

**ELECTRONIC STUDENT PORTFOLIOS: DOCUMENTING
LEARNING IN GRADE 2/3**

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Dedication

To Doug and to my family.

Abstract

Capturing, documenting, assessing, and highlighting the dynamic nature of learning has challenged educators for decades. Student portfolios offer flexible and versatile options in meeting these goals. Rapid advances in technology have permitted and indeed, enticed educators in the exploration of electronic portfolios. Technology such as computers, scanners, digital cameras, CD writers, and the World Wide Web have expanded the possibilities in documenting student growth and learning. My qualitative study focuses on using electronic portfolios in my grade 2/3 class at Blackie School. Four students were selected to participate, with equal representation from males, females, grade 2, and grade 3. The participants compiled electronic portfolios to document their learning and growth throughout the school's second reporting period. The creation of the electronic portfolios took place over a six-week period in March and April 2001. Data was collected from my journal, observations, student journals, student surveys, and parent surveys. From the data, two general conclusions emerged. Firstly, an electronic showcase portfolio or an electronic component within the traditional paper portfolio, may be more viable options for Division I (K-3) students. The time and challenges encountered in digitizing the volumes of paper samples necessary for an electronic process portfolio were enormous. Secondly, a robust computer network including a fileserver and peripherals are essential, as is technological support and training for educators. The computer system must be able to support the daily demands of the general school population in addition to supporting massive multimedia files created by electronic portfolios. Indeed, technology can be incorporated into student portfolios, offering new avenues in documenting student

learning and growth. However, the extent and role of technology must be examined. This study revealed that, given the current setting at Blackie School, creating completely electronic student process portfolios for a full class of Division I students would not be a viable alternative at this time. This study documents our experiences with creating electronic student portfolios in grade 2/3. I hope that it will be of some assistance to other Division I educators in exploring and determining the role of technology in documenting student learning.

Preface

“The teacher is no longer merely the-one-who-teaches but one who is himself taught in dialogue with the students, who in turn while being taught also teach. They become jointly responsible for a process in which all grow.”

Paulo Freire in *Pedagogy of the Oppressed*

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Chapter 1: Introduction

Background

The process of learning is lively, dynamic, and personal. Locating methods of assessment that can accurately convey and document each child's learning and progress has challenged educators for decades. As Parsons (1998) observes "educators today are challenged to find ways for students of diverse abilities, cultures, and ways of knowing to express learning, much of which is not confinable to a 'product' (p. 29)." Using student portfolios is one approach to capture and highlight the fluid and dynamic processes of learning. Incorporating technology into student portfolios is attracting more attention from educators and students alike. Herein lies my research interest, as I will be examining the viability of electronic student portfolios as a means of documenting and communicating individual learner progress.

My eight years of teaching experience have taken place in Division I (K-3) and II (4-6) classrooms at Blackie School. I have taught in traditional graded classrooms, split grade classrooms and multi-age classrooms. In any setting, teaching and learning are dynamic and active pursuits. Documenting and communicating student progress should reflect this. I have always used a form of portfolios with my students to track student learning. However, these early portfolios only presented students' published work and final products. Any underlying processes, strategies, or understandings contributing towards reaching the end products were not represented in the portfolio. I became increasingly interested in using student portfolios in my Division I classroom for the purposes of assessment, student reflection, and facilitating communication of student

progress to parents. In the fall of 2000, I worked with 31 Division I students to create portfolios that fulfilled these goals. Individual growth and progress was clearly documented for students, parents, and me. I observed that the students began to take on responsibility for their role in the learning process and were able to reflect on their progress. They became more aware of their learning and progress. The students' enthusiasm for learning grew as they recognized, identified, and celebrated their own personal growth. They were taking ownership for their learning and were able to set goals for their learning. Parents appreciated the wealth of information that the portfolio provided about their child. They were presented with a multitude of concrete examples of their child's work, comments, reflections, and goals. The portfolios provided the parents, children, and me with a common ground from which to discuss and plan for each child's program.

In creating portfolios, the students incorporated a variety of technologies. This included a computer, scanner, digital camera, and CD-ROMs. It was extremely motivating and enjoyable for the students to use technology. It allowed them to include many samples in the portfolios that would otherwise have been impossible to include, such as multimedia projects. Technology itself became another medium through which the students could demonstrate their learning, understanding, and growth. Technology opened up many avenues in documenting student progress. This led me to become interested in exploring the possibilities of using electronic portfolios with my students. An electronic portfolio is a technological variation of the traditional portfolio, possessing tremendous possibilities in expressing, extending, and documenting student learning.

Purpose and Focus

The purpose of my study was to examine the advantages and disadvantages of developing student electronic portfolios as an authentic tool of assessment. I wanted to use it as a means of assessment that would encourage students to become actively involved in their own learning and would provide concrete and lasting documentation of student learning to parents. My study involved creating and studying the use of electronic portfolios with four of my Division I students during the school's second reporting period, which spanned from November 27, 2000 to March 16, 2001. The students compiled and created their electronic portfolios from March 5 through April 10, 2001. My research question was as follows: What are the advantages and disadvantages of using electronic portfolios with Division I students as a means of assessment that encourages students to become actively involved in their learning and provides concrete documentation of student learning to parents?

Chapter 2: Review of the Literature

Introduction

Using portfolios to document student learning and growth is not a novel idea. In today's classroom, the use of portfolios stems from the visual and performing arts tradition, which showcases the breadth and depth of an artist's talents, performance, and accomplishments. Increasingly, educators are incorporating portfolios into their classrooms, and asking students to create portfolios that reflect their personal growth and accomplishments as individual learners. The portfolios produced are unique and tailored to each individual student. As technological advances continue, the options and avenues available in creating portfolios are rapidly expanding.

In my review of the literature related to electronic portfolios, several key themes or issues emerged and will be discussed in depth throughout this chapter. First, in the history of assessment, standardized testing has been shown to be an ineffective method of assessing student learning. Increasingly, educators have turned towards authentic assessment in search of alternative assessment practices. Alternative assessments open up the range of activities and tools used for assessment, one of which may be the student portfolio. A second main issue in the literature draws attention to the fact that there are numerous terms employed in regards to portfolios. As a result, it may be more challenging for educators to find a common ground upon which to engage in meaningful dialogue. A third theme in the literature points to the vast array of available technology, which can be used in creating electronic portfolios to document student learning. A final theme in the literature identifies the advantages and disadvantages of incorporating

electronic student portfolios into a school program.

History of Assessment

The history of assessment and evaluation in Canada has strong roots in quantitative practices. As schools evolved in the early twentieth century, they were given the task of sorting students from the highest achievers to the lowest (Stiggins, 1997). The system of sorting students thus met the needs of society throughout the 1920s and 1930s as it allowed students to find their way into the variety of social and economic levels present in society. Some students remained low in the sorting process, or dropped out altogether, likely moving into the dominant agricultural and emerging industrial sector of society. Other students scored higher in the rankings and continue on to higher education. At approximately the same time, compulsory education laws became a reality. Schools now were in need of efficient methods of managing the unprecedented numbers of students. One response came in the form of “assembly line schools” where the amount of time given for learning was fixed at one year per grade (Stiggins, 1997). The amount learned would vary from student to student. Some students learned a great deal at one level and thus continued to be ranked high at the next level of learning. Other students learned very little at one level and did not make a great deal of progress at the next grade level. The variations in achievement amongst and between students at each grade level widened. As a result, sorting students along the vast continuum of achievement continued (Stiggins, 1997). All students received education and society could still meet its need for individuals moving into different levels of society.

This rank ordering system of education became locked firmly in place in the 1930s with the arrival of a new kind of test. In the early 1900s the “father” of the

educational testing movement, Robert Thorndike, worked extensively on using testing to measure learning. Standardized testing in education gained momentum in the 1920s and 1930s. This type of test became popular for several reasons. It was scientific in rigor, meaning that it was objective, controlling for inherent biases and idiosyncrasies of a teacher's subjective judgements. The test could be mass-produced, mass administered, and mass scored efficiently and economically. As Stiggins (1997) notes "most importantly, it could be specifically designed to provide the quintessential sorting criterion – a score that carried exactly the same meaning for all students who took the same test" (p. 46). By 1942, an eight-year study by Tyler (1942) established formalized evaluation as the most substantial method to account for learning. Testing was viewed as an important way to assess and evaluate because a mathematical score was believed to be factual and true (Cole, Ryan, & Kick, 1995). These formalized, standardized tests served a multitude of functions and thus became a dominant method of documenting student learning and achievement for decades.

In the 1980s the theme of accountability increased test usage in documenting learning. School systems across North America invested a great deal of time, money, and energy in testing. Unfortunately, many tests used in isolation fail to permit students to demonstrate what they know and the processes of learning in which they have engaged. Formalized tests are simplistic, rigid, and static, like a frozen task in time (Cole, Ryan, & Kick, 1995). Indeed formalized tests focus on an isolated final score, rather than the processes involved in an individual arriving at an answer. The very nature and structure of standardized tests dictates that they can only give minimal information other than knowledge acquisition and basic skills. Content coverage is generally shallow because

the broad achievement targets often cover two or three grade levels of content with relatively few selected response items (Stiggins, 1997). Researchers have noted that traditional standardized tests narrow the curriculum to basic skills rather than higher-order thinking skills (Black, 1993). This promotes conformity across all students of the same chronological age, rather than acknowledging learners as individuals along a continuum of learning. Standardized tests lack sensitivity toward the individual student growth and progress that educators value. Indeed, such tests represent a very limited, microscopic and incomplete view of an individual child's abilities, and they fail to identify or provide feedback in regards to a child's overall achievement or growth. Stiggins (1997) states that "it is often the case, out of necessity, that the fidelity of large-scale assessment results be sacrificed somewhat for the sake of economy" (p. 34). In addition, when a great deal of emphasis is placed on formalized testing, it is the tests that become the driving force behind instruction rather than the curriculum.

Through the late 1980s, the role of the school began to change. Society began to realize that the bottom third of the students, who generally went to work on the farm or in the factories, had no way to contribute to the economic system (Stiggins, 1997). The need for programs for students who were considered at risk was recognized, as was the importance of workplace competency and other life skills. While only approximately 30% of high school students continued on to university, the educational experience was tailored to this minority group (Stiggins, 1997). Society realized that schools needed to become more than mere sorting institutions. As Stiggins states, schools "must become places in which students meet very high academic standards and acquire many of the life skills and job-related competencies needed to survive and prosper in a rapidly changing

world” (p. 48). Society acknowledged that schools needed to become achievement-driven institutions. This presented a challenge to educators of today, who must “define the meaning of academic success in clear and specific terms and assess student attainment with a high degree of precision” (Stiggins, 1997, p.48). As Hebert (1992) states, “standardized tests do not reflect how we teach, the effects of our teaching on children, or how we adapt instruction to learners” (p. 58). Changing the manner in which educators assess and evaluate would inevitably change what it means to teach and learn.

Authentic Assessment

Assessment is a process of gathering information about students, including what they know and can do (Hart, 1994). The purpose of assessment, then, is to find out what each individual student is able to do, with knowledge, and in context. Assessment and evaluation should also support and improve learning and teaching (Grant, Heffler, & Mereweather, 1995). Yet, as Wiggins (1998) notes, “at present, we do not assess what we value, we test what is most easy to reliably and cheaply test” (p. 20).

Both teachers and researchers have recognized the need for alternative assessments that can give a more accurate picture of the learning process. Learning is a dynamic, active, individual process whereby learners construct meaning. Educators recognize the individual needs, learning styles, and backgrounds of students and attempt to utilize instructional strategies that will assist each student in progressing along the learning continuum. Assessment must be brought in line with instruction in order to provide useful information about students. Assessment should therefore be an equally varied, dynamic, and individual process. Moersch and Fisher (1995) emphasize the need for alternative assessments that can give a more accurate picture of the learning process:

Education's renewed commitment to concept/process-based learning and its emphasis on relevancy and authentic applications have created a growing demand for dynamic assessment strategies and instruments that measure multiple dimensions of a student's academic progress. (p. 10)

Wiggins (1989) defines authentic assessment as that which requires students to go beyond basic recall and demonstrate their knowledge and understanding through a product, performance, or exhibition. This type of assessment is performance based, multi-dimensional, and facilitates exploration of student learning from a variety of perspectives. Authentic assessment proposes that students should demonstrate, rather than be solely required to tell or be questioned about what they know and can do. Such assessments engage students in activities that are meaningful, interesting, significant, and relevant to their lives. Authentic assessments are part of the curriculum and reflect real-life, interdisciplinary challenges (Hart, 1994). They present students with complex, open-ended tasks, integrating skills and knowledge. Authentic assessments involve higher-order thinking skills and a broad range of knowledge (Hart, 1994). Moersch and Fisher (1995) point out that "extending beyond a paper-and-pencil format, this new breed of assessment strategies embraces a wide variety of media (e.g. pictures, sound, video, computer-based multimedia presentations) to document student success from across the curriculum" (p. 10). When students are given the opportunity to participate in real world activities, they become more interested, engaged in their learning and willing to invest more time and energy. As Schurr (1999) notes, "product assessment is motivating because projects are stimulating, relevant, give a focus to efforts, and are

something that can represent the student before an audience” (p. 5).

Authentic assessments recognize and value students’ varied abilities, learning styles, and backgrounds. Students are encouraged to make choices about the medium through which they will engage in and represent their learning. Tasks can be attempted by all students, with activities scaffolding up to meet all students’ needs (Hart, 1994). In this way, authentic assessment includes all students, highlighting individual strengths and revealing areas to improve.

Authentic assessments encourage students to become involved in the learning process. A more student-centered classroom is promoted, wherein the teacher acts as a facilitator, guiding students in taking ownership and responsibility for their learning. Authentic assessments are scored according to clearly stated performance standards that students may assist in creating. In doing so, they “communicate to students what it means to do their work well by making explicit the standards by which that work will be judged” (Hart, 1994). The assessment measures are not arbitrary or intrusive. Rather they address the needs of the individual students.

The manner in which we assess inevitably affects the way teachers teach and the way students learn. The purpose of assessment in education must be reexamined. Standardized testing does, indeed, provide statistical information on how well large numbers of students are learning basic facts and rote understandings. However, these assessments are one dimensional, promote uniformity, and are misleading when they are used as the sole measure of a student’s progress upon which to base educational decisions. Standardized tests cannot provide the depth and rich information about individual students, what and how they are learning, and what sense they are making of

their own learning. Fischer and King (1995) point out that

the data gained from all forms of assessment must be questioned and evaluated constantly, and it must be determined if other methods of evaluation provide teachers with more valuable information that is more aligned with their instructional program. (p. 17)

Using standardized testing as a sole measure of student performance no longer matches education's instructional practices. Schools cannot continue to measure for student deficiencies (Fischer & King, 1995). Instead, "administrators and teachers must communicate as professionals, design classroom learning as facilitators, and use assessment as stewards of young people's opportunities to learn" (Fischer & King, 1995, p. 7).

Portfolios

Student portfolios offer one avenue for engaging in authentic assessment. This type of assessment "is not static, but shifting and dynamic...a portfolio can represent a possible container for the kind of assessment and information that really matters" (Kieffer & Morrison, 1994, p. 411). While portfolios are not a novel idea in education, the term portfolio can be somewhat elusive. It can carry very different meanings for different people. A portfolio at the K-12 level is essentially a collection of a student's work which can be utilized to demonstrate his or her skills and accomplishments (Lankes, 1995). Through student portfolios, curriculum, instruction, and assessment intersect. At the point of intersection, portfolios are aligned with the curriculum and offer concrete evidence of individual student learning and knowledge. Tierney, Carter and Desai (1991) view

portfolios “as systematic collections by students and teachers that could help both consider effort, improvement, processes and achievement across a diverse range of texts that were read or written” (p. x).

Portfolios can be created in many different ways, each possessing valid purposes. The form and function of student portfolios depends upon the needs and goals set out by each individual teacher. Therefore, what portfolios are depends on the needs they serve as determined by individual teachers. Gilman and Rafferty (1995) note that “portfolios are so versatile that their use defines their characteristics” (p. 1). It is this feature of portfolios that makes it difficult to define the terminology. It is not practical or even possible to write a recipe for creating portfolios with all students because portfolios are so personal and versatile. Portfolios are interpreted and implemented in a multitude of ways in order to meet the goals and purposes set out by individual classroom teachers.

In creating a portfolio, students and teachers select work samples to highlight and concretely demonstrate the processes of learning. At its best, a portfolio can create a picture of the whole child from a variety of vantage points. A portfolio becomes much like a window, allowing visitors to gain insights into the owner of the portfolio. Grant, Heffler, and Mereweather (1995) state that portfolios provide “a picture of what students know and can do, and is full of ‘snapshots’ of student learning at specific times during the year” (p. 59) This provides a great deal of detailed information about the individual learner. Portfolios can highlight both the dynamic processes inherent in learning as well as the desired products and thus is a comprehensive form of assessment. De Fina (1992) asserts that “standardized testing can offer a product – with no hint of how students produced the product – but portfolios can and do show the processes as well” (p. 65).

Portfolios provide a container, a space in which to organize, assess, and celebrate the individual learner's growth as it is occurring. Following this, portfolios can then inform future instruction. The contents of the portfolio provide rich information about each student's knowledge and skills. It offers a robust and meaningful record of student achievement. This information can then be utilized to make decisions about how to meet the needs of the individual learner. Portfolio assessment is not an end judgement but rather a continual process with the intent of assisting all students along the path of learning and celebrating the journey.

By its very nature, portfolios invite and indeed necessitate student involvement. In creating a portfolio, students are given the task of demonstrating what they have learned. Students, facilitated by teachers, collect, select and reflect upon work samples that will provide evidence of their learning and progress. Engaging in selection and reflection encourages students to accept ownership of their learning and fosters feelings of empowerment. It is these very processes of collecting, selecting and reflecting upon learning is what makes a portfolio dynamic and meaningful (Hill & Ruptic, 1991). Reflection is a key component of the process, as this invites students to think about their growth. Grant, Heffler, and Mereweather define reflection as "the process of thinking about how you have learned, what you have produced and where you will go next" (p. 73). This type of reflection allows students to become more aware of themselves as individual learners. If students are given the opportunity to reflect on their learning, they will be better equipped to identify their own strengths and weaknesses (Grant, Heffler, & Mereweather, 1995). Parsons (1998) notes that "in the process of this choosing and voicing, both learners and teachers come to a richer understanding of their own unique

gifts and talents” (p. 28). This heightened self-awareness facilitates students in recognizing their role in their own learning. Hebert (1992) notes that “developing the metacognitive process in students, even at a young age, heightens their awareness and commitment to a critical assessment of their learning (p. 2). Portfolios provide a medium for the students to see their crucial role in their learning and to take ownership over their own learning. Defina (1992) points out that “as students develop a sense of ownership of their portfolios they will take ownership of their ideas. They will recognize knowledge is acquired as part of a participatory process and that what they learn can be utilized to express their needs and wants” (p. 32). Portfolios hold students accountable for their learning and progress. As Parsons (1998) states:

They allow learners to become more engaged and empowered by selecting how best to represent their learning for assessment. Portfolio assessment also encourages learners to critically identify their own strengths and weaknesses, and discern the process of their learning. (p. 30)

The actual process of creating a portfolio is ongoing. This process is extremely powerful in creating an atmosphere in which students are invited to assert ownership and participate in decisions regarding their own learning. A portfolio itself is a process, a concrete representation of critical thinking, and reflection used to set goal (Barrett, 2000). Indeed, students must share the responsibility of this process.

Portfolios are flexible enough to accommodate any learner and thus, portfolios are inclusive in nature. Educators recognize that children have different learning styles and needs, they progress at different rates and have a variety of unique skills and talents.

Rather than promoting uniformity and conformity, portfolios allow students at any level to demonstrate their learning in a way that is personally meaningful and relevant. The processes and products of learning can be represented in a multitude of valid ways. . Portfolios support the view that learning is a personal and individual process. Hebert (1992) asserts that portfolios “speak to issues of accountability and maintain integrity of our beliefs about children and how they learn” (p. 58). Through portfolios, learning becomes purposeful, engaging, and relevant for each individual student. Indeed, the true power of portfolios is not the portfolio itself but rather the process undertaken to create them and the culture of a school where documented learning is valued (Danielson & Abrutyn, 1997).

Electronic Portfolios

Incorporating technology into student portfolios has increased the variety of terminology and interpretations. The terms “digital portfolios”, “electronic portfolios”, and “computer based portfolios” are used in the literature. At times, the terms appear to be used interchangeably and sometimes they clearly refer to different meanings. Lankes (1995) states that “the terms ‘computer based portfolios’ and ‘electronic portfolio’ are used to describe portfolios saved in electronic format” (p. 3). While she notes that electronic portfolios contain the same types of information as more traditional portfolios, the difference is that the information is collected, stored, and managed electronically. Barrett (2000) makes a clear distinction between such terms. She defines electronic portfolios as portfolios that “include technologies that allow the portfolio developer to collect and organize the artifacts in many forms (audio, video, graphics, and text)” (p. 1). She continues on to point out that “an electronic portfolio contains artifacts that may be

analogue (e.g. videotape) or computer-readable form. In a digital portfolio, all artifacts have been transformed into computer-readable form” (p. 1). Other authors define electronic portfolios as collections of student work made available on the World Wide Web (WWW).

For the purposes of this study, I defined electronic portfolios as selective and purposeful collection of digital samples of student work used to highlight individual student growth and learning and to set learning goals for the future. The work may be created in digital form, scanned from original work or photographs, or captured from a digital camera or video camera.

Technology Tools

Advances in technology have made it possible to utilize it as a medium for documenting student growth. Electronic or digital portfolios are a new option allowed by the rapid increase in technology. Moersch and Fisher (1995) state that “recent advances in microprocessors and mass storage devices, coupled with the proliferation of inexpensive multimedia authoring tools, scanners, digital cameras, personal digital assistants (PDAs), and bar code readers, have made electronic portfolios a reality” (p. 10). Peripherals such as digital cameras, video recorders and scanners can also be used to digitize examples of student learning. As a result of these types of technologies, electronic portfolios can include a wide variety of media such as text, graphics, audio, and video to document student growth and progress.

There were several computer programs referred to in the literature that provide students and teachers with multimedia authoring capabilities. Milone (1995) outlines many tools which educators found very helpful in creating electronic portfolios.

Hypermedia software including HyperStudio, Linkway Live or SuperLink is beneficial. Lankes (1995) also refers to Aurbach's Grady Profile which is a program providing templates to entering work samples. She also describes Claris' FileMaker Pro as a program enabling teachers to create their own templates. Barrett (1998) adds to this list of programs by including HyperCard, Digital Chisel and Asymeterix Toolbook. However, it is not entirely necessary to employ a specialized program in order to create electronic portfolios. Milone (1995) reminds educators that a word processor should not be overlooked as an essential tool. Text created with a word processor such as notes, observations or student work can also be easily included in the electronic portfolio.

Clearly, there are vast numbers of technological tools and software programs that can assist students and teachers in the creation of electronic portfolios. These tools offer more flexibility in what can be represented in a student's portfolio. With such a wide and varied selection of choices of tools and programs available, it can be challenging to make a selection. Individual teachers must decide what tools will assist them in creating the types of portfolios to meet their purposes and objectives.

Advantages and Disadvantages

A final common issue in the literature focuses on the advantages and disadvantages of incorporating technology into student portfolios. Milone (1995) states that "with the widespread acceptance of the 'portfolio' as a viable method of chronicling and assessing student progress, and the increased availability of multimedia computers in the classrooms, it is only natural for educators to marry the two" (p. 28). The possibilities that technology affords educators in the field of student portfolios is intriguing. Many of the articles that I have read focused solely on the clear advantages of electronic

portfolios. One advantage highlighted points to increased student motivation with inclusion of technology. For example, Milone (1995) reports that seventh graders engaged in a pilot portfolio project in Aurora, Colorado were motivated “to go far beyond what was expected of them.... The students bought into it so strongly that doing a ‘good’ job was not enough” (p. 29). Testimonials such as this appear frequently in the literature. Children today are growing up surrounded by technology such as computers, digital cameras, scanners or the WWW and they are very motivated to use technology as a tool in their learning. Incorporating technology into the learning process and into portfolios could lead to increased levels of student interest, motivation, and achievement.

Another clear advantage to using technology in portfolios is the ability to store multiple media. In doing so, students are able to demonstrate their learning in a variety of ways. Lankes (1995) points out that

since current technology allows for the capture and storage of information in the form of text, graphics, sound, and video, students can save writing samples, solutions to math problems, samples of art work, science projects and multimedia presentations in one coherent document. (p. 4)

Students are not limited to traditional paper and pencil tasks to display competency in exactly the same fashion as their peers. Using technology allows students to display individuality and include a greater variety of samples in their portfolio, demonstrating their learning and understanding in novel, personal and meaningful ways.

Incorporating technology is also advantageous because it makes the portfolio easy to access, transport, and upgrade. Students, parents, and teachers would have easy access

to work stored on the computer. Saving the information to a CD-ROM increases accessibility further and also allows the information to be easily transported between home and school and between teachers. In addition, a CD-ROM is very compact and can easily be stored within the classroom. Work saved on a CD-ROM is also easy to upgrade and provides a learning history of a child as he/she progresses through the grades. By using technology to create and store student portfolios, their work can be portable, accessible, and easily and widely distributed (Sheingold, 1992).

Although several articles presented a completely positive perspective on using technology in portfolios, some authors reported different results. While not discounting the positive aspects of using technology, these authors also reported disadvantages and challenges. Penta (1998) identified several areas of concern raised from her study of six schools in Raleigh, North Carolina. Some of the challenges encountered by the staff and students creating electronic portfolios included purchasing costly computers and software, as well as installing school-wide computer networks and servers to support the necessary technologies.

While technology advances, schools often struggle to obtain sufficient funds to purchase new equipment, computers and programs. School-wide networks and servers are costly but are beneficial in providing sufficient storage space for multimedia components of the portfolios. Using a school-wide network also enables students and teachers to access the computers from anywhere in the school. Risconscente (2000) states that digital portfolios take time to be implemented and “requires a robust school technology infrastructure that students and teachers can access on a regular basis” (p. 4). Electronic portfolios are time consuming to create and students require ample access to

the technology. Appropriate security for each individual's work on the computers must be ensured. Participants in Penta's study also reported challenges in providing sufficient training for staff and students in using any new technologies.

Summary

Indeed, there are many factors to consider before implementing an electronic portfolio program. Penta (1998) encourages educators to start small in incorporating technology into student portfolios. Barrett (2000) suggests that educators keep the process of implementing electronic portfolios simple by using familiar software already available in the school. In doing so, staff and students will likely be familiar with the software and the costs and time used for training participants would be reduced. Barrett also notes that "the value added of creating an electronic portfolio should exceed the efforts expended, and faculty members should approach their use of technology conservatively"(p. 8). Incorporating technology into student portfolios should not, therefore, defeat the purpose of the portfolios. Indeed, using technology with portfolios is a tremendous undertaking. Portfolios, in any form, are time consuming and require dedication, determination, and support.

As these authors have indicated, starting small and proceeding in manageable steps will make the process more beneficial, enjoyable, and rewarding for all participants. Modern technology clearly possesses the potential to impact student portfolios in many ways. Individual educators must determine the role, if any, that technology may play in their students' portfolios.

Chapter 3: Qualitative Methodology

Definition and Background

A research method is “a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection” (Myers, 1997, p. 5). The choice of a research method, then, influences the overall design, data collection, and the manner in which the data is presented or shared.

Glesne and Peshkin (1992) state that “qualitative inquiry is an umbrella term for various philosophical orientations to interpret research” (p. 9). It is a challenging task to locate a clear, definitive statement as to what qualitative research is, largely due to the fact that the “topic, theory, and methodology are closely interrelated in qualitative research” (Lancy, 1993, p. 3). A definition of qualitative research is thus centered on the diverse terms, methods, and topics employed. Broadly defined, qualitative research is “any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification” (Strauss & Corbin, 1990, p. 17). Terms used to describe types of qualitative research include case studies, ethnography, educational anthropology, phenomenology, naturalistic inquiry, field study, case study, participant observation, and action research (Merriam, 1998, p. 6). Qualitative researchers can be found in many disciplines and fields, utilizing a plethora of approaches, methods, and techniques. Combs (1995) states that “unlike quantitative methodology with its explicit formulaic construction, qualitative research includes a veritable cornucopia of methodologies, paradigms, and methods” (p. 1).

Qualitative methods first entered education through anthropological and

sociological methods in the study of educational settings and systems (Vidich & Lyman, 1994). An early challenge involved using non-experimental, observational procedures, field orientated and data-driven theories from other social research disciplines (Shank, 1995). Prior to this, the usage of experimental methods dominated what was considered legitimate and scientific domains of research in education (Shank, 1995). The educational researcher could now be scientific without depending on the psychological theories or experimental design.

Purpose of Qualitative Research

Chenail (2000) notes that “a hallmark of the qualitative approaches is their emphasis on open-mindedness and curiosity” (p. 6). Indeed, my qualitative project grew out of my recognition that my students’ portfolios were not realizing their full potential and also a curiosity to explore alternatives. Qualitative researchers are “interested in understanding the meaning people have constructed, that is, how they make sense of their world and the experiences they have in the world” (Merriam, 1998, p.6). In doing so, qualitative researchers attempt to answer often elusive ‘why’ questions. Where quantitative research breaks a phenomenon down into component parts or variables, qualitative research instead seeks to understand the relationship amongst the parts working together as a whole (Merriam, 1998, p. 6). In qualitative research, “it is assumed that meaning is embedded in people’s experiences and that this meaning is mediated through the investigator’s own perceptions” (Merriam, 1998, p. 6). Patton (1985, p. 1, as cited by Merriam, 1998, p. 6) supports this view in stating:

Qualitative research is an effort to understand situations in their uniqueness as part of a particular context and the

interactions there. This understanding is an end in itself, so that is not attempting to predict what may happen in the future necessarily, but to understand the nature of that setting-what it means for participants to be in that setting, what their lives are like, what's going on for them, what their meanings are, what the world looks like in that particular setting-and in the analysis to be able to communicate that faithfully to others who are interested in that setting...The analysis strives for depth of understanding.

Indeed, qualitative research has the potential to provide practicing educators with a wealth of valuable information that is easily accessible. As Grady (1998) notes, "qualitative studies that seek to build understanding and discover meaning are immensely practical for teacher-researchers and others who would attempt to unravel some to the mysteries of schooling" (p. 11).

Characteristics

Naturalistic inquiry. The characteristics of qualitative methodology mesh well with conducting research in the dynamic and interactive environment of my elementary classroom. Phenomenological inquiry employs a naturalistic approach in seeking to understand phenomena within a context-specific setting (Hoepfl, 1997). In this type of study, the focus is on depicting the essence or basic structure of an experience or phenomenon (Merriam, 1998). In my research, I sought to understand how electronic portfolios could be used to document student learning in my grade 2 / 3 class at Blackie

School. Qualitative researchers often work in the field where the research is taking place. As a result of the aim of my research, it took place in the natural setting of Blackie School. As Merriam (1998) notes, in qualitative research “the investigator spends a substantial amount of time in the natural setting of the study, often in intense contact with participants” (p. 8). Qualitative research is purposeful, emphasizes social processes and rejects the artificiality of the lab, causality, absolutes, and statistical analysis. Hoepfl (1997) states, “qualitative research uses the natural setting as the source of data. The researcher attempts to observe, describe, and interpret settings as they are” (p. 3).

The students in the study worked primarily in the office and staff room of Blackie School. We required access to a minimum of four multimedia computers on the school network for large blocks of time as well as access to various peripherals and technologies including a scanner and a digital camera. These items were most easily accessed in the office and staff room and as a result, this setting was the best location for the students to work. This setting served as the base for exploring the creation of electronic portfolios with my students.

Conducting research of this nature within Blackie School was convenient for the participants and myself. The phenomenon being studied would take place in this environment so it was logical that the research should take place in the same setting under the same conditions. This research design allowed me to explore and make sense of experiences and a phenomenon as it pertains to students in a particular environment.

Population sampling. In contrast to quantitative research with larger and more random population sampling, qualitative research sample selection is generally nonrandom, purposeful, and small (Merriam, 1998). This purposeful sampling seeks rich

information cases which can be studied in depth (Patton, 1990). In my research project, I utilized a small population sample consisting of four students. The selection process was based on obtaining equal representation of males and females, grade 2s and grade 3s, as well as representing a variety of academic abilities and skills. As a result, one male and one female from each of grade 2 and grade 3 were selected (see Appendix A). Hoepfl (1997) identifies maximum variation sampling as a form of purposeful sampling that “can yield detailed descriptions of each case, in addition to identifying shared patterns that cut across cases” (p. 6). Due to the types of information that I was seeking to obtain, consideration was also given to students whose parents, based on our prior relationship, indicated a willingness to engage in conversations about portfolios and to participate in surveys. As Merriam (1998) notes “purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned” (p. 61). The participants in my study were purposefully and carefully selected in order to yield the types of information that I was curious about.

Flexibility. In qualitative inquiry, the research has an emergent design as opposed to a predetermined design (Hoepfl, 1997). Researchers focus on the emerging processes, in addition to the outcomes of the research. Qualitative research thus accepts the possibility of unidentified variables. Merriam (1998) states, “the design of a qualitative study is emergent and flexible, responsive to changing conditions of the study in progress” (p. 8). Qualitative research can be more sensitive than quantitative research to the daily changes that may take place in social organizations such as schools (Grady, 1998, p. 4). Indeed, the design of my project was flexible in nature and it continued to

evolve and take shape as it progressed. New elements arose due to the dynamic nature of the learning environment and due to uncontrollable elements such as student attendance, school closures, computer availability and capability. Factors such as these inevitably affected the design and progress of the project. Qualitative research is flexible and can be adapted to meet the needs of an ever-changing social situation such as the school setting.

Data collection. While the design in qualitative inquiry may be emergent, the questions to be explored and plans for data collection are addressed at the outset.

Merriam (1998) defines data as:

nothing more than ordinary bits and pieces of information
found in the environment. They can be concrete and
measurable, as in class attendance, or invisible and difficult
to measure, as in feelings. (p. 69)

Whether or not bits of information become data depends on the purpose, interests, and perspectives of the researcher (Merriam, 1998, p. 69) Data that is conveyed through words have been labeled as qualitative data. As Patton (1990) states, qualitative data consist of

direct quotations from people about their experiences,
opinions, feelings, and knowledge; detailed descriptions
of people's activities, behaviors, actions; and excerpts,
quotations, or entire passages. (p. 10)

Data collection in qualitative studies is thus about asking, watching, and reviewing (Merriam, 1998, p. 69).

Qualitative research is characterized by data collection in a natural setting, where

the human researcher is a key instrument (Campbell, 1996). Merriam (1998) states that “qualitative inquiry, which focuses on meaning in context, requires a data collection instrument that is sensitive to underlying meaning when gathering and interpreting data” (p. 1). Since tasks such as interviewing, observing, and analyzing are central to qualitative research, humans are best suited for these activities. The research process can evolve and take shape because of the proximity and role of the investigator to the study. Merriam states that in qualitative research, “the investigator is the primary instrument for gathering and analyzing data, and as such, can respond to the situation by maximizing opportunities for collecting and producing meaningful information” (p. 20). Thus, the study design is not completely fixed and the research can monitor, respond to, and modify the study as deemed necessary by the researcher in order to make the study as meaningful as possible. Hoepfl (1997) in referring to the work of Lincoln and Guba (1985) states that humans are a valuable instrument in naturalistic or qualitative inquiry because

humans are responsive to environmental cues, and able
to interact with the situation; they have the ability to
collect information at multiple levels simultaneously;
they are able to perceive situations holistically; they
are able to process data as soon as they become available;
they can provide immediate feedback and request verification
of data; and they can explore atypical or unexpected responses”.

(p. 5)

In this study, since I was the primary instrument for collecting and analyzing data,

I was very close to the data. I was part of the environment and I was able to participate in daily activities of the study. I had the opportunity to observe from within, ask for clarification or more information, and redirect when needed. This type of research design provided flexibility in gathering as much information as possible and allowed me to make sense of the experience being studied.

In my research, I used several data collection techniques. One ongoing tool took the form of observation of the participants in the context of a natural setting. Grady (1998) defines observation as “looking with a purpose” (p. 22). Observation is a common form of data collection in naturalistic or field based research and is advantageous because it allows a researcher to “capture slices of life” (Grady, 1998, p. 22). As Hoepfl (1997) notes “observational data are used for the purpose of description - of setting, activities, people, and the meaning of what is observed from the perspective of the participants” (p. 7). Observation makes it possible to record behavior, as it is happening and thus forms a firsthand account of the phenomena being studied. As Merriam (1998) notes:

observation is the best technique to use when an activity, event, or situation can be observed firsthand, when a fresh perspective is desired, or when participants are not able or willing to discuss the topic under study. (p. 96)

Using observation as a data collection technique also allows the researcher to take note of valuable nonverbal actions. As Grady (1998) notes, “observers can notice behaviors of teachers and students that have no verbal counterpart and yet carry much meaning”(p. 22). In reality, researchers are neither totally participants nor are they totally observers (Merriam, 1998, p. 102). Rather, Gans (1982, as cited by Merriam, 1998, p. 102) views

the researcher as a “research participant-one who participates in a social situation but is personally only partially involved, so that he can function as a researcher” (p. 54).

Merriam (1998) supports this description is stating:

Participant observation is a schizophrenic activity in
that the researcher usually participates in the activity.

While participating, the researcher tries to stay sufficiently
detached to observe and analyze. (p. 103)

Since I worked with young students in creating electronic portfolios, it was not possible for me to observe completely from the outside. The students did not possess all of the technological skills and at times, they required instruction or assistance with technology. Due to their age, they required guidance and support as they worked. As an observer, however, my activities were kept as unobtrusive as possible. I jotted short notes, phrases, or key words to help me write in my field journal after class. Hoepfl (1997) points out that “field researchers rely most heavily on the use of field notes, which are running descriptions of settings, people, activities, and sounds” (p. 8). While I found that I was able to record brief notes and comments during the observation time, recording can range from continuous, to sketchy notes, to not recording anything at the time (Merriam, 1998, p. 105). The amount and nature of the recording depends of the role of the researcher and the extent to which he/she is a participant. Indeed, my field notes served as cues to assist me in recounting the full details of the observation period. Field notes may take many forms, including descriptions, direct quotations, and observer comments (Merriam, 1998, p. 111). I jotted my notes on a small pad of paper. I included descriptions of the setting, activities, comments that the students had made, challenges

that they encountered and their reactions, and questions or concerns raised. The observations were only part of the task. As Merriam (1998) notes, “even if the researcher has been able to take notes during an observation, it is imperative that full notes be written, typed, or dictated as soon after the observation as possible” (p.105). Each evening after we had worked together, I transcribed my field notes into my project journal. Writing out my observations and reflections took a great deal of time and effort. However, this served as the basis for my data analysis, so detail and precision was important. Merriam (1998) notes that

an important component of field notes is observer commentary; comments can include the researcher’s feelings, reactions, hunches, initial interpretations, and working hypotheses.... In raising questions about what is observed or speculating as to what it all means, the researcher is actually engaging in some preliminary data analysis. (p. 106)

The reflection on what had been observed and experienced was part of making sense of the phenomenon. As a result, this process served as the beginnings of analyzing the data.

A second source of data collection was the journals that the participants wrote in after each weekly session. Due to the age of the participants, the students were given several open-ended questions from which they could select and respond to. This provided the students with some structure and guidance. These response journals offered the students a chance to voice their thoughts, reflections, feelings, observations, and questions. In doing so, the journals opened up another form of dialogue between myself and the participants because I could respond, answer questions, and ask for more

information or clarification as needed. Qualitative research acknowledges this as a valuable source of data, as Hoepfl (1997) states

another source of information that can be invaluable

to qualitative researchers is analysis of documents.

Such documents might include official records, letters,

newspaper accounts, diaries, and reports, as well

as the published data used in a review of literature.

(p. 8)

A final source of data collection in my research involved surveys of the participants and their parents. Students were given a survey appropriate for their age, requiring them to respond to statements by coloring faces (see Appendix B). Parents were given a lengthier survey, requiring them to respond to the questions in as much detail as possible (see Appendix C). All surveys included space to offer any additional information not requested on the form.

Summary. Qualitative research is generally characterized by “the goal of eliciting understanding and meaning, the researcher as primary instrument of data collection and analysis, and findings that are richly descriptive” (Merriam, 1998, p. 11). Thus, “qualitative research has an interpretive character, aimed at discovering the meaning events have for the individuals who experience them, and the interpretations of those meanings by the researcher” (Hoepfl, 1997, p. 3). In this study, I sought to understand the experience and value of creating electronic portfolios to document student learning in my elementary classroom. The meaning was contained in the experiences of the participants. As Adler and Clark (1999) note “qualitative researchers look for interpretations that can

be captured in words rather than in variables and statistical language” (p. 2). A qualitative research design offered the flexibility to gather the data for myself so that I could examine these experiences as valued research data as it pertains to my students and me.

Potential Problems

In order for educators to learn about their practice, research must be undertaken. The methodology employed in the research is dependent upon the goals and structure of the research. Any methodological approach in research is subject to criticism as no single approach is completely infallible. As Merriam (1998) notes

all research is concerned with producing valid and reliable knowledge in an ethical manner. Being able to trust research results is especially important to professionals in applied fields, such as education, in which practitioners intervene in people’s lives. (p. 198)

Qualitative methods may be chosen to better understand a phenomenon about which little is yet known. This approach can also be used to gain new perspectives about phenomena that much is already known, or perhaps to ascertain a more in-depth understanding of something that may be challenging to describe or convey quantitatively (Hoepfl, 1997). Choosing a qualitative research design assumes a certain view of the world that determines how the researcher selects a sample, collects and analyzes data, in addition to the manner in which issues of validity, reliability, and ethics are approached (Merriam, 1998). Research must be rigorous in nature and present insights and conclusions that make sense to educators in order to help them learn about their practice. Merriam (1998) states that “the applied nature of educational inquiry thus makes it imperative that

researchers and others have confidence in the conduct of the investigation and in the results of any particular study” (p. 199). Since qualitative research presupposes a different worldview and different assumptions than traditional quantitative research, many writers support different criteria for assessing and examining qualitative research.

One area that research is scrutinized is its internal validity. In conventional research, internal validity refers to the extent that the findings accurately convey reality. Traditionally, weight has been given to quantitative forms of research. This approach uses statistical procedures to discover facts existing in reality (Katsuko, 1995). Yet researchers supporting qualitative approaches question the ability to ever grasp what reality is precisely. Lincoln and Guba (1985) remark that “the determination of such a isomorphism is in principle impossible” (p. 294) because one would have to know the “precise nature of that reality” (p. 295). If this were known, it follows then, that there would be no need to test it. Merriam (1998) states:

One of the assumptions underlying qualitative research is that reality is holistic, multidimensional, and ever-changing; it is not a single, fixed, objective phenomenon waiting to be discovered, observed, and measured as in quantitative research. Assessing the isomorphism between data collected and the ‘reality’ from which they were derived is thus an inappropriate determination of validity. (p. 202)

The qualitative researcher acknowledges the presence of multiple realities and strives to represent these realities adequately. People’s construction of reality and how they understand and make sense of the world is the focus of qualitative research. According to

Lincoln and Guba (1985), reality is “a multiple set of mental constructions...made by humans; their construction are on their minds, and they are, in the main, accessible to the humans who make them” (p. 295). A qualitative researcher seeks to understand people’s realities, their interpretations of reality. Since humans are the primary instruments of data collection and analysis in qualitative research, these interpretations of reality are accessed directly through the researcher’s strategies such as observation and interviews. In this way, readers are actually closer to reality than if a data collection instrument is interjected between readers and the participants. When reality is viewed in this light, internal validity is clearly a strength of qualitative research. Merriam (1998) points out the importance of this aspect of qualitative research:

In this type of research it is important to understand
the perspectives of those involved in the phenomenon
of interest, to uncover the complexity of human
behavior in a contextual framework, and to present a
holistic interpretation of what is happening. (p. 203)

The role of the researcher in qualitative studies permits the integration of the researcher’s viewpoints into the research. The researcher’s viewpoint and value judgements are deeply connected to the research because the researcher’s subjectivity is central in qualitative research (Katsuko, 1995). In this way, the phenomena being studied is related to the researcher’s value judgement. As Katsuko states “there is a belief that research facts and researcher’s value judgements or interpretations of the research cannot exist separately” (1995, p. 352). In qualitative research, one of the philosophical assumptions is that reality is not an objective entity but rather reality, in this form of research, is subjective and

value bound.

There are several strategies that a researcher can employ in order to enhance internal validity. One strategy is triangulation, which means using multiple investigators, multiple sources of data, or multiple methods to confirm findings (Merriam, 1998). In my research, I did not rely on any single source of information or method. Instead, I began by collecting and reading a variety of articles and studies involving electronic student portfolios. This gave me an overall impression and a framework in which to compare my findings with and within which to orientate myself. I also utilized multiple sources of data, including my observations, student journals, surveys, as well as observations from other professionals. Using a range of sources, investigators, and methods ensures that the interpretations of participant's realities are accurate.

A second strategy used to enhance internal validity is referred to as member checks (Merriam, 1998). In member checks, the data and tentative interpretations are taken back to the individuals from whom they were derived with the intent of determining if it is plausible. I used this strategy with the participants throughout my study. I asked for clarification and confirmation of my interpretations to ensure that they represented each participant's experiences and views of reality. This took place through discussions as well as through the students' journals.

Long-term observations also serve to increase internal validity by providing a substantial base of data. Themes or patterns in observations may begin to emerge over time. This study took place over approximately six weeks. I observed the participants for at least 3.5 hours per week in creating their electronic portfolios in addition to incidents and events naturally occurring within the regular class.

Peer examination was also an important component of this research process. This involves asking colleagues to comment on the emerging findings of a study. I shared and discussed the data and my interpretations with colleagues on a very regular basis.

Appealing to an outsider's perspective gave me a broader view of what was emerging and it helped me to make sense of the data. Through discussing and sharing, I was able to verbalize and also obtain feedback in regards to the enormous amount of data collected.

Clarifying one's assumptions, worldview, and theoretical orientation at the outset of the study also enhances a study's internal validity (Merriam, 1998). This allows for any elements that may affect a study to be recognized and acknowledged before the study is undertaken. An awareness of these factors is important in the selection of a methodological approach, design of a study, and interpretation of the data. I knew that I wanted to utilize a qualitative approach for my study because my goal was to understand the advantages and disadvantages of using electronic portfolios with my elementary students. I wanted to understand the process from the students' perspective, the parents' and my own. Their realities were a crucial part of my research. I was aware that I was seeking rich, deep, information that would be highly contextualized and conveyed through words. I was aware of potential biases and attempted to compensate for this by collecting data from a variety of sources, selecting the population sample based on purposeful criteria, and sharing my interpretations with colleagues. Being aware of potential biases, assumptions, and worldviews encourage the researcher to be more sensitive to the impact of such elements throughout a research study.

Qualitative research also faces criticism in terms of reliability, or the extent to which the research findings can be replicated. This has long been problematic in social

sciences for the simple fact that human behavior is never static. In research design, reliability is based on the assumption that there is a single reality and that studying it repeatedly will produce the same results (Merriam, 1998). This is a central notion in conventional research that focuses on discovering causal relationships among variables and uncovering laws explaining phenomena. This quantitative research seeks to quantify and represent through numbers and statistics that can be replicated. However, this contradicts the goal of qualitative research. Merriam (1998) states:

Qualitative research, however, is not conducted so that the laws of human behavior can be isolated. Rather, researchers seek to describe and explain the world as those in the world experience it. Since there are many interpretations of what is happening, there is no benchmark by which to take repeated measures and establish reliability in the traditional sense.

(p. 205)

Achieving reliability in the traditional sense is thus highly impossible in educational settings where the phenomenon under study is constantly in flux, multifaceted, and highly contextual. Replication will not produce the same results because there are too many emerging and uncontrollable factors. While reliability cannot be applied to qualitative research in a traditional sense, Lincoln and Guba (1985) suggest considering instead the dependability or consistency of the results obtained from the data. In this way, given the data collected, outsiders would agree that the results are consistent and dependable. Data in a qualitative study appears as words and can take many forms including field notes, documents, interview notes, or tapes. Merriam (1998) states that “the question then is not

whether findings will be found again but whether the results are consistent with the data collected” (p. 206). A qualitative study provides the reader with enough description and detail to show that the author’s conclusion is logical and makes sense.

A final area in which qualitative research studies are scrutinized involves external validity. This is the extent to which the findings of one study can be applied to other situations. It is the ability to generalize findings across different settings. In order to make statements that can be generalized and apply to many contexts, only limited aspects of local conditions can be included (Lincoln & Guba, 1985). The more aspects of local conditions that are included make the statements more context specific. Educational settings are very dynamic and highly context specific. The inclusion of local conditions is important in understanding the phenomenon under study because it impacts the experience. According to Cronbach (1978), “when we give proper weight to local conditions, any generalization is a working hypothesis, not a conclusion” (p. 125). The working hypothesis recognizes the local conditions and the impact on the phenomena under study. The findings of the study may not be generalized to a new setting because of the existence of local factors. As Hoepfl (1997) notes, “in the naturalistic paradigm, the transferability of a working hypothesis to other situations depends on the degree of similarity between the original situation and the situation to which it is transferred” (p. 13). The research can provide sufficient information and detail and it is up to the reader to decide whether the findings are applicable to the new situation. It is not possible that my research findings could be completely generalized across different settings. Much of what I observed and interpreted depended on the context in which we were working and the particular individuals participating in the study. As Lincoln and Guba (1985) note, the

existence of local conditions “makes it impossible to generalize” (p. 124). Instead, I can provide working hypotheses based on the local conditions. In my findings, I provided sufficient detail describing our experiences and hypotheses based on the results. It becomes the responsibility of the reader to decide how or if these hypotheses apply to them in their situations and if they can learn anything from our experiences. Merriam (1998) states that “reader or user generalizability involves leaving the extent to which a study’s findings apply to other situations up to the people in those situations” (p. 211).

Qualitative research seeks to understand the meanings people have constructed, their realities, and how they make sense of their world. Qualitative research takes on a very different worldview than that of quantitative research and thus cannot be assessed in the same manner. They are different forms of research requiring unique methods of assessment. Strauss and Corbin (1990) believe that the “usual cannons of ‘good science’...requires redefinition in order to fit the realities of qualitative research” (p. 250). Qualitative research has the potential to provide educators with a wealth of valuable information to aid in understanding the complex nature of teaching, learning, and education. Merriam (1998) states:

Research focused on discovery, insight, and understanding from the perspectives of those being studied offers the greatest promise of making significant contributions to the knowledge base and practice of education. (p. 1)

While any research methodology contains strengths and weaknesses, qualitative approaches possess the ability to aid educators in gaining valuable, meaningful understandings about their practice.

Methodology in Current Literature

Identifying a methodology within the articles was quite challenging. The majority of the articles I read focused on how to implement electronic portfolios in your own classroom, rather than on a research study of electronic portfolios. As I continued to search, I found a few studies and projects involving electronic portfolios. Each project was qualitative in nature. For example, from 1994 – 1997, The Coalition of Essential Schools and The Annenberg Institute for School Reform conducted a research project. Researcher David Niguidula and software developer, Michelle Risconscente, headed up the project. The purpose of the research project was to investigate what was necessary to implement digital portfolios. Six schools in New York State participated in the project, which permitted individual students to present a richer picture of their knowledge and abilities. The researchers visited the schools on a regular basis, helping each through its pilot phase and observing what was necessary to put a digital portfolio system in place. Through their visits, guidance, and assistance the researchers became participants in the project, which is a characteristic of qualitative research. In addition, none of the schools participating in the study assumed that each student would immediately begin composing a digital portfolio. Instead, each school began with pilot projects involving from one to fifty students. This is similar to a case study approach found in qualitative methodologies.

Throughout the study, teachers observed the progress of creating digital portfolios. As Niguidula (1997) noted, “for this pilot project, you will want to *observe* rather than *judge* the process of creating digital portfolios” (p. 4). Observations were recorded as notes and shared with the other teachers in the project. Teachers used the

tool of ethnographic observation and reflection to gather information about the process of creating digital portfolios rather than formalized observations and statistical analysis resulting in judgements. The pilot study assisted teachers in understanding the process of creating a digital portfolio as well as what the product of a completed portfolio might look like in their school with their students. This is characteristic of qualitative researchers who seek to understand the social and cultural contexts in the study. The research involved holistic inquiry within the natural setting of the school and the students' course of learning.

The phases of Niguidula's project were recorded much like a journal, including dates, events, and excerpts of conversations between teachers and the researchers. In keeping with a qualitative approach, the research team worked with each school to tailor the project to the schools' vision, staff, and students. The project moved in varying directions for each school, providing new avenues of exploration. For instance, in one pilot school in Croton-on-Hudson, the experiment continued into the 1996-1997 school year with only the original students in fifth grade. Niguidula (1997) points out that further investigations into how the addition of teacher and parent comments to the portfolios affects the instruction and learning were being explored (p. 12). As a result of their original studies, new inquiries and hypotheses emerged and invited investigation. In conclusion to his study, Niguidula notes:

Digital portfolios are a powerful presentation tool to augment paper portfolios. The process of implementing them in the school has provoked interesting dialogues about instruction in the context of new technology. As staff members look

ahead to the future, most expect these discussions to continue, and hope that the digital portfolios will be used by all grade levels for an expanded set of purposes.

(p. 12)

This depth of rich information cannot be adequately captured in statistics, formulae, and quantitative research. Yet it has tremendous value for the participants in the study to make sense of their experiences and to share them with others in a meaningful way.

Another project in the literature examined the use of digital student portfolios as an instructional, assessment and evaluation tool in two K-12 schools in the Washington D.C. area. In this 1996 project by Irvine, Barlow, Ford and Nibley, pre-service and in-service teachers worked to facilitate the design and development of student digital portfolios. Participants in the study included four in-service teachers, two pre-service teachers from a local university and forty students diagnosed with learning disabilities. Again, this was not a large-scale study, but rather focused on a particular group of people as in a case study. Observation also played a key role in collecting data in this study. As the researchers Irvine, Barlow, Ford, and Nibley (1997) note, “by carefully monitoring all participant progress (students, teachers, and trainers), it was possible to make accurate statements regarding the effectiveness of the project” (p. 4). Qualitative research was prevalent in this project as the researchers used observations, consultant feedback and student feedback in order to gather information.

Penta conducted another project in North Carolina in 1995. The objective of the project was to develop new methods of assessment. Six magnet schools decided to fill the objective by developing student electronic portfolios based on their own research. Penta

(1998) acknowledges that a mixed method approach was used to evaluate the development of alternative assessment (p. 4). An evaluator attended portfolio-planning meetings, kept field notes and developed tables to describe similarities and differences in approaches used in each school. The evaluator visited schools to observe during each stage of the development process. Penta (1998) outlines other data sources including:

field notes of magnet staff meetings; regular on-site observations at each school; tables of similarities and differences by school, revised and tracked over time; debriefings of magnet staff after trips to conferences and other districts; and audits of electronic and printed versions of portfolios. (p. 4)

These are examples of the range of possibilities in qualitative research for the purpose of gathering information. From the information gathered, Penta was able to draw out conclusions and recommendations for other schools considering implementing electronic portfolios.

Summary

Qualitative research allows teachers to collect the types of information that they are curious about and to capture the data in ways that are meaningful to the researcher. In the above-mentioned studies, qualitative research made it possible for the teachers to pursue a goal that was of importance to them in a way that made sense and was most useful to them in their own schools. Qualitative research allows teachers to be researchers, using the tools and methods available to them to collect and analyze information pertinent to them. Using qualitative research makes sense for me as I explore

the role of electronic portfolios in documenting student learning in my primary classroom.

Chapter 4: Data

The focus of this project was to consider the advantages and disadvantages of using electronic portfolios with Division I students as a means of assessment that encourages students to become actively involved in their learning and provides concrete documentation of student learning to parents. This project was therefore considered from three perspectives including the four participating students, their parents, and myself.

The participating students each produced a digital creation of their traditional paper portfolio, representing their work during the school's second reporting period. Each portfolio was organized in Microsoft PowerPoint by a title page, and the five subject headings Language Arts, Math, Science/Social Studies, The Arts, and Free Choice (see Figure 1, 2). Each student's work samples from their paper portfolio were scanned, typed, photographed, or imported from other computer programs into their electronic portfolio in the corresponding category. As a result, many of the types of samples were standard for all four students. The students had freedom to choose if and when to use the digital camera to represent their learning through photos or videos. The Free Choice section was very open and students could include any special items of importance to them. The students were expected to include rationale statements for their entries. This encouraged the students to reflect on their learning and progress. Each student's electronic portfolio consisted of approximately fifty slides, although there were no formal limits on length imposed. The students also made use of clip art, sound effects, music, font variations and color, backgrounds, and various layouts to create their presentations. The electronic portfolios were saved on individual rewritable CD-ROMs and the students each

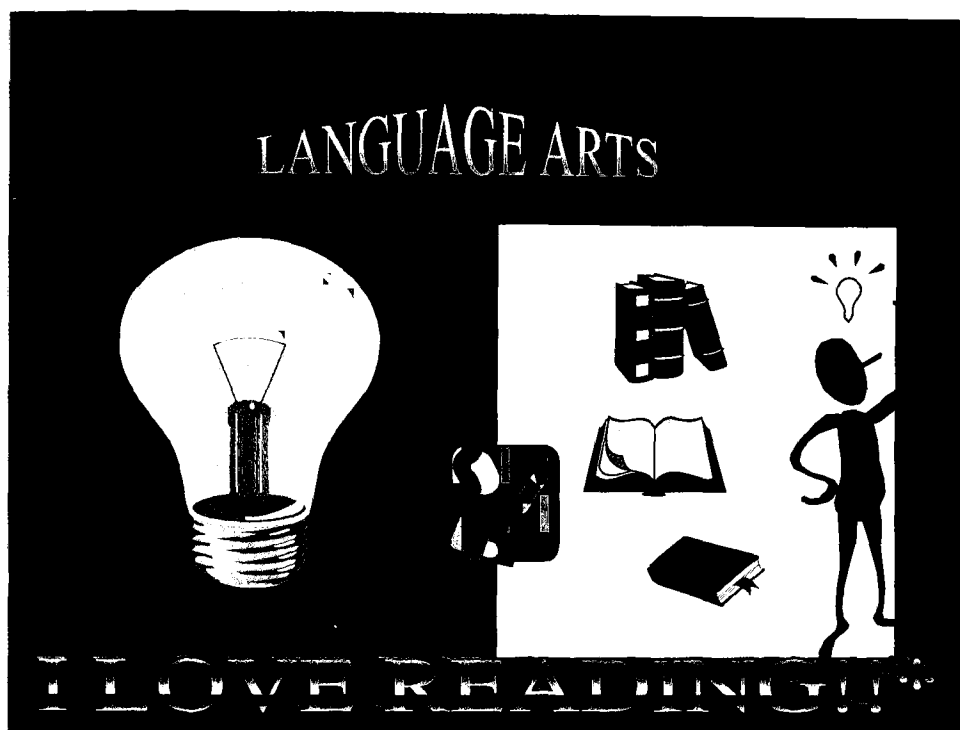


Figure 1. Students used Microsoft PowerPoint to create subject headings to organize the contents of their electronic portfolios.

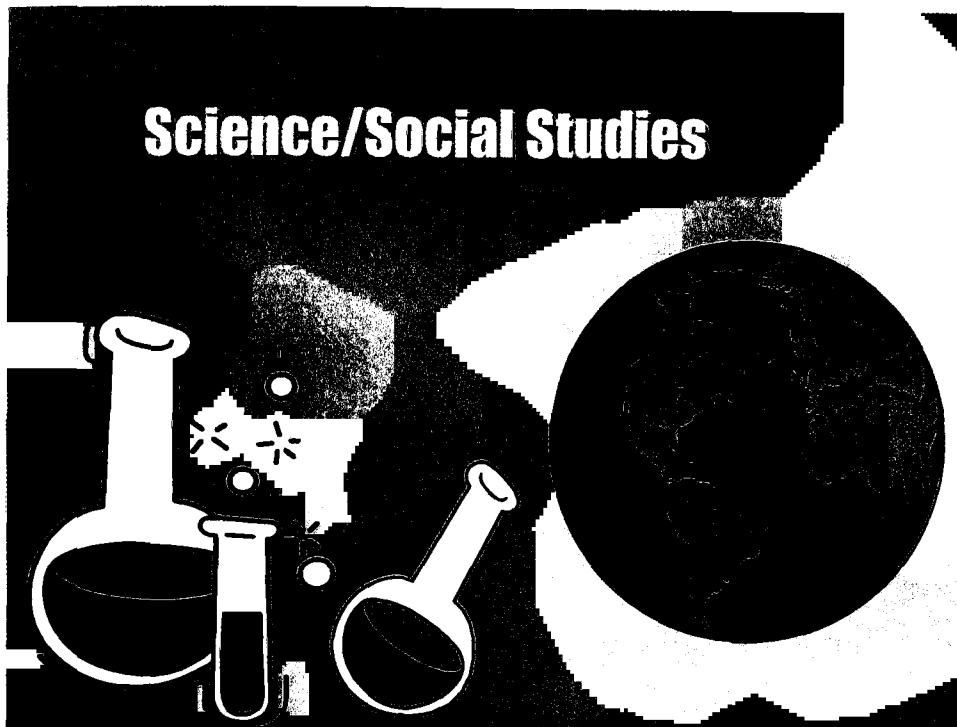


Figure 2. Students used Microsoft PowerPoint to create subject headings to organize the contents of their electronic portfolios.

decorated their own jewel case cover. We also put a copy of PowerPoint Viewer 97 on each CD. This feature was downloaded free from the Internet and it ensured that the students would be able to view the presentation on their home computers even if they did not have the PowerPoint program.

Advantages

From my viewpoint as the classroom teacher, I felt that one of the greatest advantages of creating electronic portfolios with Division I students was student motivation. As Wiedmer (1998) notes:

...the enhanced medium offers additional ways to display unique talents and abilities. For students, positive results of portfolio use include a stronger sense of personal responsibility for learning, increased motivation to achieve results and reach goals, and heightened interest in learning. (p. 587)

Working with computers is, indeed, very motivating for many students. I found that the four students in my project were very focused and eager to create their own electronic portfolio. All of the students in the project wrote about their desire and enjoyment in working with computers. As one student stated, "I like working on an electronic portfolio because I really love computers". Another student wrote, "I want to take my electronic portfolio home soon. A question I have is how long will it take? This is really exciting for me". I found that the students' attention spans and their willingness to persevere with a task greatly improved when working on their electronic portfolio. They worked diligently for long periods of time and on several occasions, the students requested to work through recess or other scheduled classes.

This level of motivation manifested itself in a positive attitude towards their learning and also in an increase in the effort used to create the electronic portfolio. The amount of detail and effort included in the electronic portfolio exceeded that of their traditional portfolios. A parent observed that “kids enjoy using the computers and therefore are more excited to learn”. The students were keen to include more information and detail when reflecting upon the inclusion of entries in their electronic portfolio as shown in Figure 3. I felt that the students took more time and became more thoughtful in their responses. They expanded upon their observations of their electronic portfolio samples as in Figure 4. Parsons (1998) notes:

The critical activity of creating a portfolio empowers both teachers learners to gain ownership of their work....And, in the process of this choosing and voicing, both learners and teachers come to a richer understanding of their own unique gifts and skills. (p. 28)

Student motivation also led to student ownership. Through the creation of the electronic portfolios and reflecting on their learning, the students began to take on ownership of their portfolio and of their learning. The samples in the portfolios encouraged the students to be accountable for their learning. Through their rationale statements the students identified their progress. The students also felt a great deal of ownership over the actual portfolio because it could be personalized to each individual learner. The students were able to tailor their electronic portfolio in ways that were not possible with their traditional portfolios by including digital pictures, videos, clip art, voice clips, and music clips (see Figure 5). The options available to the students allowed them to really make the

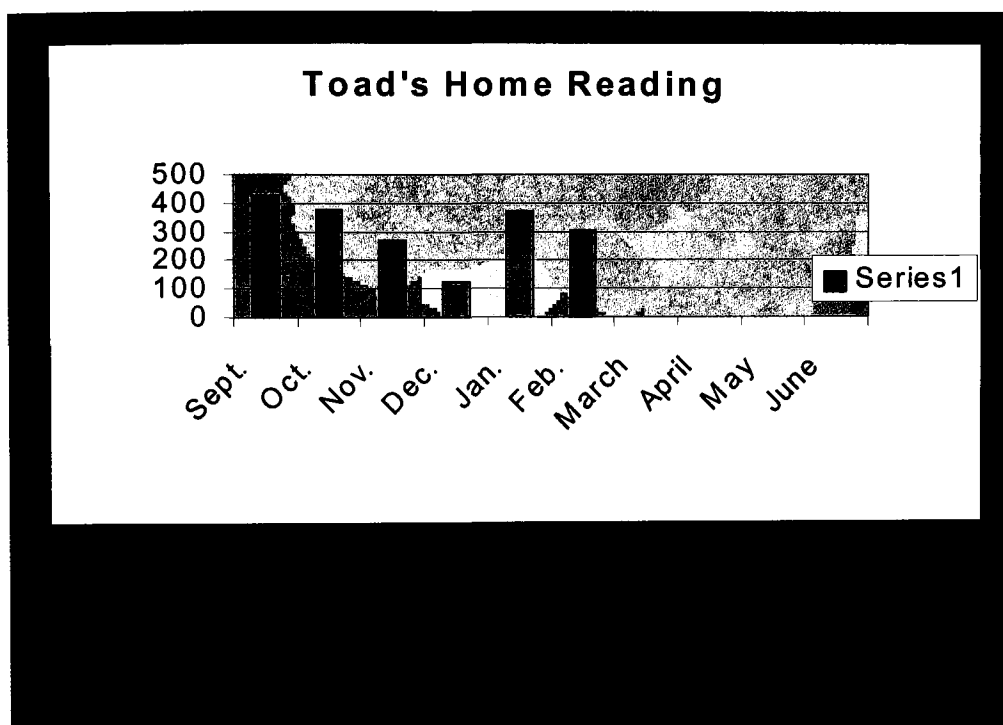


Figure 3. Students reflected upon the entries included in their electronic portfolios.


FEB 16, 2001 Journal Form

My S.S. Journal
by Alyssa

I learned a lot about Sodas and have
the pioneers Travel and
thaer Schools.

I really liked when we want in sentors
like the reding sentor
the living sentor reding cards the
foto sentor and the activity sentor.
I want to find out more about the pioneers
life stiole.

Draw a picture of what you learned.



This is my Social Studies journal form. I liked the part when we learned about the pioneers making their homes out of sod. It is kind of like the Inuit because they make bricks out of snow instead of sod!!

Figure 4. Students included more detail when reflecting on the entries included in their electronic portfolios.



Figure 5. Students were able to include video clips, voice clips, music, clip art and digital pictures in creating their electronic portfolios.

electronic portfolio their own unique creation. As Wiedmer (1998) states:

One of the primary benefits of developing any portfolio is the depth of an individual's involvement in the selection and design process. The development of a digital portfolio requires active participation from the very beginning. (p. 587)

The electronic portfolios became more than collections of student work. The electronic portfolios became a reflection of who they were as students and as unique individuals. Thus, the portfolios became very personal creations. The electronic portfolio made it possible for the voice or character of the student to be portrayed, as shown in Figure 6. As one parent observed: "I was surprised to see and hear (my daughter's) character shine through the presentation. You still had the factual sheets but there was the child's own personality presented.". Using technology to create portfolios allows the message or information to be presented with power, evoking responses and emotions from the audience. A parent commented that "it is more exciting to see and watch on the screen...it seems alive". The students found these possibilities offered by technology in creating their portfolios to be very motivating.

The students' motivation and enthusiasm followed through to sharing and celebrating their learning with their families. The students were very eager to take their CD-ROMs home. One parent noted "the enthusiasm that was shared when viewing this format of portfolios was exciting for both parent and student in our home". Due to the high level of student motivation, enthusiasm, and ownership, each student tried to do their best in creating their electronic portfolio. They were very eager to share their work with others. A student commented "when I got home the first thing I did was watch my

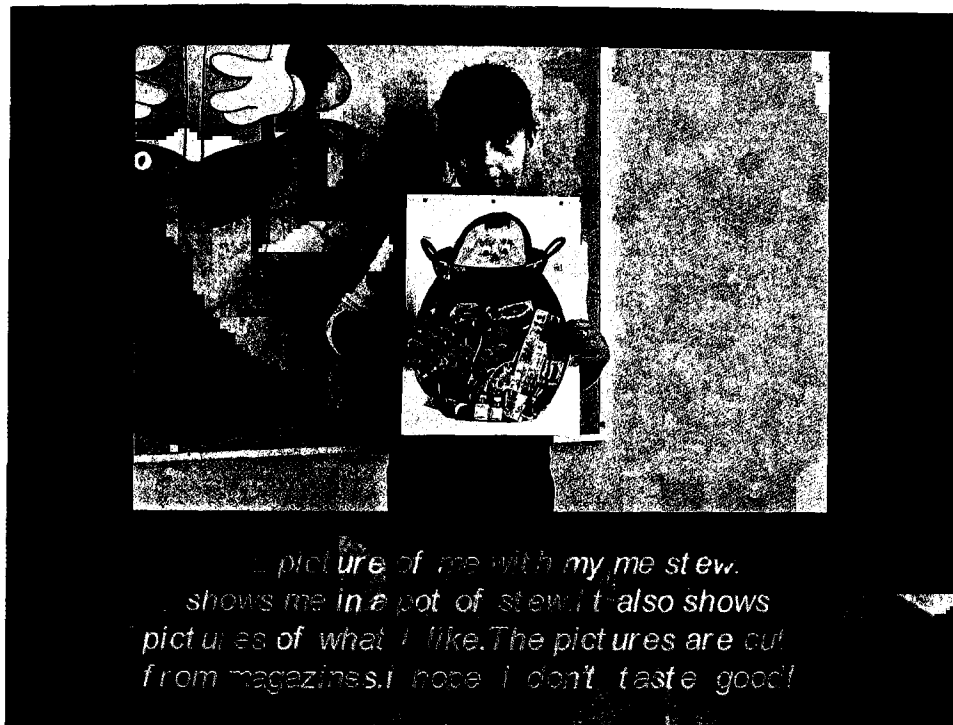


Figure 6. The character or personality of the students was portrayed in their electronic portfolios through their comments, videos, music, and photos.

electronic portfolio with my family. It went well! And my family said they liked it a lot. And I was proud!”. Sharing their accomplishments and growth in a new way, through technology, was clearly a source of tremendous motivation for these students.

A second advantage of using electronic portfolios was their flexibility. An electronic portfolio can take many forms depending on the goals, needs, and available technologies. Just as there is no single, correct way to create traditional portfolios, the same is true for electronic portfolios. The concept of an electronic portfolio can be adapted or molded to fit a multitude of settings. While there are a variety of software packages that can be used in creating electronic portfolios, there is flexibility in choosing a program. For this study, we opted to have the portfolios created in Microsoft PowerPoint since we had access to the program on the school’s computers and the students were already familiar with the basics of the program. Electronic portfolios are also flexible in that they possess the capability to include virtually anything, offering students increased options in how to document their learning. Oros, Morgenegg, et al. (1998) state that “digital storage of portfolio contents allows a larger amount and a greater variety of student materials to be retained” (p. 15). The students in the study made use of the presentation features of PowerPoint as well as importing videos, scanned images, and digital photos to document their learning and growth (see Figure 7). This made the electronic portfolios a versatile method of documenting learning. When asked what were the best things about her electronic portfolio, one student responded “1) that I can put anything in 2) when I am done I can show it to anyone 3) I get to make it”. While traditional paper portfolios must constantly deal with the amount, size, or shape of the samples, electronic portfolios are less constrained and can include a much greater variety

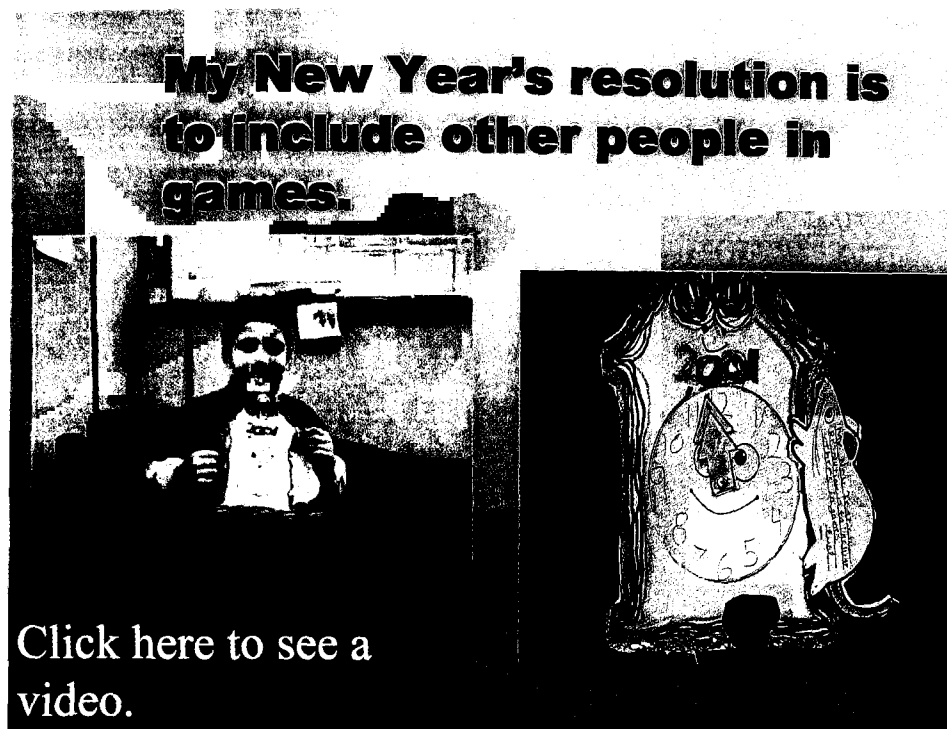


Figure 7. Students were able to include virtually anything in their electronic portfolios through the use of videos, sound clips, and digital photos.

of items. I felt that this feature of electronic portfolios allowed the students to show their learning with greater depth and breadth.

Managing and storing portfolio materials are concerns shared by many teachers interested in using portfolios with their students (Lankes, 1998). Traditional paper portfolios contain a great deal of paper whether they are stored in boxes, file folders, binders, or scrapbooks. It can be challenging to manage and store all of the documentation for an entire class and to be able to transport portfolios home in order to share with the parents. Parents, too, reported that at times, the traditional paper portfolio could become so thick with papers and information that it becomes overwhelming. Electronic portfolios, on the other hand, were very easy to store and transport. For this study, students compiled their electronic portfolios on the school's network and when they were finished, we saved their work on individual CD-RWs so that the students could take their portfolios home to share with their families. The CDs were inexpensive, very compact, and took up very little storage space in the classroom. Wiedmer (1998) notes:

The electronic process of portfolio development condenses the collection of data and artifacts and reduces the quantity of paper that must be handled and stored in a typical hard-copy portfolio. (p. 587)

All of the artifacts and documentation were easily be stored on a single CD for each child. One parent commented that "an advantage to electronic portfolios over paper is being able to scan your child's work and determine where more effort is required without dealing with copious amounts of paper". Storing a portfolio in electronic format addressed the concerns of managing the large amounts of documentation often included

in portfolios.

A final advantage of creating electronic portfolios was the development of the students' computer and technology skills. Since the students were very motivated to learn and the learning was enjoyable, they were keen to take risks with the technology. They experimented to learn how to use special features of the programs and peripherals to create their desired results. They quickly became very adept in their use of technology. While I was able to offer some support as the students worked, we were also extremely fortunate to have the assistance of T. Hampshire through Alberta Initiative for School Improvement (AISI). Blackie School participated in an Information and Communication Technology (ICT) project within Foothills School Division. T. Hampshire, an educator in the division, worked within Blackie School two times per week as an AISI ICT Project Administrator. Hampshire worked with staff and students in integrating technology into the curriculum. He was an invaluable resource in assisting my students and myself in understanding and utilizing technology. I was impressed with how quickly the students learned skills and gained knowledge to help them create their electronic portfolios. A parent also noticed this in stating that "I was surprised to see how well he has grasped the technology at his age". Although the students were just seven, eight, or nine years of age, they proved themselves to be very capable of grasping technology concepts and gaining an understanding of how to work with a variety of technologies to achieve the desired results.

In creating electronic portfolios with Division I students, many advantages were noted by the students, parents, and me. Farmer (1997) highlights many advantages of this form of portfolio in stating:

An electronic portfolio makes sense because it can store work compactly, and it accommodates a variety of media. In addition, it can be made easily accessible to a number of audiences; work can be duplicated to facilitate multiple assessments; it offers flexibility of arrangement and selection; and it fosters student ownership of personal effort. (p. 30)

Indeed, there are many characteristics of electronic portfolios that make it one viable medium for documenting student learning and growth.

Disadvantages

Through the course of this study, several areas to be addressed were also noted. Interestingly, several aspects identified as being advantages also contained elements that proved to be disadvantages as well. For instance, one of our biggest challenges was the technology itself. As Farmer (1997) states:

The key to electronic portfolios often lies in the computer system.

If a variety of media are to be incorporated, a variety of peripherals and software are required, along with computer space and capabilities. (p. 31)

Blackie School had adequate peripherals for a project undertaking electronic portfolios. A digital camera was purchased in the fall of 2000. The camera stored digital photos and videos on 3.5" diskettes. This feature of the digital camera made it easy and quick to insert photos and videos into a presentation. Blackie School also had a color scanner and a CD-Writer.

The bulk of Blackie School's multimedia computer stations were housed in a

single computer lab. The lab contained about thirty Pentium 1 networked stations. There were also three Pentium1 networked stations in the staff room and two additional stations in the school administrators' offices. The classrooms were not networked and may have only contained one or two 486 computers.

Due to limited time available in the school's computer lab, we opted to work in the staff room and office area. This was the only other location in the school where there were four computers that had Microsoft PowerPoint, the necessary disk drives, and were connected to the school network. However, only one of the stations was capable of running the sound files. In addition, none of the stations contained video cards that were adequate enough to run the videos at the proper speed. It was very difficult and frustrating for the students to judge whether or not certain features of their electronic portfolios were working properly and whether or not the features were effective. Fortunately, T. Hampshire was able to view the presentations on his laptop computer. The students were then able to identify any adjustments or changes that were necessary in their electronic portfolios.

A second major area of concern rested with the school's network and server capabilities. The network and server were pushed to the limit in supporting large classes working in the computer lab as well as our PowerPoint presentations simultaneously. Although there were only four electronic portfolios being created, they were very large files, taking up a great deal of RAM and space on the server. The average electronic portfolio consisted of fifty-three slides. Each portfolio contained background music, sound clips, as well as several videos and digital photos. The size of the electronic portfolios ranged from 44 MB to 94 MB for one reporting period's work samples. In

addition, each video clip averaged about 634 KB and background music was on average 648 KB in size. When these applications were open in addition to applications being used in the computer lab, the server resources were not adequate to maintain all of the activities simultaneously. Some tasks such as copying and pasting or saving work became very slow and programs experienced glitches. As a result, the system became overloaded and froze on several occasions. For students working in the computer lab, this meant they were not able to access programs or complete assigned projects. For the students in this study, it meant that they had to exit the programs without being able to save any new work. This was clearly a source of growing frustration for the students, identified in this comment, "I don't like it when the computer kicks you out and I don't like it when the clip art doesn't give you a lot of pictures". The server clearly would not have been able to handle a whole class set of electronic portfolios documenting learning for an entire school year in addition to technological demands placed by the rest of the school population.

Electronic portfolios also take a great deal of time. It was very challenging to find enough time to work with the students during school hours. Since the students were still quite young and many aspects of the programs and peripherals were new to them, they could not be left to work on their electronic portfolios on their own. They required instruction and one-on-one time to help them achieve the results they were seeking. Due to the fact that our school participated in a technology AISI project, we were given a number of substitute days to work on any areas of technology. As a result, I was fortunate enough to be able to take two half days to be released from my classroom in order to work with T. Hampshire and the four students in the study. I also accessed two additional

half days from my own teacher professional development time. In addition to this, I also used some of my preparation periods to work with students individually.

There was also considerable time spent on my part outside of school hours. Much of this time was spent scanning student work samples. The school's scanner was connected to the secretary's computer and as a result, it was not possible to use the scanner for long periods of time during the school day. The vast majority of the scanning, therefore, had to be done after school or on weekends. Most of the students' work samples at this age level were in paper form, which meant that scanning was a big part in creating the electronic portfolio. When I first began scanning the students' work samples, I left the scanned images in individual folders in Photo Editor. This allowed the students to modify or alter the photos before copying them into their PowerPoint presentation. However, when the school's computer lab was in use, the server became overloaded with our presentations. There was not sufficient RAM to run all of the operations and it became very slow for the students to copy their samples into PowerPoint. The students would spend ten minutes or more waiting for an image to be pasted into their presentation. This was a tremendous waste of time for the students. As a result, when I continued to scan the work, I also copied it from Photo Editor into each child's presentation. On average, it took one minute and fifteen seconds to complete one scanned item. Each student had an average of fifty-five items to scan for one reporting period. T. Hampshire also brought his scanner in and he, too, scanned many samples. While this allowed the students' class time to be more productive, it also meant a large increase in workload for myself.

Challenges were also encountered in obtaining good quality scanned images.

Students in grade two and three generally write with a pencil and we found that at times, some of these samples simply did not scan well because the pencil did not show up. Other times, the image being scanned contained small typed print and when the sample was scanned it was not very clear. In these cases, we either opted to leave the sample out or, if possible, I would type the entry right in PowerPoint. As Niguidula (1997) points out “what took time was putting work into digital form in the first place – word processing, scanning, or digitizing audio or video” (p. 6). Any work that the students had originally created using the computer was very easy to include in the electronic portfolio. However, scanning and digitizing the large amounts of paper samples completed by students at that age was a clear disadvantage to this type of portfolio.

While the ability to include virtually any type of sample in an electronic portfolio has been identified as an advantage, it is also an area to be monitored. Technology made the possibilities limitless and I encountered challenges in knowing when enough was enough. I am sure that the students could have continued to tinker with and improved their portfolios endlessly and it was difficult to have them bring their projects to an end. We included all of the items that we would have put in our traditional portfolios such as stories, poems, graphs, drawings, math activities, or science experiment logs. In addition, we included items that would not have been possible without the use of technology. This included video clips of the students giving their description of a project or the rationale statement. It also included digital photos of art projects or special items of importance to the student, animation, and sound clips. The students had freedom to decide how to best document their learning. Some of the students were eager to include many videos or digital pictures in their portfolios, expanding the possibilities of what items could be

included. Since nothing was impossible, it meant that everything was possible. It became challenging to be selective about what to include in the electronic portfolio and how it would be most effectively presented through a technological medium.

A final disadvantage in creating electronic portfolios pertains to the students' access to computers outside of school. The electronic portfolios should be shared with families in order to communicate information about the child's growth and progress. For students who do not have access to a computer at home this would be a potential disadvantage. A logical solution would be to have students and their families come to the school to view the portfolio. Prior to the study, I knew that each of the participating students had a computer at home. However, I did not know if these computers possessed the capabilities necessary to run the PowerPoint presentations. Whether or not the students would be able to view their portfolios at home was a potential disadvantage in creating electronic portfolios. After experiencing many of the challenges we encountered at school with such large files, videos, and sound clips, I was very concerned that the presentations would not run properly on some of the students' home computers. Some of the students did not have Microsoft PowerPoint, so we loaded a copy of PowerPoint Viewer 97 on each CD. Fortunately, all of the students in the study were able to run their portfolio presentations at home. They reported that all of the videos, animations, and sound clips ran properly. The only area of concern mentioned by the students was that the presentations were very slow to open due to their large size.

A related concern stemming from sharing the electronic portfolios came from parents acknowledging their comfort level in dealing with technology. While parents reacted positively to the concept of an electronic portfolio, there was still a hint of

reservation. One parent commented “you cannot just flip through the portfolio at will, as it lays readily accessible in paper format. We are not all computer savvy”. Electronic portfolios may challenge the comfort zone of adults who prefer the traditional hard copy presentation of student growth that they are accustomed to. Another parent responds, “personally, I like to search information the Internet but, when I am reading or studying the material, I prefer a hard copy”. Indeed, electronic portfolios provide a new medium in which to view a child’s accomplishments and growth.

Summary

Examining the use of electronic student portfolios is clearly not a simple or straightforward task. Indeed, there are many valid advantages and disadvantages in using electronic portfolios that must be considered and weighed. Portfolios, by their very nature, draw out student feelings of motivation, ownership, and empowerment. These are undeniably powerful components of the learning process. Using technology also affords students greater flexibility and a wider array of options in documenting progress and learning. Yet, as Wiedmer (1998) notes, “using technology as an alternative and more authentic method of portfolio development creates many interesting challenges” (p. 589). The available technology and its capabilities are obviously essential and ultimately the success of electronic portfolios rests with the existing computer system. The advantages and disadvantages of using electronic portfolios will therefore vary from school to school. Potential drawbacks include lack of robust equipment to create and manage massive files, scheduling conflicts, and time needed to digitize student work.

Technology is essentially a tool and educators can use this tool to promote or enhance student learning. The nature and role of technology in student portfolios is

highly flexible. The form and function of electronic portfolios is adaptive depending on the goals of the individual teacher and the available technology. Exploring the possibilities of electronic student portfolios is indeed a worthwhile endeavor. It is one that should be approached with an awareness of the benefits and potential drawbacks in order to make purposeful, prudent decisions. Electronic portfolios possess a great deal of promise as a method of documenting student learning, one that merits continued attention and exploration.

Chapter 5: Discussion and Recommendations

Making a decision to explore the possibilities of using electronic portfolios is a complex undertaking and many issues must be considered beforehand. As Parsons (1998) points out:

Like any educational idea, portfolios present both opportunities and difficulties. Let's continue to explore ways to use portfolios wisely and overcome their potential problems to ensure their success as a useful assessment alternative. (p. 30)

The same is true of electronic portfolios. There are both advantages and disadvantages in using electronic portfolios with Division I students. After completing this study, there are several recommendations or modifications that I would suggest.

Firstly, I would recommend creating an electronic showcase portfolio rather than a process portfolio. A process portfolio may contain a large number of samples to highlight the actual processes in learning. Since students in Division I produce largely paper products, an electronic process portfolio would require a great deal of time to scan the samples. In addition, this creates massive files that can be difficult for school networks to manage and store. A more viable approach would be to create product or showcase portfolios wherein only the students' greatest achievements or final products from the year would be included. This would limit the number of samples included in the portfolio and thereby reduce the amount of time needed to digitize samples and create the final portfolio.

A second option to the challenges encountered in creating electronic portfolios

would be to include an electronic component within the traditional hard copy portfolio. Rather than a completely electronic portfolio, in this scenario, students would each have a CD as part of their paper portfolio. The CD could include any projects that were already created on the computer, such as multimedia presentations. The traditional paper portfolio would still exist and the CD would be an added component in the overall portfolio package. Scanning work samples may be eliminated altogether and still allow multimedia projects to be included in the portfolio in their original format. This situation permits students to continue to show the processes in their individual learning and also allows them to show their skills and knowledge in incorporating technology into their learning.

With students in Division I, I feel that the above two alternatives are more manageable and practical to undertake, particularly when planning for an entire class. Perhaps as students move along into higher grades, the expectations for electronic portfolios could increase as the students' skills and independence grow. However, at the Division I level, the drawbacks and additional demands placed on the classroom teacher do not make electronic portfolios a viable alternative to documenting learning with an entire class.

If technology is to play any part in student portfolios, technological support is extremely important. In order to have the students creating multimedia presentations, scanning work, using digital cameras, or working on the Internet, classroom teachers must also be knowledgeable in these areas. Particularly with young students, it is imperative that the teacher has the knowledge and skills to support and guide the students as they work. My students did not possess extensive knowledge and skills in working

with technology, so it was essential that I had enough knowledge to support and assist them as they worked. As mentioned, we were fortunate to have the opportunity to work with T. Hampshire. He provided many staff in-services focusing on how to use technology in the classroom. Hampshire helped me to help my students. He was also instrumental in helping us overcome the many intricacies that we encountered in working on the school server, using computers, and peripherals to create the kinds of electronic portfolios desired. Having access to an expert was essential in helping me, as the classroom teacher, to provide assistance to my students in using technology. We also had support from the school's systems operators when we experienced challenges with the computer system, network, or server. Without technological support of this nature, electronic portfolios would definitely not have been possible.

Clearly, the nature and capabilities of the computer system to be used in creating electronic portfolios must be examined in advance. Ideally, it would be helpful to have students working on their electronic portfolios in the classroom. The classroom would need to be connected to the school network and contain sufficient multimedia computers for the students to work on. If large amounts of scanning are needed, it may also be worthwhile to purchase a scanner for the classroom so that scanning could be done at any time. The system to be used must be able to support numerous multimedia projects as well as run other programs simultaneously so that classes and teachers can work on a variety of projects throughout the school. The system must possess enough RAM for the network to operate smoothly while a variety of applications are being run on the network. A digital camera, color scanner, and a CD writer are essential tools in documenting, digitizing, and making copies of student work. Using a zip drive may be an option,

although we did not explore this avenue. Working off of a zip drive may have alleviated some of the problems experienced as we worked off of the server.

I would also strongly recommend the use of volunteers when working on electronic portfolios or electronic components of portfolios with Division I students. Students of this age level definitely require more time and assistance. Making use of parent or community volunteers would reduce the load carried by the classroom teacher and would address some concerns regarding the time needed to create electronic portfolios.

Summary

It is clear that the possibilities to using technology to develop and manage electronic portfolios are here. Educators, exploring alternatives to traditional means of assessment, are turning their attention to student portfolios. The field of portfolios is as wide and varied as the numbers of students and teachers implementing them in classrooms. The value of portfolio assessment, however, depends on many factors, including the goals of the portfolios, the type of portfolio, and the ways that students and teachers collect and analyze items (Salend, 1999). Portfolios, in any form, possess tremendous potential to contain the types of dynamic assessments that truly matter in education. These assessments focus on the growth and achievements of the individual child on the path of lifelong learning. Portfolios are a valuable means of documenting student learning across the curriculum. Kieffer and Morrison (1994) state:

A portfolio ultimately represents a creation of self, a whole life portfolio. Its contents, like items in a scrapbook, are tangible pieces of the story. They are ways to remember.

A portfolio becomes an ethnography of the person, an ethnography of the teacher, an ethnography of learning.

Everything is connected. (p. 412)

The portfolio becomes a personal history of learning and growth. The entries provide documentation of individual accomplishments and triumphs. These entries also provide important information to teachers to shape and inform instruction as well as providing information for parents regarding their child's progress. Technology possesses the capabilities of taking student portfolios to an entirely new level. Electronic portfolios can serve all of the same purposes of traditional portfolios and then extend and make way for new possibilities. Moersh and Fisher (1995) state:

From a technological perspective, the future of electronic portfolios appears bright. Improvements in mass storage devices, processing speed, and compatibility among various platforms have signaled a new generation of electronic portfolios capable of fulfilling their promise of providing a seamless assessment scheme for K – 12 educators. (p. 123)

As technology continues to progress, educators will continue to find innovative ways to integrate technology into the curriculum and use it to support, document, and celebrate the process of learning.

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Appendix A

Letter of Consent

February 8, 2001

Dear Grade 2/3 Parents,

As part of my graduate studies at the University of Lethbridge, I am currently working on a research project concerning electronic student portfolios. My study focuses on the use of electronic portfolios in an elementary classroom as an effective way to help teachers, students, and parents understand and make decisions about individual student learning.

Portfolios are part of our regular assessment and evaluation program. Creating electronic portfolios will be done as part of our regular class work. My project will be based upon my work with a small sampling of the class. I may have reason to collect and share specific examples of student work and reflections in either my oral, written, or published presentations. I will also be using a survey with the students as well as with parents to obtain feedback in regards to their child's electronic portfolio.

I would like to request your permission to use your child's work as examples in my research. If published, I will only use a pseudonym to refer to your child, to protect identity. Participation is voluntary and you or your child may withdraw from the study at any time without prejudice. If you choose to allow your child to participate please sign this letter in the space provided on the next page, and return it to the school with your child.

Thank you for your assistance with my project. If you have any questions please feel free to contact me at Blackie School, 684-3666, or by e-mail dhipkin@cadvision.com. Also feel free to contact the supervisor of my study, Dr. David Townsend at 329-2731 or by e-mail david.townsend@uleth.ca, and/or the chair of the Faculty of Education Human Subject Research Committee if you wish additional information. The chairperson of the committee is Dr. Keith Roscoe, 329-2446 or keith.roscoe@uleth.ca.

Sincerely,

Karen Hipkin

Please sign and return to school.

I/We, _____ give permission for the work of our child
_____ to be included in the reporting and publishing of this research.

Print Name _____

Signature _____

Date _____

Appendix B
Student Survey Blueprint

Name _____ Date _____

1. My paper portfolio makes me feel...



2. My paper portfolio shows what I have learned and what I need to work on...



3. My electronic portfolio makes me feel...



4. My electronic portfolio shows what I have learned and what I need to work on...



5. I like my (PAPER / ELECTRONIC) portfolio better because...

6. Is there any other information that you would like me to know about your
electronic portfolio?

Appendix C

Parent Survey Blueprint

1. Please describe your past experiences with student portfolios.
2. Before seeing your child's electronic portfolio, what did you expect to see?
3. After viewing your child's electronic portfolio, what were you surprised to see?
4. In your opinion, do you feel the electronic portfolio adequately conveys information to you about your child's learning? Explain.
5. What do you see as the advantages to using electronic portfolios over traditional paper portfolios?
6. What do you see as the disadvantages in using electronic portfolios rather than traditional paper portfolios?

7. Which type of portfolio do you prefer? Why?

8. What suggestions do you have to improve the effectiveness of the electronic portfolio in providing information about your child's growth?

9. Is there anything else that you would like to add?

Child's Name _____

Parent Signature _____

Date _____