Digital Portfolios in Middle School: A Phenomenographic Study of Student Engagement and Achievement

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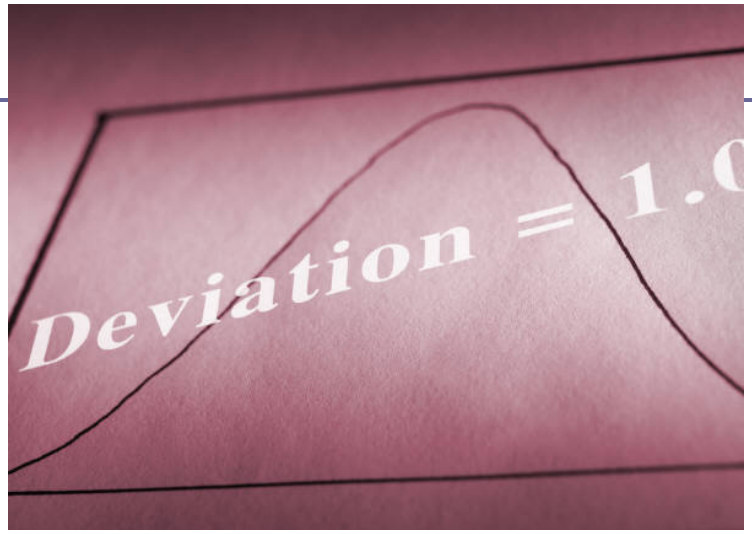
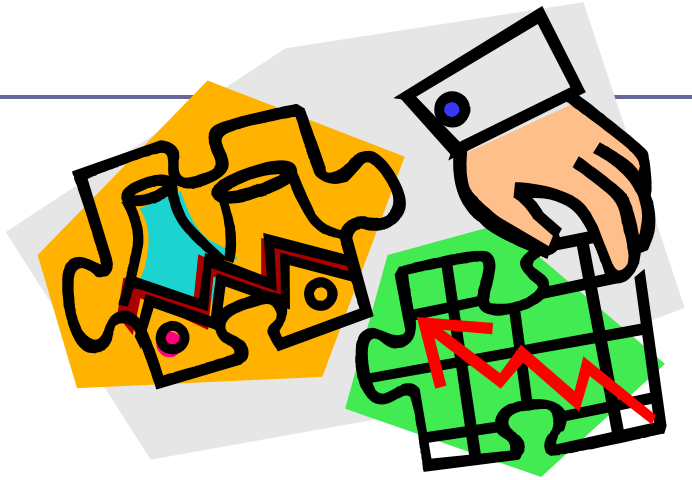
Abstract

- The purpose of this phenomenographic study was to examine how the development of digital portfolios by middle school students impacts student engagement and student achievement.

- Data collection, using a mixed methods approach, included interviews of six eighth grade students, content analysis of eighteen student portfolios, and the use of secondary source data from state assessment reports and from the My Voice Student Aspirations Survey.





- *T*-tests were used to compare the assessment and survey data between twenty-three portfolio and non-portfolio schools. Content analysis was used to analyze portfolio data using a category-coding procedure.

- The absence of schools with robust portfolio processes in place at the time of the study made it necessary to adjust the definition of portfolio schools for purposes of the quantitative portion of the study.

- Results of the quantitative data analysis indicated no significant difference between portfolio and non-portfolio schools, while qualitative data revealed strong evidence that digital portfolios have a positive impact on student engagement.

Chapter One:
The Problem and Its Components

Background

- K-12 students need information literacy skills to work in 21st century global workplaces.
- Processes and tools used for classroom instruction and assessment must be adapted.
- Digital portfolios are a promising process tool for this.
- Research on digital portfolios in the k-12 environment was scarce when this study began.

Purpose

- This study on digital portfolios provided an opportunity to:
  - understand the use of digital portfolios for instruction and assessment,
  - contribute to the research base, and
  - understand the extent to which the state's new ICT literacy standards were contributing to student engagement and achievement.

Four Research Questions

Does student creation of digital portfolios have an impact on …

1. student engagement, as measured by the My Voice Student Aspirations Survey?
2. student engagement, as measured by student interviews and portfolio reviews?
3. student achievement in reading, as measured by state assessment tests?
4. student achievement in mathematics, as measured by state assessment tests?

Chapter Two: Literature Review

Selected List

Friedman, 2006	Kelly & Haber, 2006
Pink, 2005	Quellmalz & Kozma, 2003
New Hampshire State Board of Education, 2005	Hobbs, 2007
Quaglia Institute, 2006	Leu, 2000
BellSouth, 2003	Boekhorst and Britz, 2004
Levin & Arafeh, 2002	Breivik, 2005
Hewett, 2004	Kuiper, Volman, & Terwel, 2005
Ahn, 2004	Center for Media Literacy, 2005

More about the Literature

- The next several slides convey key points from 16 different sources. Each is more fully described within Chapter 2 of the dissertation.

Chapter 2

- *The World is Flat* (Friedman, 2006)
  - Technology and communications have changed the nature of workplaces.
- *A Whole New Mind, (*Pink, 2005)
  - The world has transitioned into a new era called the Conceptual Age which requires a greater balance of left-brain and right-brain thinking.

Chapter 2

- *Ed 306.42 Information & Communication Technology Program Standards* (New Hampshire State Board of Education, 2005)
  - Schools should provide an integrated approach to the use of 21st century tools within all curriculum areas.
  - Schools should assess students' ICT competency by the end of eighth grade using assessment rubrics applied to the contents of digital portfolios.

Chapter 2

- *My Voice Student Aspirations Survey*. (Quaglia Institute, 2006)
  - The survey measures whether conditions within the school environment are supportive of students' aspirations to succeed. Survey results provide insight into student motivation and inspiration.

Chapter 2

- *The Growing Technology Gap Between Schools and Students* (BellSouth, 2003)
  - "While teachers feel they are making dramatic leaps in their ability to harness the power of technology to create stimulating, engaging and challenging learning experiences for students, the students themselves have seen few changes in classroom instruction. What's more, students revealed that they were hungry for more opportunities to use technology in challenging and meaningful ways in the learning environment." (p. 1)

Chapter 2

- *The Digital Disconnect: The widening gap between Internet-savvy students and their schools*, (Levin & Arafeh, 2002) [Pew Internet & American Life Project]
  - "In our conversations with students about the quality and nature of their Internet-based assignments, they repeatedly told us that they wanted to be assigned more—and more engaging—Internet activities that were relevant to their lives. Indeed, many asserted that this would significantly improve their attitude toward school and learning." (p. 18)

Chapter 2

- *Improving instructional practices*. (Hewett, 2004)
  - A key benefit of using portfolios is in the creation of "assessments that are not imposed on the learner but encourage the learner to play an active role in the assessment process" (p. 228).
- *Electronic portfolios: Blending technology, accountability & assessment.* (Ahn, 2004)
  - "E-portfolio creation is a continual, reflective process that must become an embedded part of the school culture" (Ahn, p. 14).

Chapter 2

- *National educational technology standards for students: Resources for student assessment*. (Kelly & Haber, 2006)
  - Portfolios can be used for both formative and summative assessment purposes.

Chapter 2

- *Designing assessment of learning with technology.* (Quellmalz & Kozma, 2003)
  - SITES-M2 describes approaches to assessing student skills using ICT literacy in complex problem solving situations.
  - There are “currently few studies of the development of skilled performance in the use of technologies in significant, complex problems to inform setting proficiency levels at different age and grade ranges” (p. 406).

Chapter 2

- *Reading the Media: Media Literacy in High School English*. (Hobbs, 2007)
  - Media rich classroom experiences promote student engagement in class.
  - “Making informed choices, questioning texts, composing and sharing ideas using various symbol systems, tools, and technologies, and fully engaging in the practices of citizenship – these are key dimensions of literacy in an information age.” (p. 159)

Chapter 2

- *Literacy and technology: Deictic consequences for literacy education in an information age.* (Leu, 2000)
  - Literacy instruction should not hold to traditional instructional practices, but should constantly change as new technologies arise.

Chapter 2

- *Information literacy at school level: A comparative study between the Netherlands and South Africa.* (Boekhorst and Britz, 2004)
  - Infrastructure of school libraries can and should be utilized to a greater extent to support information literacy within the school curriculum.
- *21st century learning and information literacy.* (Breivik, 2005)
  - "It is time for both technology and information literacy skills to be accepted as a core competency to be acquired systematically through all levels of formal learning" (p. 25).

Chapter 2

- *The web as an information resource in k-12 education: Strategies for supporting students in searching and processing information.* (Kuiper, Volman, & Terwel, 2005)
  - Meta-analysis of 66 studies indicating that careful instruction in conducting effective search strategies and analyzing resulting information is essential for k-12 students to develop meaningful knowledge using information literacy skills. Access issues must be addressed, and Internet filtering mechanisms should not be counted on as a substitute for teaching such critical analysis skills.

Chapter 2

- *Media literacy: A definition … and more.* (Center for Media Literacy, 2005)
  - Defines media literacy as “a framework to access, analyze, evaluate and create messages in a variety of forms — from print to video to the Internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy.” (¶ 4)

Chapter Three: Methodology

Mixed methods approach

Quantitative	Qualitative
23 middle schools	2 schools
State assessments ■ NECAP Reading ■ NECAP Mathematics Student perceptions surveys ■ My Voice Student Aspirations Survey	Interviews (6) ■ 3 per school Content analysis of student portfolios (18) ■ 3 portfolios of students interviewed + ■ 6 more portfolios

Phenomenography

- “A specialized method for describing the different ways in which people conceptualize the world around them” (Gall, Gall, & Borg, 2003, p. 483).
- “A way of learning about the different ways students think about things, by asking questions and categorising the answers” (Sharma, Stewart, & Prosser, 2004, p. 1).
- Phenomenography is valuable for developing research agendas to improve educational practice (Webb, 1997).

Why phenomenography?

- Phenomenography was used for this study to learn:
  - how students think about their portfolio work within the school context

    and
  - what changes in student thinking might have occurred as a result of the instructional use of portfolios.

Selection of Schools (quantitative)

Portfolio schools (n=19)
Non-portfolio schools (n=4)

Schools participating in this study (n=23)

Schools participating in My Voice Survey in 2006-07 (n=63)

All NH schools with 8th grade (n=134)

Portfolio vs Non-Portfolio Schools

- Extent of portfolio implementation in terms of:

  (a) whether students had been regularly and reliably storing their digital files for later retrieval for portfolio work,

  (b) whether students had spent any amount of time reviewing and reflecting on their digital work, and

  (c) whether students had spent any time organizing and assembling collections of their work into actual digital portfolios.

Portfolio Schools	Non-portfolio Schools
Met (a) in 2005-06	Did not meet (a) in 2005-06
19 schools	4 schools

Selection of Schools (qualitative)

- Change from random selection of 3 schools to purposeful selection of schools that met criteria (a,b,c)
- 3 schools identified through communications with school contacts where student interviews and portfolio reviews as originally designed would be possible
- Subsequent scheduling issues at one school
- Qualitative research ultimately conducted at 2 schools
- Number of student interviews and portfolio reviews adjusted accordingly

Two Schools

Eastwood

- Rural K-8 school with enrollment above state average (316) for K-8 schools
- Students go to area high school with above state average (851) enrollment
- 5% enrollment in school lunch program (below state average of 21%)
- Students creating e-portfolios for first time in 2006-07
- Used PCs with PowerPoint to create portfolio collections
- NH sample portfolios used as starting point

Westwood

- Rural middle school with close to state average enrollment (517) for middle schools
- Students go to area high school with above state average (851) enrollment
- 16% enrollment in school lunch program (below state average of 21%)
- Students creating e-portfolios for first time in 2006-07
- Used Macs with iWeb to create portfolio collections
- Implementation plan created by school team previous year

Selection of Students & Portfolios

- One classroom of students (approximately 25 students) provided permission letters
- Random selections at each school:
  - 9 students for portfolio analysis
  - 3 of 9 students for interviews

Interviews

- Open-ended questions related to My Voice conditions were used for semi-structured interviews:
  - Sense of accomplishment
  - Fun and excitement
  - Curiosity and creativity

Portfolio Analysis

Student Letter and Artifact Number	Content Area(s) Addressed by Artifact	Media Format Type	Purpose / Function of Artifact	Organiza-tional Placement within Portfolio	Researcher Description and Comments
Student A: Artifact 1	Science	Excel file with spreadsheet and graph	Student assignment	Portfolio is organized by content area with science as 3rd content area on portfolio menu.	Artifact shows graph of data results from science

Chapter Four: Findings

Research Question #1

Does student creation of digital portfolios have an impact on student engagement, as measured by the My Voice Student Aspirations Survey?

- Compiled results of 6 questions from My Voice Student Aspirations Survey for portfolio and non-portfolio schools
- Aggregated My Voice scores for each school used to compare results from portfolio and non-portfolio schools using a *t*-test for independent samples with non-equal variances
- Based on $p = .05$, the obtained t value of -.746 did not exceed the critical value of 2.080.
- **No statistically significant difference between My Voice results for portfolio and non-portfolio schools**

Research Question #2

Does student creation of digital portfolios have an impact on student engagement, as measured by student interviews and portfolio reviews?

- Students rated their portfolio experiences on scale of 1 to 5
- Percentages of students' ratings were high

School	Effort & accomplish-ment	Fun & excitement	Curiosity & creativity
Eastwood	100%	100%	100%
Westwood	67%	67%	33%
Both	83%	83%	67%

Effort and accomplishment

- Reasons for higher ratings:
  - Time students spent working on their portfolio
  - Desire to put effort into it because they knew it was important
- Templates make the work easier
- One student rated lower … hadn't done most of portfolio work at time of interview

Fun and excitement

- Reasons for higher ratings:
  - Exciting to be looking back and seeing their work from previous years
  - Fun pulling all their work together, especially if they were working in class with friends who could help with ideas
  - Fun to have the opportunity to design and create their own portfolios
- One student rated lower … preferred math class to computer lab

Curiosity and creativity

- Eastwood students rated this higher than Westwood students
- Reasons for higher ratings:
  - Fun designing and putting one's own style into a portfolio
  - Learning new features in the software that students didn't know how to do previously
  - Being able to add a professional quality look to one's portfolio
- Rated lower if they felt they weren't doing a lot of interesting and new things or there wasn't much to be curious about in terms of the content and software

Fourteen themes

Thoughts and feelings	Student reflections
ICT features used	Friends and family
Assignments in content areas	Criteria and expectations
Software and websites	Taught us things
Designing	Organizing artifacts and using portfolio templates
Finding artifacts from previous grades	Including artifacts saved on home computers
Choosing artifacts to include	Health and safety topics

Thoughts and feelings

- The portfolio “shows, like, all the hard work that I’ve done over the years at [school], and … it’s kind of like shows my personality almost, and like, you know, about me and stuff like that.”

ICT features used

- Students showed they were comfortable using many software features:

  adding hyperlinks, adding slide transitions, creating custom animations within slides, creating folders and saving files to folders, sending emails with attachments, creating tables, creating charts and graphs, creating databases, editing images, changing background and font colors, using calculators, adding notes or text boxes to documents, using a digital thesaurus, creating graphic maps, scanning material to create an image file, creating movies from slides, creating blogs, and creating web pages.

Software and websites

- References to PowerPoint (27) were far more frequent than references to any other program (between 1 and 6)
- Google was only website specifically named
- No other references to Internet use were made

Designing

- “I just had fun coming up with things to type and just pictures of finding things that I like to do and things that I liked online…. Talking with friends made it easier to come up with ideas and easier to put things down on the website.”

Finding artifacts from previous grades

- Creating reflections for prior year work was harder because had to:
  - “think back on all the stuff you’ve done, and what you did and how you did that”
  - Some teachers assigned more computer related work, and so it was easier for those students to find artifacts for inclusion in their portfolios.

Choices

- “I chose the things that I was most interested about, like, the stuff that I learned about the most.”
- “I picked them because they were, I think, they were the biggest part of the year what we did, so I thought that those should be in there with the other things.”
- “Just pretty much think about what is your best work and do your best work on it, pretty much. Don’t just try to throw, just type stuff up and not mean anything. Just try to show your best work.”

Health and safety topics

- Only a few comments -- DARE program and classroom safety video
- There was a notable absence of any comments related to Internet safety or anything else that could be categorized as related to social, ethical, responsible use of ICT.

Portfolio Analysis

- At least five things in common:
  - (1) Each portfolio had some kind of table of contents;
  - (2) Each had a personal page which told the viewer something about the student's interests;
  - (3) Each artifact had an accompanying reflection or a placeholder where the student was planning to add one;
  - (4) Artifacts were accessed via hyperlinks which allowed the artifacts to be any type of file, such as Excel, Word, etc.;
  - (5) 30% of the total assignments saved to portfolios were Word documents

Portfolio analysis

- Design flexibility of portfolio collection software allowed students an important design freedom
- Portfolios from both schools clearly showed students were taking the time to make design choices that would represent their personal tastes.
- Contents of portfolios spanned 6 - 8 subject areas
- Westwood portfolios contained several artifacts created in physical education classes, but none of this in Eastwood's
- Eastwood portfolios contained much more math artifacts than Westwood's (confirmed interview data of infrequent ICT use in math classes at Westwood)

Research Question #3

Does student creation of digital portfolios have an impact on student achievement in reading, as measured by state assessment tests?

- 19 of 23 schools were identified as portfolio schools
- Pre-test scores (Fall 2005 NECAP Reading Grade 7) compared to post-test scores (Fall 2006 NECAP Reading Grade 8) of portfolio schools using a *t*-test for paired samples
- Based on $p = .05$ and $df = 18$, the obtained t value of .000 did not exceed the critical value of 2.101.
- **No statistically significant difference between NECAP Reading scores in 2005 and 2006 for portfolio schools**

Research Question #4

Does student creation of digital portfolios have an impact on student achievement in mathematics, as measured by state assessment tests?

- 19 of 23 schools identified as portfolio schools
- Pre-test scores (Fall 2005 NECAP Mathematics Grade 7) were compared to post-test scores (Fall 2006 NECAP Mathematics Grade 8) of portfolio schools using a *t*-test for paired samples
- Based on $p = .05$ and $df = 18$, the obtained t value of 1.824 did not exceed the critical value of 2.101.
- **No statistically significant difference between NECAP Mathematics scores in 2005 and 2006 for portfolio schools**

Chapter Five:
Conclusions and Recommendations

Conclusions

- *It's Too Soon to Know* - Most schools are still in the early stages of implementing a portfolio process, so it's too soon to really measure the impact on students.
- *Students Value Digital Portfolios* - They know that if something is important to the school and the state, they should put more effort into it.
- *Word Processing Abounds* - Students indicated a willingness and preference for new experiences with digital tools. Yet, the overwhelming amount of artifacts created by Microsoft Word software indicated a heavy reliance on this ICT tool for most assignments.

Conclusions

- *Some Teachers Don't Assign ICT Tasks* - There were indications that in some subject areas, computers and possibly other digital tools were not being used. Also, it appeared that some teachers made limited or no use of media centers, computer labs, or mobile labs to enhance their teaching.
- *Peer Editing Helps Students* - Students liked being able to work on their portfolios with friends in class, so that they could give and receive suggestions on improvements to their portfolios.

Conclusions

- *It's Not about the Software* - Each school used a different software solution and still created portfolios with several similar characteristics, indicating that the software was less important than the portfolio guidance and structure provided by the teacher.
- *Good Filing Systems Help with Artifact Selection* - When procedures for naming and saving files on the school server were clear, and grades earned on assignments were evident, it was easier for students to select desired artifacts for their portfolios.

Conclusions

- *Students Benefit from Seeing Portfolio Examples* - It was clear from several students that they benefited from having sample portfolios to view and templates to work from instead of having to build from scratch.
- *Students Need Guidance to Reflect on their Work* - Different students had different levels of comfort and confidence with writing their reflections. All students seemed to benefit from the guidance provided by their teachers on what kinds of things should be part of reflections.

Conclusions

- *Some ICT Literacies are Missing* - The two categories of research tools and social, ethical use did not appear to have received as much instructional attention as the other categories of basic operations and concepts, productivity, problem solving and decision making, and communication tools.

Implications for practice

If teachers will:

- Introduce and underscore importance of portfolios
- Provide portfolio examples
- Provide guidance, writing prompts, encourage peer editing
- Integrate ICT tools into their instruction as much as possible
- Overcome professional barriers in order to do this
- Avoid developing comfort with only one kind of digital tool, such as word processing.

Implications

Students will:

- Take work seriously
- Learn to evaluate their own work more critically
- Get better at self-reflection
- Become more engaged in their learning

Implications

- "The teachers who prompt students to reflect on their work are helping students to understand how standards are translated into practice" (Niguidula, 2003, p. 37).
- As indicated by the BellSouth (2003) study, a rich and varied digital experience is what students want and expect; this is what will keep them engaged in their learning.

Implications

- Modest amount of evidence in the data about portfolio assessment
- Difficult to come to definitive conclusions or recommendations about this
- Schools in this study provide an example of combining formative with summative assessments
- Some of the assessment tasks can be completed as part of a formative assessment process throughout each year
- NH will need to give the assessment process careful consideration and be willing to adapt with new information about effective portfolio assessment

Implications for research

- Much public attention on Internet safety and ethical, responsible uses of technology in general
- Internet use for effective research and analysis is a topic of growing interest among literacy educators
- Not clear why topics not more prominent in this study data
- Research on teaching practices in various content areas related to Internet safety, Internet research, and ethical, responsible ICT use would be valuable.

Recommendations

- Replicate the study using the original and more robust definition of portfolio schools to produce the statistical data for which this study was originally designed.
- Enlist the help of Library Media Specialists since they have unique training in research skills and ethical, responsible use, to ensure that these competencies are more fully addressed within ICT literacy programs.

Recommendations

- Review school curricula in each content area for ICT integration and areas that need to be strengthened with curriculum revisions, additional digital resources, and professional development needs.
- Promote the Use of Common Assessment Rubrics Statewide – It is unlikely that all schools in the state will have enough similarities in their portfolio implementation to ensure consistent statewide measurements. Without consistency, it will be difficult for the state to know whether all eighth grade students in all schools are meeting the same ICT competencies.

Thank you for taking the time to view this presentation!