Digital portfolios: Advancing assessment through technology

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DIGITAL PORTFOLIOS: ADVANCING ASSESSMENT THROUGH TECHNOLOGY

A Project
Presented to the Faculty of California State University, San Bernardino

In Partial Fulfillment of the Requirements for the Degree Master of Arts in Education

by Sherrie Ann Juras June 2001
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Faculty of
California State University,
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ABSTRACT

Portfolio assessment is a time consuming and cumbersome task. However, the research indicates that portfolio assessment is multifaceted and may be applied to many learning or instructional situations. Also, portfolio assessment provides more detailed and specific understandings of student achievement. Emerging technologies can be used effectively and efficiently to help educators more comprehensively understand and examine student learning achievements. This project combines educational research on portfolio assessment, instructional design, and Constructivist learning theory into a design that can be used to help teachers plan and collect evidence and artifacts that represent student achievement in standards-based learning.
ACKNOWLEDGMENTS

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CHAPTER ONE

INTRODUCTION

Background Information
As technology becomes increasingly indispensable in classrooms throughout the United States and the world, innovative educators are creating new ways to document student achievement. Though standardized tests show some measures of students' growth, or lack thereof, they are limited in what they meaningfully reveal to the most vested stakeholders: the students and their parents, and to the instructional planners, the teachers. Scores and grades may show how students rate against one another locally, regionally, or nationally, but they do not tell much about if, when, and how, young people learn.

According to Routman (1988), standardized testing often focuses on what students cannot do, as opposed to what they can do. Also, test scores and course grades attempt to represent what a student knows at a very specific point in time.

Such assessments are limited in what they actually reveal about student growth. Also, they are limited as planning tools, since most grading occurs after a unit of
instruction, and standardized test scores are generally available to teachers the next instructional year. An assessment tool that documents student growth and that facilitates instructional planning is needed.

Portfolio assessment is one solution. Vavrus (1990) states portfolio assessment is a systematic and organized collection of student work that serves as a basis for ongoing evaluation. According to Valencia (1990), portfolios that include a variety of types of indicators of learning allow teachers, parents, students and administrators to build a complete picture of student development. DeFina (1992) states that portfolios should contain the actual day-to-day work of students which reflects what they have learned. Unlike standardized tests, portfolios show what students can do.

Statement of the Problem

Although portfolio assessment provides important evaluative information, portfolios can be cumbersome and time-consuming to implement and use. Bulky binders, boxes of collected work samples and products, art or other visual displays are not always easy to store or move from one location to another. Also, planning pages, drafts of
written documents, and their subsequent revisions, can be quite a heavy burden for a student or teacher to carry or house in order to document the various stages of the writing process. Sifting through student portfolio collections can be a physical challenge as well as a time-consuming task. Specific products included in physical portfolios may serve to document only certain achievements, yet all of it has to be waded through in order for instructors to find the specific evidence they are looking for. As a result, a collection of material that reveals students' growth and achievement may not be easily accessed by instructors, in a time-effective manner.

However, if the material itself is somehow rendered portable, and is arranged to represent specific targets of students' development, it then becomes a more efficient evaluative tool. For this reason, a digital portfolio that links student work samples to academic standards, and that digitally stores the information, would be beneficial to all stakeholders, especially to students and teachers. Such a portfolio could be stored on a CD-ROM, a laser disk, a high-storage floppy disk, in a folder on a school server, or on a webpage on an
Intranet or over the Internet. This project is an effort to develop a portfolio interface through which students and teachers can access mandated academic standards, as well as obtain suggested activities they could employ to demonstrate mastery of those standards. Also, the project supplies a consistent template to use to format assignments to be submitted in their digital portfolios.

Project Overview

The evolving technologies used to create digital portfolios can demonstrate student achievement in virtually unlimited ways. Evidence of student growth and achievement can be documented digitally. Such evidence can take the form of text, graphics, photos, sound, video data, and can even include database records of standardized or course-end test scores and grades. Portfolios also reflect more complete profiles of young learners when they include teachers' anecdotal comments and students' reflections about their collected work, growth, and achievement. Using portfolios to document achievement is portfolio assessment. It is one method of collecting authentic assessments, or performance-based assessments of students' efforts.
Constructivist learning theorists such as Seymour Papert (1993) agree that students learn when they find and generate their own knowledge. One way to increase the likelihood and the motivation of students to learn is to give them an essential voice in their own evaluations. A digital portfolio provides a metacognitive avenue through which students examine and explain their own learning. They engage in critical thinking and they make evaluative choices each time they decide whether to include a particular document as an artifact of their work. Students also exercise important information age skills as they vary the media formats they use for their portfolio submissions.

This project is an effort to create a school-based, intranet-accessed digital portfolio interface, for use in a ninth grade English class. The project applies alternative assessment strategies and computer-based technologies to create a product that assists in the creation of a dynamic representation of student achievement.

The San Bernardino High School digital portfolio is designed to accommodate student work submissions from a variety of media formats, although it is still largely
text-based here. As students and teachers increasingly use other technologies to provide evidence of their growth and achievement, this portfolio will expand the kinds of student work it routinely documents.

The SBHS portfolio is a standards-based design, providing evidence of ninth grade students' learning and efforts in language arts. This means that student work submissions are directly connected to specific content standards, as designated by the California Department of Education. In addition to the standards themselves, sample assignments are linked to the standards. The assignment links provide students and teachers suggested activities that could be used to help students understand the standards and to demonstrate their achievement. The design is strongly influenced by the current research in assessment, technology, and instructional design.

Chapter two reviews the literature on portfolio development and use, portfolio assessment, and interactive media used in instruction. The research heavily influenced the development of the project. Chapter three outlines the project's goals and objectives and includes an explanation of the instructional design model selected to develop the project. The chapter
includes a discussion of the project’s formative evaluation, and its strengths and limitations. Chapter four concludes the project with an explanation of potential enhancements to the project, as well as some suggestions for implementing the digital portfolio. Recommendations for improving the portfolio and a conclusion follow.
CHAPTER TWO
REVIEW OF THE LITERATURE

A review of the literature on portfolio assessment and multimedia technologies in instruction yields several inter-related themes appropriate to the development of this project. This literature review is organized into the following subtopics that will examine issues pertaining specifically to portfolio assessment, such as 1) what is a portfolio? 2) What is the purpose of a portfolio? 3) What typically goes into a portfolio? 4) How are portfolios evaluated? The review also examines issues relevant to the technological aspects of portfolio implementation such as: 1) media forms of portfolios, 2) Constructivism and its influence in education technology, specifically regarding assessment, and 3) the interactive nature of multimedia as it may be employed in collections of student digital portfolios.

What is a Portfolio?

A portfolio is a systematic collection of student-produced work over a period of time. Collected work may include text-based documents, recorded video or sound, multimedia projects, tests, quizzes, photos,
scanned objects, and more. Such archived information depicts a more complete profile of an individual learner. DeFina (1992) states that in education, portfolios are used to assess students’ strengths and weaknesses over time. Melograno (1994) adds that portfolios offer a dynamic, visual presentation of student’s abilities, strengths, and areas of needed improvement. Furthermore, Melograno describes portfolios as consisting of six characteristics which: 1) Represent a wide range of student work in a given content area; 2) Engage students in self-assessment; 3) Allow for student differences in learning needs and styles; 4) Foster collaborative assessment; 5) Focus on effort, improvement, and achievement; and 6) Link assessment and teaching to learning.

Graves and Sunstein (1992) note that portfolios provide educators with an assessment system that includes multiple measures of students’ abilities taken over time. Bird (1990) calls portfolios containers of documents that provide evidence of someone’s knowledge, skills, and/or dispositions. Barrett (1998) describes digital portfolios as using technology to support alternative assessment efforts. Finally, Sheingold (1992) notes that electronic
portfolios make student work portable, accessible, and more easily and widely distributed.

What is the Purpose of a Portfolio?

The purpose of a portfolio directly informs the design of a portfolio. In other words, the intended use of the portfolio shapes its design, its form, and its applications. For instance, the purpose of a showcase portfolio is to contain only students' best products and documents, and it may employ several media. The purpose of a writing portfolio is to not only collect writing documents, but also to demonstrate student understanding of the writing process. A writing portfolio likely contains entries that represent different stages of the writing process. As such, some entries are rough, unfinished documents. Entries in this type of portfolio are predominantly text-based documents.

Grasso-Ryan (1996) explains that the information you get from a portfolio results from what it's structured to reveal. A "sportfolio," for example, charts students' progress towards articulated outcomes in a fitness program curriculum (Melograno, 1994). Portfolio entries in a sportfolio may include time and distance
measurements, measures of weights lifted, body fat percentages, or heart rates. Research by Weldin and Tumarkin (1998) finds that the entries for a portfolio are determined by the purpose of the portfolio and by the context of the other exhibits found there. Finally, Lankes (1995) groups portfolios in education into six different types, based on their purposes: developmental, teacher planning, proficiency portfolios, showcase portfolios, skills portfolios, and college admissions portfolios. According to Lankes (1995), developmental portfolios are designed to document students' progress and improvement. Artifacts included represent a range of student development over a period of time, usually an academic year. They may include test scores, report card grades, homework samples, and other data. They may also include site or district specified types of assignments selected for inclusion at pre-designated times during a year. Teacher planning portfolios are designed for teachers to receive information about an incoming class of students' ability levels and experiences. These are also likely to include test scores, prior subject area grades or evaluations, and sometimes anecdotal information. The teacher uses the information to more
efficiently plan instructional units. Proficiency portfolios require student submissions that document competence and performance in school, district, or state-mandated educational standards. These portfolios include samples of student work that serve as evidence of their achievement of the competencies. Showcase portfolios represent the best accomplishments of a student’s educational career; these are typically organized to include samples of student work that represents their highest achievements in each subject area. Employment skills portfolios profile student work and aptitude in order for employers to evaluate a prospective employee’s work-readiness skills; these portfolios may also include career research, aptitude tests and work experience documents. Finally, college admissions portfolios are used to determine a prospective student’s eligibility for college or university study. Consequently, Lankes found that the functional purpose of a portfolio is what determines its contents.

What Goes into a Portfolio?

Again, the primary purpose of a portfolio will dictate its contents. However, portfolios in education
appear to be combinations of showcase and proficiency portfolios, as described above. They are designed to include evidence of program goals, of student achievement in content areas, or evidence of development over time. Meyer (1992) finds that portfolio contents should allow students to document desired performance through real-life situations. Lankes (1995) adds that portfolio assessment is not limited to standardized test scores, but also may include student projects that demonstrate problem-solving skills as well as skills used for analyzing and synthesizing information. Kirk (1997) describes the portfolio content as including any evidence of outcomes that closely relate to program goals, which are clearly communicated to students at the onset of a course of study. She adds that portfolio assessment included opportunities for students to take responsibility for active learning and for evaluating their own educational progress. Portfolio submissions then, are connected to program goals established for each student prior to portfolio collection. Contents reflect attention to the prescribed goals.

Rousculp and Maring (1992) note that metacognition was a major outcome of their students' writing portfolio
experience. Their students experienced opportunities to become more critically aware of their own reading, writing, speaking, listening, and thinking abilities. In this study, students were required to submit reflective descriptions of each of the documents they submitted to their writing portfolios. These reflections detail how well the students felt they met each of the requirements of their course. The written reflections also offered students opportunities to assess their own progress and learning.

Gomez et al. (1991) find indications that portfolio collections encouraged students to be more aware of their progress and development. They note that portfolios could include all kinds of student-produced documents that students can review and comment on at a later time. In a case study involving an elementary teacher and several of her students, Gomez, et al notice that reviewing portfolio evidence collected throughout the year encouraged these very young students to gain knowledge about themselves as learners. It also encouraged their instructor to make specific curricular adaptations to accommodate their needs or learning styles.
Farr (1990) recommends that portfolios for students contain reading and writing activities and learning experiences that reflect the goals of an integrated communicative arts curriculum. Other researchers in language arts (Nist & Diehl, 1990) conclude that other important portfolio components that should be included are reading inventories, surveys, questionnaires, and self-awareness journals, as well as anecdotal records, observations, contracts, checklists, and study skills inventories (Weinstein, Palmer, & Schultz, 1987). Tierney, Carter, and Desai (1991) suggest that effective portfolios encompass a wide range of authentic reading and writing activities and processes, and provide a framework for individualizing instruction and for self-assessment.

Finally, Valeri-Gold, Olson, and Deming (1992) identify three areas of concern which must be clearly addressed when implementing portfolio assessment: 1) the focus of the portfolio is based on clearly defined objectives developed by the teacher (and collaboratively by students where appropriate); 2) the audience critiquing or evaluating the portfolios is established; and 3) the evidence, or pieces of work, include many...
forms, (e.g. works in progress, rough drafts, final copies, tests and quizzes, checklists, and questionnaires), selected by the students, who are active participants in the process.

Portfolio content obviously is a direct function of what purpose the portfolio is designed to demonstrate or communicate. As such, no ready formula for producing a single type of portfolio, or a portfolio content list, for use by a classroom teacher, or by any stakeholder interested in student education exists.

How are Portfolios Evaluated?

Evaluation methods for portfolios are as varied as their purposes require. Paulson and Paulson (1991) state, "What we see when we evaluate a portfolio is the product of the glasses we wear when we evaluate portfolios." In other words, evaluation of portfolios depends entirely upon what the work collections are intended to depict. However, research indicates general guidelines for evaluating portfolio exhibits. For instance, Newmann and Archbald (1992) explain that portfolio criteria must articulate the cultivation and documentation of meaningful, significant, and worthwhile forms of
accomplishment. Wolf (1991) adds that portfolio assessment should maintain an attitude that the evaluation is dynamic, and that the richest portrayals of student performances are based upon multiple sources of evidence, collected over time, in authentic settings.

In Vermont, a state-mandated portfolio assessment is one part of its certification process for new teachers. Preservice teachers assemble portfolios that document their competencies as teaching professionals. Dollarse (1996) explains the evaluation of these portfolios includes a review of the portfolio itself, as well as an oral presentation/defense of the package by the submitting preservice teacher to a three-person committee.

Lamme and Hysmith (1991) analyze portfolio assessment and note two components assist the evaluation process: 1) teachers' anecdotal comments on students' work and progress; and 2) students' own comments, which explain why particular items represent their growth or achievement. The authors also conclude that teachers using portfolios typically collect three kinds of data to use for evaluation: collection and analysis of student work or artifacts, student reflections and self-evaluations, and observations, checklists, and scales. Teachers who engage
in portfolio assessment use the three kinds of data in various combinations.

Valeri-Gold, Olson, and Deming (1992) conclude that since students are often involved as decision-makers in the portfolio’s evaluation, standards with objectives must be clearly established before the portfolio process can effectively begin. The researchers add that a timeline should be developed as part of the assessment process. The timeline encourages accountability on the part of the students, for submitting samples, and for teachers, for reviewing and assessing student progress.

Similarly, Zigmond and Silverman (1984) state formal and informal assessment tools need to be incorporated into the portfolio to provide information about the students’ performance abilities, to clarify goals and objectives for remediation, to document future growth, and to establish future program changes. Flood and Lapp (1989) offer another evaluative process through a comparison portfolio. Here, evaluation compares a student’s beginning and end-of-term performances in a course. Progress or achievement is measured as a function of a student’s individual development over a given time period.
Kirk (1997) also explains that teachers conduct regular checks of the working portfolio to determine if students are making progress and staying on a determined timeline. She adds that during such progress evaluations, teacher feedback is necessary. Then, revisions can be made when they are needed. Kirk also insists that teachers provide students with standards or other evaluative criteria at the onset of the process. Melograno (1994) adds that a working portfolio be transformed into a submission portfolio, which include a student’s best work or evidence of effort, progress, and achievement of all desired learning outcomes, when they are to be evaluated.

Additionally, portfolio evaluation includes not just the work compiled within a portfolio. It also includes a determination of how the work represents student growth, progress, or achievement. In outcomes-based evaluation, attention is on how effectively student portfolio submissions document their achievement of course objectives or standards. Hopple (1995) suggests that critical to each submission and subsequent evaluation is a self-reflection document that accompanies every submitted artifact. This document explains why the piece is included in the portfolio, which standard or objective was being
demonstrated, and a description of how well the outcome was accomplished.

Finally, though portfolio assessment helps to individualize evaluations of student work or of learners themselves, an important drawback of portfolio assessment is in quantifying the results such assessment reveals. One concern is the issue of standardization of portfolio contents. While some researchers argue against standardized content (Paulson & Paulson, 1991), others suggest that some amount of standardization of portfolio content is necessary. For example, French et al. (1991) insists that standardization is necessary if portfolio data is to be aggregated. Otherwise, they note, there is no basis for comparability. Wolcott (1992) discusses a middle ground on this issue by including an established number of specific portfolio entries, coupled with an equal number of open or unspecified types of submissions in students' writing portfolios.

Marzano (1994) stated that the most difficult and controversial issue related to the use of portfolios has been the challenge of objective assessment. Most portfolios are scored holistically, using specific or generic rubrics (see Table 1).
<table>
<thead>
<tr>
<th>Generic Rubric</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Demonstrates a thorough understanding of the important information relative to this topic and can exemplify that information in detail; carries out the major processes/skills that relate to this topic with relative ease and automaticity.</td>
</tr>
<tr>
<td>3. Demonstrates an understanding of the important information relative to this topic and can exemplify that information in some detail; carries out the major processes/skills that relate to this topic, but not necessarily with ease and automaticity.</td>
</tr>
<tr>
<td>2. Demonstrates an incomplete understanding of the important information relative to this topic but does not have severe misconceptions; or makes a number of errors carrying out processes/skills that relate to the topic, but accomplishes the basic purpose of the process/skill.</td>
</tr>
<tr>
<td>1. Demonstrates severe misconceptions about the important information relative to this topic; or makes so many errors when carrying out the processes/skills relative to the topic that they fail to accomplish this purpose.</td>
</tr>
</tbody>
</table>

Copyright 1998 by R. J. Marzano.
Elbow (1991) explains decisions about portfolio scoring highlight the tension between validity and reliability. Elbow states portfolio assessment is an extremely valid form of assessment because it accurately measures complex variables that depict students' real abilities. However, this same complexity makes it difficult to reach reliable agreement among different scorers. Finally, Barton (1993) suggests that evaluators simply link grading of portfolios to the purposes established for them. In effect then, evaluation of portfolios is intrinsically tied to the reasons educators have for using them.

What Are Some Media Forms of Portfolios?

As described earlier, portfolios are containers of documents and artifacts. As such, a portfolio may employ any media form that purposefully conveys its collector’s interpretation of its requirements. In education, portfolios are typically text-based documents, although the exact nature of the text documents may vary tremendously. But portfolios may also contain other non-text artifacts.
Among media used for artifacts or documents are photographs, videotape or film, constructed projects or models that use wood, metal, plastic, plaster of Paris, clay, or other materials. Other submissions could be multimedia projects, musical compositions or recorded interpretations of musical sounds, rhythms, or lyrics. Still other portfolio documents could include drawings, paintings, and sculpture.

Any imaginable communications tool, any product resulting from the purposeful application of learned concepts could be included as part of an entry in a student’s portfolio.

Weldin and Tumarkin (1998) state that how and when documents go into the portfolio depend upon the nature of the portfolio. They add that contents can include a variety of formats and products, such as classroom assignments, finished or rough drafts, tests or quizzes, videotapes of performances or special events, audiotapes of speeches, booktalks, or oral reading experiences. According to Weldin and Tumarkin, baseline entries and the subsequent goal-setting process determine the focus and form of the portfolio’s contents.
Bahr and Bahr (1997) note that portfolios typically consist of materials collected and arranged in binders. However, technology can facilitate the development and display of student portfolios and broaden the types of work samples that can be stored. Computer-based technologies enhance storage and data collection as they provide a means of collecting, storing, and displaying text, graphics, sound, and full-motion video.

Also, the technologies allow students to scan handwritten work. Technology also maintains demographic and testing data, and it can accommodate the inclusion of annotations by students, parents, and teachers. Bahr and Bahr (1997) explain that immediate access to large amounts of data could promote accurate assessment results and facilitate the development of sophisticated expert systems to assist teachers with instructional planning.

Lankes (1995) finds electronic portfolios or computer-based portfolios stored student work collections on floppy or hard disks, and on CD-ROM disks. Mills (1997) describes a natural fit between portfolios and technology, though he notes the implications for equipment and software are many. Also, though Mills indicates the flexibility and capacity of electronic
portfolios is impressive, he admits a potential problem regarding the comfort level of the computer literacy of both students and faculty members could exist in schools.

Barrett (1999) indicates that digital portfolio formats should necessarily reflect the technological profile of the institution using them. Barrett offers a decision matrix to consider prior to establishing portfolio data collection. The matrix assists teachers and administrators in planning for digital data collection and storage by assessing issues such as: teachers' and students' technological skills, student and staff access to computers, hardware and software inventories, portfolio purposes, data storage, the multimedia elements to be included, and the support technologies needed to manage data digitization.

Using the matrix can assist instructional planners who wish to use technology to develop other forms of assessment in schools. Barrett's matrix also depicts a range of data storage options that suit various models of school site technology situations. Like the portfolio process itself, a site's technology hardware, software, and student and staff usage levels, are parts of the
holistic analysis necessary for productive implementation of the digital portfolios in a school.

Constructivism, Technology, and Assessment

Constructivism is a cognitive theory that suggests learners do not discover knowledge, they construct it in authentic settings. Thompson, Simonson, and Hargrave (1996) note that in Constructivist learning settings, learner control and the use of realistic and authentic information is critical to instructional effectiveness. Also, Grabe and Grabe (1998) add that thinking and learning are active. They state that students acquire information from the world around them and generate personal knowledge. They solve problems. They create new ideas and new things. This process is Constructivism, and it is learning in action. Papert (1990) notes Instructivism is when learners passively absorb knowledge, as if they were sponges. Conversely, he describes Constructivism as when learners actively construct knowledge, which is then more meaningful, applicable, and memorable.
Finally, Jonassen (1996) adds that Constructivist models of instruction strive to create environments in which learners actively construct their own knowledge and that in such environments, they actively engage in interpreting the external world and reflecting on their interpretations. Jonassen also argues that when learners build their own interpretations of the world, they have more ownership of those thoughts, so those thoughts are less likely to degenerate over time.

Constructivism strongly influences educational technology practices whenever computer-based applications or other technologies are used to create information. When learners use computer technologies as tools to create knowledge, they are engaging in Constructivist activities. Students are not learning from the computer, but rather with the computer as a functional tool. For example, when a student uses the Internet as one research tool for a report on gun control, and then synthesizes the information in a multimedia report, she is constructing her own knowledge as she presents the information. Another student has read a book, several encyclopedia articles, and viewed a film on the Holocaust. He then uses the ideas he has studied to
create a webpage that defines and describes Holocaust. He has created knowledge for himself by virtue of his experience.

Constructivism has an important place in assessment as well, particularly in portfolio assessment. Generally, learners will select their own materials, documents, and artifacts to include in their portfolios. And as Barrett described earlier, when students add their own reflections as to why they have included certain submissions, they must reflect on their learning. They add meaning to the experience by cognitively reviewing the processes, which occurred during their learning endeavors. This reflection, or metacognition, is a vital portion of Constructivism.

Keifer and Faust (1993) find that the physical object of the portfolio only begins to take shape as learners select and arrange evidence of their learning with a particular audience and a particular purpose in mind. When the student goes on to compose reflections exploring the meaning of the evidence, the collection is transformed into a powerful document representing the self-aware learner. Lamme and Hysmith (1991) discover the portfolio process is an assessment process in which
students bear much of the responsibility for the curriculum through self-reflection and self-evaluation. To become autonomous learners they conclude, students must learn to assess what they have learned and how they learn best.

Moersch (1999) notes that electronic portfolios change the focus of a classroom from teacher-centered to student-centered. Researchers also indicated that when students are actively involved in developing their own assessment tool, they begin to set goals for themselves and to check their progress toward reaching those goals. This helps to develop self-assessment skills (Paulson & Paulson, 1994; Tierney, 1992). Micklo (1997) concluded that portfolio development redirects student learning towards problem solving and reasoning and it places responsibilities on the learner. Weldin and Tumarkin (1998) stated that portfolio assessment promoted self-regulated student learning and ownership. Finally, Melograno (1994) stated that when students make decisions about the selection and quality of their work, they begin to establish standards by which their work can be evaluated.
Interactive Multimedia in Digital Portfolios

Because portfolios can be so varied in their structures, applications, and formats, they are perfect ventures for employing multimedia applications in student assessment. Limited only by the specifics of a portfolio’s design, multimedia capabilities blend seamlessly with the authentic assessment measures portfolios encourage. Digital or electronic portfolios combine assessment with technology to produce, display, and store evidence of student achievement or progress. Melograno (1994) notes that computerized grade programs with rubrics, motor-skills videotapes, computer simulations, and digitized video of pre-post demonstrations of skills, all can contribute to electronic portfolios, and are used to document learner outcomes.

Nguidula (1994) explains that the nature of multimedia is performance-oriented. Videotapes, audiotapes, hypermedia, and text add another dimension to student performances. He adds that using forms other than student papers, opens student work up to other viewers besides teachers, and it encourages instructors to
broaden their assessments to include a range of learning styles. Barrett (1998) explains that multimedia can address different learning strategies, as well as learning objectives, at one time, stimulating all senses to form a complete learning experience. She explains that by using static and moving images, sound, and text, a portfolio can fully engage students' senses.

Liu and Rutledge (1997) compare project learning methods, multimedia versus traditional text-based methods of project construction in a study. Their results show that students in the treatment group, who used multimedia, were more motivated to toward learning than those in the control group. Also, the researchers conclude that students enjoyed project construction using multimedia more than did the control group, whose assignment media was text-based. The treatment group spent more time on-task and more of their own time constructing the multimedia projects than did students working in the control group. Students in the treatment group reported a more positive image of themselves as a result of their project work. Interestingly, Liu and Rutledge note that the treatment students felt the multimedia design provided them a way to express.
themselves and they developed a strong sense of ownership for their work.

Similarly, Delclos and Hartman (1993) compared research products and processes between a traditional course and a multimedia course. The authors conclude that students in the multimedia course used more research and theory to support their analyses, and they better integrated their findings in presentations of their research, than did the traditional course. A connection seems to exist between multimedia and student motivation.

Venezky (1991) suggests that multimedia offers the ability to adapt to different learners, content, and pedagogical differences. Because of this flexibility in delivery or creation of content, multimedia, especially as it is used in web-based content or in hypermedia, is more interactive than text-based content or assignment.

Conclusion

Portfolios provide educators and others with multidimensional profiles of learners' abilities and achievements. They provide more details about learners and they demonstrate evidence of student growth and improvement. Portfolio content can be specified according
to particular purposes. The research indicates that portfolios may be adapted to serve a multitude of educational purposes. Similarly, research reveals that portfolios, as well as the artifacts compiled within them, may take many physical forms. Constructivist instructional practices encourage learners to create knowledge for themselves. Multimedia technologies are tools that assist twenty-first century learners to create that knowledge. Therefore, an instructional design model that facilitates the integration of Constructivism and multimedia technologies in portfolio development and integration is necessary for this project.

For the purpose of designing a standards-based portfolio, a model that assists planners to organize the mechanisms of a digital portfolio is important. The Gerlach-Ely Design Model (1980), holds the most practical promise (see Appendix A). A discussion of the design issues as they apply to the incorporation of the research and the project’s development is presented in chapter three.
CHAPTER THREE
PROJECT DESIGN AND DEVELOPMENT

As indicated by much of the research discussed in chapter two, the purpose of a portfolio informs its design. Therefore, this chapter outlines the project’s design and development by first articulating the goals and objectives for the project. A description of the instructional design model and its application to the structure of this project follows. The formative evaluation of the project, as well as a discussion of its strengths and limitations, and recommendations for further study is included here.

Goals and Objectives

The goal of this project was to create a functional digital portfolio interface that matched student work samples to California Language Arts standards, for use in a ninth grade English classroom. It was a goal that students who use the portfolio would become more aware of themselves as learners, and that they would develop self-assessment skills. It was a goal that teachers would assist students to document achievement using a variety of measures.
Objective 1: Learners will understand how to access language arts standards from among four domains, and review sample performance activities, in order to provide evidence of mastery.

Objective 2: Learners will understand how to provide reflective comments that explains their entries, and how they meet the standards.

Objective 3: Learners will understand the inter-relatedness of the standards, and comprehend that one work sample may often target several standards simultaneously.

Project Design and Purpose

The design of this project, addressed the problem of systematically collecting and accessing evidence of student achievement through an authentic assessment instrument: the digital portfolio. However, in its project development, it was a functional portfolio interface. That is, the interface was more of a dispenser of information than it was a container of student work demonstrations, a departure from the traditional conception of a portfolio. This design presented the
conception of portfolio as a dynamic interface through which students accessed information and then attempted to document their understandings of what was expected of them academically. The design allowed teachers to select their own method of housing evidence of student performances. It recommended a consistent format for work submissions, and it allowed for students to drop work samples off at a student drop-box on an Internet course site, or for students to email work samples to a teacher.

The purpose of the design was to encourage students to become more familiar with what is expected of them academically, particularly in ninth grade English language arts. Also, the design offered considerable latitude for students in how they chose to respond to those expectations, the standards. Additionally, the design encouraged students to have some say in their evaluations and to respond to specific state standards in language arts. In this design, students actively interacted with the portfolio as they attempted to document their academic achievements. As they prepared and submitted data documents, students engaged in meta-cognitive activities. By choosing their own representative work samples, and by defending their
selections, they learned to apply self-assessment, critical thinking, and problem-solving skills.

Design Structure

Because the digital portfolio encompassed evolving technologies and allowed for independent as well as cooperative student efforts, a flexible instructional design model was important. The model should allow designers to adapt instructional content and evaluation methods according to the needs specified by the portfolio type. In this case, the Gerlach-Ely (1980) design model best suited the needs of the instructional designer of the digital portfolio in several ways (Appendix A).

The Gerlach and Ely model is a systems model that involves an iterative series of ten stages that assist planners to develop active combinations of objectives, strategies, resources, and evaluations, in order to achieve instructional goals (1991). Instructional designers Dick and Carey note that such a systems approach allows for several concepts to be interrelated to produce an outcome for effective learning (1990). The Gerlach and Ely model is a mix of linear and concurrent development activities. Several stages are seen as
simultaneous, but the model is generally linear in its orientation (1980).

Following is brief explanation of the Gerlach and Ely instructional design model and an explanation of how the model influences the portfolio’s design.

**Stage 1: Specification of Content**

In this stage of design, planners articulate the instructional content to be utilized in order to assist learners to achieve the academic standards in a content area. For this project, the designer utilized portions of literature-based units found in San Bernardino City Unified School District’s adopted ninth grade English text, *Language of Literature*, portions from the designer’s study unit on *The Tragedy of Romeo and Juliet*, as well as writing workshops, and other course materials. In the project, the specific content was found by navigating to the academic standards for ninth grade English, (see Appendix G) then proceeding to one of four strands within English language arts: reading, writing, listening and speaking, or English language conventions. From there, each academic standard was linked to a generic project or assignment. Satisfactory completion of the project or assignment, as determined by a classroom
teacher, demonstrated student achievement of that standard.

Stage 2: Specification of Objectives

This design stage calls for the articulation of the instructional objectives. For this project, understanding how to access the academic standards was the objective.

Through the first two stages of the Gerlach and Ely model, 1) the designer identifies content and 2) specified objectives. This task emphasized content as it identified objectives, but it also allowed for objectives to inform content selection. One strength of the Gerlach and Ely model for the portfolio's design was that these first two stages were interchangeable.

For the digital portfolio, the model applied in how the California State content standards for language arts, grades nine and ten, were articulated within the portfolio's design. As such, they were of use to both teachers and students. The portfolio's design also included suggested activities that addressed the standards, but the assignments were generic. A classroom teacher could fill in details in the sample assignments with specific information selected from district adopted texts, or with specifically assigned materials. That
assignment could be adapted to apply to an individual, group, or classroom of learners, or assignments may be arranged in instructional units. Or, in another configuration, the standards themselves may be considered the objectives, and the content that helped facilitate the students' ability to achieve the objectives was then selected.

Stage 3: Assessment of Entering Behaviors

Next, the Gerlach and Ely model's third stage called for an assessment of students' entry level skills or behaviors. Specific procedures for identifying such behaviors were not described, but for the portfolio, they could include reading inventories, assessments, and surveys, writing skill tests, or scores from the previous year's SAT-9 exams, writing samples, and grades. Eventually, they would likely include video or audio recordings of students' reading or speaking performances. For this project, a learning expectations survey and a multiple-choice survey on academic standards were available for students to complete by linking to: www.Blackboard.com/courses/ENG1C3, and in Appendix B.

In addition to these surveys, future design enhancements to the portfolio should include read-only
teacher and student access to data such as test scores and students' transcripts.

The next five stages of the Gerlach and Ely model, like the first two, were interchangeable and will influence one another. Actually, these five stages occur simultaneously, and they were interactive in that decisions in one area affected the range of decisions in the others. The stages were: 4) determine strategy, 5) organize groups, 6) allocate time, 7) allocate space, and 8) select resources. The Gerlach and Ely design model's attention to the prerequisite needs of a Constructivist classroom, especially these five stages, was why the model was applied for the design and development of the digital portfolio.

As the five stages were practically applied in the portfolio, their specifics depended on students' instructional needs. The completely developed portfolio would enable both student and teacher to clearly ascertain which academic content standards needed to be addressed. Students would enter their ID numbers, and the standards they had not yet met would be displayed for each subject area. Instructors would select strategies appropriate for the learner based on their entering
behaviors and abilities, and also based on what specific standards the students had yet to demonstrate.

Stage 4: Determination of Strategy

In this project, determination of strategy was based on articulating the California's expectations for ninth grade level performance in language arts. The web-based portfolio informed students of the content standards, and then an assignment suggestion was linked to each standard. Here, determination of strategy meant first learning what must be achieved, and then examining a suggestion for attempting that achievement.

Stage 5: Organize Groups

This stage of the portfolio's design could be effectively employed in two ways. First, students who needed to achieve similar standards may form in teacher-directed or student-selected groups, to work on projects designed to showcase their efforts toward achievement of the standard. Or, in another configuration, one that would rely on the data base of student achievement being operational, the teacher designed assignments or projects in which all group members work together on one product. Here, each group member would specialize in a different aspect of the
project's construction, while each individual attempted to master separate standards.

For example, in a multimedia project designed to demonstrate students' understandings of core literature, such as *Romeo and Juliet*, project group members all had different responsibilities, according to the standards they had to meet. One member could work toward specific reading standards by researching background materials about the play, about Shakespeare, or about Elizabethan England. Another could write the text portions of the project, while achieving a particular writing standard. A group editor could employ knowledge of grammar rules and use resources detailing language conventions to proofread and edit the project contents. Another student could prepare and deliver the presentation of the project, in order to demonstrate a particular oral language standard. All group members would work cooperatively to achieve individual and disparate academic standards. Also, the design here similarly encouraged interdisciplinary interactivity, when the math, science, and social studies portions were activated in a subsequent portfolio project design.
Stage 6: Allocation of Time

For this project, time allocation was considered only within the configuration of an academic year. In other words, students would have one academic year to compile and submit evidence of their learning. Of course instructors could customize their own courses by adding specific time parameters, or by designating a specific time schedule or by imposing a specific order for achieving the standards. However, in testing the project, students were given a limited amount of time to develop and submit their evidence. Students were given three days in a computer lab: one day to complete the inventories, then two days to choose a strand, and then a standard to begin their work. Then, students were given three weeks to develop and submit their work sample.

Stage 7: Allocate Space

In order to implement the web-based portfolio in a classroom, allocation of space was an integral issue. Space considerations included designer attention to access to computers for word processing, for Internet research, and other issues. Additionally, workstations that include scanners, digital cameras, printers, and image enhancing software, were important. Also, computer
workspace must allow for whole class and/or small group configurations of students and include tables for non-computerized work and activities. In the test classroom, space was allocated primarily based upon existing resources.

For this project, one word processing station equipped with two computers and one printer was available to students. Another three computers were set up for students to use to develop multimedia projects using Hyperstudio, PowerPoint, or Kai’s Powershow software. For the test group, no scanner or digital camera was available for student use in project development. Finally, three Internet workstations were available for students to use in research, or to submit work documents via email, or in the student dropbox at www.Blackboard.com/courses/ENC1C3. Other space considerations included desk or table space for group and individual reading, planning, and designing assignment responses.

**Stage 8: Selection of Resources**

In addition to the previously described computer resources, selection of resources called for the designer to organize other instructional resources as well. For
this project, the designer utilized all available curricular materials prescribed for ninth grade level studies in English. All students testing the design had access to all printed course material suggested or referred to in the portfolio. Students also had access to bookmarked materials available on the Internet.

Again, as is typical the Gerlach and Ely model, the selection of resources impacted the other four mid-stages of the model. Again, the dynamic nature of the model lent itself perfectly to the design of the portfolio, as time, space, and resources, all influenced the determination of which strategies and what group or individual configurations would best represent what students knew and could do.

Stage 9: Evaluation of Performance

In the portfolio design, evaluation of performance was twofold: first, students selected and submitted assignments which represented their responses to the standards; in effect, they self-evaluated as they were required to include a response that explained how their work answered the standard. Second, teachers evaluated the student performances to determine whether or not the work submitted satisfactorily met the described standard.
Should student work submissions be deemed unsatisfactory, the instructor then would make adjustments, particularly to the model's mid-stages, four through seven.

According to the Gerlach and Ely design model (1980), evaluation was closely linked to the learner objectives. In this project, the instructor made adjustments to the strategies, the organization of groups, time, space, and resources, based on student performance evaluation, and in the model's final stage.

**Stage 10: Analysis of Feedback**

In the Gerlach and Ely design model, in addition to the evaluation of student performance, attention was also directed to evaluating the system itself. The designer analyzed performances to evaluate the effectiveness of the instruction. Feedback focused on reviewing all of the stages in the model, with a special emphasis placed on examining decisions regarding the objectives and strategies selected (1980).

For the portfolio, analysis of feedback worked to make the learning objectives, the standards, more comprehensible to learners. This was achieved by developing the sample assignment portion of the portfolio. Later versions could include student work
samples, archived from previous students, to serve as examples for learners.

In the portfolio test, participants had unlimited access to the workspace, some limits on the time they had, and wide choices in resources to use.

Formative Evaluation

Applying the portfolio interface in a classroom environment was achieved over several months of instruction. Students were introduced to academic standards during the first weeks of class. Students gained Internet navigational experience through several instructional activities unrelated to the portfolio, and through interacting with the surveys over two academic quarters. The details of the students' participation in the project are described next.

Forty-three students participated in the portfolio project. All subjects were students enrolled in ninth grade, college preparatory English classes at an area high school. Student computer experience ranged from very little to very proficient, though only five students reported Internet access from their homes. Interactivity with web design was introduced and practiced during
computer lab sessions using web-based activities and quizzes to study Romeo and Juliet. Students also interacted via the online surveys.

Before interacting with the project, students spent one period discussing their understanding of what learning expectations, or standards, for ninth grade English were. Participants were later given time to take an online survey about the standards. Questions used in the discussion are included in Appendix B, the Standards survey.

In class sessions following the discussion and survey experience, students were given twenty minutes to complete another survey, the online Learning Expectations survey at the Blackboard course site (see Appendix C). The survey served to ascertain student attitudes toward academic expectations for them at grade level, and to determine some of their attitudes about assessment.

In order to determine whether or not student experiences with the portfolio interface met the project’s instructional objectives specified at the beginning of this chapter, it was important to know what students understood about academic standards.
Finally, students completed a questionnaire about the effectiveness of the portfolio interface after spending two days navigating through the portfolio site (see Appendix D). Students were given instruction in the purpose of the portfolio interface. In addition, students were given two tasks to complete: First, they were asked to select a ninth grade English standard, and design or choose an activity that they could use to in order to demonstrate the standard. Second, they were asked to locate another standard for which they could use the same activity, or a variation of that activity.

Questions in the Post-Navigational questionnaire measured the effectiveness of the portfolio's design. They also provided the designer with feedback in terms of meeting the project’s goals. They provided some indications as to the strengths and weaknesses of the project’s design, and pointed to areas for improvement of the project.

Below are four bar graphs (see Figures 1-4), that indicate some aspects of the effectiveness of the portfolio interface for students interacting with it. The graphs depict four of the questionnaire’s critical questions used to match the evaluation of the portfolio
interface to the project’s objectives. The results for all students and all questions are found in Appendix 0.

Figure 1. Bar Graph Formative Evaluation Question #8

![Bar Graph](image)

Were you able to select a standard and activity you could work on?

The data reveals that 85 percent of the students were very successful in locating a standard they could work on, as well as locating an activity that matched the standard. Another 12 percent of the students felt they met with average success. It appears the design does allow students to successfully locate standards and sample learning activities. As a result, the project’s first objective is met. Other data match that impression (see Figure 2).
72 percent of the students reported that the information presented in the portfolio helped them to understand the academic standards very much. Another 26 percent felt they understood the academic standards to an average degree. Only 2 percent of the students felt the portfolio interface did not help them much to understand the academic standards. Since most of the students felt they understood the standards, it could be that the few students who did not gain information did not successfully negotiate the entire portfolio. Another possibility is that the language used in portions of the
interface intimidated students. The instrument failed to ascertain that aspect of the students' experience. The data depicted in figures 1 and 2 do provide evidence that the first objective is met by the project.

Evidence indicating completion of the second objective, that learners will understand how to provide reflective comments that explain their entries, and how the entries meet the standards, did not present itself clearly in the testing of the project. Students may not have carefully read the information in the student template, or they may not have had enough time to effectively use it, to know when and how to add their input in the portfolio's design, (see Figure 3).
While 65 percent of the students clearly saw they could add comments and input to their assignments through the portfolio interface, another 21 percent indicated the opposite. Even though most students understood how they could add explanations to their assignments, the 21 percent who didn’t see that capability indicate a design flaw. One modification that would more convincingly achieve the second objective is to enhance the interactivity of the student template page.
Achievement of the project’s third objective, is best revealed though a discussion of the data depicted in the following graph, Figure 4.

Figure 4. Bar Graph Formative Evaluation Question #9

You found another standard for which you could use the same activity?

More convincing than with the previous question, 75 percent of the students responded that they were able to locate another standard for which they could apply the same activity, or a variation of the activity. The complexity of the question could be a factor in the results. This question also drew the second highest percentage of unsuccessful experiences with the portfolio
interface. 16 percent of the students reported little success trying to locate a second standard for their assignment sample. Another contributing factor could be the overall level of language used to describe the standards in the portfolio interface.

The third objective of students being able to see the inter-relatedness of the standards is met, although the evidence indicates that only to a satisfactory degree. More interactions with the portfolio and more specific data from those experiences are needed.

Strengths and Limitations

One strength of the portfolio interface project is that it places all the information a student needs to understand secondary grade level expectations in one convenient location. The design also affords students the chance to view sample assignment suggestions so they understand the kind of work expected of them in high school. The design also helps students plan ahead, and it encourages them to venture into the curriculum on their own. It serves the needs of individual learners, but it's adaptable and flexible enough to allow for work in cooperative learning group arrangements too.
Another strength of the project is its dynamic form. As an interactive web-based document, it can be accessed and used by students anywhere who have Internet access. Information may be added or deleted with relative ease, so the information dispensed, especially the academic standards, is likely to be current and appropriate.

A last strength of this project is how comprehensive it is. The project supports student or teacher efforts in four academic content areas and for four grade levels. The structure of the design makes it perfect for including new information and adding improvements to the site. The likely improvements that future forms the portfolio interface may take already exist in its structure.

There are limitations in the project design as well. One weakness is that without the functionality of the database of achievement as envisioned, the portfolio is not nearly as interactive as it should be. It is more of an informational kiosk than it is a dynamic document. This limitation impacts the effectiveness of the portfolio design and its purpose.

Other important limitations were time and access to computer resources. Although students were prepared and
briefed for their interactions with the portfolio interface, they did not have the time or computer access that would have made the experience more useful to their class's current curricular needs. More long-term experiences are needed for the students, and more practical applications of the portfolio's information need to be developed.

Another limitation with the project is the evaluation instrument. More specific quantitative data is needed to better measure the effectiveness of the project's design. Since much of the project resources went into the construction of the project, little time or energy was left to design a more effective instrument. Also, more qualitative data that includes students' comments about using the portfolio should be collected.
CHAPTER FOUR

RECOMMENDATIONS AND CONCLUSION

Recommendations

It is recommended that teachers who use the portfolio, demonstrate how to use it for their students. By first modeling how to use the portfolio and its information for students in each of the academic classes, students will learn how to use it effectively. It is suggested that teachers demonstrate how to bundle standards by designing and completing a demonstration unit for their students.

Also, it is recommended that district information technologists assist in activating the database of achievement. Doing so would provide parents, students, and teachers with updated information on demand, provided they have Internet access. It is recommended that such activation include secure log-in measures. Also, it is recommended that sufficient, secure storage space be provided for students to archive their submissions. The dynamic nature of a portfolio as a container is then realized.
It is recommended that parents be involved by checking on their students’ progress and by helping students to select their assignments for individualized learning activities. Also, parents may assist students in organizing, planning, or documenting their achievements in their portfolios.

Another recommendation is to encourage greater student access to computers. In homes or schools, regular access is needed in order for students to become more information savvy and more fluent in computer technologies. 21st Century students require access to achieve this fluency.

Conclusion

In conclusion, the project went well, but not as well as expected. Although students were generally favorable in their responses to the portfolio, not all of the information gathered sufficiently answered questions about its design and use. Students did learn the standards, and did report understanding how to add input to their work assignments. They also learned how to access sample activities and how to format assignments, and how to submit their work electronically. Students
were able to navigate through the site for specific tasks, but long term practice and use of the document was not examined.

Students demonstrated interest in using the portfolio for accessing and submitting their assignments, but a half-week in the lab, every eight to ten weeks wasn’t enough access to implement it for every student I the class, or to use it for assessment. A few students have Internet access, and all of them seemed interested in completing independent work on their own time. However, for this project, collecting the data and rendering a description of the portfolio in use over time was not included.

Future use of this project should include several modifications. As mentioned as a limitation, one priority is adding functionality to the database of achievement. An important and motivating aspect of the project, as envisioned, is fully realized with this component in working order. Until an identification number opens and reveals a learner’s achievement record, the portfolio is only one-dimensional. Similarly, the interactive nature of the document is enhanced through the database’s operation.
Other modifications could include interdisciplinary project links, or teacher-specific assignment links in the portfolio. Now, each standard has only one suggested activity. The database of achievement can be expanded to include a database of sample activities. Another design modification would include assessment rubrics accessible from the standards pages. Students would know how their work to be evaluated before they begin it.

Each of the project's goals was met, although one was only partially achieved. More testing and more analysis should be done. The testing of the project was largely a positive experience too, although analyzing the data revealed much about what was not looked for in its results. Overall, the design of the portfolio project was inspired but not as inspiring to actually pull off. Still, as a foundational effort in merging technology with assessment, the project has many implications for further application and study.
APPENDIX A

GERLACH-ELY INSTRUCTIONAL DESIGN MODEL
Gerlach-Ely Instructional Design Model

From "A Conceptual Framework for Comparing Instructional Design Models"
APPENDIX B

THE STANDARDS SURVEY
The Standards Survey

Instructions:
Choose the response which BEST matches your understanding of the California state standards in language arts.

Question 1 (points)
Are you aware there are content standards for ninth English?
- very aware
- aware
- somewhat aware
- not aware at all

Question 2 (points)
The academic content standards are in all of the following subjects EXCEPT
- MATH
- SCIENCE
- ENGLISH
- SOCIAL STUDIES
- PHYSICAL EDUCATION

Question 3 (points)
Content standards outline the
- Expectations for grade level work by subject area
- material the teacher is supposed to cover
- the topics your parents want covered
- all of the above.

Question 4 (points)
The content standards in English are divided into
- four strands
- six strands
- five strands
- three strands
APPENDIX C

LEARNING EXPECTATIONS SURVEY
Learning Expectations Survey

Instructions: Choose the answer that most closely represents your own thinking about student assessment issues in high school education.

1. In school, students understand what is expected of them?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

2. In school, students are given some say in how they are evaluated or graded?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

3. Annual tests, like the Sat9 tests given every March or April, completely and fairly demonstrate most of your learning in school?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

4. Teachers' tests in subjects like math, English, science, or social studies, fairly show what you have learned in those classes?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

5. It would be helpful to your learning if teachers explained the state of California's expectations for you in each subject, in each grade?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

6. Students should be able to choose some of their own assignments to demonstrate their learning?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree
7. Students are given opportunities to do what they do well when they have to demonstrate their learning in class assignments?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

8. Class assignments allow you to demonstrate your learning in interesting and creative ways?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

9. If you understood what educational expectations, or standards, were expected of you, you could create some of your own ways to prove you have learned a skill or concept?
   a. strongly agree
   b. agree
   c. unsure
   d. disagree
   e. strongly disagree

10. When student work is evaluated, student explanations of how the work meets the assignment criteria should be considered?
    a. strongly agree
    b. agree
    c. unsure
    d. disagree
    e. strongly disagree
APPENDIX D

POST-NAVIGATIONAL QUESTIONNAIRE
<table>
<thead>
<tr>
<th>Question</th>
<th>Rating Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How well did the program keep your interest?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>2. Were the directions clear?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>3. Did the presented information help you to understand academic standards?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>4. Do the sample assignments give you some ideas of the work that is expected of you?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>5. Do you understand how to format your assignments to include information about which standards your work addresses?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>6. Does the portfolio's design encourage you to be creative in choosing assignments?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>7. Does the portfolio format allow you to add your input or comments to your assignments?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>8. Were you able to select a standard and activity you could work on?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>9. You found another standard for which you could use the same activity?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>10. Will you apply the information you learned from the portfolio interface to your work routine in English class?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
</tbody>
</table>
APPENDIX E

HOME PAGE AND INDEX
Welcome to this web site! This is an interesting cyberplace because YOU are here. At this site you will update your own digital high school portfolio, which will be accessible at the high school and PROVE your mastery of the REQUIRED academic standards in each of the four content areas (English, math, science, and social studies). To search a content area's standards, click on it.
APPENDIX F

STUDENT TEMPLATE
Student Work submission template

After selecting a content area standard and a performance activity, include the information in **bold**, in this order, on all your work submissions.

**Student Name:** Frank Velasco

**Content Area:** English

**ESLR(s) Addressed:** Understand and use Technology; Academic Skills in reading and writing.

**Academic Standard:** Reading 2.1. Students will read grade-level-appropriate material and demonstrate decoding and phonetic skills.

**Performance Activity:** Work in cooperative groups to identify and explain the plot, climax, and theme of Shakespeare's play *Romeo & Juliet*. Demonstrate your understanding by constructing a five card stack, slide, or page composition. Present your group's product to the class. (Note, this assignment also meets Listening & Speaking standards 1.6 and 1.7).

**Teacher:** Ms. Juras

**Student Reflection:** (Student comments on the process and what they learned by completing this sample.)

**Teacher Anecdote:** (Teacher to complete this section. Here, a hyperlink to an anecdote may be provided by the teacher)

**The Sample:** (The student pastes the actual...
APPENDIX G

DATABASE OF ACHIEVEMENT
DATABASE OF ACHIEVEMENT

Data Base of Achievement

Enter your student ID # to find out which academic content standards you have left to meet.

Under construction
APPENDIX H

EXPECTED SCHOOLWIDE LEARNING RESULTS
Below are San Bernardino High School's ESLRs. For each work sample submitted, students must refer to at least one ESLR, on the student template.

ESLRs (Expected Schoolwide Learning Results) ESLRs are competencies all SBHS students must achieve before they graduate from this historic institution. All students participate in instructional, extracurricular, and social activities in order to achieve and demonstrate these five competencies.

Academic Skills
1. All students will read in a reflective and purposeful manner
2. All students will write reflectively and critically
3. All students will communicate effectively in a variety of forms
4. All students will identify, locate, and organize information or data
5. All students will be proficient in math

Critical Thinking/Problem Solving
1. All students will analyze, evaluate, and synthesize information through independent and/or cooperative efforts
2. All students will apply problem solving and critical thinking strategies to real life scenarios
3. All students will evaluate procedures and modify them to address new situations

Life/Social Skills
1. All students will work collaboratively with diverse populations
Life/Social Skills

1. All students will work collaboratively with diverse populations

2. All students will exercise responsible behavior to facilitate academic physical and social success

Career Awareness

1. All students will set and pursue realistic and challenging career and personal goals

Technological Competency

1. All students will demonstrate technological literacy
APPENDIX I

PORTFOLIO SEQUENCE SUBJECTS
Choose the content area to view the California Academic Standards for each subject area. Then, click your grade level for the specific standards for that grade. Finally, click the domains, or strands, under each subject to find sample assignments for each academic standard.
English

Click on one of the four links below to find the exact state standards listed by strand for your grade:

9th | 10th | 11th | 12th
Social Studies

9th 10th 11th 12th

Select your grade level
Math

Click on one of the four links below to find the exact state standards listed by strand for your grade:

9th | 10th | 11th | 12th
Science

Click on one of the four links below to find the exact state standards listed by strand for your grade:

9th | 10th | 11th | 12th
APPENDIX J

SUBMIT WORK SAMPLE
Submit

1. Format your assignment as shown in the student template.

2. Navigate to: www.blackboard.com/

3. Log in.

4. Click student tools, and select drop box

5. Click browse to select your assignment file from the disk or hard drive

6. Click send file to instructor

OR:

send an attachment to:

msjuras@myschoolmail.com
APPENDIX K

NINTH GRADE ENGLISH STRANDS
Click on one of the four links below to find the exact state standards listed by strand for your grade:
VOCABULARY

1.0 WORD ANALYSIS, FLUENCY, AND SYSTEMATIC VOCABULARY DEVELOPMENT: Students apply their knowledge of word origins both to determine the meaning of new words encountered in reading materials and to use those words accurately. Example

1.1 Identify and use the literal and figurative meanings of words, and understand word derivation. Example

1.2 Distinguish between the denotative and connotative meanings of words, and interpret the connotative power of words. Example

1.3 Identify and use knowledge of the origins of Greek, Roman, and Norse mythology to understand the meaning of new words (e.g., the word "narcissistic" drawn from the myth of Narcissus and Echo). Example

READING COMPREHENSION

2.0 READING COMPREHENSION (FOCUS ON INFORMATIONAL MATERIALS): Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced. The selections in Recommended Literature, Grades Nine Through Twelve (1990) illustrate the quality and complexity of the materials to be read by students. In addition, by grade twelve, students read two million words annually on their own, including a wide variety of classic and contemporary literature, magazines, newspapers, and online information. In grades nine and ten, students make substantial progress toward this goal. Structural Features of Informational Materials Example
Writing

WRITING STRATEGIES

1.0 Students write coherent and focused texts that convey a well-defined perspective and tightly-reasoned argument. Student writing demonstrates awareness of audience and purpose and use of the stages of the writing process, as needed. Example

Organization and Focus:

1.1 Establish a controlling impression or coherent thesis that conveys a clear and distinctive perspective on the subject and maintains a consistent tone and focus throughout the piece of writing. Example

1.2 Use precise language, action verbs, sensory details, appropriate modifiers, and active rather than passive voice. Example

Research and Technology:

1.3 Use clear research questions and coherent research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources. Example

1.4 Develop key ideas within the body of the composition through supportive evidence (e.g., scenarios, commonly held beliefs, hypotheticals, and/or definitions). Example

1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and how different perspectives are found in each medium (e.g., almanacs, microfiche, news sources, in-depth field studies, speeches, journals, and technical documents). Example

1.6 Integrate quotations and citations into written text, while maintaining the flow of ideas. Example

1.7 Use appropriate conventions for documentation in text, notes, and bibliographies, adhering to style manuals (e.g., the Modern Language Association Handbook or Chicago Style Manual).
LISTENING AND SPEAKING STRATEGIES:

1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They incorporate gestures, tone, and vocabulary tailored to audience and purpose.

Comprehension:
1.1 Formulate judgments about the ideas under discussion and support those judgments with convincing evidence. Example
1.2 Compare and contrast how media genres (e.g., nightly news, news magazines, documentaries, on-line information) cover the same event. Example
1.3 Choose logical patterns of organization (e.g., chronological, topical, cause/effect) to inform and to persuade by soliciting agreement or action, or to unite audiences behind a common belief or cause. Example
1.4 Choose appropriate devices for introduction and conclusion (e.g., literary quotations, anecdotes, references to authoritative sources). Example
1.5 Recognize and use elements of classical speech form (introduction, first and second transitions, body, and conclusion), formulating rational arguments and applying the art of persuasion and debate. Example
1.6 Present and advance a clear thesis statement and choose appropriate types of proof (e.g., statistics, testimony, specific instances) that meet standard tests for evidence, including credibility, validity, and relevance. Example
1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations. Example
1.0 WRITTEN AND ORAL ENGLISH LANGUAGE CONVENTIONS: Students write and speak with a command of standard English conventions. Grammar and Mechanics: Example

1.1 Identify and correctly use clauses (e.g., main and subordinate), phrases (e.g., gerund, infinitive, and participle), and mechanics of punctuation (e.g., colons, commas, hyphens). Example

1.2 Understand sentence construction (e.g., parallel structure, subordination, proper placement of modifiers) and proper English usage (e.g., consistency of verb tenses). Example

1.3 Demonstrate an understanding of proper English usage and control of grammar, paragraph and sentence structure, diction, and syntax. (Manuscript Form) Example

1.4 Produce legible work that shows accurate spelling and correct use of the conventions of punctuation and capitalization. Example

1.5 Reflect appropriate manuscript requirements, including title page presentation, pagination, spacing and margins, and integration of source and support material (e.g., in-text citation, use of direct quotations, paraphrasing) with appropriate citation. Example
APPENDIX L

SUGGESTED ACTIVITIES
SUGGESTED ACTIVITIES

Reading Activities

READING Performance Activities are projects or assignments, developed by the students and teacher, which when competently completed, as ascertained by the classroom teacher, (a score of 80% or better), prove student attainment of a particular content areas standard, as described by California Department of Education.

1.0 Find a reading selection from any one of your textbooks that had difficult words on it. Type one or two paragraphs of the reading selection in Word, and italicize at least 3-5 words you didn't know. Then explain how you tried to learn those words.

1.1 Write a definition of literal meanings of words, and a definition of figurative word meanings. Now, choose three words to use in two sentences each: 1) use the word literally and 2) use the word figuratively. Enter your samples in a Word document, and italicize your chosen words.

1.2 Write an explanation of the difference between connotative and denotative meanings of words. Attach any imported media clip you would like that gives an example of the two kinds of meanings. Sample clips should not exceed 30 seconds in length.

1.3 Select a word or phrase from the following list: Achille's heel, tautology, echo, narcissistic, Pandora's Box, Midas touch, Herculean effort, etc. Research the word or phrase's origins and present the information in a brief report, story, drawing, song, or personal presentation.
Writing Activities

1.0 For 5 days, read short letters to the editor of your school's or city's newspaper. Choose one letter and write an argument against the letter's position on an issue.

1.1 Write a one-page response for each of the following topics (or submit your suggestions): 1) Why you hate it when the phone rings? 2) Why the company should hire a young person like you for an after-school or weekend job? 3) What are some problems that exist in your city that the mayor should know about, and what are your ideas to improve those community problems? 4) Your favorite place is...

1.2 Rewrite 1.0 or any topic in 1.1, highlighting your use of active voice, action verbs, sensory details or more. Attach before and after samples. Describe and discuss your improvements.

1.3 Use topics generated in Reading 2.2-Reading 2.5 to demonstrate your understanding of writing research questions, conducting research, and gathering evidence.

1.4 Use any topic in Reading 2.0-2.8 to research and develop ideas in a composition.

1.5 Review your research in Reading 2.4 or 2.5. Create a table or graph that represents the ways information is organized and delivered. Explain why information is packaged differently.

1.6 Review Writer's Inc. on quotations and citations. Use the techniques to add to your research work in R2.4 or R2.5. Attach before and after samples from your research report.

1.7 Depending on your topic, explain which bibliographic style will you use to cite and document your sources, MLA, APA, or other? See Writer's Inc. for definitions.

1.8 Use any topic you've studied to design and organize a webpage for. Add to your page at least 4 times throughout the year.

1.9 Review your writing for 1.0 or 1.1. Explain who your audience is for each topic. Explain what would be your purpose for each writing topic. Why does audience matter? How does purpose change your writing? Explain which stages of the writing process you've used.

2.0 Review assignments in 1.0, 1.1. Choose one of those compositions to develop into a 1,500 word essay (3+ pages). Explain which stages of the writing process you've used.

2.1 Write a story, real or imagined, about a memory you have about when you learned something. Use time and place details, along to suggest the tone or feeling of the writing.
Listening & Speaking Activities

1.0 Present a five minute talk using your topic from Reading 2.4, 2.8, 3.2, 3.12, or elsewhere. Consider different audiences for the same talk. Vary your delivery to suit the listeners in each audience.

1.1 Select and listen to a recorded speech by a prominent or historical figure. List the main idea(s) being discussed. List the evidence the speaker uses to support his/her main points.

1.2 Use your topic from R3.4, or choose another topic. Prepare a short talk in which you compare and contrast how different media genres cover the same story or event.

1.3 Choose two controversial topics (Reading 2.8) or use any ideas you wish to persuade people to view as you do. Develop each of your arguments into brief speeches. Use two different organizational patterns. Explain why you chose the organizational pattern you did.

1.4 Revise one of your previous talks to include new introductory or closing techniques, such as using a famous person's views on the topic (quotations), compelling statistics or facts, or a narrative story or anecdote that will evoke an emotional reaction or grab your audience's attention to your talk. Example: Thomas Jefferson stated that, "All men are created equal." What he meant by those five short words is...

1.5 Revise any talk from 1.1-1.4. Add sensory or descriptive details where appropriate. Write a description of the revisions you made, and discuss why you made them.

1.6 Prepare a speech using your paper from Writing 2.3.1 and your evidence or support from Writing 2.4.3 to present the information in a convincing manner.

1.7 Use the information you organized in Writing 2.3.4 in your presentation, or as a model for similar documentation, and redraft it for use as a visual aid.
English Language Conventions
Activities

1.0 Submit any recorded or written work and explain what English language conventions were used.

1.1 Post one of your documents. Use color text to highlight your own uses of clauses, phrases, mechanics, usage, and sentence structure. Revise your writing, if necessary.

1.2 Use your own work or use any portion of a resource you read in R2.2-2.2.5. Find and select examples that demonstrate control of grammar, paragraph and sentence structure, diction, syntax, and usage.

1.3 Rewrite, on paper, any previously submitted written work. Make sure your writing is easy to read, free from any spelling/typing errors, and free from any grammatical mistakes and punctuations errors.

1.4 Use your research report from WI.4. Resubmit the paper to include the following manuscript/document requirements: title page (presentation), pagination (page numbers), spacing and margins.

1.5 Submit any research paper or report that includes appropriate presentation of report in a paper document form, which includes title page presentation, pagination, spacing and margins, and integration of source and support material (e.g., in-text citation, use of direct quotations, paraphrasing) with appropriate citation.
APPENDIX M

UNDER CONSTRUCTION PAGE
Stop back to soon to see these activated links!

Under construction
<table>
<thead>
<tr>
<th>Question</th>
<th>strongly agree</th>
<th>agree</th>
<th>unsure</th>
<th>disagree</th>
<th>strongly disagree</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In school, students understand what is expected of them?</td>
<td>18</td>
<td>22</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>2. In school, students are given some say in how they are evaluated or graded?</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>20</td>
<td>13</td>
<td>42</td>
</tr>
<tr>
<td>3. Annual tests, like the SAT9 tests given every March or April, completely and fairly demonstrate most of your learning in school?</td>
<td>4</td>
<td>13</td>
<td>7</td>
<td>17</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>4. Teachers' tests in subjects like math, English, science, or social studies, fairly show what you have learned in those classes?</td>
<td>18</td>
<td>18</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>5. It would be helpful to your learning if teachers explained the state of California's expectations for you in each subject, in each grade?</td>
<td>6</td>
<td>22</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>6. Students should be able to choose some of their own assignments to demonstrate their learning?</td>
<td>16</td>
<td>16</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>7. Students are given opportunities to do what they do well when they have to demonstrate their learning in class assignments?</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>22</td>
<td>4</td>
<td>42</td>
</tr>
<tr>
<td>8. Class assignments allow you to demonstrate your learning in interesting and creative ways?</td>
<td>4</td>
<td>12</td>
<td>8</td>
<td>13</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>9. If you understood what educational expectations, or standards, were expected of you, you could create some of your own ways to prove you have learned a skill or concept?</td>
<td>10</td>
<td>14</td>
<td>13</td>
<td>5</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>10. When student work is evaluated, student explanations of how the work meets the assignment criteria should be considered?</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>22</td>
<td>8</td>
<td>42</td>
</tr>
</tbody>
</table>
APPENDIX O

FORMATIVE EVALUATION RESULTS
| Questions                                                                 | (1 = "not much") | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Totals | Average | %1 | %2 | %3 | %4 | %5 | %6 | %7 | %8 | %9 | %10 |
|--------------------------------------------------------------------------|------------------|---|---|---|---|---|---|---|---|--------|---------|----|----|----|----|----|----|----|----|----|----|    |
| 1. How well did the program keep your interest?                          | 6                | 6 | 13| 12| 6 | 43 |    |    |    | 0.698 | 0%       | 0%  | 14% | 14% | 0%  | 2%  | 0%  | 14% | 30% | 28% | 14%  |
| 2. Were the directions clear?                                            | 1                | 1 | 8 | 12| 21| 43 |    |    |    | 0.914 | 0%       | 0%  | 2%  | 0%  | 0%  | 0%  | 2%  | 0%  | 19% | 26% | 49%  |
| 3. Did the presented information help you to understand academic standards? | 1                | 3 | 8 | 12| 6 | 13 | 43 |    |    | 0.721 | 2%       | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 7%  | 19% | 28% | 50%  |
| 4. Do the sample assignments give you some idea of the work that is expected of you? | 3                | 3 | 5 | 10| 7 | 15 | 43 |    |    | 0.767 | 0%       | 0%  | 0%  | 7%  | 0%  | 0%  | 0%  | 7%  | 12% | 23% | 16%  |
| 5. Do you understand how to format your assignments to include information about which standards your work addresses? | 6                | 3 | 5 | 5 | 9 | 12 | 43 |    |    | 0.884 | 0%       | 0%  | 0%  | 0%  | 14% | 3%  | 0%  | 7%  | 12% | 23% | 16%  |
| 6. Does the portfolio's design encourage you to be creative in choosing assignments? | 6                | 9 | 9 | 12| 7 | 43 |    |    |    | 0.791 | 0%       | 0%  | 0%  | 14% | 0%  | 0%  | 0%  | 0%  | 21% | 21% | 28% |
| 7. Does the portfolio format allow you to add your input, or comments, to your assignments? | 3                | 6 | 6 | 9 | 6 | 13 | 43 |    |    | 0.791 | 0%       | 7%  | 0%  | 14% | 0%  | 0%  | 14% | 14% | 21% | 14% | 30%  |
| 8. Were you able to select a standard and activity you could work on?     | 2                | 5 | 11| 11| 14| 43 |    |    |    | 0.744 | 0%       | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 5%  | 12% | 26% | 33%  |
| 9. You found another standard for which you could use the same activity?  | 2                | 1 | 4 | 4 | 8 | 13 | 11 | 43 |    | 0.814 | 0%       | 0%  | 0%  | 0%  | 5%  | 2%  | 9%  | 9%  | 19% | 30% | 26%  |
| 10. Will you apply the information you learned from the portfolio interface to your work routine in English class? | 1                | 2 | 3 | 7 | 4 | 10 | 16 | 43 |    | 0.907 | 0%       | 0%  | 0%  | 0%  | 2%  | 5%  | 7%  | 16% | 9%  | 23% | 37%  |
REFERENCES


