Implementing the Electronic Portfolio: How to Improve Upper Elementary Student's Metacognition

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Abstract

This paper presents a literature review and analysis on how electronic portfolios may enhance students' metacognition skills, specifically in Language Arts. Grounded in social constructivist theory, this inquiry connects electronic portfolios and metacognition to students' self-efficacy, self-regulation, and motivation. After reviewing more than 30 articles on metacognition and electronic portfolios, the evidence strongly suggests that if electronic portfolios are presented and taught using research best practices, they can add to the enhancement of students' metacognition. The inquiry concludes with an example of electronic portfolio developed in Weebly that teachers can implement in their classrooms to benefit the learning of students in upper elementary classrooms.

Keywords: metacognition, electronic portfolios, self-efficacy, self-regulation, motivation

Résumé

Cet article présente une revue de la littérature et de l'analyse sur la façon dont les portfolios électroniques peuvent améliorer les compétences de métacognition des élèves. Ancré dans la théorie socioconstructiviste, cette enquête se connecte les portfolios électroniques et la métacognition à l'auto-efficacité, l'autorégulation et la motivation des élèves. Après avoir examiné plus de 30 articles sur la métacognition et les portefeuilles électroniques, la preuve suggère que si les portfolios électroniques sont présentés et enseignés à l'aide des meilleures pratiques de recherche, ils peuvent améliorer la métacognition des élèves. L'enquête conclut avec un portfolio électronique que les enseignants peuvent mettre en œuvre dans leurs salles de classe au niveau élémentaire.

Mots-clés: métacognition, portfolio électronique, auto-efficacité, autorégulation, motivation

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The field of education is vast and continually evolves as it strives to create optimal pedagogical methods for students to reach their highest learning potential. Students learn in various ways and as teachers, we have a challenging job of ensuring that the highest level of learning transpires. The thesis of this paper asserts implementing electronic portfolios (EPs) can improve student's metacognition in an elementary classroom. It encourages an important step in improving students' ability to engage in their own learning, to set goals, and reflect upon the process of their own learning; hence increasing their metacognition. One can observe this process through Abrami and Barrett's (2005) research that explains since EPs are student centered they "are expected to have positive effect on attitudinal, motivational, and affective outcomes" (p. 6). Equally important is self-regulation. According to Abrami, Savage, Wade, Hipps, and Lopez (2007) EPs are connected to students' ability to self-regulate where the main feature of self-regulation is metacognition. Furthermore, to address self- reflection in EPs, the study by Wade, Abrami, and Sclater (2005) showed that the EP process benefits students in being able to highlight their weaknesses, as well as increase their self-regulation skills.

The purpose of this literature review is to analyze how EPs can enhance metacognition and self-regulation in upper elementary students thus improving students' Language Arts skills. To begin, we define EPs to establish a clear rationale before exploring how they can be used to increase metacognition which can be "referred to as the awareness, knowledge and control of cognition" (Wade et al., 2005, p.4). The term metacognition can be visualized as an umbrella encompassing the terms motivation, self-efficacy, self-regulation, and reflection to provide evidence on how EPs can improve student's metacognition skills. The main question that guided this paper was:

RQ1: How can an electronic portfolio enhance metacognition skills in upper elementary students? Due to the complexity of this question, the three sub questions have also been considered:

RQ1 (a): What elements of a digital platform are required to best promote metacognition and self-regulation?

RQ1 (b): How does self-regulation improve students' metacognition?

RQ1 (c): How motivation, engagement, and autonomy are reflected in successful EPs and associated with metacognition and self-regulation?

Finally, to conclude the paper, a prototype based on Barrett's (2000, 2006, 2007, 2011) research provides an example of an EP for Language Arts. This prototype is designed for grade six elementary teachers, but can be adapted for other grades as well.

Social Constructivist Theory

The predominant theory used to ground EP research and student learning is social constructivism, which describes students as motivated, active problem solvers who collaborate to construct new knowledge through effective feedback, goal setting, and self-reflection (Abrami & Barrett, 2005; Alexiou & Paraskeva, 2010; Wade et al., 2005). EPs leverage technology to promote 21st century skills, which mirror this description (Barrett, 2007). Two mixed method studies conducted by Wade et al. (2005) and Alexiou and Paraskeva (2010) developed frameworks based on Vygotsky's (1978) research whose goal was for students to become self-regulated learners to enhance academic skills. Wade et al.'s (2005) model emulated Danielson and Abrutyn's (1997) stages on how to develop a portfolio. They adopted the five stages of the portfolio process from the QESN-RÉCIT (2005), which was based on Barrett's (2000) research. It identified five stages for the portfolio process (a) collection, (b) selection, (c) reflection, (d) evaluation, and (e) celebration. In contrast, Alexiou and Paraskeva's (2010) EP framework

consisted of three phases based on Zimmerman's (2000) "cyclical model of self- regulation: forethought, performance control, and self-reflection" (p. 3052). Alexiou and Paraskeva (2010) and Wade et al. (2005) both concluded EPs have positive effects on student learning.

Electronic Portfolio

An electronic portfolio can be described as telling a story (Barrett & Garrett, 2009). The instructor explicitly teaches metacognitive strategies which students use to create their collection of artifacts. From there, the students create hyperlinks to provide reflections on their work and receive feedback to further improve their product. EPs allow students to activate prior knowledge, predict, utilize metacognitive and goal setting strategies, and reflect upon their learning. These are all proven strategies to increase metacognition (Barrett 2007; Zellers & Mudrey 2007).

Various studies provide evidence on how EPs contribute to improved metacognition. Avraamidou and Zebal-Saul (2003) concluded that EPs assisted pre-service teachers to "engage themselves in reflective and metacognitive activities about their views of science teaching and learning" (p. 438). Likewise, Lehtonen (2002) determined that EPs led to increased satisfaction and pride among students, which supports previous findings that state self- efficacy is connected directly to metacognition. Barrett's (2007) two-year action research study provided evidence on the impact of EP on secondary students' learning. This meta-analysis involved 6, 000 students from 20 schools across the United States. The study categorized the sites as low, medium, and high implementers of EPs. The findings showed low implementers were from classes where single teachers were using EPs in low populated schools in one subject area, usually technology. However, the high implementers were level wide Language Arts schools whose teachers understood the reflection and metacognition processes and how to use them for assessment for learning (formative assessment). The participants had high technology skills and a collaborative

support system. The findings led Barrett (2007) to state "content and reflection on learning is more important than technology in implementing electronic portfolios…the focus should not be on the technology, but on the learning" (p. 447). Explicitly teaching the reflective process and technology skills is critical when implementing the EP in the upper elementary classroom.

Metacognition

As the premise of this paper is to provide evidence on how EPs can enhance metacognition skills and self-regulation in upper elementary students, it is important to define metacognition. Its origins stem from Flavell (1979) who discussed metacognition as "thinking about thinking" (p. 906). Since then, it has evolved to encompass different skill sets such as analyzing arguments (Halpern, 1998); using inductive and deductive reasoning to make inferences (Willingham, 2007); evaluating or making judgements based on information (Case, 2005); and problem-solving (Willingham, 2007). El-Koumy (2004) took a step further to explain metacognition involves two types of knowledge: "(1) knowledge about one's own cognition and (2) knowledge about self – regulation of one's own learning" (p. 7).

Knowledge about one's own cognition is connected to self-perception and self-efficacy. Pajares (2006) defined self-efficacy as the learner's judgment on his or her capability to complete a task. Alderman's (1999) study concluded students who believe they will do well on a task, are more likely to succeed than those who regard the task negatively. Similarly, Pajares and Miller's (1994) findings showed students who have strong self-efficacy are more likely to persevere and complete a task than those who do not. Following McCabe and Margolis' (2001) recommendations, teachers can teach strategies to students to improve their self-efficacy and self-perception and incorporate these strategies when developing and using the electronic portfolio.

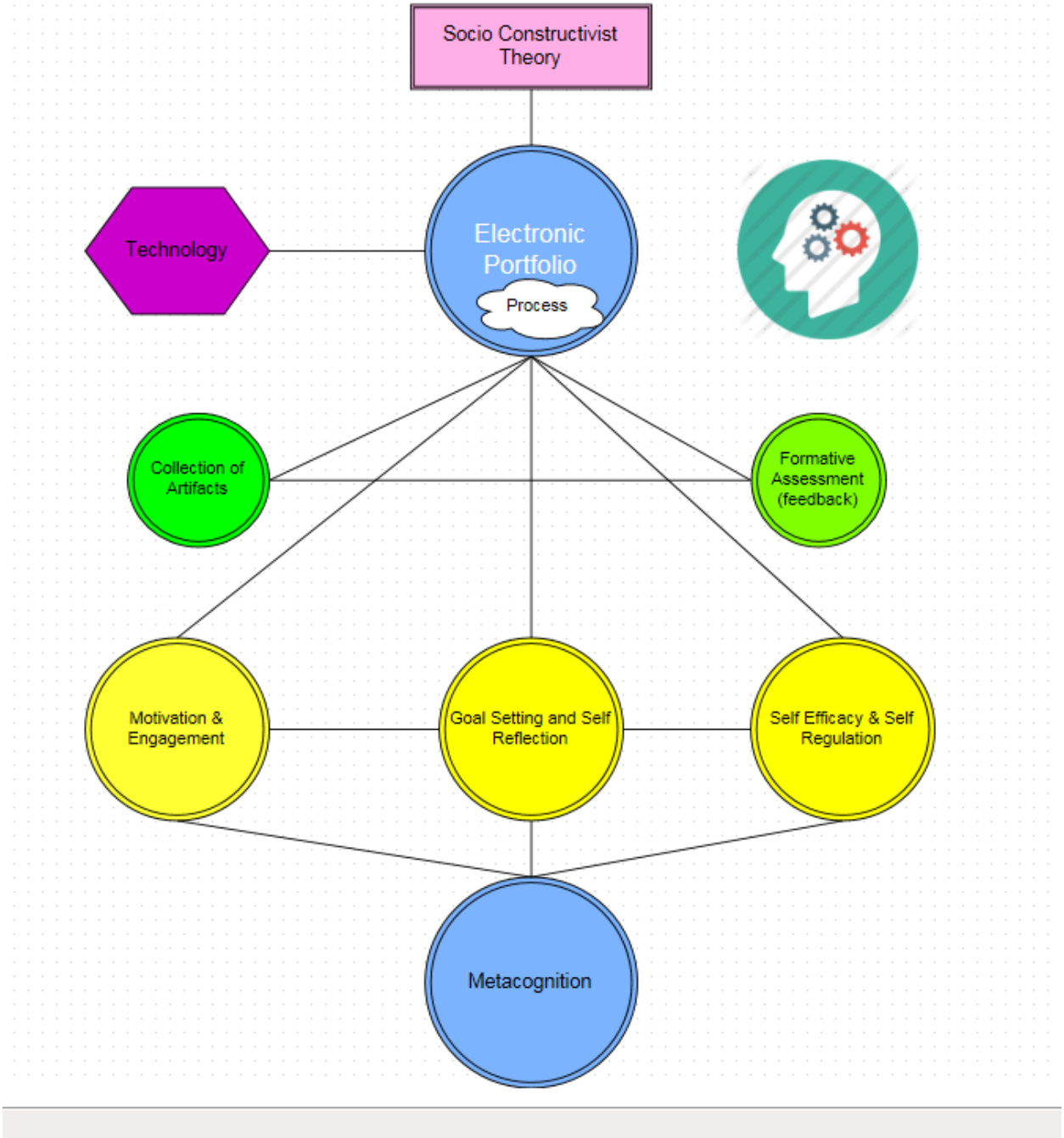

Figure 1. Visual displaying how Social Constructivist Theory grounds the analysis showing how the EP connects with metacognition to improve student learning.

Methodology

An action research approach, using Brown's (2002) five-step cycle was used for this literature review. The first step was to identify the problem, purpose, and questions to address the

research question: How can an EP enhance metacognition skills and self-regulation in upper elementary students? Second, a plan of action was developed. This involved creating a graphic organizer to help visualize and anchor the connections between the EP and metacognition as well as help construct the main categories of the literature analysis (see Figure 1). Key words and the web 2.0 tool (https://www.draw.io/) were used to create this visual. Third, literature was collected, using the University of Calgary's library database. Fourth, data sets were analyzed and conclusions were formed using the literature review matrix. As a result, important citations, key words, and themes emerged from the research. Finally, results and conclusions were written leading to the development of a prototype of an EP.

To further explain the collection, interpretation, and analysis of the data, approximately 30 papers were downloaded for this literature review. Two different folders were created using the referencing software, Mendeley: EP and Metacognition. Articles were organized in their designated folders. Two literature review matrixes (table 1) were developed to organize the components of the research; one for electronic portfolios and another for metacognition.

Table 1

Literature Review Matrix

Author/ Date	Theoretical/ Conceptual Framework	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice

To extend the organization of the research, a color code was assigned to each of the three research questions (see table 2). Then, the matrix and citation tables were analysed, numbering

the articles so that the information coming from the same study matched. Key words based on the guiding questions were highlighted and another thematic table was created based on the specific themes/ theories that emerged. This process systematized the information and structured the ideas and topics for the inquiry. Table 2 has evolved since the research stage. During the writing and editing phases, the questions progressed from four, which overlapped, to three that were more concise and connected. Once these steps were created, the writing and analysis of the inquiry commenced.

Table 2

Color Code Chart

Question/Color	Key Words
What elements of a digital platform are required to best promote metacognition and self-regulation? / Highlighted yellow	Web 2.0, Weebly.com, Blogs, Pod casts/ video
How does self-regulation improve students' metacognition? / Highlighted green	Self-monitoring, Critical thinking, Goal Setting, Self-assessment, Reflection
How motivation, engagement, and autonomy are reflected in successful EPs and associated with metacognition and self-regulation? / Highlighted pink	Self-efficacy, Autonomy, Engagement

Literature Review and Findings

Social Constructivist theory grounds the research throughout this literature review. Its elements of collaboration, effective feedback, problem solving, and self-reflection strategies to

construct new knowledge are embedded within the following sub-questions. The purpose of this section is threefold: (a) to find what elements of a digital platform are required to best promote metacognition and self-regulation, (b) to understand how self-regulation improves students' metacognition, and (c) to review how motivation, engagement, and autonomy are reflected in successful EPs and associated with metacognition and self-regulation.

Technology and Electronic Portfolio

When developing EPs, a number of technology related decisions are involved to support metacognition and student learning. Falls' (2001) study found the classroom teacher struggled with the familiarity of technology when implementing EPs and the length of time it took to teach students how to use the technology appropriately. This echoes Meyer, Abrami, Wade, and Scherzer's (2011) recommendations that schools require adequate digital tools and infrastructure maintained by technical staff to implement EPs. Support from administration with sufficient professional development and professional collaboration is essential. Likewise Tosh, Light, Fleming, and Haywood's (2005) mixed method study, which gathered data from two institutions and six courses, stated that students spent more time learning to use the technology and customizing their portfolios than using them to improve their learning.

Although these previous studies underline the challenges of using technology, Batson and Chen (2008) suggested EPs are "uniquely suited to this digital age as a focus of learning and a viable way to frame and leverage this open revolution in education" (p. 3048). Similarly, Zellers and Mudrey (2007) interviewed four professors from Lorain County Community College. Forty pre-defined, semi-structured questions on the usage of EPs in education were given. The responses were grouped into common themes and two professors found clear evidence of critical thinking and analysis that increased student metacognition. The third instructor noted they helped keep the students focused on their final goal and product. However, the fourth teacher

concluded her students did not understand the reflective process and they were disengaged in the portfolio process. This study recommended the teacher have a clear purpose for the portfolio, take the time to promote the EP, teach the students the appropriate skills necessary to create the EP through an open system so students have control over certain features, and coach the students through the reflective process. Finally, Barrett's (2011) research introduced a concise model on how to specifically use digital tools to create an EP that increases students' metacognition and alleviates the challenges presented above.

Self-Regulation

One definition of self-regulation may be interpreted as individual learners who are motivationally, metacognitively, and behaviourally active participants in their own learning (Zimmerman, 2000). In order to develop self-regulated strategies, Perry (1998) stated "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" (p. 716). This coincides with the benefits and necessity of formative assessment to assist students in the reflection and revision of their work. After reviewing 250 researched articles, Black and Wiliam (1998) determined "all these studies show that innovations that include strengthening the practice of formative assessment produce significant and often substantial learning gains" (p. 139). He further concluded assessment for learning is essential for peer and self-assessment. To connect this claim to electronic portfolios, Wall, Higgins, Miller, and Packard (2006) used technology to capture assessment information. Their conclusions indicated using digital tools to record the students' learning process was "central in supporting and facilitating pupils' talk and awareness of the different learning implicit in classroom activities" (p. 271). Although in a different context, Lam's (2015) analysis provides evidence that a portfolio based classroom in an English as a second language setting

can enhance the learner's ability to self- reflect through formative assessment. According to his research, this leads to increase motivation, self-assessment, and improved writing skills.

Additionally, a mixed method study conducted by Meyer et al. (2011) used expectancy theory to study sixteen teachers working students in grades four to six from Quebec, Manitoba, and Alberta who participated voluntarily during the 2007/2008 school year. They wanted to research the factors that influenced EP use in the classroom. The results showed low EP implementers experienced technical challenges and resisted change. However, "the high implementers reported using more pedagogical practices that support self-regulated learning as a result of the scaffolding provided by the software" (p. 191). Similarly, according to Wade et al.'s (2005) research, EPs were linked to students' ability to self-regulate their learning and to enhance meaningful learning of important educational skills and abilities. This is especially true regarding literacy skills, which has proven to be a main feature of metacognition. Meyer, Abrami, Wade, Aslan, and Deault's (2010) also found when teachers highlighted the importance of planning, producing, and reflecting throughout their instruction, students' goal setting and reflection levels increased.

Despite the benefits discussed above, one must use caution when beginning to develop EPs in their classroom. As presented in Barrett's (2011) research, electronic portfolios have two faces: the process and the product. Educators must distinguish between the two and decide which one they will use. Otherwise, as presented in Barrett and Carney's (2005) case study, students may not reveal their true reflections. They showed that in-service teachers tended to withhold their teaching weaknesses through the EP platform. The researchers concluded this was because of the dual purpose of the EP as a formative process and summative product. This is consistent with findings in Placier, Fitzgerald, and Hall's (2001) and Barrett's (2006, 2011) studies. Comparably, Davies, Arbuckle, and Bonneau (2004) stated "Assessment for learning is ongoing,

and requires deep involvement on the part of the learner in clarifying outcomes, monitoring on-going learning, collecting evidence and presenting evidence of learning to others" (p. 1). Involving summative assessment within these parameters may deteriorate the authenticity of this process.

Motivation and Engagement

Important characteristics of learning are motivation and engagement. When students have a choice on how to learn a specific topic, research shows students are more engaged and willing to increase their knowledge and understanding of the material (Kuh, Kinzie, Schuh, & Whitt, 2005; Ramsden 2003). Furthermore, self-efficacy can be defined as learners' beliefs about their capabilities on how they learn (Bandura, 1997). Empirical research suggests self-efficacy can be developed and EPs can be an effective practice to enhance self-efficacy in students (Abrami & Barrett, 2005; Pajares, 2006; Walker, 2003).

Similarly, Walker's (2003) research focused on students' writing self-efficacy beliefs. She made the important connection of EP's potential to help students evaluate their literacy, identify their strengths, set goals, reflect upon their progress, evaluate and improve their learning; thus increasing their self-efficacy. Comparatively, although not specifically using an EP platform, Priego, Muñoz, and Ciesielkiewicz (2015) examined how the systematic use of blogs in a university level course could lead to the development of student's metacognition skills. After analyzing the data collected through interviews, the results indicated the following three conclusions. First, they found an increase of self-regulation skills because of the autonomous nature of the blog assignment. Second, the constructive feedback the students received had a direct correlation to their increased self-efficacy, as the comments validated their learning. Third, an increased motivation occurred due to the students' ability to successfully achieve their goals. Moreover, open source EPs offer the ability for choice where individuals have ownership

over their work. This was discussed in Tosh et al.'s (2005) mixed method study on how acceptance and motivation when using EP technology can increase student engagement. Surprisingly, most students at the college level in the study stated the EP did not help them progress through the course. Students' reflections did not reflect honesty; instead they perceived it as more work. The researchers concluded this reaction was due to a closed digital EP platform, whose purpose was to present a product that encompassed their summative evaluation. Consequently, Tosh et al. (2005) recommended EPs should be an open system, multi-purposed, and utilized for personal development which offers choice.

It is worth noting that leveraging digital tools within an electronic portfolio has also been proven to increase motivation. For example Avraamidou and Zembal-Saul (2003) and Barrett (2006) showed how technology, hyperlinking, and publishing artefacts on the web, engages and motivates students to do their best work as a wider audience may view it. Furthermore, promoting ownership in one's work motivates students to improve their learning which can lead to increased metacognition.

Electronic Portfolio Design and Prototype

The empirical research available on metacognition and learning is quite extensive. However, in regards to EPs, the research is still emerging and the majority of the research is in the area of secondary and post-secondary education (Nicolaidou, 2013). The studies examined in this analysis, show the limitations stem from quasi-experimental designs due to small sample sizes instead of a true experimental design. Nevertheless, these studies have laid the groundwork for more research (Alexiou & Paraskeva, 2010; Meyer et al., 2011; Nicolaidou, 2013). Thus, based on the analysis on the components of the EP and metacognition discussed in the findings, one may conclude, that if presented and taught according to research best practices as presented, there is strong evidence EPs add to the enhancement of students' metacognition. This section of

the discussion, grounded in social constructivist theory, presents a prototype for elementary teachers to follow and successfully create EPs in their classroom following Barrett's (2000, 2006, 2007, 2011) research.

Technology Platform

The EP was designed using *Weebly,* a website creator which includes numerous user friendly options. For example, it has the capability to provide a protected password for privacy issues (FOIP) with a storage capacity of 5MB per file. The variety of preloaded themes allows the developer the option of creating many different pages while including pictures, video, audio, hyperlinks, a blog, and uploading documents from his or her computer. It is important to note Barrett's (2011) suggestion when developing an electronic portfolio with your students for the first time. Limit the EP to one core subject so that the process is manageable, for example, Language Arts - writing. Finally, to enhance the EP, digital tools can be incorporated as audio or video commentary about their work.

Theoretical Framework

Barrett (2000) developed *The Electronic Portfolio Development Process* that will be used as the theoretical framework for the prototype of the EP. It contains five stages and within each stage there is a series of levels. Stage one involves defining the purpose, learner outcomes, the audience, and the resources needed during the development of the EP. Stage two consists of the design and plan of the EP. The artifacts, software, and web 2.0 tools are selected, and the students' personality is shown through using the technology and allowing personal freedom of design. "Learners find their voice and passions through choice and personalization! A portfolio is a student's story of his or her own learning. It's positive digital identity development or personal online branding" (Barrett, 2011, p.9). Stage three is the development of the portfolio encompassing three sections: What? So what? Now what? *What* refers to the meaning and value

of each artefact selected in the portfolio. *So what* involves students' reflective statements about their related achievement. Finally, *now what* establishes the student's learning goals for the future. Stage four encompasses inspect, perfect, and connect. The student would analyze the first three stages of his or her portfolio and then organize the artefacts, identifying patterns using hyperlinks. They would then review the portfolio goals, the teacher and peer assessments. To finish, the fifth stage consists of the presentation portfolio. This is where the student presents, shares, and evaluates the portfolio. An example of these five stages can be seen by going to http://6kportfolio.weebly.com.

This framework outlines the steps involved when creating an electronic portfolio. However, an additional aspect of the electronic portfolio is digital story telling. "A digital story is a personal narrative that may show the author's identity: strengths, weaknesses, achievements, disappointments, learning experiences, passions, and hopes for the future; in other words: reflection" (Barrett, 2006, p. 1). This medium adds personality and identity which can motivate students to internalize information and use their prior knowledge to make connections to build and construct their story. It is an effective example of using digital literacies to transfer their message to a larger audience making the learning authentic. The digital story uses the strength of multiple intelligences, enabling differentiation for the learner so everyone can benefit from the experience. The following website provides an example of a digital story created for the electronic portfolio prototype that follows the grade six Language Arts writing learner outcomes and the artifact -the biography of Katherine Paterson: http://6kportfolio.weebly.com/digital-story-telling.html.

Portfolio Design Process

The grade six Language Arts general outcomes from the Alberta Education program of studies are for students to listen, speak, read, write, view, and represent to enhance clarity and

artistry of communication. The content for these outcomes is presented through the six plus one traits by Ruth Culham (2005): ideas, organization, vocabulary, sentence fluency, conventions, and presentation. For this prototype, the biography of Katherine Paterson was chosen (Paterson, 2012).

To begin, the first step is for the teacher to explain the definition and structure of a biography. An exemplar of a biography was created (see Appendix A). After analyzing the sample together, the criteria based rubric would be presented, so the learner knows the expectations (see Appendix B). Once the student has a collection of writing, he or she would develop the portfolio using weebly.com. First they would create the homepage and set up their page links to writing pieces, reflections based on learning outcomes, learning goals, and a blog for peer reviews. A template was developed for students to complete each month as they set their goals using the strategies taught from Culham's (2005) 6 + 1 write traits (see Appendix C). Second, they would choose the artifacts indicating the learner outcomes it fulfilled and upload them in Weebly under writing. Third, the students would create hyperlinks to join their reflections to their pieces using these questions as guidelines:

1. Why did you select this piece of writing?
2. What do you see as the special strengths of this piece?
3. What was especially important to you as you were writing this piece?

Finally, a blog would be created in Weebly by the students for sharing, giving feedback, and peer review. The student blogging guidelines from Cofino (2009) were adapted to remind the students that their feedback should be constructive (helpful), but not hurtful. When giving feedback through a blog, one should consider the author and the purpose of the post, relate the comment to the post answering a question, or add meaningful information to the topic.

To begin this feedback process, the teacher needs to provide direction. A peer feedback checklist is useful, especially when developed with the students, and only focuses on one or two criteria. Otherwise, it becomes overwhelming and ineffective for the student at the elementary level (See Appendix D). Following these steps and leveraging the digital tools (text, audio, video, hyperlinks, websites etc.) one can create an "e-Portfolio that is essential for 21st Century Literacy" (Barrett, 2011, p.14).

The EP process, when explicitly taught, has the ability to improve students' metacognition skills. However, it is also important to mention besides the issues of administrative support and technology, it can be time consuming to teach the important steps and strategies involved in self-reflection, self-evaluation, constructive feedback, and goal setting. However, once taught and practiced, these skills will benefit the student as he or she progresses through school and beyond. Also, monitoring student progress within the EP and blogs, assisting with technology, and providing feedback can be tedious. Conversely, creating structures where students help with some of the feedback and technology questions can alleviate this issue.

Future Research

Although this inquiry has solidified the notion that EPs can make a difference in students' metacognition skills, most of the research is from a secondary or post-secondary perspective. More research is needed in an upper elementary setting on how the implementation of EPs with explicit teaching on the use of technology and metacognitive strategies can improve students' learning in reading and writing. Until such research is conducted, educational decisions can be based on the findings of the research discussed in this paper. The challenges of technology, such as lack of computer skills and software or hardware access, can impede the progression of EPs. Guidance from administration in the form of professional development, collaboration, planning time is essential for the optimal success of EP enhancing students' metacognition skills.

Conclusion

Electronic portfolios are an effective means to incorporate 21st century learning skills; engaging students to produce authentic and meaningful projects. The EP process allows students to acquire knowledge, internalize their learning, and understand what, how and why they learn. This inquiry used a social constructivist theory to underpin the research on how EPs can enhance metacognition skills in upper elementary students. Metacognition and the EP were defined, developing a clear context to the question, "which digital platforms and tools seem best able to promote metacognition and self-regulation?" Similarly, self-regulation was investigated through the lens of how it improves students' metacognition. As well as, how motivation, engagement, and autonomy were reflected in successful EPs and associated with metacognition and self-regulation. The analysis of these questions verified that when explicitly taught and EPs are supported, planned, presented in a purposeful manner, they can enhance the metacognition skills in upper elementary students. Barrett's (2000) Electronic Portfolio Development Process: reflection, goal setting, and collaboration were used as framework for the EP prototype for grade six Language Arts. This prototype, will allow a classroom teacher to create an EP with his or her students.

Digital tools may act as a catalyst to enrich the EP, but as this paper analyzed, it is the process within the EP that augments self-efficacy, self-regulation, motivation, and engagement of the learner. Subsequently, this leads to higher level thinking skills and metacognition that ultimately adds to student's personality, personal voice, and identity throughout his or her learning journey. It is hoped that future research will provide connections of metacognition to improved reading and or writing skills based on the implementation of electronic portfolios in upper elementary students. This concrete evidence would provide further substantiation to the value of electronic portfolios in today's classrooms.

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Appendix A

Biography on Katherine Paterson – Author of Bridge to Terabithia

Katherine Paterson, a well acclaimed author, is the winner of the Newberry Award as well as many others. Born in China, she was the daughter of missionaries who were forced to move to the United States as refugees due to the attack from Japan during World War II. These were poor times and she had to rely on books and her imagination to entertain her. She attributes being around literature to the reason she is such a good writer today.

When she grew up she went to collage studying literature. She taught school for one year and continued her grad studies in Virginia focusing on Christian education. After receiving her masters, she followed in her parents' footsteps and completed missionary work in Japan. An awkward choice due to the fact she was prejudice against the Japanese because of the World War II. However, a friend convinced her to go and she loved her time spent there. Upon returning to the United States, Katherine married and had 4 children.

She started writing when the church gave her a scholarship and Katherine felt pressured to produce something with it. Her books were published and then she was hooked. Nevertheless, it did take her many years for her books to be recognized nationally and internationally. Some of her books include "Jacob How I Loved," "Bridge to Terabithia," "Great Gilly Hopkins," "Parks Quest," and many more. The book she is most proud of is "Jacob How I Loved" and most difficult to write was "Bridge to Terabithia". Katherine was going through a tragic time in her life and wrote it to ask questions and find answers to the meaning of tragedy and life.

Katherine has brought many characters to life with her vivid images of settings and events that she weaves intricately throughout her plots. The metaphors force the reader to think deeply about the messages in her stories and how everything is interconnected. She is an amazing author of the 21st century.

Bibliography - Appendix A

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Appendix B

Rubric - Mini Biography of Katherine Paterson

Criteria	4 Excellent	3 Proficient	2 Basic	1 Limited
Make notes and use reference sources appropriately 3.321	Students are able to take purposeful notes from more than one source and reference them accurately in a bibliography	Students are able to take focused notes from more than one source and reference them fairly accurately in a bibliography	Students are able to take appropriate notes from more than one source and reference them somewhat accurately in a bibliography	Students notes from more than one source are questionable and their references in a bibliography are flawed
Develop and follow own plan 3.131	Precise information is accessed and gathered to develop a plan using a graphic organizer	Logical information is accessed and gathered to develop a plan using a graphic organizer	Partially correct information is accessed and gathered to develop a plan using a graphic organizer	Confusing information is accessed and gathered to develop a plan using a graphic organizer
Organize and develop ideas in a variety of ways 3.312, 3.411	Mini Biography contains a methodical introduction, body and conclusion that partially enhances topic	Mini Biography contains a methodical introduction, body and conclusion that supports topic	Mini Biography contains a methodical introduction, body and conclusion that partially supports topic	Mini Biography contains a disorganized introduction, body and conclusion that interferes with the topic
Explore and utilize digital tools 3.221	Uses the search engines and mind mapping software in an innovative manner to create a mini biography that informs and engages the audience	Uses the search engines and mind mapping software in an effective manner to create a mini biography that informs and engages the audience	Uses the search engines and mind mapping software in a workable manner to create a mini biography that informs and engages the audience	Uses the search engines and mind mapping software in an ineffective manner that does little to create a mini biography that informs and engages the audience
Work collaboratively 4.111	Skillfully completed the peer review following the checklist and skillfully contributed knowledge, opinions, and skills of the group	Effectively completed the peer review following the checklist and effectively contributed knowledge, opinions, and skills of the group	Appropriately completed the peer review following the checklist and appropriately contributed knowledge, opinions, and skills of the group	Inappropriately contributed to the peer review and ineffectively contributed to knowledge, opinions, and skills of the group

Appendix C

A Reflection for the Month of February in Language Arts

Name _____ Date _____

For the month of February I enjoyed working on…. because…

_____

_____

The following was easy/difficult because (circle which one).

_____

_____

In Language Arts, I have to work more at

_____

_____

_____

My objective in Language Arts for March is …

_____

_____

_____

February

Language Arts – Bridge to Terabithia novel study

(Biography, comprehension strategies, conferencing, character profile, digital photostory)

Learning

1. What do you like to do?

_____

_____

2. Explain what you find easy in regards to school work?

_____

_____

3. Describe what you find difficult in regards to school work?

_____

_____

4. What types of strategies do you use and find helpful in Language Arts?

_____

_____

Objectives

A) What are your goals for the upcoming year?

B) How are you going to attain your goals? (Strategies)

Language Arts

A)_____

_____

B)_____

_____

Appendix D

Peer Feedback Sheet – Mini Biography

Name

Name of your partner

Sentence Structure			
Criteria	**Yes**	**No**	**Constructive Feedback**
Variation of sentence beginnings			
Variety of sentence lengths			

✓ - Copy this check mark to indicate yes or no