support and resources.*** The three key codes included in this category were timely feedback and available academic resources. Fifty-four students (77%) commented that faculty, staff, and course facilitators were always responsive, and provided adequate feedback in a timely manner. Students perceived the feedback from course facilitators and the university resources as very beneficial learning support in the program:

The ITMA faculty has been very helpful and quick to respond via email to any question or concern that I might have (#61).

I feel that the entire ITMA faculty was helpful and timely in grading assignments and responding to any questions and emails. Since the classes are self-paced with scheduled due dates I feared that if I turned in assignments early that they would not be graded until the due date had passed. That was not the case. All the professors were timely in grading assignments when turned in and that was certainly an advantage for me since I routinely turned in my assignments prior to the due date (#60).

Being affiliated with the university, seventeen students (24%) commented that they were able to access academic resources such as library databases, online software tutorials, and the instructional materials provided in the program. Student #15 also commented that the program increased the amount of instructional materials to which she had access. Student #58 commented that the services provided by the university to virtual campus students surpassed her original expectation. She stated, “from the registration processes, access to library databases, to storage and submission of assignments, not a single provision was overlooked and served to ease my initial concerns regarding my navigation through the curriculum.”

***Pedagogical approaches.*** Pedagogical factors address how learning and teaching should be carried out in the process of learning and teaching (Masoumi & Lindstrom, 2012). Three key

codes classified under this theme were reflective learning activities, authentic learning approaches, and flexibility.

*Reflective learning activities.* The reflective learning activities gave students the opportunity to show the instructor what they had learned. Reflective writing as an instructional strategy encourages students to think more clearly about the process of learning, not simply the topic they are studying. Sixty-one students (87%) commented that the reflective practice was one of the most valuable learning processes they had encountered throughout the entire program. It helped them become aware of their strengths and weaknesses, analyze and evaluate their own work, determine their professional and personal growth, and ultimately support their understanding and growth. A number of students indicated that they would use reflection in the future. The quotes below illustrated this:

From the very beginning of the ITMA program, I have been taught ways to reflect, as well as had ample opportunities to practice reflecting on my work. I have been given the opportunity to answer questions regarding works, which have taught me how to reflect, as well as opportunities to reflect on my work from scratch without any prompting. All in all, as I write my reflections I think about the experience that I participated in and how I ended up where I did. I look back at each event and see how it impacted my product, thoughts, and processes (#61).

Since being in the ITMA program, I can physically see the growth and development over the last three years through the different reflections I have written. I conduct a reflection to summarize my experiences and to focus on how I ended up where I did (#58).

Reflections have given me the opportunity to gain insight into what I have achieved and how the process of what I've learned has evolved (#64).

*Flexibility.* Forty-seven students (63%) commented that they enjoyed the flexibility allowed in this program in terms of its flexible due dates and being able to resubmit assignments. Student #65 claimed that without the flexible due dates allowed in the program, it would have not been possible for him to obtain a master's degree while teaching and coaching. Another student agreed that the flexible due dates allowed her to "continue to work and complete the Master's degree all at the same time" (#52). Twenty-seven students (39%) indicated that the degree of flexibility is one of the major reasons that they chose the ITMA program. They appreciated flexible due dates for the assignments in each course. A student wrote, "I chose to enroll in ITMA because of the flexibility that distance education offers. ITMA classes do not follow a strict timeline. Assignment due dates are flexible, and I am able to work at my own pace" (#43). Students also valued the benefit of flexibility in terms of assignment resubmission. One student wrote, ITMA allowed for resubmission of assignments, which I found beneficial as a student because it reflected the value of my learning over my grades (#48).

*Authentic learning approaches.* Fifty-one students (73%) showed their appreciation of authentic learning experiences throughout the program. Students were able to work on real-world projects or work-related problems brought from their professions within the ITMA courses. In return they could also immediately apply new knowledge when they returned to their work:

If the value of a program is measured by its utility or applicability outside of the classroom then the ITMA program receives an A+. I was fortunate in that the ITMA program curriculum was directly aligned with my job. I made a strategic decision early on in the program to make every effort to choose real project needs from work to meet my assignment requirements. There were times when this strategy resulted in additional work but I felt the value of being able to directly apply my school assignments on the job

more than outweighed any additional work that may have been required. I have been able to apply nearly all that I learned during the ITMA program on my job (#62).

***Overall experience.*** Overall, all students in the ITMA program stated that their experiences was very positive, enjoyable and beneficial. They acknowledged that the program has had a huge impact on the way they approach education and learning. Student #67 commented, “Overall I feel that this program has made me much more effective in my job as a teacher and the end result is that my students receive the benefits.” Many students expressed high confidence on their career transition. Twenty-one students (30%) indicated that they have changed jobs during their enrollment in the program and seven students reported that they had been promoted in their profession.

Forty-six students (66%) indicated that the program helped them grow personally. They shared how they were able to become successful online learners. Students stated that learning online definitely requires a different mindset, planning skills, and conversation skills compared to face-to-face learning. Many students felt they had become more self-disciplined after completing the program. The rigorous nature of the program encouraged students to manage their time and stay focused on routine schedules, as many students are full-time employees:

I have become much more self-disciplined because of the program’s rigorous plan of study. I have improved my abilities to plan ahead, stay on task, manage a schedule with deadlines, and organize information (#53).

Some courses especially required a significant amount of time to finish the assignments by the given deadlines. Many students expressed the necessity of time management and noted that their time management skills had improved:

Time management has been crucial for me and developing my personal timeline has been successful for me (#66).

I have found that I am able to successfully manage my time well over the ITMA classes. I have learned how to pace myself to make sure that deadlines are met, and I complete each class on time (#54).

Along with all these aforementioned positive aspects of the program, eleven students (16%) also noted challenges in two areas: one is a lack of peer interaction in the program. One noted, “my online learning experience was positive, but I wish there would have been more peer interaction” (#49). They felt isolated from peers and preferred to have more opportunities and diverse channels to communicate with instructor and peers. Examples of their comments were,

I wish there would have been more peer interaction (#39).

I enjoyed doing peer reviews, but felt it would have been helpful to have more threaded discussions and chats (#31).

During all this time in the ITMA program I have communicate with my instructors and peers only through print (#49).

Second, four students (5%) indicated that the hardest part of online learning was not having a hands-on guidance when it comes to the software and hardware problems:

For instance, not being able to have a technical advisor sitting beside me seemed to cause me much stress and anxiety (#42).

It was difficulty for me not having a hands-on experience in digital video with an instructor that could guide me through my mistakes and taking tests online (#67).

In summary, the information presented in this chapter discussed the emergent themes from the students' reflections with respect to students' learning outcomes and learning experiences in the program. The implications of these themes are discussed in Chapter Five.

## **Chapter 5: Summary and Discussion**

The purpose of this study was to explore how students' reflections in e-portfolios could be used as an evaluation method for program evaluation practice. This chapter provides a summary and discussion of the study and implications of the study. Recommendations and limitations of the study are suggested.

### **Summary and Discussion**

This study examined the use students' reflections in e-portfolios for program evaluation. The study used a qualitative content analysis method to analyze the students' reflections. The result of the data indicated that the students' reflections in the e-portfolios documented the students' learning process throughout the program by providing sufficient evidences of their improvement of the AECT standards, as well as a wide variety of dimensions of professional competence. The review of students' reflections identified eleven categories and they were categorized into two overarching themes: (1) students' perceptions on their learning outcomes, and (2) students' learning experience in the program.

In Reflection One, the reflections revealed how students represented and analyzed their previous knowledge and skills with respect to the five areas of instructional design. It provided a snapshot to which students could later to demonstrate their improvement in the program. In essence, this reflection set the stage for the Reflection Two, which analyzes student growth as a professional within the program.

In Reflection Two, students demonstrated their accomplishment and learning process toward program objectives as well as an increased awareness of their own professional competence as instructional technologists. Reflections being made on past and current knowledge and experiences provided the students with the opportunity to present their

improvement and growth throughout the program. Students also discussed their plans to integrate acquired knowledge into their professional contexts. Overall, the students expressed strong confidence toward their professional identities.

Reflection One and Two did not provide specific measurable indicators to assess how well students performed the five tasks in the instructional design, but enabled students to show instructors how much they had improved in performing the five tasks through the program.

The results of this study indicated that students' reflections are an effective tool to document perceptions regarding learning experiences in an online program. In Reflection Three, the reflections revealed several aspects of the program that impacted students' learning in the program. Three indicators that students considered with respect to the quality of program were curriculum and course instruction, learning support and resources, and pedagogical approaches.

Curriculum and course instructions are two important indicators in the program evaluation (Anderson, Anaya, Bird, & Moore, 2005; Robinson, 2004). Seventeen percent of students indicated that they chose the program because of the well-structured curriculum. They also acknowledged that the quality of course content and instruction in this online master's program was equivalent to that of the face-to-face in terms of learning outcomes.

Law, Hawkes, and Murphy (2002) note that the provision of learning support and resources should be appropriately provided in the online program before, during and at the end of the program. They emphasized that the availability of resources and services, technical support, and special requirements for online learners should be clearly communicated before admitting students. Interaction with instructors is directly related to students' satisfaction in the program, and timely feedback is considered important to the quality of the program (Nicol & Macfarlane-Dick, 2006). The results of this study support these assertions. The students in the program

perceived that timely feedback and access to abundant resources provided were very beneficial learning support from the program.

Lastly, the results of the data showed several positive aspects of pedagogical approaches that impacted the students' learning. By reviewing the reflections, the researcher realized that the students' reflections on their learning experiences offer vital information to diagnose and analyze the effectiveness of the online program's pedagogical approaches. Gordon (2003) purports that the process of reflection allows students to compare their knowledge, skills, experiences, and attitudes against standards. First, 87% of students addressed that a reflection-centered instructional approach provides a valuable opportunity for them to consider their learning and growth throughout the program. Second, 73% of students expressed an appreciation for the authentic learning approaches incorporated in the course design of the program. These strategies enabled students to work on real-world problems and apply new knowledge obtained in the program to solve problems in a real-world setting. Lave and Wenger (1991) claim that authentic learning activities offer students a chance to carry out real-world related tasks that enable the learners to experience the intended use of the knowledge and skills they acquired. In other words, adult students bring their relevant work problems to the learning situation because they have a context to which they can apply new knowledge and skills and they encounter situations where they can apply what they are learning. Third, many students pointed that the flexibility of the program is the beauty of the online program. It has been well documented that flexibility is one of the primary features of online learning (Collins & Berge, 1995; Holmberg, 2004). Students enjoyed the two different types of flexibility allowed in this program, those being the flexible due dates for assignment completion and the allowance of assignment resubmission.

Besides all these positive aspects of the program discussed in the students' reflections, a few students noted challenges they encountered in the program. One challenge was the lack of peer interaction, which results in the feelings of alienation and isolation. According to Galusha (1998), students in online program often feel isolated due to the absence of social interaction as being geographically separated from each other. The other challenge was the absence of hands-on guidance when students faced software and hardware problems. The challenges in these two areas indicate that online learning is not ideal for all learners, as well as inform students what they should be expected as online learners. Regardless these challenges they faced in the program, all of them indicated that they have a strong confidence in their professional competencies.

From the research findings, the researcher can posit that students' reflections provide a great deal of evidence to inform instructors and stakeholders regarding students' personal and professional growth through the program. In addition, students' reflections provided student perceptions of the program and identified what features of the program should remain and what parts of the program were in need of improvement.

### **Implications of Study**

The findings of this qualitative study contributed to the understanding of the value of students' reflections as an evaluation tool for the program evaluation. As online education increases in importance, program evaluation for quality assurance becomes a critical component of program improvement (Martinez, et al., 2006; Rovai, 2003; Simonson, et al., 2011). Gredler (1995) states that evaluators should not assume that measurable outcomes are the only key to a program evaluation. It is important that evaluators use multiple sources to comprehensively

analyze and assess how sufficiently the program prepares students to meet their personal and professional goals (Rovai, 2003; Simonson, et al, 2011).

Students' reflections in e-portfolios provide another dimension of qualitative information for program evaluation. The use of reflections in e-portfolios provides benefits for students in the form of self-evaluation (Shamin, 2012). Through reflections, students can be directly involved in monitoring their own learning process and evaluating their personal and professional growth. In addition, reflections also give an opportunity to students to share their perspectives on learning experiences in programs (Wagner, 1994). One of the benefits of reflections is that students can relax from the pressure of grading while reflecting upon their professional growth, because the reflections in e-portfolio are not for accurately measuring students' achievement. According to Costa and Kallick (2000), in assessment of reflections, "there is no such thing as failure, only the production of personal insights" from one's learning experience (p. 61). Another main benefits of reflection to students in online programs is that they can have enough time to record insightful information on their learning outcomes and the impacts of program. This kind of information is unlikely to be collected via interview and survey questionnaires in a limited time (Eisner, 1998).

In addition to students benefiting from reflections, the findings of this study indicate that program evaluators can benefit from students' reflections. From the program evaluator's perspective, the use of students' reflections is a relatively easy way to generate students' perceptions on different aspects of programs (Wagner, 1994). Rovai (2003) suggests a participants-oriented strategy for three types of program evaluation: program process evaluation, program output evaluation, and program impact evaluation. Students' reflections in written form can provide evaluators an important source of information that might be uncovered through other

data collection techniques such as a survey and an interview (Wagner, 1994). It provides an opportunity for faculty to become aware of more depth and diversity of students' learning process. The reflections add a supplement qualitative source to program evaluations to (1) probe an individual and collective insights into the students' professional growth, (2) help inform instructors and evaluators what instructional strategies and pedagogical approaches are effective. Themes emerged from the reflections can assist evaluator to identify program impact on students. Ultimately, it helps instructors improve curriculum and redesign courses by highlighting approaches that are not effective. To this end, in order to use students' reflections as data for program evaluation, instructional strategies for reflective activities might be carefully considered in instructional design for the quality assurance of reflections.

### **Recommendations**

This study effectively demonstrated that students' reflections in e-portfolios can provide informative data that can be used to analyze for patterns and themes to describe students' learning outcomes and their perceptions on the various aspects of the program for the purpose of program evaluation. Based on the findings of this study, several recommendations can be made for using students' reflections for program evaluation.

Students' reflections in e-portfolio can be used for formative and summative evaluations of a program. For formative evaluation, the program and courses can be refined and modified based on the information gathered from the students' reflections. The analysis of these reflections helps teachers and administrators to ascertain benefits derived from participation in the program, as well as strengths and weaknesses of the program. The information collected from these reflections can help address if: (1) the goals and objectives of the program are being

achieved as planned; (2) the instructional strategies are well implemented as designed; and (3) all necessary resources and assistance are provided at the level demanded.

For summative evaluation, these reflections provide an additional channel for teachers and evaluators to determine the effectiveness of the program in obtaining the desired learning outcome. In particular, teachers can determine whether the students enrolled in the program meet the targeted level of competencies. This kind of qualitative data can help evaluators better understand what students have achieved, how they have met the desired level of competencies, and how they have applied acquired knowledge to solve problems in their professions.

In order to use students' reflections in e-portfolios for program evaluation, the guiding questions for these reflections must be initially designed to help inform program evaluation (Rovai, 2003). Prior research indicates that a framework and guidelines are necessary to help students develop meaningful reflections (Pappas, 2010; Woodward & Sinclair, 1998). The guiding questions for such reflections should encourage students to compare their previous and current knowledge and skills in order to probe their growth and improvement through the program. The researcher recommends to design questions that can help students reflect on their past performance, current strengths, and future growth. Reflections require higher-order thinking skills (Savery & Duffy, 1996), and it is difficult to trigger high-level reflection without appropriate support (Hmelo & Lin, 2000). Therefore, it is recommended to provide students with sufficient opportunities and guidance to practice the reflective skill throughout the program.

This study explored the use of student's reflections as a mechanism that can be used in conjunction with other methods of data collection to conduct a more comprehensive evaluation of online programs. This qualitative analysis found that such data not only reveals individual

student achievement and growth, but also can provide insights and help inform the design and implementation of distance-delivered learning experiences.

### **Limitations of the Study**

There are several limitations associated with this particular study. First, there was the issue of potential researcher bias because the researcher had been working in the ITMA program as a course facilitator for a couple of years. The researcher made every effort to ensure that the results of the study pertained solely to information gathered under the data collection guidelines and not through any incidental information known to her. Second, students' reflections were not anonymous and they have been reviewed and formally assessed by course facilitators for assessment purposes, so there is a possibility that an issue of validity may exist if the students' reflections were not honest. Lastly, variability in students' writing ability may have had an impact analyzing the written documents. The students may indeed have gained insight and awareness through the reflective practice in the e-portfolio process, but if they are not skilled in expressing their learning process and achievement clearly or descriptively, these changes may not have been detected.

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## Appendix A

### Quality Indicators of Online Programs

Researcher/Organizations	Benchmarks
Institute for Higher Education Policy (IHEP, 2000)	<ul style="list-style-type: none"> <li>• Institutional Support</li> <li>• Course Development</li> <li>• Teaching and Learning</li> <li>• Course structure</li> <li>• Student support</li> <li>• Faculty support</li> <li>• Evaluation and Assessment</li> </ul>
Bates (2000)	<ul style="list-style-type: none"> <li>• Access and flexibility</li> <li>• Cost</li> <li>• Teaching and learning</li> <li>• Interactivity and user friendliness</li> <li>• Organizational issues</li> <li>• Novelty</li> <li>• Speed</li> </ul>
McGorry (2003)	<ul style="list-style-type: none"> <li>• Flexibility</li> <li>• Responsiveness</li> <li>• Interaction</li> <li>• Student learning</li> <li>• Technical support</li> <li>• Technology</li> <li>• Student satisfaction simultaneously</li> </ul>
Kidd (2005)	<ul style="list-style-type: none"> <li>• Interaction</li> <li>• Design</li> <li>• Convenience</li> <li>• Feedback</li> <li>• Usability</li> </ul>
Department of Education (2006)	<ul style="list-style-type: none"> <li>• Course Overview and Introduction</li> <li>• Learning Objectives (Competencies)</li> <li>• Assessment and Measurement</li> <li>• Instructional Materials</li> <li>• Learner Interaction and Engagement</li> <li>• Course Technology</li> <li>• Learner Support</li> <li>• Accessibility</li> </ul>

- Sloan Consortium (2010)
- Institutional support
  - Technology support
  - Course development and instructional design
  - Course structure
  - Teaching and learning
  - Social and student engagement
  - Faculty support
  - Student support
  - Evaluation and assessment
-

## Appendix B

### Guidelines for the nine standards in e-portfolio<sup>1</sup>

Design	Design is the process of planning the instruction. Through the design process you specify the conditions that are part of the learning environment. Documents that detail the plans for the design of an instructional product are included. In these documents, you might discuss learners, context, or the instructional strategies needed to meet the need of the learners.
Development	Development is the actual creation of instructional materials. Included in this domain are the final products created from the plans detailed in the design documents.
Utilization	Utilization includes the use of processes and resources for learning focusing on the user's perspective. Utilization artifacts are able to demonstrate your knowledge and skills in response to the following questions: What have you done to encourage the use of a particular type of media? What have you done to encourage the adoption of a new technology? What have you done to encourage that this new technology is incorporated into the organization? What policies and regulations restrict the use of certain technologies?
Management	Management includes the actual or planned management of projects, resources, delivery systems, or information. This can include managing budgets, personnel, or supplies, as well as facilities, technology, or the information needed by individuals
Evaluation	Evaluation determines the adequacy of something. This something may be a project, a program, or even a product and is usually based on a predetermined set of criteria.
Research	Research includes developing an awareness of the issues that impact Instructional Design & Technology. Studying the concepts, problems, and approaches with which to investigate the problems enhances a students' ability to read and make sense of research they may encounter.
Resources	Resources help us in many ways. As you proceed through the program you will encounter many external resources that may be helpful and appropriate to apply in educational environments.
Resume	A page that documents a student's goals, educational background, and work experiences.
Reflection	Reflection makes your learning meaningful to you. It allows you to look back and come to know how much you've learned and how your attitudes and opinions have changed in the process of learning. It allows you to document the personal insight and growth you have experienced by having completed an assignment or project. It allows you to determine what you need to succeed as an Instructional Technologist.

<sup>1</sup> Pierson, M. E. (2010). Guidelines for the placement of artifacts in the ITMA e-portfolio. [Class handout]. Retrieved from [http://www.itma.vt.edu/modules/fall11/porteval/Guidelines\(Spring%202010\)%20\(2\).pdf](http://www.itma.vt.edu/modules/fall11/porteval/Guidelines(Spring%202010)%20(2).pdf)

**Appendix C**

An overview of the reflective activities

Reflection Artifacts	Description of Activity	Grading Criteria
<p>Reflection One:  Your previous approach<sup>2</sup></p>	<ul style="list-style-type: none"> <li>• Using the five tasks presented above as organizers, reflect upon and analyze your previous approach to instruction.</li> <li>• Describe how, or if, you typically performed each of the five tasks. Identify problems you encountered in performing each task and how you attempted to solve those problems.</li> <li>• Also identify significant successes you experienced with respect to each of the tasks. Where appropriate, include specific examples that demonstrate your role in the instructional process:                         <ul style="list-style-type: none"> <li>○ Design: conditions for learning</li> <li>○ Develop: instructional materials and experiences</li> <li>○ Utilize: processes and resources for learning</li> <li>○ Manage: plan, organize, coordinate, and supervise instruction</li> <li>○ Evaluate: the adequacy of instruction and learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Described how, or if, each of the five tasks (design, develop, utilize, manage, evaluate) was typically performed. (5)</li> <li>• Identified problems encountered in performing each task. (5)</li> <li>• Identified and described attempts to solve those problems. (5)</li> <li>• Identified significant successes experienced. (5)</li> <li>• Included specific examples that demonstrate their role in the instructional process (not required for all categories). (3)</li> <li>• Grader's discretion. (2)</li> </ul>

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<sup>2</sup> Instructional Technology in Context: Your previous approach [Class handout]. (2011). Retrieved from <http://www.itma.vt.edu/modules/fall11/itcontext/lesson7.htm>

<p>Reflection Two:</p> <p>Your current approach<sup>3</sup></p>	<ul style="list-style-type: none"> <li>• Reflect upon and analyze your current approach to instruction. Organize your response according to the five tasks presented above.</li> <li>• Describe how, or if, you typically perform each of the five tasks. Identify problems you currently encounter in performing each task and how you attempt to solve those problems.</li> <li>• Also identify significant recent successes you have experienced with respect to each of the tasks. Where appropriate, include specific examples that demonstrate your role in the instructional process.</li> <li>• Discuss how your new knowledge of technology impacts your performance of the task, solving the problems you encounter, and may have been involved in recent successes.</li> <li>• Finally, compare your past approach to instruction with your current approach and discuss any similarities and differences between the two approaches.</li> </ul>	<ul style="list-style-type: none"> <li>• Described how, or if, they typically perform each of the five tasks (design, develop, utilize, manage, evaluate). (5)</li> <li>• Identified problems currently encountered in performing each task. (5)</li> <li>• Identified how they attempted to solve those problems. (5)</li> <li>• Identified significant recent successes experienced (with respect to each of the tasks). (5)</li> <li>• Compared similarities and differences between past and present approaches to five tasks. (5)</li> </ul>
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<sup>3</sup> Instructional Technology in Context: Your current approach [Class handout]. (2011). Retrieved from <http://www.itma.vt.edu/modules/fall11/itcontext/lesson8.htm>

<p>Reflection Three:  Differences in your approach and non-IT approach<sup>4</sup></p>	<ul style="list-style-type: none"> <li>• Identify and reflect upon the specific ways in which ITMA has affected you.</li> <li>• Consider how, or if, your life will be different upon completion of the ITMA program.</li> <li>• Upon completion of this process, and using <b>your own set of organizers</b> that express the personal and professional impact, describe and discuss the results of your reflections. Where appropriate, include specific examples.</li> <li>• Based upon your reflections, respond to the following questions:</li> <li>• Am I an instructional technologist?</li> <li>• Why?</li> </ul>	<ul style="list-style-type: none"> <li>• Identified ways ITMA has affected them. (5)</li> <li>• Provided reflections of how ITMA has affected them (providing examples where appropriate). (5)</li> <li>• Described if they are an instructional technologist. (5)</li> <li>• Explained why they are an instructional technologist (or why they are not). (5)</li> <li>• Well organized responses that reflect deep thought. (5)</li> </ul>
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<sup>4</sup> Instructional Technology in Context: Differences in your approach and non-IT approach [Class handout]. (2011). Retrieved from <http://www.itma.vt.edu/modules/fall11/itcontext/lesson9.htm>

**Appendix D****Students' basic information**

Year	No.	Grade					Age				
		A	A-	B+	B	20+	30+	40+	50+	60+	
2005	M	5	5	-	-	-	1	2	1	1	-
	F	5	5	-	-	-	3	1	1	-	-
	Total	10	10	-	-	-	4	3	2	1	-
2006	M	4	4	-	-	-	1	2	-	1	-
	F	7	7	-	-	-	-	2	3	2	-
	Total	11	11	-	-	-	1	4	3	3	-
2007	M	4	4	-	-	-	-	1	1	1	1
	F	6	6	-	-	-	1	2	2	1	-
	Total	10	10	-	-	-	1	3	3	2	1
2008	M	5	5	-	-	-	1	3	1	-	-
	F	5	2	1	2	-	3	2	-	-	-
	Total	10	7	1	2	-	4	5	1	-	-
2009	M	5	5	-	-	-	1	3	1	-	-
	F	5	5	-	-	-	-	5	-	-	-
	Total	10	10	-	-	-	1	8	1	-	-
2010	M	1	1	-	-	-	1	-	-	-	-
	F	9	7	1	-	1	2	4	2	1	-
	Total	10	8	1	-	1	3	4	2	1	-
2011	M	3	2	1	-	-	-	2	-	1	-
	F	7	5	2	-	-	2	2	3	-	-
	Total	10	7	3	-	-	2	4	3	1	-

## Appendix E

Criteria used in grading the reflections statements in student's portfolio<sup>5</sup>

Indicator	Unacceptable	Approaching	Target
Careful Thought	Most statements include personal reactions that relate to the component.	Most statements include personal reactions that are descriptive, insightful, and relate to the component.	All statements include personal reactions that are descriptive, insightful, and relate to the component.
Self-assessment	Few or no statements articulate what was learned about the component from creating the artifacts.	Most statements articulate what was learned about the component from creating the artifacts.	All statements articulate what was learned about the component from creating the artifacts.
Critical Thinking Skills	Few or no statements illustrate the ability to effectively critique work or provide suggestions for constructive practical alternatives.	Most statements illustrate the ability to effectively critique work and provide suggestions for constructive practical alternatives.	All narratives illustrate the ability to effectively critique work and provide suggestions for constructive practical alternatives.
Indication of Personal Growth	Few or no statements provide suggestions for future professional development or future application of the knowledge or skill.	Most narratives provide at least 1 suggestion that is related to the artifact and provides for future professional development or future application of the knowledge or skill.	All narratives provide at least 1 suggestion that is related to the artifact and provides for future professional development or future application of the knowledge or skill.
Description	Describes an event, experience or artifact using facts and feelings.	Describes an event, experience or artifact clearly using appropriate terms; provides relevant details.	Describes an event, experience or artifact with clear and precise terms; provides selective details and facts.
Analysis	Few or no statements give insight into decision making or connect experience to prior knowledge, artifact, and component.	Most statements give insight into decision making, and connect experience to prior knowledge, artifact, and component.	All statements give insight into decision making, demonstrate awareness of issues, and connect experience to prior knowledge, artifact, and component.

<sup>5</sup> Pierson, M. E. (2010). Assessing reflections in the ITMA portfolio [Class handout]. Retrieved from [http://www.itma.vt.edu/modules/fall11/porteval/Assessing%20Reflections-Spring2010\[1\].pdf](http://www.itma.vt.edu/modules/fall11/porteval/Assessing%20Reflections-Spring2010[1].pdf)

## Appendix F

### Indicators of competencies of AECT domain addressed in the Student Reflection Documents<sup>6</sup>

<b>Design</b>
<p>A. Instructional Systems Design</p> <ul style="list-style-type: none"> <li>- use design principles</li> <li>- apply a variety of Design models and the different implications of the models</li> <li>- identify learning theories from each model</li> <li>- prescribe, implement, and evaluate the lesson</li> </ul>
<p>1. Analyzing the Instructional Systems Design</p> <ul style="list-style-type: none"> <li>- write objectives for content and outcomes</li> <li>- use research methods to investigate tasks and content</li> <li>- understand the instructional content, tasks, and context</li> <li>- identify the theories of instructional design and systems development</li> <li>- categorize objectives using Bloom's</li> <li>- compare and contrast curriculum objectives in one's subject area</li> </ul>
<p>2. Designing the Instructional Systems Design</p> <ul style="list-style-type: none"> <li>- to create a plan</li> <li>- to research in-depth the subject area plus make accommodations for all learners</li> <li>- to use a variety of context and systems for procedures and principles</li> <li>- to recognize the current trend</li> <li>- to use technology to create interactive lessons for students</li> </ul>
<p>3. Developing the Instructional Systems Design</p> <ul style="list-style-type: none"> <li>- to use multimedia</li> <li>- to use more than one multimedia authoring</li> <li>- to use research to help with the development and the selection of instructional media</li> </ul>

<sup>6</sup> AECT standards for initial and advanced programs in educational communications and instructional technology [Class handout].(2011). Retrieved from <http://www.itma.vt.edu/modules/fall11/porteval/standards.htm>

<p>4. Implementing the Instructional Systems Design</p> <ul style="list-style-type: none"> <li>- to create a plan that incorporates multimedia authoring that addresses the needs of all learners</li> <li>- to conduct research that will help in the implementation of the instructional plans</li> </ul>
<p>B. Message Design</p> <ol style="list-style-type: none"> <li>1. To apply principles to help create lessons</li> <li>2. To research multiple media designs</li> <li>3. To develop educational messages with or without learners</li> </ol>
<p>C. Instructional Strategies</p> <ol style="list-style-type: none"> <li>1. To chose different strategies for different types of learners</li> <li>2. To identify several strategy models and apply within the field or subject</li> <li>3. To demonstrate the use of these appropriate strategies</li> <li>4. To evaluate these strategies</li> <li>5. To select strategies those are motivating for the learner</li> </ol>
<p>E. Learner Characteristics</p> <ol style="list-style-type: none"> <li>1. To identify or create a range of strategies for the subject area</li> <li>2. To apply the created range of strategies for the subject area</li> </ol>
<ol style="list-style-type: none"> <li>1. Chose the correct educational media that will be in a program</li> <li>2. Use productivity tools to create an educational product</li> <li>3. Use theory, research, and evaluation to help in choosing the correct tools</li> <li>4. Use Instructional Design principles to pick the appropriate tools to create the product</li> <li>5. Develop the product that applies learning strategies</li> <li>6. Use research to improve programs</li> <li>7. Create a portfolio that would showcase strengths</li> </ol>
<p>A. Print Technologies</p> <ol style="list-style-type: none"> <li>1. Develop products that are focused on the text such as posters, brochures</li> <li>2. Use educational software to produce programs and to include a variety of different applications</li> </ol>
<p>B. Audiovisual Technologies</p>

<ol style="list-style-type: none"> <li>1. Use visual and media literacy principles to help produce materials</li> <li>2. Create a storyboard using visual and media</li> <li>3. Use appropriate equipment</li> </ol>
<p>C. Computer-Based Technologies</p> <ol style="list-style-type: none"> <li>1. Incorporate computer-based technologies that can produce audio or visual instructional materials</li> <li>2. Use digital information</li> <li>3. Use digital tools such as cameras, video cameras and scanners</li> </ol>
<p>D. Integrated Technologies</p> <ol style="list-style-type: none"> <li>1. Use authoring tools to help with the development of the product</li> <li>2. Create materials that can be used for distance education</li> <li>3. Use both electronic and non-electronic media to produce instructional media</li> <li>4. Produce materials using the WWW and electronic mail</li> <li>5. Create a web page with links</li> <li>6. Produce a CD</li> <li>7. Find and use materials found on the web</li> </ol>
<p>A. Media Utilization</p> <ol style="list-style-type: none"> <li>1. To use appropriate technologies for instructional design process</li> <li>2. To use research and theory in the utilization of technologies learning</li> <li>3. To use technology resources in different learning contexts</li> </ol>
<p>B. Implementation and Institutionalization</p> <ol style="list-style-type: none"> <li>1. To use correct instructional materials and strategies in different learning context</li> <li>2. To integrate educational communication and instructional technology in different learning context</li> <li>3. To identify, implement, and evaluate strategies that will involve the stakeholder in the process</li> </ol>
<p>C. Policies and Regulations</p> <ol style="list-style-type: none"> <li>1. To use technology standards</li> <li>2. To use and instruct professional ethics</li> <li>3. To use and instruct copyright and fair use guidelines</li> </ol>

4. To use and instruct effective policies in instructional technologies and variety of context
5. To use and instruct policies and regulations which apply to distance delivery technologies
<b>Management</b>
A. Project Management: to apply, implement, and evaluate different learning context
B. Resource Management: to apply, implement, and evaluate different learning context
C. Delivery System Management: to apply, implement, and evaluate different learning context
D. Information Management: to apply, implement, and evaluate different learning context
<b>Evaluation</b>
A. Problem Analysis: to find, evaluate, and correct
B. Criterion-Referenced Measurement: to apply information for creating new and better materials
C. Formative and Summative Evaluation: to apply evaluation strategies in a variety of education communication context
D. Long Range Planning: to create a plan using all technology standards

## Appendix G



VirginiaTech

Office of Research Compliance  
 Institutional Review Board  
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 Blacksburg, Virginia 24060  
 540/231-4606 Fax 540/231-0959  
 e-mail irb@vt.edu  
 Website: www.irb.vt.edu

**MEMORANDUM****DATE:** November 16, 2011**TO:** Barbara B. Lockee, Yanzhu Wu**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)**PROTOCOL TITLE:** Use of Students' Reflections in e-Portfolios for Program Evaluation: Qualitative Content Analysis**IRB NUMBER:** 11-966

Effective November 16, 2011, the Virginia Tech IRB Administrator, Carmen T. Green, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

**PROTOCOL INFORMATION:**Approved as: **Exempt, under 45 CFR 46.101(b) category(ies) 4**Protocol Approval Date: **11/16/2011**Protocol Expiration Date: **NA**Continuing Review Due Date\*: **NA**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

**FEDERALLY FUNDED RESEARCH REQUIREMENTS:**

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

*An equal opportunity, affirmative action institution*

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

\*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office ([irbadmin@vt.edu](mailto:irbadmin@vt.edu)) immediately.

cc: File