

The REFLECT Initiative Research Project

The REFLECT Initiative:

Researching Electronic portfolios: Learning, Engagement and Collaboration through Technology
with a focus on high school students in the Arizona Education Professions program

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Abstract

In 2005, this research project was launched to study the impact of electronic portfolios in secondary schools. This paper will review the preliminary results of this research project and two of the instruments used to gather information on high school students' attitudes toward portfolios and assessment, reflection on learning, the specific technologies, and the tools used. The presentation will outline some of the data provided by students in the Arizona Education Professions program participating in this research project at the end of the two-year study, and will provide recommendations for new research on electronic portfolios in K12 schools.

Objectives or Purposes;

The overarching goal of The REFLECT Initiative was to collect data and draw conclusions about the impact that developing and maintaining electronic portfolios have on secondary student learning, motivation and engagement; and how teaching practices and strategies change with electronic portfolio integration.

REFLECT is both an acronym and the overarching purpose behind this research project: the REFLECT Initiative will study issues related to portfolio learning and reflection. The data collected will provide research-based evidence on the effect that developing and maintaining electronic portfolios have on student learning, motivation, and engagement. To that end we will seek to identify what conditions facilitate and encourage students to care about their work and be proud of it. Can the project identify the conditions necessary to motivate students to maintain their portfolios as a record of their growth over time and as a story of their learning? Some of the key research questions that will guide the study include:

- How do e-portfolios provide evidence of deep learning?
- Under what conditions can e-portfolios be successfully used to demonstrate assessment for learning and assessment of learning?
- Under what conditions do students take ownership of their e-portfolios?
- What are the benefits of developing e-portfolios as perceived by students, teachers, administrators, and/or parents?
- What are perceived obstacles to implementing e-portfolios with secondary school students and how can they be overcome?
- How do paper portfolios differ from e-portfolios?

See Appendix C for some preliminary “answers” to these questions.

The REFLECT Initiative Research Project

Perspective(s) or Theoretical Framework;

The research draws upon the established literature and theoretical constructs with validated research instruments and data collection protocols. These resources will include: (see the reference list for the details of these resources)

- **Reflection:** Jennifer Moon, Maxine Alterio & Janice McDrury
- **Motivation:** Self-Determination Theory, Intrinsic Motivation (Deci & Ryan): <http://www.psych.rochester.edu/SDT/>
- **Theory of Student Engagement and Qualities of Engaging Schoolwork** (Schlechty Center): <http://schlechtycenter.org>,
- **Project-Based Learning:** Buck Institute, George Lucas Education Foundation
- **Technology Competency:** ISTE NETS-T and NETS-S plus Essential Conditions
- **Portfolio Development:** Teachers (Nona Lyons, Lee Shulman), K-12 Students (Elizabeth Hebert, Anne Davies, Jim Mahoney, Evangeline Harris Stefanakis), Post-Secondary (Kathleen Blake Yancey, Barbara Cambridge, David Tosh)
- **Assessment FOR Learning:** Rick Stiggins, Anne Davies, QCA: <http://www.qca.org.uk/afl/>

Educational or Scientific Importance of the Study.

The REFLECT Initiative was a 24-month action research study of the impact of electronic portfolios on student learning, motivation, and engagement in secondary schools. In May 2005 more than 25 schools or districts were accepted to participate in this mixed-methods study. The project engaged up to 3,000 secondary school students from across the country in the use of web-based electronic student portfolio tools that were provided at no cost to the students for two years.

The existence of an accessible archive of authentic student work can provide valuable data for school improvement. For the students themselves, the effect of maintaining a reflective portfolio has the potential to support deep learning and ownership of the learning process. The use of technology-based productivity tools has become widespread; most of the work of students now passes through or is finalized in electronic form or can be converted easily into digital documents. This development and the availability of web-accessible portfolio tools and secure web-based storage of data, create the dual opportunities inherent in the design of the REFLECT Initiative.

The central question of the overall study is, “What is the impact of electronic portfolios on student learning, motivation, and engagement in secondary schools?” But the study also worked with sites to design how they would study the use of portfolios with their students. Thus, each participating institution could incorporate its own questions regarding the organization of work or student products over time, assessment, presentation, portfolio design, roles of various faculty members, or simply, “How can we explore and make use of this resource with our

The REFLECT Initiative Research Project

students?” Several of the site project directors gave input into the questions asked in the student questionnaire developed at the mid-point of the study.

The project included a significant professional development component and TaskStream includes direct technical support to aid in design and execution of a school’s portfolio program. The size of the study affords us the opportunity to transcend anecdotal evidence and amass significant experiential data relating to the impact on student learning and engagement. The web-based interactive environment offers all participating educational institutions the opportunity to share results and experiences at local levels and in the overall study.

This study comes at an appropriate time to study the potential of electronic portfolios to engage students in active participation in assessing and managing their own learning. In 2005, the level of available technologies made possible a study about the role of electronic portfolios to support student learning, engagement and collaboration. Using a common toolset (TaskStream) that provides a unique tool for the three basic types of portfolio (working/process portfolio, assessment portfolio, showcase portfolio), the participants of the REFLECT Initiative are personalizing their implementations for their own teaching and/or learning needs. Thus, the data is beginning to highlight the multiple factors, strategies, and purposes, helping us gain insight into the effect each have on the learning process.

This is the first national research project on electronic portfolios in secondary schools, from California, Arizona, New York, New Jersey, Michigan, Tennessee, Ohio, Maryland plus a cohort in an English language school in Brazil! Two projects are sponsored by State Departments of Education (Arizona and New Jersey). In the Arizona project, future teachers begin developing their professional teaching portfolios while still in high school, easily transferring them to any Teacher Education program in that state.

Methods, Techniques, or modes of inquiry; and Data Sources or Evidence;

Research data has been generated through such vehicles as surveys, on-site observations, online discussions, and journals, and the aggregation of student focus group data. Data was collected at several points along the way:

- Early in the process (Fall 2005 – beginning of first school year) – “Pre”
- Half-way through the process (Spring 2006 – end of first school year) – “Mid”
- End of the process (Spring 2007 – after first half of second school year) – “Post”

The next two pages contain the detail, in table form, of the research design, including the research questions, research methods, data collection instruments, and summary of the data collection timeline.

The REFLECT Initiative Research Project

Modified Research Design

	DESIRED OUTCOMES (HYPOTHESES)	RESEARCH QUESTIONS	RESEARCH METHOD	DATA COLLECTION INSTRUMENTS
1.	E-Portfolios enhance student learning.	How do e-portfolios provide evidence of deep learning?	Student reflections in portfolios Student attitude toward school & learning	NJ Student questions CAQ Student Focus Group Responses
		Under what conditions can e-portfolios be successfully used to demonstrate assessment for learning and assessment of learning?	Teacher Reflections on implementation process Observations in schools Conversations with teachers and administrators	Teacher journals Site visit reports C-BAM Assessment Practices
2.	E-Portfolios enhance student motivation and engagement.	Under what conditions do students take ownership of their learning and work?	Questionnaire about Motivation and Learning (students)	CAQ
			Student Focus Groups	Student Focus Group Responses
3.	E-Portfolios are more effective than paper-based portfolios.	What are the benefits of developing e-portfolios as perceived by students, teachers, administrators, and/or parents?	Teacher Reflections & Interviews Student Questionnaire Student Focus Groups	Student Focus Group Responses Teacher Journals Site Visit Reports
		What are perceived obstacles to implementing e-portfolios with secondary school students and how can they be overcome?	Teacher Reflections and Interviews Student Focus Groups	Teacher Journals Teacher Questionnaire Student Focus Group Responses Site Visit reports
		How do paper portfolios differ from e-portfolios?	Teacher Reflections	Site visit reports Teacher journals Student Focus Group Responses
4.	Developing e-portfolios builds technology skills.	What are the skills necessary to effectively implement e-portfolios?	Technology Skills Assessment - Teachers - Students	TAC & CAQ
			Portfolio Facilitation Skills – Teachers	Assessment skills (Davies)
5.	E-Portfolio development benefits all learners and all schools	What are the characteristics of the study participants?	Demographic Questionnaire – teachers & students	Teacher Surveys Student Surveys
		What are characteristics of school sites?	NETS Essential Conditions plus local school site information	Inaugural Meeting + Site Visit Reports

Table 1. Research Design

The REFLECT Initiative Research Project

Revised Summary of Research Protocols

	Source: S=Student T=Teachers	Data type: T= qualitative #=quantitative	Data collection method
Initial: Early in the process (Fall/Winter 2005-6 – beginning of first school year)			
Demographic Questionnaire - Prior experience with paper portfolios Prior Experience with tech integration	S & T	T & #	Survey
Questionnaire about Student Engagement (HSSSE)	S	#	Survey
Technology Skills Pre-Assessment – (UNT: TAC 6.1 & CAQ 5.27)	S & T	#	Survey
NETS Essential Conditions plus local school site information (ISTE)	Site Leader	T& #	Survey
CBAM Instrument – (UNT)	T	#	Survey
Checklist of Student Involvement in Assessment (Davies)	T	T & #	Survey
Technology Proficiency Self-Assessment - TPSA (UNT)	T	#	Survey
Professional Development Needs Assessment	T	#	Survey
Ongoing through Online Professional Development			
Teacher Reflections (journals) on implementation process, including: - Benefits of e-portfolios	T	T	Journal, Site Visit
- Obstacles to implementation, and how they can be overcome	T	T	Journal
- How the portfolio is introduced to students (lesson plan)	T	T	Journal
Onsite observations and conversations – Fall 2005 – Spring 2006			
Observation checklist	Director	T & #	Site Visit Report
Mid: process (Spring 2006 – end of first school year)			
Portfolios, Assessment, and Reflection Survey*	S & T	T & #	Survey
Technology & TaskStream Tools Survey*	S & T	T & #	Survey
Onsite observations and conversations – Fall 2006 – Spring 2007			
Observation checklist	Director	T & #	Site Visit Report
Student Focus Groups - Questions in Appendix		T	Audio
Post: End of the process (Spring 2007 – end of second school year)			
Questionnaire about Portfolios and Learning (Hartnell-Young)	S & T	#	Survey

Table 2. Summary of Research Protocols

Versions of the Surveys are linked from the following website:

<http://electronicportfolios.org/reflect/research.html>

Source of Instruments:

HSSSE: questions extracted from High School Survey of Student Engagement: <http://ceep.indiana.edu/hssse/>

UNT: Knezek, G.; Christiansen, R.; Miyashita, K. (2000) Instruments for Assessing Attitudes Toward Information Technology (2nd Edition). Institute for the Integration of Technology into Teaching and Learning, University of North Texas. <http://www.iittl.unt.edu/> Computer Attitudes Questionnaire v.5.27 (Students) and Teachers Attitudes toward Computers v.6.1, TPSA, CBAM

ISTE: National Educational Technology Standards Project <http://cnets.iste.org>

Davies, A. (2005) Data collection instrument on Checklist of Student Involvement in Assessment. (Personal correspondence)

Hartnell-Young, E. (2007) Data collection instruments for teachers and students. (Personal correspondence)

Focus Group Questions: adapted from Vandarsal (personal correspondence) and Strudler & Wetzel (2005)

*Mid-point surveys adapted from sources documented in <http://electronicportfolios.org/reflect/AERAPaper2006.pdf>

The REFLECT Initiative Research Project

Results and/or conclusions/point of view

This AERA paper presents data from the Arizona project, which was implemented with individual teachers in at least six schools across the Phoenix area, and students in their Education Professions courses, offered through a Career and Technical Education program available in high schools across Arizona. The Education Professions program provides high school students with pedagogical knowledge and classroom experiences to prepare them for further post-secondary Teacher Education programs. It should be noted that most of the Teacher Education programs in Arizona use TaskStream for accountability and student e-portfolios.

Initial Observations from Year 1 Site Visits across all of the national sites

After the first year of implementation of the REFLECT initiative, we found that the teacher's role was critical to success. For many teachers in this study, there was a dual learning curve: learning the TaskStream technology tools and learning to use portfolios with students. Those teacher who had prior experience using the TaskStream tool in their Teacher Education programs, or those with prior paper-based portfolio experience, were able to quickly start implementing the program with their students. Those teachers who understood reflection and metacognition and used Assessment FOR Learning strategies provided quality feedback to their students.

Access to technology was also important, but less critical than the teacher's role. Some sites were using the TaskStream system to extend the school day, requiring students to post work after school hours. One piece of data that we collected from students was computer and Internet access from home (see below). Accommodations were always made for students who did not have home access. Many sites had laptops available for students to use in the classroom on a regular basis, while some sites found challenges with computer lab scheduling impacting on in-school use.

Findings from Year 2 Student Focus Groups

During the second year of the project, focus groups were conducted in ten of the high schools involved in the study. A brief example of the student comments made in one focus group will be shared in the presentation of this paper. In sessions lasting between 15 and 40 minutes, groups of five to ten students were asked a series of questions about their use of portfolios, technology, reflection and TaskStream. A list of the possible questions is included in Appendix A, although not all questions were asked of all groups.

As a summary of all of the students focus groups, they generally...

- liked using the TaskStream system
- felt that the program helped them stay organized - a major theme that came up over and over was the word "organized" or "organization"
- liked access from home – for most schools, there is no access to school networks from home
- said it helped them do their assignments (especially those sites using a DRF)
- said that they planned to use portfolios after they graduate

The REFLECT Initiative Research Project

- compared their portfolios to MySpace (a few called it their “academic MySpace”) – Most of the student mentioned that they participated in social networks and saw different purpose for the two systems, with about the same ease-of-use
- wanted more individuality and creativity in the portfolio system as they could do in their MySpace pages
- perceived the following purposes for developing their portfolios: college applications, keeping work organized, seeing growth over time
- thought that both reflection and feedback in the portfolio helped their learning
- wanted to be able to review the work of their peers, and have the opportunity to provide feedback

Final Data Collection from the Arizona students

Dr. Elizabeth Hartnell-Young developed two parallel questionnaires (one for teachers, one for students) to gather information about attitudes toward e-portfolios, as part of a student she conducted for Becta (2007). The following are the results of the survey responses by the students who were actively using the portfolio tools in the Arizona project in May 2007, at the end of the project. The complete responses to this student survey are included in Appendix B.

More than 80% of the Arizona Ed Professions students who completed the survey (N=17) either disagreed or strongly disagreed with these statements: My portfolio...

- Has taken up too much time in class (82%)
- Has taken up too much time outside class (82%)

More than 80% of these students either agreed or strongly agreed with these statements: My portfolio...

- Is good to do with other students (82%)
- Helps me be better organized in my work (94%)
- Gives me new ways of presenting my work using technology (88%)
- Is good for showing my progress to other people (82%)
- Was easy to do because teachers helped me (94%)
- Has helped us to give feedback on each other's work (82%)

Computer Access of the Arizona students

At the beginning of the project, students were asked about their access to computers and the Internet. For the students in Arizona, 95% said they had a computer at home and 90% said they had Internet access at home. We then asked how often they used computers and the Internet at home and at school. The data as shown in the tables below are instructive about the differences in technology access available to these students during the school day. As shown below, more than 93% of the students used a computer or the Internet at school less than four hours per week, whereas they had more access at home. Only one of the schools in the Arizona project had access to computers available to the students in their classrooms. The rest of the schools had to schedule computer lab time, or schedule access to the school’s library computers.

The REFLECT Initiative Research Project

How many hours do you use computers and the Internet at home? (N=73)

Hours using at home	Computers	Internet
0 hours per week	14%	15%
1-4 hours per week	37%	42%
5-10 hours per week	23%	21%
10-20 hours per week	18%	15%
More than 20 hours per week	8%	7%

Table 3. Arizona student computer & Internet access at home

How many hours do you use computers and the Internet at school? (N=73)

Hours using at school	Computers	Internet
0 hours per week	25%	25%
1-4 hours per week	68%	70%
5-10 hours per week	7%	5%
More than 10 hours per week	0%	0%

Table 4. Arizona student computer & Internet access at school

Findings from the Site Visits

The following were the “Success Factors” observed in the site visits conducted in both years of the study. In an effort to categorize the sites for our research data analysis, after the first site visits were completed, the 20 sites were confidentially classified as to their level of implementation, borrowing from the recent electronic portfolio research of Strudler & Wetzel (2006): Low, Medium and High. In the six sites classified as “Low” the students were using TaskStream primarily as online storage of their digital work with little or no interactive feedback between teacher and student. Those seven sites classified as “Medium” showed promising, emerging use of various TaskStream tools, were using a DRF (Directed Response Folio – a structured assessment portfolio), or were using the system to facilitate some interactive feedback (primarily teacher-to-student). Those seven sites classified as “High” demonstrated creative use of TaskStream and/or other technologies, including a DRF or multimedia, with relatively high levels of interactive feedback (including student-to-student).

There are unique problems facing those sites where there was only a single teacher in a school site, such as the Arizona project. Some of these teachers have found other teachers to support them in their buildings. When there are two teachers in a school, there is an opportunity to share the development time, and to share ideas for technology integration. A pair of teachers can be a small community of practice, and support each other, although this pair of teachers does not provide a systemic experience for students, since the experience with the electronic portfolios is usually in only one content area. The best examples of a pair of teachers in this study were in the English/Language Arts content area.

The REFLECT Initiative Research Project

In the sites that had a strong teacher leader, or an active technology coordinator, there was stronger support for the teachers implementing electronic portfolios. Here we have an opportunity to build a real community of practice. Also, there is more support for the technology components of the implementation, especially scanning and sizing images, adding video to the portfolios, etc.

The school-wide, cross-curricular approach offers the most exciting potential to support teaching, learning, and change. Not only can teachers share ideas with each other, but the students can also learn from each other. When students see the use of electronic portfolios across the curriculum, they will be more likely to see more importance and relevance to the process. The goal would be to build toward a comprehensive high school graduation portfolio, as implemented in one of the research sites.

The highest level of implementation was in the sites with school-wide implementation at a grade-level and in the Language Arts content area. Perhaps this finding indicates that Language Arts teachers understand reflection and are experienced at using portfolios for formative assessment. The lowest level of implementation was in the sites where a single teacher was leading the project with a few students in a school or the primary implementation was in a technology course. This finding validates the assumption that content and reflection on learning is more important than technology in implementing electronic portfolios. The focus is not on the technology, but on the learning! Having mature technology integration strategies, a higher level of technology skills, and a support system or close collaborators were also indicators of “High” levels of ePortfolio use.

Finally, the importance of administrator support cannot be underestimated. The most successful high school that was implementing e-portfolios across two grade levels during the project had very strong principal support, as well as a strong teacher leader/coach. The programs that struggled with implementation were those where there was turnover in principals between the time of the grant application, and the project implementation, and where there was limited or non-existent administrator support. The most successful schools could also be classified as suburban schools, as compared with the inner-city schools. Finally, the more successful sites tended to have a more student-centered philosophy for using the e-portfolio, through the comments of the students made during the focus groups, and the qualitative comments submitted as part of the online surveys.

Limitations of the Study

One problem with this study was timing, both in terms of its duration and in terms of the particular development of the Internet as it was emerging during the period of this research (2005-2007). The project only lasted two years, which prior research on school change shows is much too short to show any lasting change. A majority of the students in the study used this particular system for one year or less. Furthermore, the changes in the Internet (moving from Web 1.0 to Web 2.0) and the emergence and popularity of social networking sites had an impact on student attitudes toward the specific tool used to develop these portfolios. It should be noted that the use of social networking sites, such as MySpace, and video sharing sites such as YouTube, may help students build the technology skills necessary to construct their own

The REFLECT Initiative Research Project

electronic portfolios with Web 2.0 tools, as discussed by teachers in Australia at the 2007 ePortfolio conference in Melbourne.

If this research had been conducted two years earlier, the students would not have had the type of experiences with Web 2.0 tools (primarily outside of school) that influenced their current attitudes toward their highly structured e-portfolios. It was obvious in both focus group data and in the surveys that some of the students completed during the project, that their use of Web-based tools outside of school was influencing their attitudes toward the use of this particular e-portfolio tool (they wanted more personalization and creativity). That was not the case for most of the teachers. In many cases, the teachers were much less sophisticated with the use of Web-based tools than many of their students

Recommendations for Future Research & Development

Schools interested in implementing electronic portfolios are encouraged to conduct a similar systematic study so that we can all learn “what works and why” to more broadly answer some of the key research questions posed by the REFLECT Initiative. We hope that through more formative research on the use of electronic portfolios that support assessment *for* learning that we can realize the true potential of using technology to both improve and showcase student achievement across the curriculum.

The following are recommendation for future research, based on the findings of this study.

- Support and follow students in one or two schools for the full four years of high school. One of the schools in the study gave accounts to every freshman during each of the two years, and those students could provide interesting insights after four years of using an e-portfolio.
- Collect data on high school graduation portfolio development. There is a need for more longitudinal research in the implementation of electronic portfolios in secondary schools.
- Develop a different model of training teachers in high schools. Due to a limited budget, the project adopted a two-day, hands-on “Training of Trainers” approach in the summer prior to the first year of implementation, which was not enough for most high school teachers. Many of the sites did not implement the project with students for at least two-to-six months after the training. TaskStream provided an 800 number and a very competent help desk for teachers to call, but many of them did not have phones in their classrooms, and did not find that type of help useful in the middle of the process of working with students. However, teachers were observed handing their cell phones to students to call the Help Desk during class, to help them retrieve their forgotten passwords (a common problem). Furthermore, there is a difference between having a good help desk for “just-in-time” assistance, and a “big picture” introduction to the use of portfolios in education, how to integrate the portfolio process into classroom practices, as well as the use of a specific portfolio software.

The REFLECT Initiative Research Project

- Develop a different model of supporting high school students, since some of the hands-on work happens at home. Many of the students worked on home computers, but were not given the 800 number to call when they had problems. It is recommended that an “Atomic Learning” type of online video tutorials be made available for all users of any e-portfolio system.
- Focus on multiple schools in a single state, with the same statewide assessment requirements. This study involved schools in at least eight states, so there were difficulties with comparison of consistent outcome measures as well as academic requirements. There are several states in the Northeast that are currently requiring e-portfolios for all students (New Hampshire and Rhode Island) for different purposes. This requirement provides an excellent opportunity to control for the same in-state requirements, and look for the different factors that lead to successful student learning outcomes, measured with consistent outcome measures.
- Compare multiple tools. As mentioned earlier, this study was funded by the tool provider, and the analysis benefited from the consistent use of a single e-portfolio tool. However, the larger exploration of e-portfolio development in secondary schools would benefit from a study that looks at students using multiple tools, which is the reality of the student Internet experience today. For example, in one school in the New Jersey project, the Language Arts teachers introduced digital video editing to enrich their students’ e-portfolios with digital essays, which many student said was their favorite part of the process.

Recommendations for Teachers: If you want to implement ePortfolios...

- “Don’t go it alone” - A single teacher in a school will have difficulty implementing an e-portfolio – teachers need a community of practice. In the Arizona project, when this recommendation was given at the end of the first site visit, changes were made to the professional development of these isolated teachers, so that they could better share ideas with each other.
- “What’s your purpose? Audience?” – Have a clear sense of purpose and audience for the development of an e-portfolio. The sites that had a clear purpose (i.e., high school graduation demonstration, reflection and metacognition) were more successful.
- Questions to ask – There are a variety of questions to ask about implementing e-portfolios. During the initial meeting with the site leaders, the issue of implementing change was discussed, focusing on these factors: Vision, Skills, Incentives, Resources, Action Plan.
- NETS Essential Conditions Rubric – We used ISTE’s (2001) Essential Conditions Rubric to assess where schools were in their integration of technology. That instrument provided each school with an opportunity to address where they met the conditions considered necessary for the successful implementation of technology. The most successful site in the project had been implementing technology on a systematic and purposeful basis for at least five years prior to their participation in REFLECT.

The REFLECT Initiative Research Project

Final Thoughts

We had great ambitions when this project was envisioned. However, the reality of the high school culture made it obvious that change was going to take much longer than the duration of this study. There were also significant limitations in the schools' access to the technology resources necessary for implementing e-portfolios. Many school networks also blocked many of the popular social networking sites (in one Arizona school, the school network blocked the TaskStream survey where the term "MySpace" was included in a question!). Therefore, the reality in schools is that many of them will need to use these types of customized e-portfolio systems that provide the security required by many school IT departments.

However, there is a real disconnect between the way students use technology during school hours and after school. The difference in the amount of time students access computer and the Internet between home and school, as shown in this report by the students in Arizona, was also reflected by all of the students in the larger study. As mentioned earlier, the students really liked the access to their TaskStream portfolios from home, where they could not access their schools' network disk storage. If students are going to find the "every-day-ness" in e-portfolio implementation, if they are going to use their e-portfolios as a lifelong learning tool, then we need to find strategies that allow them to use the tools where they have ubiquitous access, whether it is web-based tools from home, or the emerging use of "smart" cell phones, PDAs, or MP3 players.

The use of technology can motivate students to develop portfolios, especially if we make the process engaging and rewarding. We must give students opportunities for creativity and personal expression in their e-portfolios. If we can facilitate a higher level of engagement while furthering the goals of learning in formative electronic learning portfolios, then we may realize the real promise of using technology to both improve and showcase student achievement.

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The REFLECT Initiative Research Project

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Appendix A

Questions for Focus Group of High School Students

Name _____ Location _____ Date _____

These are the general research questions that I want to answer:

- Under what conditions can e-portfolios be successfully used to demonstrate assessment for learning and assessment of learning?
- Under what conditions do students take ownership of their learning and work?
- What are the benefits of developing e-portfolios as perceived by students
- What are perceived obstacles to implementing e-portfolios with secondary school students and how can they be overcome?

NOTE: Not all questions were asked of all students in all focus groups. Depending on the responses to the questions during the focus groups, some questions were skipped to avoid duplication. In other groups, questions were pared down due to a more limited availability of time.

Let's talk for a few minutes about your participation with the TaskStream program and the EP purposes and procedures

1. What year are you in school?
2. Can anyone tell me what a portfolio is?
3. You have been using TaskStream since last year. Can anyone describe what you have been doing with TaskStream?
4. Can anyone tell me what an electronic portfolio is? What do you put into your electronic portfolio?
5. What were the [required and optional self-selected] items that you included in your EP? (Has this changed over time?)
6. What methods did you use to get your artifacts into the computer? (scanned, uploaded)? Was this process straightforward?
7. When you began, what did you see as the main purposes of the EP? Did that change for you? (N2, N1)
8. Did you receive feedback about your work in TaskStream? From your teachers? From your fellow students? Was it helpful? How did it help your learning?
9. What, if anything, did you learn from that process? What did you think you were supposed to learn?
10. Have you ever done a paper portfolio? Do you think using TaskStream was the same, less, or more work than doing a paper portfolio?

Now let's talk about some of the technology issues.

11. How do you store and use artifacts from classes you've taken in the past? [prompt: computer files, papers, data, research, etc.]
12. Do/Did you have sufficient access to computers and other technologies to complete your portfolios in a timely manner?
13. What is the level of support available to you for EP use? What support would be helpful to you? To other students?
14. In what ways did your teachers support your portfolio development?
15. How well prepared do/did you feel to complete the EP? How well prepared are/were the other students?
16. What problems came up when using Taskstream? How did you get support for its use?

The REFLECT Initiative Research Project

17. Did you or your fellow students have problems in putting together the EPs? Has this changed over time?
18. What technical issues did you have in creating your work?
19. Did you develop any new skills as a result of portfolio preparation?
20. Where did you gain the skills you needed to complete an ePortfolio?
21. In what other ways did your teachers use TaskStream How was it integrated into your courses? What did you gain from using it? Did you collaborate with your classmates more regularly? Review their work more regularly than in other courses? Other benefits?
22. Do you use any other Internet websites to publish information about yourself? MySpace? Others?
23. How does TS compare?
24. What do you see as the benefits of having a portfolio?
25. What are the advantages or benefits resulting from putting together an EP?
 - a. Follow up –How has the EP allowed you to see the big picture of your learning, connecting courses and experiences?
26. What are the disadvantages or concerns resulting from putting together your EP?
 - a. (Follow-up -How much time did it take for you to complete the EP?
 - b. Are the portfolio tasks, requirements and evaluation clear?
27. What was the role of reflection in the EP process? Within each class? For benchmarks? And now has that changed?
28. How do you think reflection helps you to learn?
29. Tell me about “reflection” in your program. Do teachers ask you to reflect on your learning?, How? What role, if any, did formal reflection play in your portfolio development?
30. Do you want to continue using the TaskStream portfolio system?
31. Do you plan to use a portfolio after you graduate? Add to it?
32. As you look back on the EP experience so far, has it been worth your investment of time and effort?
33. What advice would you have for students who were just beginning the EP program?
34. Anything else that you’d like to add?

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Appendix B

Questions about Your E-Portfolio

Instructions: Select how you feel about your portfolio with each statement.

My e-portfolio...

(Total Author Responses: 17)

Rated Item(s)	Total	Distribution				Average	SD or D	SA or A
		1	2	3	4			
1. Has been fun to do	17	6%	24%	53%	18%	2.8	29%	71%
2. Has made me more interested in my work	17	0%	41%	47%	12%	2.7	41%	59%
3. Has taken up too much time in class	17	24%	59%	18%	0%	1.9	82%	18%
4. Has taken up too much time outside class	17	41%	41%	18%	0%	1.8	82%	18%
5. Is good to do with other students	17	6%	12%	59%	24%	3.0	18%	82%
6. Tells me about what my friends are learning	17	24%	35%	24%	18%	2.4	59%	41%
7. Helps me think more about my own learning	17	18%	24%	35%	24%	2.7	41%	59%
8. Gives me enough space to store all the stuff I want	17	6%	18%	53%	24%	2.9	24%	76%
9. Makes me take more care with my work	17	12%	29%	41%	18%	2.7	41%	59%
10. Helps me be better organized in my work	17	0%	6%	71%	24%	3.2	6%	94%
11. Helps me to show people what I'm really good at	17	0%	29%	53%	18%	2.9	29%	71%
12. Gives me new ways of presenting my work using technology	17	0%	12%	59%	29%	3.2	12%	88%
13. Helps me to be creative	17	12%	24%	35%	29%	2.8	35%	65%
14. Helps me to be confident	17	12%	24%	47%	18%	2.7	35%	65%
15. Helps me to plan how to improve	17	6%	29%	53%	12%	2.7	35%	65%
16. Helps me judge whether I have improved over time	17	6%	24%	59%	12%	2.8	29%	71%
17. Is good for showing my progress to other people	17	0%	18%	59%	24%	3.1	18%	82%
18. Has helped me understand my work better	17	6%	29%	47%	18%	2.8	35%	65%
19. Has made me pleased with my progress	17	6%	29%	47%	18%	2.8	35%	65%
20. Is something I would like to do again in the future	17	12%	12%	53%	24%	2.9	24%	76%
21. Has helped me to learn	17	0%	35%	47%	18%	2.8	35%	65%
22. Was easy to do because teachers helped me	17	0%	6%	71%	24%	3.2	6%	94%
23. Forced me to do things that teachers should have done for me	17	12%	59%	24%	6%	2.2	71%	29%
24. Has helped us to give feedback on each other's work	17	6%	12%	53%	29%	3.1	18%	82%
Response Legend: 1 = Strongly Disagree 2 = Disagree 3 = Agree 4 = Strongly Agree								

The REFLECT Initiative Research Project

Appendix C

A preliminary look at the “answers” to the research questions

Here is a preliminary look at the findings from the national study. A more in-depth report will be prepared with extensive data from the project that supports these conclusions.

1. How do e-portfolios provide evidence of deep learning?

Deep learning involves reflection, is developmental, is integrative, is self-directive, and is lifelong (Cambridge, 2004).

Based on that definition, it would be impossible to answer that question based on two years of data, from schools that, for the most part, went through the motions of implementing this project at a very surface level. This is not to criticize the teachers or the students involved in this project. For most of them, portfolio development was a brand new experience. The issue raised is simply too complex to address in a short period of time. The emphasis of the initial selection of the schools to participate in this study was for *breadth*, involving as many schools as possible, and not *depth*, following a smaller group of students and teachers for a longer period of time. As a result of that collaborative decision by the team planning this study, the project could not explore deep learning, but instead addressed the challenges of implementing a complex change, within a time frame known to be too short to see any major results, which the school change literature indicates is three-to-five years. Therefore, rather than addressing this question from empirical experience, the longer report will discuss this question on a theoretical basis. Drawing on comments made by students in the surveys and focus groups, we have some indicators that this evidence would be forthcoming, given enough time and appropriate implementation.

2. Under what conditions can e-portfolios be successfully used to demonstrate assessment for learning and assessment of learning?

Teachers, for the most part, rated themselves as just beginning or “on the way” to implementing assessment for learning strategies, which can be more easily implemented when portfolios are used in the classroom to support formative assessment and learning. In addition to their self-rating, at least 20% of the teachers also described the evidence that supported their self assessment, which also provided an opportunity for these teachers to reflect on their practice and model the portfolio process as they completed the survey. Many of the teachers completed this survey during the spring of the first year of the project, so there was not enough elapsed time to see if the implementation of an electronic portfolio would make a change in their assessment practices. As a follow-up to this study, it would be interesting to see if the teachers who implemented portfolios at a high level actually changed their assessment practices.

3. Under what conditions do students take ownership of their learning and work?

From the comments made by the students in the focus groups, as well as the responses to survey questions, students wanted to be able to express their own individuality, choice, and creativity in their portfolios. While most of them did not have prior experience with either a

The REFLECT Initiative Research Project

paper-based or electronic portfolio, a majority of these students had experience with other types of web-based publishing, especially on their social networking sites. That experience, and the elements of choice in both the content and design of their portfolios, influenced their attitudes to their e-portfolios. In a few examples, where students demonstrated extreme creativity in their e-portfolios, the content focused on their passions, while not necessarily emphasizing their academic work.

4. What are the benefits of developing e-portfolios as perceived by students, teachers, administrators, and/or parents?

The primary benefits of having an e-portfolio, as expressed over and over in the student focus groups, was *organization*. It should be noted that 65% or more of the students appreciated having space to store their work; to have access to their work at home as well as at school; recognized that the e-portfolio gave them new ways of presenting their work; and was good for showing their progress to other people.

More than 80% of the teachers responded that the following qualities on an e-portfolio were very important: Having school work in one location; Being able to have online access to student work from home and school; Being able to view teacher feedback, personal reflections and coursework in one system. At the end of the study, more than 80% of the teachers who responded agreed or strongly agreed that working with portfolios:

- Helps my students to show others what they are really good at
- Gives us all new ways of presenting our work using technology
- Helps my students to be creative
- Helps my students show their progress to other people
- Was a learning experience for me

5. What are perceived obstacles to implementing e-portfolios with secondary school students and how can they be overcome?

Today's teenagers are connected to the digital world in ways that their older brothers and sisters, who are now in college, may not have experienced. The Web 2.0 tools that have emerged in the last three years have dramatically changed the technology experiences for adolescent students. Once content with email and message boards (asynchronous communication) and surfing the Web looking for information, today's young people want to contribute and collaborate more with their peers, especially in real time conversations (and games!). As Marc Presky (2008) recently said, young people told him "e-mail is for old people!" Social networks (MySpace, Facebook, Orkut) are a fact of life for many teenagers outside of the school day. Using those tools, the students have a lot of freedom of expression, choosing the colors, backgrounds, music, and graphics that suit their desires to express their individuality, and Web 2.0 tools appear to motivate student creativity (Plough, 2008). In the controlled structure of this e-portfolio tool, many of the students expressed a desire for more personalization of their web-based portfolios, which is consistent with the stage of their adolescent development when individuality and identity are very strong life tasks (Boyd, 2006).

The REFLECT Initiative Research Project

The major obstacle for teachers was *time* (mentioned in the teacher journals more than any other issue). The complementary issue of *competing priorities* was also mentioned often by teachers. Other teachers expressed frustration with technical issues and, for many, their lack of proficiency with technology and the specific e-portfolio tool.

6. How do paper portfolios differ from e-portfolios?

This question could be answered on two levels: the obvious paper vs. computer storage, or the differences in the portfolio development process. Adding technology created a level of complexity that was frustrating for many teachers; it might seem easier to store student work in file folders. However, the benefits of using technology for maintaining an e-portfolio were recognized by many of the students, as illustrated in this quote:

It is a modern, contemporary way to show colleges and peers your work. It is also much easier to keep track of than a paper portfolio. (New Jersey student)

There may have been a "technology" effect at work in many of these sites. By having an electronic portfolio, the students used the computer more often, which prior research in the Ed Tech literature has shown to be more motivating for students' learning (CARET, 2005). Many of the positive comments from students related to how much they enjoyed doing their assignments online, or how much it helped them to keep their work organized.

7. What are the skills necessary to effectively implement e-portfolios?

The skills can be divided into two types: portfolio skills and technology skills. Teachers have different portfolio development skill requirements from students. Below is a matrix that begins to outline the skills necessary for implementing e-portfolios:

	Students	Teachers
Portfolio skills	<ul style="list-style-type: none"> • Collect evidence of learning • Select specific evidence the demonstrates a particular outcome, goal or standard • Reflect metacognitively on learning represented in evidence, making a case that the artifacts constitute evidence of achievement • Make connections in their learning • Set goals for future learning 	<ul style="list-style-type: none"> • Model all of student competencies PLUS: • Implement classroom-based assessment FOR learning strategies to provide specific and detailed feedback to learners about their learning • Support student reflection through modeling and research-based practices • Create an environment that facilitates students' deep learning
Technology skills	<ul style="list-style-type: none"> • File Management Skills (i.e., naming files, organizing in folders, able to move and copy files, search and find files on a network folder, a hard drive, or a portable flash drive) • Using a Web Browser and E-Mail Program, including attaching files • Common tools used for constructing portfolio artifacts, depending on curriculum (i.e., word processing, concept mapping, spreadsheet, presentation software) • Converting artifacts into digital format (i.e., scanning images, taking photos with a digital camera, recording audio, digitizing video – depending on technological background of teacher or student) • Skills in using the specific e-portfolio software being used to organize the portfolio 	