An Electronic Portfolio to Support Learning[1]

Anne Wade

Philip C. Abrami

Jennifer Sclater

Authors
Anne Wade, is Manager and Information Specialist at the Centre for the Study of Learning and Performance/Education, Concordia University, Montreal, Quebec. Correspondence concerning this article can be sent to Anne Wade, Concordia University, LB 581. 1455 de Maisonneuve Blvd. West, Montreal, Quebec, Canada H3G 1M8. Email: wada@education.concordia.ca Philip C. Abrami, PhD is a Professor, Director and Research Chair at the Centre for the Study of Learning and Performance, Concordia University, Montreal, Quebec. Jennifer Sclater, is an ICT Cosultant at the Centre for the Study of Learning and Performance, Concordia University, Montreal, Quebec.

Abstract

Abstract: In this paper, we provide a description of a CSLP research project that looked at portfolio use within a middle school, the web-based e-portfolio software we have developed within the context of the Quebec educational system, our plans for further development of the tool, and our research plans related to the use of portfolios to support learning. Our aim is to combine research evidence on portfolio use with practical feedback from the field in an attempt to develop easy-to-use, powerful software designed to support active self-regulated student learning in schools.

Résumé : L'article contient une description d'un projet de recherche du CEAP qui examine l'utilisation de portfolios au sein d'une école secondaire, le logiciel de portfolios électroniques axé sur le Web que nous avons développé au sein du système d'éducation du Québec, nos plans visant le perfectionnement de l'outil et nos plans en matière de recherche visant l'utilisation de portfolios pour appuyer l'apprentissage. Notre objectif est de conjuguer les résultats de la recherche sur l'utilisation de portfolios avec la rétroaction pratique des utilisateurs afin de tenter de développer des logiciels puissants et faciles à utiliser pour appuyer l'apprentissage auto-réglementé et actif des étudiants dans les écoles.

Educational Goals of Portfolios

A portfolio may be defined as a purposeful collection of student work that tells the story of a student's effort, progress and/or achievement in one or more areas (Arter & Spandel, 1992; MacIsaac & Jackson, 1994). The Quebec Education Programme (QEP) (Ministère de l'Education du Québec, 2001) is based on the principles of socio-constructivism including a belief in the value of portfolios and requires teachers and students to develop a proficiency with them. Consequently, the use of portfolios has been mandated within the elementary Language Arts curriculum and is encouraged in other core subject areas.

The QEP lists the following as possible advantages of portfolios, they: involve students in their learning (as a tool for reflection); allow students to increase their ability to self-evaluate; teach students to make choices; encourage students to better understand themselves and focus on their strengths; allow students to reflect on their procedures, strategies, and accomplishments so that they can improve and correct them and ultimately succeed; promote feedback during the learning process, particularly during individual conferences; encourage students to reflect on their strengths, needs, errors, interests, challenges, and objectives; encourage interactive processes among students, teachers, and parents; shows student progress because it tracks performance over time; and they are used to assess competencies developed by students.

Portfolios can be linked to the following cross-curricular competencies within the QEP (2001):

Intellectual Competencies. Encourages students to "use information, to solve a problem, to exercise critical judgment and to use creativity." (p.13)

Methodological Competencies. Encourages students to "e self reliant, to select appropriate means for attaining objectives, to analyze the way they use available resources, and to evaluate the effectiveness of their work methods." (p.26)

Personal and Social Competencies. Encourages students to "exchange points of views with others, to listen and to be open to differences" (p. 35) and to adapt their behaviour to the social context of learning.

Types of Portfolios

Danielson and Abrutyn (1997) identified three main types of portfolios: working, showcase, and assessment. Working (also known as "process" or "learning") portfolios contain works in progress, track student learning over time, and may be temporary because students move on to either an assessment or showcase portfolio. Showcase portfolios exhibit the student's best work. They are generally used to demonstrate the level of accomplishment that the student has attained. Students often use showcase portfolios during college applications or for professional employment purposes. Assessment portfolios are structured and standardized with "the content of the curriculum determining what students select for their portfolios" (p.5).

Digital Portfolios

In the past, portfolios were collections of work stored in binders, file folders, or boxes. Today, computers are used as an effective tool for developing and storing portfolios given their ability to store and process large quantities of content, and because they can effectively support and guide the portfolio process. These computer-based portfolios are called digital or electronic portfolios (e-portfolios). The advantages of using digital portfolios include:

- Digital portfolios provide an effective means for cataloguing and organizing learning materials, better illustrating the process of learner development.
- Students can easily integrate multimedia materials, allowing them to use a variety of tools to demonstrate and develop understanding. (This may be especially advantageous for at-risk children whose competencies may be better reflected through these authentic tasks.)
- Students can develop their Information and Communication Technology (ICT) skills through the creation of multimedia work and use of the tool.
- Student work becomes easy to share with peers, teachers, parents and others, and lets students and others provide feedback through a single electronic container.
- Digital portfolios provide remote access to work for students to complete homework or when otherwise learning at a distance from school.
- Digital portfolios provide remote access to student work for teachers for review and assessment purposes.

- Digital portfolios provide an opportunity for greater and improved communication with parents.

The use of digital portfolios can be linked to the following cross-curricular competencies within the QEP (2001):

- **Methodological Competencies** . Encourages students to "be familiar with the purposes, concepts, vocabulary, procedures and techniques of ICT," (p. 29) their use of ICT to carry out a task, and to evaluate their use of ICT.
- **Communication-related Competency.** Encourages students to "experiment with different forms of communication: oral, written, visual, media-related" (p.38).

The Portfolio Process

The QESN-RÉCIT _*_ (2005) identified five stages to the portfolio process for print-based or digital portfolios, (1) collection, (2) selection, (3) reflection, (4) evaluation and (5) celebration (see: http://www.qesnRÉCIT.qc.ca/portfolio/ port_eng.html). These stages are analogous to those laid out by Danielson and Abrutyn (1997) for developing portfolios. In the collection stage, teachers and students work together to save artefacts that represent successes and opportunities for growth. In the selection stage, teachers and students review and evaluate the saved artefacts and jointly decide which of those artefacts best demonstrate the achievement of learning goals. At the reflection stage, students articulate their thinking about each piece in the portfolio. Students evaluate their own growth over time as well as discover any gaps in their development. This stage is undoubtedly the most crucial and it is what enables portfolios to become lifelong learning tools. In the evaluation stage students compare their reflections to their pre-set goals and other achievement standards and indicators and set learning goals for the future. Finally, in the celebration, or as Danielson and Abrutyn (1997) call it, the presentation stage; students share their portfolios with their peers. This is the stage where appropriate public commitments can be made to encourage collaboration and commitment to professional developments and lifelong learning (Barrett, 2001).

Pedagogical Value and Potential Benefits of Portfolios

In the next two sections we examine the use of portfolios to support student self-regulation and to encourage authentic assessment.

Student Self-regulation

Proponents of socio-cognitive models emphasize that to develop effective self-regulated learning strategies, "students need to be involved in complex meaningful tasks, choosing the products and processes that will be evaluated, modifying tasks and assessment criteria to attain an optimal challenge, obtaining support from peers, and evaluating their own work" (Perry, 1998, p. 716). When students use portfolios, they assume more responsibility for their learning, better understand their strengths and limitations, and learn to set goals (Hillyer & Lye, 1996). Educators believe that portfolios allow students to think critically, and become active, independent and self-regulated learners (Mills-Courts & Amiran, 1991; Perry, 1998).

Self-regulated learners are individuals who are metacognitively, motivationally, and behaviourally active participants in their own learning. A main feature of self-regulated learning is *metacognition*. Metacognition refers to the awareness, knowledge and control of cognition. The three processes which make up metacognitive self-regulation are planning, monitoring, and regulating. Other aspects of self-regulated learning include *time-management*, regulating one's own *physical and social environment*, and the ability to control one's *effort and attention*.

Metacognitive self-regulation : The main aspect of self-regulation is metacognition, and it includes planning, monitoring, and regulating activities. Planning involves setting educational goals and outcomes as well as task analysis. Self-regulated learners set specific learning or performance outcomes and then monitor the effectiveness of their learning methods or strategies and respond to their evaluations. Self-monitoring is essential in enhancing learning. It helps students focus their attention on and discriminate between effective and ineffective performance and reveals inadequate learning strategies. It improves time management as well.

Physical and social environment management: Regulating one's physical and social environment includes study environment management and help seeking. Management of study areas requires locating a place that is quiet and relatively free of visual and auditory distractions so that one can concentrate. Once identified with dependency, substantial evidence now indicates that seeking assistance from others, particularly in the form of elaborated explanations, is valuable and can subsequently lead to autonomous learning.

Time management: Time management involves scheduling, planning, and managing one's study and production time.

Effort regulation: Effort regulation is the ability to maintain focus and effort towards goals despite potential distractions and setbacks. Effort regulation reflects a commitment to completing one's learning goals by directing and regulating one's energy toward them.

Effort regulation is more generally associated with a belief in effort-outcome covariation which, in general, is the belief that success in learning is caused by personal effort and not personal ability, luck, or task difficulty.

Portfolios can provide evidence of student self-regulation. Students may review their own work and then modify learning goals as a result of such reflection. The process of reflection is what makes portfolios a tool for life-long learning and professional development rather than a mere collection of work (Foote & Vermette, 2001). The student needs to be able to make a direct connection between each submission in the portfolio and an intended learning goal. The student needs to be able to explain why a specific submission was placed within the portfolio. Barrett (2004) further confirms the importance of this idea when she says, "the artifacts need to be accompanied by the learner's rationale, or their argument as to why these artifacts constitute evidence of achieving specific goals, outcomes, or standards" (p. 3). Bereiter and Scardamalia (1989) mention that portfolios encourage the pursuit of personal cognitive learning goals, what they call intentional learning. Portfolios prompt students to look back, to digest and debrief, and to review what happened so that they can set new goals and determine next steps (Camp, 1992). In an attempt to demonstrate the effects of reflection, Sweidel (1996) asked students self-reflective questions about their study strategies and found that at the end of the semester they were able to identify relationships between the process and the outcome of their studying.

Wade and Yarbrough (1996) elaborate on the pedagogical value of using portfolios as a learning tool. Portfolios are developmental in their nature, since a portfolio represents a certain period of students' growth and learning. Portfolios should not be solely used for short-term goal attainment since they are the culmination of long-term learning outcomes. Portfolios are dual valued in that they offer both the teachers and the students the opportunity of dyadic interaction. A portfolio allows the student the opportunity to reflect and record learning process while offering teachers an authentic integrative approach of evaluating student growth and achievements as well as acting as a feedback mechanism for their teaching practices. Portfolios are also interactive in that they enable students to share their work with their teachers and peers, thus seeking guidance or suggestions. In this way, the development and establishment of the portfolio may be seen as a form of collaboration.

Alternative or Authentic Assessment

Alternative or authentic assessment is any type of assessment in which students *construct* or *create* a response to a question or a task. In traditional assessment, students *choose* or *select* a response from a given list, such as multiple-choice, true/false, or matching. Alternative assessments may include short-answer questions, essays, performance assessment, oral presentations, exhibitions, and paper-based or electronic portfolios.

Well-designed alternative assessments elicit high-level thinking and the demonstration of

skills and competencies relevant to the complex tasks learners face in realistic situations. Alternative assessments, such as portfolios, have the potential to reflect a competency and not an abstraction of a competency (i.e., a numerical or letter grade). In addition, holistic appraisals allow for flexible and creative demonstration of competencies such that the "whole is greater than the sum of the parts". Finally, alternative assessment may be especially useful for encouraging learning improvement and self-regulated learning.

However, the evaluation of responses to alternative assessments may be especially time consuming to score and judgments may be idiosyncratic and lacking in dependability or repeatability. Using scoring keys or rubrics helps increase the accuracy of scoring but may not eliminate it entirely. Parents, in particular, seem to have difficulty interpreting the results of alternative assessments especially when they are used for the purposes of summative evaluation.

Portfolios help students become involved in the evaluation of their own learning (Fenwick & Parsons, 1999). Given that the use of portfolios allows students to choose and organize the kind of content they want to include, this engages the students in the evaluation and assessment process. Contrary to traditional testing methods, which do not readily reflect student growth, portfolios may demonstrate learning gains and thus promote authentic learning.

Our Prior Research on Portfolios

As a precursor to our involvement with digital portfolios, Kakkar, Zitkute and Abrami (2000) explored whether paper-based educational portfolios assist the processes of self-regulation. To this end, a mixed-method study was employed to investigate student self-regulation in high context, low context, and no portfolio classrooms. Data were collected through class observations and student and teacher questionnaires. A total of six teachers and 162 students from middle school participated in the study. Four teachers (two language art and two French teachers) were using educational portfolios in the classroom. The two teachers not using educational portfolios in their classroom taught French as a second language and Geography, respectively. In order to analyze each classroom to determine if the portfolio activities were indicative of a high or low context portfolio environment we adopted classroom observations methods. We were guided by Perry's (1998) analysis of the qualitative differences in portfolio activities between high and low self-regulated classrooms. These qualitative differences focused on the difference between writing and portfolio activities in the following areas: tasks, student control, support and evaluation. There were two high context portfolio classrooms and two low context portfolio classrooms.

The main goals of this study were to a) provide evidence that portfolios encourage students to become self-regulated learners and b) to analyze how different portfolio processes influence student self-regulation. We hypothesized that students will become better self-regulators as they continue to be part of a portfolio classroom and subsequently students in a high context portfolio classroom that foster high self-regulated

processes will be stronger self-regulators.

Low Context Portfolio Classrooms

We found several important differences in portfolio pedagogy between the high and low context portfolio classrooms. Data from the low context portfolio classrooms indicated that student self-regulatory processes remain unchanged within a four-month period in a low portfolio environment; this was congruent with our original predictions. In fact, we found that students in the low context portfolio classroom scored similar to students in the non-portfolio classrooms.

In the low context portfolio classrooms, we observed that in the area of assessment students were exposed to both traditional and portfolio approaches to learning. This resulted in students being confused with regards to what was expected of them. These classrooms had a strong focus on personal achievement in relation to other students' accomplishments; this is contrary to portfolio pedagogy. This finding supports the claim by Koretz, Klein, McCaffrey and Stecher (1993) concerning the large differences between standardized tests scores and portfolio assessment scores.

Concerning peer-conferencing in the low context classrooms, we recognized that students often had trouble understanding the full benefits of this portfolio process. Peer-conferencing sessions may not be beneficial for all students because sometimes students tend to focus too much on the content of the material and other times students do not find the conference beneficial (Gearhart & Wolf, 1997).

Otherwise, while we did witness a great deal of self-reflection occurring in the low context portfolio classrooms, students often complained about not being able to fully understand the value of self-reflection. Many have found that self-reflection is an effective process that enables student to identify their weaknesses and strengths and to be able to monitor their learning progress (Sweidel, 1996). In the low context portfolio classroom, self-reflection was not viewed as a valuable tool for students.

High Context Portfolio Classrooms

We had anticipated that self-regulatory processes in the high context portfolio environment would be improved within a six-month period of time. We found that there were some significant positive changes in the area of personal achievement orientation and academic related perceptions in the high context portfolio classrooms. With regards to alternative assessment, there was a strong focus on student progress and personal achievement throughout the portfolio process. There was less of a focus on student outcomes on specific tasks and more on long-term projects. In this present study, however, this type of assessment strategy did create some level of stress and anxiety for the students. This often occurred because students had not completed the portfolio work in time.

Similar to the low context portfolio classroom, students had trouble understanding the value of peer-conferencing. Some students appeared to be stressed because they 'had' to

peer-conference. We assume that while there is some support in the literature concerning the benefits associated with peer-conferencing, little is understood about how this process may or may not contribute positively to student learning.

Finally, the process of self-reflection is believed to encourage students to isolate their strong and weak points and to identify their goals (Wolfe, 1996). We found that there was a great deal of emphasis of the process of self-reflection in the high portfolio classroom. Students in the high context portfolio classroom believed that self-reflection benefited them because it enabled them to pinpoint their weak points.

We also hypothesized that students who are in portfolio classrooms will be higher self-regulators as compared to students in non-portfolio classrooms. We found evidence of improvements; we must, however, be cautious about accepting these results because no pre-test and no observations were conducted with the non-portfolio group and hence it is difficult to offer a definitive conclusion.

Implications for Theory and Practice

Portfolios are touted as an excellent pedagogical tool, yet before large-scale portfolio implementation continues we need to re-examine why and how we use them. In the above-mentioned study, we noticed some change in the expected direction but not as much as we expected.

First, it appears that the transition is not a ready one from more traditional modes of instruction and assessment to portfolio processes and assessment. Despite their willingness, effort, and preparation—which were both genuine and substantial—our small sample of teachers in the low context classroom did not entirely abandon more traditional classroom practices. Likewise students in portfolio classrooms struggled, in some ways yearlong, with portfolio activity and responsibilities. Yet, there were significant changes that occurred consistent with students increasing their self-regulation—a sign of hope. We speculate that the demands of the portfolio classroom are greater than in more traditional, teacher-centered classrooms on both student and teacher especially during a time of transition from other ways of teaching and learning.

Second, portfolios place greater emphasis on the process of learning and different emphasis on the outcomes of learning than traditional methods of instruction and assessment. The discomfort of students with portfolios may signal their struggle with self-regulating their learning because they have not fully accepted its precepts due perhaps to the demands placed on them externally for traditional achievement gains. Alternately, they may not wish to accept the risks associated with the personal responsibility of regulating their own learning to achieve success. The struggle is difficult and change may neither be asked for nor accepted willingly.

The findings of this study have important implications for practice. Combining traditional and portfolio pedagogy in a similar environment does not encourage self-regulatory processes in students. Instead, it seems to create confusion for students trying to

understand what is expected of them in both traditional and portfolio projects.

On the other hand, a high context portfolio environment does not guarantee high self-regulatory processes. The high portfolio context which focuses on meaningful tasks, peer support, numerous self-reflection activities, students having a flexible choice of choosing projects to work on and teacher guidance seems to increase self-regulatory processes only slightly.

On the basis of this evidence, we believe the following is worth exploring. First, the use of portfolios should be a school-based or board- (district-) based initiative. Both students and teachers should believe that the change to portfolios is widespread and a regular part of the school routine. Second, the use of portfolios should begin early in students' educational experience and not be short-lived. The processes of self-regulation and approaches to pedagogy which portfolios support require time for younger students to learn and effort for older students to make the transition form traditional, teacher-directed methods. Third, teachers need to develop facility with portfolio processes and they should be supported with appropriate professional development. Fourth, electronic portfolios may provide additional means to scaffold teachers and students in the portfolio process and better encourage self-regulation. This research and these reasons helped us develop the CSLP's electronic portfolio software tool.

The CSLP's Digital Portfolio

The research and development performed by the Centre for the Study of Learning and Performance (CSLP) is directly tied to the general societal need to improve learning skills to meet the challenges that arise in the face of rapidly changing technology and the globalization of knowledge. CSLP research aims to develop strategies and tools to facilitate students' acquisition of general competencies that foster communication, literacy, numeracy, and inquiry skills for creative use in educational and workplace settings. The primary goal of our research is the advancement of knowledge and its wide-scale application in order to have an immediate, direct, and sustained effect on how our schools and the workplace operate. We are especially interested in learning how ICT can be used in this regard.

As a follow-up to the centre's small-scale research project on the use of portfolios which suggested that technology may be an effective means to scaffold the portfolio process, and our interest in learning more about effective uses of technology in schools, digital portfolio software was designed by members of the CSLP. The software was developed according to the CSLP's policy on software development which states that all software should be based on peer-reviewed empirical research evidence, refined on the basis of research evidence, and then serve as the basis for collecting new evidence about teaching and learning using technology; emphasis should be placed on supporting meaningful motivational and learning outcomes; and tool design should consider what is known about the processes and contexts of learning and instruction.

Background

The CSLP e-portfolio project began in 2001 with the implementation of the Quebec Education Programme and the establishment of the QESN-RÉCIT Portfolio Committee, of which the CSLP continues to be a member, and as a result of our research project mentioned above.The QESN-RÉCIT Portfolio Committee acts as a provincial clearinghouse on portfolios, especially digital portfolios, and provides access to theoretical and practical material, tools, and expertise on this pedagogical approach (see: http://www.qesnRÉCIT.qc.ca/ portfolio/ index.html).

A prototype version of e-portfolio was designed as part of a student thesis' work, with input from members of the QESN-RÉCIT Portfolio Committee, teachers and students. This software was tested in the field with one school and a fully revamped web-based version was developed in 2004 as a result of this pilot project.

Partners involved in the e-portfolio project

The original partners involved in the e-portfolio project include: the Director of the QESN-RÉCIT, four of the nine English school boards in the province of Quebec, namely Sir Wilfrid Laurier, English Montreal, Western Quebec and Central Quebec, and Quebec's Societé GRICs (an organization that develops tools and provides support to meet the needs of the school boards). The Riverside and Eastern Townships school boards have recently decided to partner as well. The project has received financial contributions from: Industry Canada, Valorisation Recherche Québec, Fonds Québécois de la Recherche sur la Société et la Culture and the Norshield Development Foundation.

The Current State of the Software

Developed in PHP using a MySQL database, our bilingual, web-based e-portfolio software may be considered as both a Process (or Learning) and Showcase Portfolio tool for elementary and early secondary students. It is currently installed on the servers of six English school boards and approximately 60 teachers will use the software with their students in the 2005–2006 school year. The CSLP has also presented the software to various French boards to encourage use outside of the English sector. The e-portfolio package (with plug-ins and manuals) is downloadable through our FTP site. The software is described in more detail at: http://grover.concordia.ca/eportfolio/promo/ .

The Structure of the Software

The e-portfolio has been designed into three separate environments: Administrator, Teacher and Student.

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The Administrator environment

In this environment, the administrator (such as a school board technician) must enter the various settings for: school, teacher and student records, within their school board. Data from the GRIC's JADE database can be imported directly into the database for classes,

teachers, and student records. Each student is assigned a space maximum of 60 MB for the storage of their work, reflections/conferences, and showcase portfolio. These values are stored in the database and can be modified (and increased) by the Administrator as necessary.

The Teacher Environment

In this environment teachers are able to: link the students in a given school to their own classe(es); set up a class homepage, set up specific subject areas or topics which will be linked to individual student work, define their questions to be used for student reflection and conferencing within specific subjects or topics; store shared work such as text or multimedia files to be viewed by all the students within their class, access students' process and showcase portfolios; and display/print out student work. Each page has a "help" button that opens a window with the in-context help related to this screen. This helps teachers to better understand the structure and functionalities of the software.

The Student Environment

This environment can really be considered the heart of the software, as students can perform all the commands offered within the software. These include: linking to a class home page, selecting an interface from a dozen templates, creating new work, editing existing work and saving under a different version number; setting of learning goals; reflecting on their work; conferencing on their work with a peer, parent or teacher; selecting items to be sent to their showcase portfolio; and the viewing and customization of their showcase portfolio. The software contains a text editor with basic word processing commands. Additionally, a student may link files created within applications or multimedia software to their work. Finally, students may directly record work (such as the reading of text), reflect, or conference through the use of a recorder function.

Other Software Features
The Digital Reading Portfolio

This past year, the CSLP redesigned the Digital Reading Portfolio stand-alone software (originally designed in Filemaker Pro by RÉCIT at Riverside School Board) so that it is now accessible from within the CSLP e-portfolio software. This software is geared to beginning readers in cycle one (grades one and two) and is designed to track their reading development. Students record samples of reading throughout the year and reflect by writing, illustration, and/or audio recording. It is hoped that students become familiar with the use of the software and of basic portfolio processes, such as reflection and then move onto the creation of their own e-portfolios in cycle two (grades three and four).

Non-Quebec users

Because the software was designed within the framework of the Quebec Education Programme, it uses the cycle system. Student work is linked to the cycle in which the student is enrolled. Thus, when a student enters the second level of their cycle, they may view their work from the previous year. However, given interest for use of the software outside of the province, the CSLP has also designed a non-Quebec version that operates according to grades.

Validation

As with any software development project, the CSLP e-portfolio software underwent several testing phases. Our designers/programmers performed some functionality testing, and a more complete test of the software was conducted internally (by non-technical users) and by an external debugging firm who conducted intensive testing on all platforms and a variety of computer types.

Following this process, a copy of the software was sent to an FTP site for downloading by our partner schools who then piloted the software in volunteer schools. Each year, the RÉCIT have solicited teachers from each of their boards to collaborate with us in an attempt to learn more about how technology can be applied to the portfolio process. Professional Development Initiative Grants (PDIGs) were requested from the Quebec Ministry of Education to fund release time for participating teachers. This provided the opportunity to organize Swap and Share days that allowed the teachers to come together and share portfolio projects, and discuss issues and challenges faced in the classroom. Additionally focus groups were organized to obtain feedback on our software. The CSLP prepared annual reports summarizing these sessions. See http://www.qesnRÉCIT.qc.ca/portfolio/eng/theory.htm to view the *Case Study Reports*.

Feedback from the field

Given that the necessary technology was not in place in all our schools to facilitate use of the software and the fact that the use of portfolios represents a significant shift in teaching practice, implementation in previous years was a fact-finding mission; What do teachers want in an electronic portfolio, how do teachers plan to use electronic portfolios with their students, and what kind of technical and pedagogical support do teachers need to successfully implement the software in their classrooms? Approximately 15 teachers received training on the functionality of the software, while an additional 40 teachers attended information sessions, where the software was presented. In all sessions with teachers and consultants, feedback was encouraged. A list of suggestions, ranging from basic functionality to interface design to pedagogical use was compiled and brought back to the design and development team.

Challenges: Teachers found it difficult to fit e-portfolio into their classroom routine and found it difficult to make using electronic portfolios a seamless part of their teaching. This was, in part, due to changes required in classroom structure when using portfolios (e.g., classroom management, changes to classroom activities, a shift in control of learning from the teacher to the student). Finally, teachers in our fact-finding mission were frustrated that they were either restricted in the use of the computer lab to as little as thirty minutes a week, or had one to three computers in their classrooms that were either not maintained, or not connected to a network. This did not encourage the active use of portfolios in their classrooms.

Successes : The teachers appeared to have overcome many of the organizational challenges they faced in previous years. Overall, teachers and students were very positive

and excited about the e-portfolio software. They felt that the software was student-friendly and clearly reflected and provided scaffolding for the portfolio process. Given that student-led conferencing (or parent conferencing) is an integral part of the Quebec Education Programme; this was the focus for many teachers. Thus, rather than conducting the traditional parent-teacher interviews as in the past, student-led conferencing sessions were used whereby students showed their work within both their process and showcase digital portfolios and actively reflected on their learning with their parents. Teachers reported that parents were extremely pleased with these sessions as they provided an opportunity to meaningfully discuss the development of their child's learning and provided a window into their child's classroom. They felt that using e-portfolio was truly using computer technology to support learning.

Future Development

Given the dynamic nature of software development, enhancements to the software are planned for next year through the addition of new functionalities, improvement of existing features, and the creation of new tools for teachers and students.

Link to ABRACADABRA: A Literacy Resource

The ABRACADABRA software is another collaborative research and development project that was initiated by the CSLP in 2004 in response to local, provincial, and federal needs to dramatically improve the literacy skills of emerging readers. This highly interactive web–based software, explores the use of technology to support students learning to read, educators and many others involved in teaching young children. It provides a scaffolded but flexible curriculum that aims to offer strong support and guidance for novice educators, adaptability to meet jurisdictional requirements and preferences, customization for learner needs and preferences, and variability in implementation for experienced educators. The e-portfolio software will be linked to ABRACADBRA so that students will be able to complete ABRACADBRA reading and writing activities within their portfolio.

Improved professional development

Currently, the professional development features within the e-portfolio software enable teachers to enhance their knowledge of the e-portfolio process through a handful of links to relevant Internet sites. Next year, this component of the software will be fully revamped. Improved pedagogical support, through the use of *just in time* video clips, is the desired goal. These resources will be integrated throughout the software in an attempt to inform teachers about successful practices related to specific stages of the portfolio process (e.g., how to encourage the setting of meaningful learning goals, how to support students in the reflection process, etc.).

Archiving of portfolios

A significant benefit of using digital portfolios in the classroom is the ability for an individual to track the development of their learning over time. Access to a student's portfolio from previous years, is therefore critical. Students should be able to carry forward their portfolios as they move through the educational system (and even beyond).

Currently the software is designed to provide access to work within a cycle (over two years), however we hope to provide the ability to archive portfolios so that they are easily accessible in later years.

Refinement of features

As we continue to learn about the theoretical principles related to metacognitive processes such as self regulation, various functions within the software will be refined to encourage active and meaningful reflection on a student's learning goals.

The e-portfolio Research Project

The CSLP's philanthropic mission is to develop and make available scientifically-based and pedagogically sound tools for the classroom. Consequently the software has been offered at no charge to the educational sector. It is hoped that those who use the CSLP e-portfolio software will become active partners in our research on the use of digital portfolios.

Objectives

A research team within the CSLP has recently obtained funding from the provincial granting FQRSC, to learn more about the nature of digital portfolio use (quality and quantity), and discover necessary improvements for the tool and additional ways to promote teacher professional development within the tool; to measure the impact of digital portfolio use on key processes such as self-regulation, motivation, collaboration and problem-solving skills; to measure the impact of digital portfolio use on such important learning outcomes as literacy skills; and to look especially at at-risk students, students with special needs and male versus female students. Weexpect that digital portfolios will enhance teaching and learning processes especially for students at-risk of school failure. We expect that teachers using e-portfolio will become more expert users because of the scaffolding provided in the professional development that will be embedded in and linked to the tool. We expect that the use of e-portfolio will benefit students by (1) enhancing motivational and cognitive benefits due to the use of multimedia for learning; (2) increasing the development of ICT skills; (3) improving accessibility to school work from remote locations; (4) enhancing communication with parents about school performance, which will increase parental involvement in the child's learning ; and (5) increasing the flexibility of carrying forward school work from year to year and therefore truly monitoring individual student learning gains over time.

Research Schools

In order for this research project to advance, widespread use of the software is required. Thus, the CSLP, in collaboration with our partners will be working to encourage intensive use of digital portfolios within their school boards prior to the collection of student data. Schools and their staff, who wish to participate in this collaborative project, will be considered a "research" site and additional services will be provided to them. Monthly meetings will be planned to encourage the active sharing of information among the project participants.

Professional Development

A concerted effort will be made on the training of teachers within the research schools. Training will focus not only on use of the software, but also on the theoretical principles that underlie the processes that are supported by the software. Additionally, as mentioned above, our focus will be on the development of online materials for teacher professional development and the CSLP has hired a RÉCIT to help in this endeavour. Our intent is to marry the theory with practice. The QESN-RÉCIT is currently designing a one-day workshop focusing on the key portfolio processes that will be given to consultants in all the English school boards. Research schools will act as pilot sites for this workshop. It is expected that within the research schools there will be active support for, and encouragement of, the use of digital portfolios by those teachers who have agreed to participate. In the second and subsequent years, student achievement and process data will be collected.

The CSLP believes that our approach to research, development and dissemination, which focuses on evidence-based practice, provides opportunities for our partners, in particular, and the educational community, in general, to have active input into all phases of the project. It will also provide them with ownership over the outcomes and genuine opportunities to reap the benefits of effective pedagogical practices aimed at increasing literacy and subsequently a reduction in school dropouts.

Notes

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*Quebec English Schools Network - Réseau de personnes ressources pour le développement des Compétences des élèves par l'Intégration des Technologies

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