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Electronic portfolios : tools for authenic formative assessment

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Abstract

The culture of students is ever changing. Teachers are struggling to find ways to meet the needs of different learning styles and levels. Assessment for learning is the current *buzz* statement in education. This review examines using electronic portfolios as tools for assessing learning. This paper examines how electronic portfolios can be used as an assessment for learning tool that engages students in their own learning. The review found that electronic portfolios can be used as an assessment-for-learning tool, but more evidence is needed to determine whether it should be the sole means of learning assessment.

ELECTRONIC PORTFOLIOS:

TOOLS FOR AUTHENTIC FORMATIVE ASSESSMENT

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ABSTRACT

The culture of students is ever changing. Teachers are struggling to find ways to meet the needs of different learning styles and levels. Assessment for learning is the current *buzz* statement in education. This review examines using electronic portfolios as tools for assessing learning. This paper examines how electronic portfolios can be used as an assessment for learning tool that engages students in their own learning. The review found that electronic portfolios can be used as an assessment for learning tool, but more evidence is needed to determine whether it should be the sole means of learning assessment.

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INTRODUCTION

Background

There has been a recent push for 21st century learners to be taught through student-centered learning experiences that are evaluated with authentic formative assessments. Some of the notable supporters and researchers that promote formative assessment are Stiggins (2002), Chappuis and Stiggins (2002), Barrett (2005) and Black, Harrison, Lee, Marshall and Wiliam (2004).

Formative assessment can be defined as:

> Assessment for learning is any assessment for which the first priority in its design and practice is to serve the purpose of promoting students' learning. An assessment activity can help learning if it provides information that teachers and their students can use as feedback in assessing themselves and one another and in modifying the teaching and learning activities in which they are engaged. (Black, Harrison, Lee, Marshall & Wiliam, 2004, p. 10)

The concept of formative assessment is not new, but recent studies that have been conducted showing that formative assessment can help students learn at a deeper level. "From our review of the international research literature, we were convinced that enhanced formative assessment would produce gains in student achievement, even when measured in such narrow terms as scores on state-mandated tests" (Black et al., 2004, p. 10-11).

There are many schools struggling with making improvements on the state-mandated tests that are required by the nation to meet the needs of No Child Left Behind. What many schools do not realize is that the current assessment system being used is not helping close

the gap between students and it does leave students behind. According to Stiggins (2002), "Student achievement suffers because these once-a-year tests are incapable of providing teachers with the moment-to-moment and day-to-day information about student achievement that they need to make crucial instructional decisions" (p. 759). Teachers and schools that have been introduced to an assessment for learning concept want to have a student-centered classroom with formative assessment and are looking for tools to help provide feedback to their students. Notice that it is assessment *for* learning and not assessment *of* learning. *Assessment for learning* relates to formative assessment and *assessment of learning* means summative assessment. For this review, the focus will be on assessment for learning. Teachers can incorporate formative assessment into their classrooms by using many different forms of assessment. The one tool that is not used often in a K-12 setting is the electronic portfolio. Therefore, this review is going to look at using electronic portfolios as a means for providing formative assessment when evaluating individualized learning of 21st century learners.

According to Barrett (2005):

> An electronic portfolio uses electronic technologies as the container, allowing students/teachers to collect and organize portfolio artifacts in many media types (audio, video, graphics, text); and using hypertext links to organize the material, connecting evidence to appropriate outcomes, goals or standards. (p. 5)

There are many different definitions that describe what electronic portfolios are, but they are all similar to Barrett's definition. The rest of this review will look at how electronic portfolios can be used to provide formative assessment for learning in 21st century

classrooms to increase achievement.

Purpose and Significance

The analysis of using electronic portfolios for formative assessment is appropriate because teachers are trying to find a method of formative assessment that helps students produce higher and deeper learning skills with an increased motivation to learn. Every student is different not only in what motivates them, but also in how they learn. These different learning strategies are known as multiple intelligences. Teachers can gain a better understanding of how students learn through e-portfolios (Greenberg, 2004). Portfolio assessment allows students with different intelligences to show what they've learned over time through a more in-depth procedure that includes multimedia presentations (Irvine & Barlow, 1998).

There are many tools that can be used to help a teacher incorporate assessment for learning; electronic portfolios may be the most beneficial. Portfolios have been used for many years in the art field. Artists have been completing portfolios of their work in paper form until recently when the digital world has developed. Portfolios allow learners to display their knowledge and receive feedback along with learning reflective practices that create deeper learning.

The problem is deciding whether an electronic portfolio can be used as an authentic formative assessment tool that promotes creative, life-long learners. This is the focus of assessment for learning, which will be discussed later in the review. It is important, because many employers are looking for workers who are able to show these characteristics. Employers are also concerned about technology skills. "Technology is a real world requirement in today's business world. Not only do teachers need technology skills for their

own professional competency, but they have the responsibility of preparing future workers to be competent with the current technology" (Hewett, 2005). Therefore, it is essential for teachers to prepare their students for the workforce and to teach them how to become creative learners that can show their processes and products. Many employers are asking for a portfolio at interviews, which makes it more relevant to assess through portfolios rather than a subjective way that is biased and unauthentic.

This review will examine studies that were conducted across various grade levels between kindergarten and the university level. The elementary levels examined are electronic portfolios for all subjects to show the progression of learning. University level portfolios in the studies were mostly of education majors with the exception of one social work program and a career portfolio plan that encompassed a whole university. These studies will be used to examine various aspects of electronic portfolios and assessment for learning. They will address the following questions:

- What are electronic portfolios;
- Why is there a need for assessment for learning;
- Why should electronic portfolios be used when assessing learning;
- What types of electronic portfolios will help teachers use "assessment for learning" in their classrooms;
- Do electronic portfolios have a positive impact on motivation;
- How should electronic portfolios be assessed?

METHODOLOGY

It was not a difficult task for the reviewer to find reliable and research-based articles on electronic portfolios and assessment for learning. To find literature for this review, the reviewer used the following electronic databases: EBSCO, Academic OneFile (through the University of Northern Iowa) and Google Scholar. EBSCO provided access to various educational and professional development journals from thousands of publishers in full text. Academic OneFile is the premier source for peer-reviewed, full-text articles from the world's leading journals and reference sources. Google Scholar provides an Internet search of articles that are relevant to the key descriptors.

The reviewer found various sources by using the following descriptors when searching theses online databases: e-portfolios, digital portfolios, electronic portfolios, motivation, engagement, formative assessment, assessment for learning, and authentic assessment. Once the reviewer started to do research, she found additional articles through the references listed in the pieces she had read. Then these resources were found using EBSCO, Academic OneFile, and Google Scholar. The reviewer had checked out some assessment books prior to conducting this literature review through the Silo program at the local library.

All of the sources were checked to ensure they were valid articles. In order to determine whether they were valid, the reviewer analyzed each study's design, measurements, and explanations from the researchers. The reviewer looked further into articles that were obtained from Google Scholar to verify that they were reliable and credible sources for this literature review. The sources for this review were picked based on whether they addressed the questions that were being asked, quality of the content, qualified authors,

date of publication, publication source and whether they were a research-based articles or journals. She also looked at the citations of other articles. Most of the articles were ones that were cited in an article read by the reviewer. The reviewer focused on finding recent material on both formative assessment and electronic portfolios. Most of the articles she used for the review were written in the past ten years.

ANALYSIS AND DISCUSSION

This analysis will explore using electronic portfolios as an assessment for learning tool in education. In order to completely understand whether it is a usable tool, the review will describe what electronic portfolios are, the various types of electronic portfolios, assessment for learning in more detail and analyze why electronic portfolios should be used as an assessment for learning tool. The review will also address whether electronic portfolios motivate users and how these portfolios should be assessed.

Electronic Portfolios

The portfolio concept is not new, but should be visited since it is the backbone of the electronic portfolio concept. According to Wolf and Siu-Runyan (1996), "a portfolio is a selective collection of student work and records of progress gathered across diverse contexts over time, framed by reflection and enriched through collaboration that has as its aim the advancement of student learning" (14). When creating a portfolio, students had to collect work that was composed on paper or photos and it was usually kept in some type of binder. Other items (i.e. videos, art work, audio) could be included in the portfolio, but could not be stored in the binder with the paper artifacts. The advancement of technology in the late 20th century and early 21st century has enabled portfolios to become an electronic source that allows users to include many artifacts.

The literature holds many different definitions for electronic portfolios (ePortfolio or e-portfolio) and these definitions have similar concepts behind them. The following two definitions explain e-portfolios most comprehensively and they both need to be introduced to provide a greater understanding of electronic portfolios: "A personal ePortfolio is a multidimensional digital representation (identity) of a reflective individual providing access to personalized services--e.g. learning and development, assessment, employment, and personal development planning" (Ravet, 2005, ¶ 24). "An e-portfolio is a digitized collection of artifacts including demonstrations, resources, and accomplishments that represent an individual, group, or institution" (Lorenzo & Ittelson, 2005a, p.1). E-portfolios allow students to compile artifacts easier than the old notebook fashion. There are many websites that have portfolio-hosting sources that allow students to organize their artifacts (Fitch, Peet, Reed, & Tolman, 2008). Websites are not the only electronic source that can be used to create electronic portfolios. These electronic portfolios can also be compiled in the form of CD-Rom, DVD, PowerPoint, website, or other electronic devices.

E-portfolios also allow for private support, shared discussions about work, feedback about specific items and they encourage ongoing reflection (Greenberg, 2004). Some of the major benefits to using e-portfolios in the learning process are that they are easy to share with peers, teachers, parents, and others; there is greater and improved communication with parents and the development of information and communication technology skills (Wade, Abrami & Sclater, 2005).

The interface of an e-portfolio allows students to use multiple modalities in which they can include photos, text, or video (Ring, Weaver, & Jones, 2008). Multi-modal simply means that students are able to show learning through different tools, materials or methods.

In multi-modal learning, according to Ring, Weaver, and Jones (2008),

> Students bring to the assignment their individual perspectives and then surprise themselves, their classmates, and their instructor by communicating effectively, sometimes more effectively than they have all semester, in some other form of art in combination with various technology and cross-curricular knowledge. (p. 108)

This allows for individuality and creativity when completing an electronic portfolio, which will be discussed in more detail in the section about student motivation. It is important to note that portfolios can be organized in different ways. According to Wolf and Siu-Runyan (1996), "Portfolio structures can range from open-ended to highly organized, portfolio contents can range from idiosyncratic collections to standardized sets of performances, and the portfolio processes can range from ongoing self-assessments to formal evaluations of student achievement" (¶ 36). In order to understand this further, one must look at these different types of electronic portfolios.

Types of Electronic Portfolios

Portfolios, both in the paper and electronic modes, can be used in multiple different ways. Types of portfolios are named based upon the purpose of preparing the portfolio. The three most common types of portfolios are showcase, structured, and learning (Greenberg, 2004). Other types of portfolios include accountability, ownership, and feedback (Wolf & Siu-Runyan, 1996), also assessment, reflective and integrative portfolios (Fitch et al., 2008). In order to understand how e-portfolios can be used as tools for assessment for learning, one must understand the differences between these types, because not all types of electronic portfolios can be used for assessment for learning. The review will examine which types

would be ideal to use in a formative assessment case after explaining these types and assessment for learning.

The showcase portfolio is prepared after the work is created, which allows the learners to show their learning experiences through authentic examples (Greenberg, 2004). In simpler form, showcase portfolios show accomplishments of mastery of standards with reflections and are the final product portfolio (Hewett, 2005). The organization of this portfolio occurs after the work is created (Greenberg, 2004) and is usually shared in a public setting (Fitch et al., 2008). The students create all the artifacts before creating the portfolio to show their mastery and their final reflections. The showcase portfolio would be ideal as a summative assessment tool.

A structural portfolio is developed (or exists) prior to completing the work that will be placed in the portfolio. This portfolio gives a list of descriptors for the learner to meet with guidance and mentoring, while trying to achieve competencies set before them. Descriptors are detailed guidelines that are laid out for the student ahead of time, which may include lists of artifacts, order of completion, and rubrics to help understand competencies. Templates can be used to help students organize the material they want to use for each of the competencies. The predefined organization occurs with the structural portfolio, which makes it easier to be systematically reviewed, evaluated, and compared (Greenberg, 2004). These e-portfolios can be improved by mentoring and guiding students while completing the competencies (Greenberg, 2004).

A learning portfolio, or sometimes called a process portfolio, allows students to show their evidence through a more personal way and may be more unstructured with material outside of the course(s) (Fitch et al., 2008). When creating a learning portfolio, students are

allowed to put any artifacts in their portfolio throughout the course that they feel are relevant to their own learning. As the students create artifacts, reorganization is ongoing as they work on their portfolio, which may never be officially completed, because they may continue to reorganize by adding, removing, or replacing materials. Although learning portfolios are the hardest to develop and maintain, they can help provide a better understanding of how the students learn (Greenberg, 2004). Another important thought to consider about learning portfolios is a formative evaluation statement made by Brown (2004):

> The instructor/assessor acts as a guide or proctor during the development of the portfolio, and models collaborative practices as mentor and mentee work together to select artifacts and other evidence that show growth over time. An important role of the instructor/ assessor is to provide critical commentary and invite the student to defend, justify, and make adaptations to his or her work samples. (p. 151)

Accountability and assessment portfolios are very similar to each other. According to Wolf and Siu-Runyan (1996), accountability portfolios include student responses to standardized performance assessments, works that meet the prescribed criteria, and structured records from teachers. These are used to evaluate student achievement for accountability. Hewett (2005) believes the assessment portfolio "can serve as a diagnostic assessment to indicate where a student is in regard to mastering the standards and help to develop a plan to reach the required standards (p. 26)." Another way to describe how assessment portfolios can be used is to look at the Fitch et al.'s (2008) description, which is "to assess student performance in the program or in aggregate for curricular evaluation" (p. 39). Although most

portfolios deal with some kind of assessment, the primary focus of an assessment portfolio is for evaluative measurements. These portfolios usually are not created to be shown in a public setting and are usually created for a specific audience.

Reflective portfolios mean exactly what their name portrays. "These focus instead on the student's ability to be a reflective practitioner as demonstration of professional growth" (Fitchet al., 2008, p. 39). When students use reflection within their portfolios, they are simply self-assessing, which can then relate back to the assessment portfolio type, but this type also relates to the ownership portfolio. These portfolios emphasize student choice and self-assessment. They may also set their own goals and personally reflect on whether they are meeting them (Wolf & Siu-Runyan, 1996).

In certain environmental settings, teachers could be searching for a way to promote collaboration with their students. The feedback portfolios are created by both the student and the teacher. This documents ongoing records of student learning through reflection and observational logs. They also include information from parents and peers. Guiding teacher and students in identifying effective learning and instructional strategies as well as communicating this information to parents are primary purposes of the feedback portfolio, (Wolf & Siu-Runyan, 1996).

The final type of portfolio to be discussed is the integrative portfolio. This portfolio has been grouped with the feedback portfolio, because a major component of it is getting feedback from peers and teachers. Fitch et al. (2008) state that this portfolio "focuses on integrative, facilitative, and evaluative processes in which students can identify sources of insight, clarify values and goals and, most important, dialogue with and receive feedback from others to integrate critical knowledge with action, reflection, and demonstration" (p.

39). This integrative portfolio includes many of the concepts from the other portfolios mentioned.

Assessment for Learning

One major component of instruction that must be considered is assessment. Assessment needs to provide students with motivation, the *I want to learn* attitude, which can describe the students as active learners. Instruction and assessment should allow students to be active in their learning experiences, because research has shown that the best learning takes place in this environment (Chambers & Wickersham, 2006). Current assessment procedures that are being used in classrooms do the opposite to students' attitude and engagement. Present classroom environments allow low-achieving students to continue to fail. Once students are marked in this category, their motivation to learn decreases and they continue to get further behind. This then increases the achievement gap and causes schools to struggle to meet yearly progress (Stiggins, 2002). Ultimately, a classroom environment should allow the students to be active in creating and processing their own understanding. A learning environment has to be *engineered* to involve students more actively in the learning tasks. The emphasis has to be on students' thinking and making that thinking public (Black et al., 2004). Formative assessment focuses on progress students are making and giving students descriptive feedback throughout the process by allowing students to be active learners. According to previous statements, formative assessment changes classroom environments, but how does the process change the achievement of students?

Stiggins (2002) states, "The effect of assessment for learning as it plays out in the classroom, is that students keep learning and remain confident that they can continue to learn at productive levels if they keep trying to learn" (p. 762). There are many aspects that should

be considered when using assessment for learning (formative assessment) in a classroom. It should not be a separate component from instruction. Instead assessment for learning should be a major part of your instruction (Black & Wiliam, 1998).

In order to understand whether these types of electronic portfolios are usable tools in assessment for learning (AfL), one must understand what makes up assessment for learning. Assessment for learning is more than using formative assessments to evaluate where students are in meeting standards. Assessment for learning considers the classroom environment, the task of the student, learning goals and how assessment helps improve understanding and learning. To better understand what assessment for learning should include, Barrett (2005) believes assessment for learning:

- should be part of effective planning of teaching and learning;
- should focus on how students learn;
- should be recognized as central to classroom practice;
- should be regarded as a key professional skill for teachers;
- should be sensitive and constructive because any assessment has an emotional impact;
- should take account of the importance of (and foster) learner motivation;
- should promote commitment to learning goals and a shared understanding of the criteria by which they are assessed;
- develops learners' capacity for self-assessment so that they can become reflective and self-managing;
- should recognize the full range of achievements of all learners;

- should provide learners constructive guidance about how to improve. (p. 17)

As you can see there are many components to assessment for learning, which can be overwhelming to many teachers when they are first introduced to this concept. What is important is for teachers to only use a few of these ideas at a time so that it does not become overwhelming. Teachers will slowly see an improvement in classroom environment. There are three major parts to AfL: (a) success criteria, (b) collaboration through peer- and self-assessment, and (c) progression of learning. These parts of AfL are explained best by Black et al. (2004):

- The criteria for evaluating any learning achievements must be made transparent to students to enable them to have a clear overview both of the aims of their work and of what it means to complete it successfully. Such criteria may well be abstract, but concrete examples should be used in modeling exercises to develop understanding.
- Students should be taught the habits and skills of collaboration in peer assessment, both because these are of intrinsic value and because peer assessment can help develop the objectivity required for effective self-assessment.
- Students should be encouraged to keep in mind the aims of their work and to assess their own progress toward meeting these aims as they proceed. Then they will be able to guide their own work and so become independent learners. (p. 15)

Based on these concepts, teachers use assessment for learning by providing clear learning targets that the students understand and then have students complete activities that show they have met the goals. After the activities, teachers provide descriptive feedback to help students improve and may also adjust instruction based on where the students are from the activity. Students should also be involved in peer-assessment, self-assessment, and sharing their achievements with their teacher and families (Stiggins, 2002). All of these concepts show great ideas in education, but are they really needed? What makes assessment for learning so important? What is wrong with the current educational practices?

Need for Assessment for Learning

Current educational systems have ineffective assessment methods and they do not promote good learning; they also include grading processes that encourage competition and assessment and feedback processes that have a negative impact on learning (Black et al., 2004). The major issue to notice is that current practices are keeping students from achieving. According to Stiggins (2002), "Student achievement suffers because these once-a-year tests are incapable of providing teachers with the moment-to-moment and day-to-day information about student achievement that they need to make crucial instructional decisions" (p. 759). Another reason that students fail or fall through the cracks is due to numerical grading, which has a negative impact on student learning. Therefore, students are not given a chance to improve, nor do they have the direction they need to figure out what was done wrong (Black et al., 2004).

State mandated tests are not the only problem with our education system. The classroom environments that students are in do not promote collaboration and they are not student-centered (Stiggins, 2002). Teachers struggle to introduce these concepts and also

have problems giving students enough wait time to answer questions. The questions only require recall versus problem-solving, which is an important part of the cognitive process. By providing the right questions, teachers can encourage more collaboration amongst the class. There should also be follow-up activities that extend the students' understanding (Black et al., 2004).

In order for teachers to improve the effectiveness of a learning environment they should:

- plan classroom activities to give students the opportunity to express their thinking so that feedback can help develop their learning;
- formulate feedback so that it guides improvement in learning;
- use activities that demand collaboration so that everyone is included and challenged;
- train students to listen to and respect one another's ideas;
- ensure that students are active participants in the lessons and emphasize that learning may depend less on their capacity to spot the right answer and more on their reading to express and discuss their own understanding. (Black et al., 2004)

According to Stiggins (2002), this assessment process should be a "continuous flow of information about student achievement that is provided in order to advance, not merely check on, student learning" (p. 761). Many studies were reviewed by Black and Wiliam (1998) on whether formative assessment helps students attain standards. The results showed that enhancing formative assessment increases the success of students reaching standards. When Black and Wiliam (1998) discussed students, they meant that improved formative assessment

helps all students, in particular "lower achievers more than other students and so reduces the range of achievement while raising achievement overall" (p. 141). Evidence shows that assessments for learning can increase the success of students, but can electronic portfolios help promote the concepts of assessment for learning? In other words, why should electronic portfolios be used to assess for learning?

Using Electronic Portfolios to Assess for Learning

Research done by Lorenzo and Ittelson (2005b) showed that e-portfolios can "enhance teaching, learning and assessment practices" (p. 3). Miller and Morgaine (2009) provide a statement that pulls assessment for learning and electronic portfolios together:

> The practices associated with e-portfolio--e.g., designing "authentic" assignments, using engaging and active pedagogy, periodic self-, peer- and teacher-formative assessments, and requiring students to reflect on their learning--help to move both professors and students in a teacher/learner relationship where "guiding" really works (p.7).

On the Assessment for Learning Continuum, portfolios should be considered when collecting data (Barrett, 2005). E-portfolios allow teachers to include many of the items that are a part of assessment for learning. A couple of major components that e-portfolios provide include easy development of benchmark learning exemplars and evidence of meeting state and local goals (Fitzsimmons, 2008). Ravet (2005) believes that the services provided by electronic portfolios support learning, show prior knowledge, manage continuing development, share knowledge and reflect on learning. It is important for the teachers to identify what they want their students to be able to do in relation to the exemplars and to share these criteria with their students. This can be done by sharing guidelines both orally and in written form with

the students (Kemp & Toperoff, n.d.). When using electronic portfolios, students can gain a better understanding of their skills, including where and how they need to improve to meet academic goals (Lorenzo & Ittelson, 2005b). Through the creation of electronic portfolios, students are able to track their learning by comparing their work to previous work and examples given by the teachers.

Another strategy that will support assessment for learning through e-portfolios is including the students in the planning of the instruction and portfolio, which is otherwise known as a learner-centered or student-centered classroom. The electronic portfolio allows students to actively engage in their learning rather than just be recipients (Tosh, Light, Fleming, & Haywood, 2005). According to McCloud (2005), "the ePortfolio experience places them at the center of learning and gives them control over this process" (p. 6). It allows students to take surveys that depict what struggles, successes and changes they would like to make to their electronic portfolios or work. Students can also be a part of writing the goals for the unit. In some cases, students could write individual goals for themselves. Electronic portfolios can help students organize their progress towards meeting the goals for the unit/class and/or personal goals they have for a course. The process of electronic portfolios can be a visual representation of progression of learning and with the assistance from teachers, students can then see what improvements need to be made to be successful. Both the teacher and the student may use a journal to track the progression or to leave comments.

Chambers and Wickersham (2007), provide a statement about a component that should be included in electronic portfolios to track progression towards meeting goals:

> To support the concept of assessment for learning, one that nurtures the learner, journaling will be introduced and carried forth as an additional method of formative assessment, enabling the instructor to pinpoint and address misconceptions and/or growth and progress as the student moves forward in their thinking. (p. 359)

Journals can be used as a self-assessment strategy. Assistance can be made with *probes* to help students address/think about certain items or goals (Beattie, 1997). These journals are typically used for the reflection process that occurs within a portfolio. By using the journal process within a portfolio, the student is encouraged to engage in on-going reflection (Greenberg, 2004). This on-going reflection should not just be completed and then set aside. It must be followed by either peer-assessment or teacher feedback.

Black, Harrison, Lee, Marshall and Wiliam (2004) believe that peer-assessment is uniquely valuable "because students may accept criticisms of their work from one another that they would not take seriously if the remarks were offered by a teacher" (p.14). Peer-assessment allows for more discussion to occur, because students are willing to question things with other classmates and not feel pressured by the teacher. This frees up the teacher to observe what is going on and what may need to be done to clarify misunderstandings. When students give each other feedback it is in kind friendly language that they understand. Peer-assessment can also help students develop the skill of self-assessment (Black et al., 2004). Peer- and self-assessment promote more independent learning, which is a major component of assessment for learning (Barbera, 2009).

Peer-assessment leads into the concept of descriptive feedback from the teacher. In order to have a high quality e-portfolio that includes assessment for learning, there must be

continuous assessment and feedback (Chambers & Wickersham, 2006). By giving guiding feedback throughout the course, students can know if they are on the right track. It also allows students to add reflections to revisions of tests, so that they gain ownership of their own work (Kemp & Toperoff, n.d.).The feedback process that accompanies e-portfolios helps students become more aware of their learning process and what they need to do in order to improve (Fitch et al., 2008).

In order to provide more evidence of using electronic portfolios as an assessment for learning tool, it is important to analyze some studies that have been conducted. The first study by Irvine and Barlow (1998) took place with forty students aged 9-11, four in-service teachers and two pre-service teachers. The study was done to show the value in using electronic portfolios when evaluating students' progress and performance. The program included modeling and training of the software and projects before the students created their own portfolios. The students' goals were to increase their understanding and use of narrative structure in written and oral storytelling. Assessment instruments were used to evaluate the students' written communication and technical writing skills. Comparisons were made from work that was completed at the beginning of the course to those from the end of the course to see whether there was improvement in skills. It was found that through the electronic portfolio process, there was increased collaboration, student-centered learning and the use of technology. The researchers used the ANOVA procedure to calculate the gain in understanding when using electronic portfolios. The teachers had a significant gain in their scores on the computer attitude and aptitude tests. The students had major gains in oral and written language, oral communication and computer attitude and aptitude. The results of this study indicated that the modules created by the students became more sophisticated with

clear understanding and the students used more in-depth, advanced features over time using the e-portfolio software, because the students became more comfortable with the technology and process (Irvine & Barlow, 1998).

Chambers and Wickersham (2006) conducted a couple of studies to see whether the use of electronic portfolios increased the self-knowledge, technology and organization skills development, and knowledge and skills transfer of secondary education graduate students. During the first study, the students worked together to decide which characteristics, skills, abilities, and performances one must have to be considered a *master teacher*. Students then had to show they met this goal through documentation in their e-portfolios. Students in the masters cohort were given a design and development structure to follow along with an outline that stated the minimum requirements (artifacts/documentation and reflections) for their e-portfolios. The students worked together to decide what qualities a *master teacher* should possess, which was what the students used to evaluate themselves. In order to find out whether this method of assessment was valuable, students took a post-questionnaire with 13 Likert scale questions and two open-ended questions at the end of the first semester. Based on the questionnaire results, the researchers found that students did not see the connection between the electronic portfolios to the masters program and did not see it as a method of alternative assessment. Therefore, in order to increase the students' understanding of the components, the researchers felt that there needed to be more connection made with the program (setting of goals, use of rubrics) and bridging the gap between the program and the classroom. Strategies they are adjusting in the next cohort include modeling, more connection, design, research, and leadership (Chambers & Wickersham, 2006).

During the following semester of the same cohort, Chambers and Wickersham (2007) conducted another study to see whether the adjustments made deepened the learning and understanding of the masters students within the same areas of self-knowledge, technology and organization skills development, and knowledge and skills transfer. The researchers found that "the e-portfolio contained evidence of ideas, knowledge and skills development as a result of class activities, reflections, communications and assignments to ultimately provide a holistic view that demonstrates an individual's growth as an educator" (p. 353). The same thirteen questions using the Likert scale were administered to the 26 students. This questionnaire administered to a cohort of graduate students demonstrated that 58% of the students agreed that e-portfolios helped them increase their knowledge of the content, 54% felt as though the reflections were useful and 58% felt that the e-portfolios had a positive impact on their learning. Results also showed that 69% of students felt as though e-portfolios helped them transfer specific knowledge, 58% thought as though their professional knowledge was transferred through the use of e-portfolios and 65% of the students thought the change in assessment helped them transfer knowledge. The results of this study showed that more students felt that e-portfolios were useful in their learning during a master's education cohort. This can be credited to including more assessment for learning components like modeling, providing more connection, design, research, and leadership throughout the cohort (Chambers & Wickersham, 2007).

Another study was done within a social work program, which included 38 students. These students had to identify four areas of learning: issues, tasks, insights, and skills they learned while trying to meet the competencies of the courses. This allowed students to include integrative and reflective functions vital to the educational process (Fitch et al.,

2008). The researchers used proof-of-concept testing to assess the use of e-portfolios. Data was also gathered through written feedback, observational data, analysis of student portfolio artifacts, feedback from faculty, feedback from field educators and comparison of efficacy of different e-portfolio databases. The study found that most students felt that the e-portfolio was just as integrated as the paper one. Some students found it easy to use, some found it slightly difficult to use, and some thought it was extremely difficult, but it did not interfere with the actual portfolio process. "The students reported that the process was extremely helpful in assisting them in integrating and reflecting on their learning" (p. 47). This shows the connection to the major component of assessment for learning, which is teaching students be aware of their learning. The final results showed:

> E-portfolios can be invaluable tools in helping our students acquire the process knowledge and skills necessary for clarifying underlying values and goes within specific professional contexts and developing effective evidence-based practices to meet those goals throughout their professional careers via the competencies acquired in coursework. (p. 50-51)

In California, teacher education portfolios are also being used. This system lets supervisors and peers review the portfolios. These portfolios are developed as part of completing the PACT (Performance Assessment for California Teachers). The PACT is designed based on planning, instruction, assessment and reflection. One study explores whether the electronic portfolio can be more valuable than the paper portfolio. The electronic portfolio mode allows both teacher candidates and supervisors to login to make comments or provide feedback. The final portfolio is reviewed and scored with an annotated rubric (Pecheone, Pigg, Chung & Souviney, 2005). Based on the results of this study, most of the

supervisors and students (over 63%) felt as though the electronic portfolio process was more valuable compared to the old-fashioned paper and videotape method and preferred it over the paper method. Over 68% of students and supervisors felt that the most valuable thing about electronic portfolios was the fact that they were able to access the portfolios from any computer via the web at any time of the day. Students (69%) also felt that the timely feedback from the supervisors added value to their experience. "Electronic portfolios allow users to engage in online discussion of annotated clips, permitting scorers to comment on whether a particular teacher candidate's interpretation of a fact or method is defensible and appropriate" (Pecheone et al., 2005, p. 171).

Electronic portfolios were used as part of the Career Portfolio Program (CPP). The CPP is an online e-portfolio tool at a large university that helps students organize their learning experiences to see their accomplishments and skills. This may be used to seek further education or employment (Reardon, Lumsden, & Meyer, 2004).The artifacts included in these portfolios were student-centered and based on learning activities. To help with organization, a skills matrix was used. Students provided documentation on different skill areas that they covered. Each cell in the matrix contains a data entry screen that allows students to import information from all of their courses along with a reflection of their experiences. This study's focus was to develop a program that helped promote student learning and retention. According to the researchers:

> An average of 80% of student survey respondents agreed or strongly agreed with the positive statements related to the learner outcome goals for the CPP. It was concluded that a positive impact on CPP program and learner outcome goals had been achieved. (p. 377)

The last study the reviewer would like to mention is a unique one. It is unique, because it is conducted in an Illinois elementary school in which all students create portfolios. Teachers at Crow Island believe that the process of creating the portfolio is more important than the content. Students have conferences with the teacher multiple times throughout the year about progress, additions, and deletions. The work from the year is combined with previous years and is stored in the Student Archives (Hebert, 1992). *Portfolio evenings* are held at Crow Island and these evenings are for reflecting. The teacher asks guiding questions to help students reflect on their learning. Students are encouraged to write their reflections down and include them in their portfolio. Students also present their portfolios to their parents during this session. They try to let the children lead the night as they show their portfolios and discuss them. Portfolio assessment has improved the ability of teachers to assess their students at Crow Island (Hebert, 1992).

This review provides various studies that show how electronic portfolios can be used as an assessment for learning tool. It surely is not the only tool that can be used, but electronic portfolios, when used correctly, can cover many of the assessment for learning concepts such as student-centered learning environments, student goals, self- and peer-assessment, and feedback.

Electronic Portfolios that Assist Assessment for Learning

Not all electronic portfolios provide the best resource for assessment for learning. It is important to use a format that focuses on formative assessment rather than summative. To understand whether each type of portfolio meets the guidelines for assessment for learning, the reviewer will analyze each type based on what the type includes and the assessment for

learning components. In order for an electronic portfolio to be used for assessment for learning, it must have the following attributes:

- Must include reflection from students;
- Inclusion of descriptive feedback or assessment from peers and teachers;
- Used to track the progression of learning;
- Allows users to have ownership in the creation process;
- Used as formative assessment.

When looking at these attributes, the following types of electronic portfolios could be used as an assessment for learning tool: structured, learning, reflective, feedback and integrative portfolios.

Structured portfolios must have specific objectives (standards) with descriptors (Greenberg, 2004). This allows students to see what they need to show when completing the portfolio. The format of this portfolio would allow for self- and peer-assessment along with teacher feedback, because guiding questions could be considered when assessing and providing feedback, which would then help students advance to a deeper understanding.

The learning portfolio, according to Brown (2004) should, "represent processes for cognitive growth, interrogation of the learning environment, self-assessment using recognized standards, and transference of learning to the workplace" (p. 150). Even though this portfolio is the hardest to develop, it accepts assessment for learning in multiple ways. The students are given ownership and allowed to make choices while the teacher and classmates guide each other toward learning.

The reflective, feedback, and integrative portfolios all provide a great way to incorporate assessment for learning into a classroom. The integrative would be the best out of

the three, because it includes both the reflective and feedback processes. The showcase accountability and assessment portfolios are not appropriate to use for assessment *for* learning. Now that there is evidence that there are types of portfolios that can be used to provide quality assessment for learning, one must wonder what electronic portfolios do to student motivation. Student motivation is another major component of assessment for learning. To look at this more deeply, the reviewer will provide evidence on whether electronic portfolios help increase student motivation.

Electronic Portfolios and Student Motivation

Motivating experiences occur when students are active or energized in reaching goals. This motivation may be intrinsic or extrinsic. Intrinsic motivation is driven from within the students. Extrinsic motivations occur when students are encouraged, rewarded or see value from an outside source. Teachers are always concerned about student motivation, because increased motivation results in a better understanding of the process and materials (Gibbs, 2004). Student motivation is a major component of assessment for learning and should be further discussed. In particular, one must look at how electronic portfolios can help improve both intrinsic and extrinsic student motivation. According to Barrett (2005), students will become more motivated if they are allowed to control the process, purpose, and contents within the electronic portfolio development, which relates to the intrinsic motivation. Kemp and Toperoff (n.d.) found that electronic portfolios can improve motivation for learning when there are clear goals that can use various tools to help students develop skills to become active learners and to advance learning. This statement pulls together the assessment for learning components along with what motivation does to improve learning, which is

important. A question to consider is how to get students motivated through electronic portfolios. Barrett (2005) explains it best:

> When learners start developing their portfolios, they need direction and scaffolding, so the institution provides direction over the content, purpose, and process, resulting in an external locus of control. If the goal is to move toward learner's intrinsic motivation to develop and maintain their portfolios, then there needs to be learner ownership of the content, purpose, and process. (p. 15)

Based on the findings from Barrett, a teacher needs to provide guidance (extrinsic motivation) for the students, but must also give some freedom to the students in order for them to take ownership of the learning process. Once this is achieved, students have an intrinsic motivation. Another way electronic portfolios motivate learners is that the "ability to personalize their e-portfolio contributes to their motivation to *work* on it throughout the year as well as their engagement in the process" (Ring, Weaver, & Jones, 2008, p. 104). The use of portfolios motivates and challenges students through reflection and self-assessment (Beattie, 1997).

The findings from the review reveal that the main idea that increases students' intrinsic motivation when using electronic portfolios is having choice and ownership within their e-portfolios. According to Wade, Abrami, and Sclater (2005) the "use of portfolios allow students to choose and organize the kind of content they want to include; this engages the students in the evaluation and assessment process" (¶ 25). The evaluation and assessment process can be done in various ways, but what has research found to be the most beneficial way to assess electronic portfolios? What tools can be used to assess electronic portfolios?

Assessment of Electronic Portfolios

A major factor that needs to be considered when assessing electronic portfolios is having the students involved. According to research completed by Black and Wiliam (1998), students learned more when classroom assessment provided accurate, descriptive feedback and involved the students in the assessment process. In order to provide an assessment for a learning classroom environment, the teacher should consider the following when using electronic portfolios:

- Analyze which students need more practice
- Continually revise instruction on the basis of results
- Confer with students regarding their strengths and areas that need improvement
- Facilitate peer tutoring. (Chappuis & Stiggins, 2002)

These items involve the students and are important, because they allow students to learn how to use assessment information to manage their own learning. Students who are involved in their own assessment might:

- Determine the attributes of good performance based on teacher samples
- Use scoring guides to evaluate real work samples
- Revise original work
- Create practice tests based on learning targets
- Communicate with others about their growth. (Chappuis & Stiggins, 2002, p. 41)

One might ask what the role of the teacher is in this type of classroom environment. The teacher is the facilitator and is guiding students toward learning. One major task of the

teacher is to provide descriptive feedback to the students. This feedback can be given in multiple ways: checklists, interviews, self-assessments and rubrics.

Checklists can be used to help record whether specified behaviors are present that should be when completing a task or goal. Checklists can be used to reflect and review processes the students encounter that may be problematic by providing a thinking process that addresses metacognitive skills. Along the line of a checklist is a rating scale. This can be used to help students realize where they are in relation to meeting a goal. Rating scales can include numerical, verbal or graphical systems that explain or judge and they can help students assess or examine the problem-solving processes (Beattie, 1997).

Interviews provide educators with an insight to understandings, feelings, attitudes, interests and motivations of the individual, which can provide diagnostic information (Beattie, 1997). Interviews can, in simpler form, be used to help identify students' understanding in relation to the goal of the unit. They also allow teachers to give feedback to the students. Guests may also be invited to interview or review, which can also serve as a resourceful feedback tool.

Another way for teachers to give feedback is through having students use self-assessment. In order for self-assessment to work, students should look at their work in relation to a set of goals and when this is done students are developing the capacity to work at a metacognitive level (Black et al., 2004). Why is it important for students to be able to compare themselves to a set of goals? According to Black and Wiliam (1998),

> Pupils are generally honest and reliable in assessing both themselves and one another; they can even be too hard on themselves. The main problem is that pupils can assess themselves only when they have a

> sufficiently clear picture of the targets that their learning is meant to attain. (p. 143)

It is important to realize that there is not one clear way to use self-assessment. There are many tools that can be used and should be used in relation to what one is trying to achieve. According to Harada (2010), these tools might include the following: reflection logs, exit passes, graphic organizers, rubrics, rating scales, checklists, timelines, flowcharts, goal-setting plans, directed conversations and conferences and letters. A few of these have already been discussed, but further discussion is needed for other ones on this list. Reflection logs, flowcharts, directed conversation, letter to a peer or parent and graphical organizers all need to have guiding questions to help students understand what they need to do in order to complete the task.

One of the major items from the list provided by Harada (2010) is using rubrics as a tool for self-assessment. Rubrics are used to provide students with descriptions of varying levels of quality in relation to meeting criteria or goals (Andrade, 2000). Matrices are often created with grading rubrics that help determine whether students have met specific outcomes or competencies (Lorenzo & Ittelson, 2005a). Rubrics are popular because they help teachers make their expectations clear for the students and parents. A major component of using rubrics is best stated by Andrade (2000), "Instructional rubrics provide students with more informative feedback about their strengths and areas in need of improvement than traditional forms of assessment do" (¶ 21). Rubrics are used because they support learning by assessing the development of skills, development of understanding and good thinking (Andrade, 2000). Before using rubrics in the classroom, it is important to model and discuss

how to use them. It is also useful to get feedback from the students on whether the rubric should be changed due to not enough detail or misunderstandings (Black et al., 2004).

These are just some of the ways electronic portfolios can be assessed. However, these are the more important assessment processes, because they support assessment for learning. It is important to ensure that the assessment process allows the students to revise their work based on the feedback they receive, whether it is a comment or a grade.

CONCLUSIONS AND RECOMMENDATIONS

The conclusion of this review will examine possible answers to the questions stated in the introduction.

- What are electronic portfolios;
- Why is there a need for assessment for learning;
- Why should electronic portfolios be used when assessing learning;
- What types of electronic portfolios will help teachers use "assessment for learning" in their classrooms;
- Do electronic portfolios have a positive impact on motivation;
- How should electronic portfolios be assessed?

Various types of electronic portfolios were examined through several sources. The types of portfolios were explained in detail about how they could be used. With that in mind, the review did provide enough research to understand the purpose of electronic portfolios including the various types and how they can be used in education through analyzing various research articles.

Stiggins' (2002), Chappuis and Stiggins' (2002), Barrett's (2005), and Black, Harrison, Lee, Marshall and Wiliam (2004) work supported the need for assessment for learning. These researchers provided evidence of how assessment for learning could improve the achievement of students. There was not enough evidence to support the needs and benefits for using assessment for learning when instructing students through their studies. More research needs to be completed to see how assessment for learning affects long-term learning of students.

The studies reviewed provided evidence of electronic portfolios being usable tools in

assessing learning. The major problem when looking at using electronic portfolios as an *assessment for learning* tool is there is not enough physical evidence that comes from studies with electronic portfolios in place as a sole means of formative assessment. The goals of the studies focused on other aspects of portfolio use. However, there is evidence that electronic portfolios can be valuable formative assessment tools when used with specified electronic portfolio types, defined goals and criteria, peer- and self-assessment strategies and appropriate evaluation methods. The reviewed literature indicated that an electronic portfolio can be used as an *assessment for learning* tool, because it provides many positive aspects that teachers are looking for, including authentic assessment, motivation and a tool for showing the standards and benchmarks that are addressed during the curriculum. However, it does not provide enough evidence to prove that electronic portfolios should be used as a sole means of assessment for learning, because the review did not include any studies from research that had electronic portfolios as a sole means of assessment for learning.

The research suggests that student motivation increases through the use of electronic portfolios. It would be ideal to have more studies from the primary and secondary levels to support this further. Another area that needs to be addressed more in this literature review is whether electronic portfolios can help students become life-long learners through self-regulation. It is recommended that research be done over a longer period of time with a set group of students in order to find evidence that supports electronic portfolios as a means of developing life-long learners.

Further research is also recommended when it comes to assessment methods that should be used when evaluating electronic portfolios. In particular, it is important to look at assessment methods that pertain to the curriculum area that is being taught. Research should

be completed to see which assessment provides more achievement among the students. It may also be beneficial to have feedback from students on how they believe their electronic portfolios should be assessed to see if there is a trend in opinions.

Further research is recommended before implementing electronic portfolios as the sole tool for assessment for learning. It is unclear how effective electronic portfolios are at administrating the components of assessment for learning. By doing further research on electronic portfolios, more evidence can be found that supports the use of electronic portfolios as a sole tool for assessment for learning when assessing the 21st century learners.

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