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Relating Elementary Students' Process Portfolios to Writing Self-efficacy and Performance

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Abstract

Relating Elementary Students' Process Portfolios to Writing Self-efficacy and Performance

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Concordia University, 2010

Writing performance is essential for academic success at all levels. To help elementary school students become better and motivated writers, educators need to help them have functional writing self-efficacy beliefs that slightly exceed what a learner can actually accomplish. A suggested way to achieve this is having students create process portfolios to: a) document the writing process and their progress monitoring, b) have access to peers' work and c) receive feedback. This multiple case study explored the development of students' writing performance and writing self-efficacy beliefs through a one-academic-year implementation of process portfolios in three fourth grade elementary school classes (N=63 students) in Cyprus. The students of two fourth grade classes (n_2=23, n_3=20) created paper-based process portfolios, while in the researcher's class (n_1=20) students created digital portfolios. The study explored how process portfolio affordances, such as a process approach in writing, progress monitoring (goal setting, reflection, self-evaluation), access to peers' work and feedback related to students' writing performance and self-efficacy and how this relationship changed over time. It relied on a mixed method (quantitative and qualitative) research methodology comprised of pre- mid- and post- portfolio implementation students' writing performance and self-efficacy tests, teachers' and students' interviews on their perceptions of portfolios and a portfolio artifact analysis. While there is much to understand regarding the impact of portfolios on

students' writing performance and writing self-efficacy the results of this study produced several important findings and practical implications related to portfolio use and the added pedagogical benefits of portfolio affordances. The key findings revealed that students' writing performance increased over time. Learning gains were also found in students' ability to provide corrective feedback and constructive comments to their peers' work, to set goals, and to provide accurate self-evaluations of their work. Students' writing self-efficacy increased over time and became more accurate as it reflected students' actual performance by the end of portfolio implementation. Implications for practice and guidelines based on a bottom-up approach that could facilitate a large-scale implementation of digital and paper-based portfolios in Cyprus in the future are offered.

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CHAPTER 1: INTRODUCTION

In an article with the title: "How portfolios motivate reluctant writers", an elementary school teacher in the US demonstrated how personal portfolios made her fourth grade students in a writing pullout program want to write. She wanted her students to select and include samples of their work they felt good about, to gain ownership in the portfolio process and to evaluate their own work. By December students were enthusiastically creating their own writing portfolios, they were setting individual, specific goals, they were including rough and final drafts of writing projects and they were reflecting on their work. As this teacher reported, "students evaluated their progress each time they looked at previous rough drafts, held conferences with her, or participated in peer review. Gradually they developed the habits of reflecting on their learning and tracking their progress" (Frazier & Paulson, 1992, p.64). Portfolios were a means through which she could provide feedback, monitor their progress, and report to parents. Frazier (1992) reported that as the year progressed, students' confidence grew and portfolios offered students a way to take charge of their learning, encouraged ownership, pride, and high self-esteem. This case study represents a quintessential example of numerous anecdotal evidence, often merely based on teachers' observations, demonstrating the connection between the use of process portfolio as a pedagogical strategy and an improvement of elementary school students' writing performance and writing self-efficacy.

A process portfolio is "a systematic and organized collection of evidence used by the teacher and student to monitor growth of the student's knowledge, skills and attitudes" (Vavrus 1990, as cited by Cole, Ryan & Kick, 1995, p.9). It "contains work

that a learner has collected, reflected upon, selected, and presented to show growth and change over time" (Barrett, 2007, p.436). In the Language Arts curriculum in particular, writing portfolios have been widely used in the US K-12 context (Herman & Winters, 1994; Purves, 1996; Yancey & Weiser, 1997; Zubizarreta, 2004) as "a method, which focuses on process over product, often assessing the written proficiency over time," (Blair & Takayoshi, 1997, p.357). Process portfolio pedagogy is in accordance with the process approach to writing, a prominent paradigm for teaching writing in the United States, which emphasizes five stages: planning, drafting, revising, editing and sharing work with peers and the teacher (Harris, Graham & Mason, 2006; Wyatt & Looper, 1999). Ample empirical research including a meta-analysis synthesizing results from a number of studies, demonstrates the value of focusing on the writing process rather than simply the final product to help students of grade four and above become better writers (Graham, 2006, as cited in Harris et al., 2006).

According to the sociocognitive perspective, individuals are understood to possess self-beliefs that enable them to exercise a measure of control over their thoughts, feelings and actions. The focus on students' self-beliefs as a principal component of academic motivation is grounded on the assumption that the beliefs that the students create, develop and hold to be true about themselves are vital forces in their success or failure in school (Pajares, 2003). According to Pajares (2006), "to increase student achievement in school, educational efforts should focus on enhancing students' self-conceptions" (p. 344). One such self-belief that has high predictive power is self-efficacy. Self-efficacy refers to learners' beliefs about their capabilities to learn or perform behaviors at designated levels (Bandura, 1997) and it is context-specific. Empirical research has repeatedly

demonstrated that students with a strong sense of efficacy are motivated to engage in challenging tasks (Bandura & Schunk, 1981), invest greater effort in assigned tasks (Salomon, 1984), set higher goals (Schunk & Swartz, 1993), persist longer in the face of occasional setbacks (Lent, Brown & Larkin, 1984) and achieve at higher levels (Walker & Chapman, 2003) compared to those with low self-efficacy (as cited in Bong, 2006).

Writing performance is essential for students' academic success at all levels (Pajares, 2006). Students' writing self-efficacy, their beliefs about their capabilities to perform writing tasks at designated levels, is an important component. It affects students' motivation and academic achievement within the school environment (Horner & Shwery, 2002) as well as their lifelong learning and success in their future professional lives. With regard to writing self-efficacy beliefs and writing performance, research findings have consistently shown that they are related. Self-efficacy beliefs have a predictive and mediational role on writing performance (Jinks & Lorsbach, 2003; Pajares, 2003, Pajares & Valiante, 1997; Walker, 2003). To help elementary school students, especially low performers, become better writers, educators need to help them have accurate self-perceptions and functional writing self-efficacy beliefs that slightly exceed what a learner can actually accomplish, for this overestimation serves to increase effort and persistence (Pajares, 2006).

There is evidence to suggest the feasibility and effectiveness of early interventions and the importance of the teachers' role to increase students' self-efficacy beliefs (Mccann & Turner, 2004; Pajares, 2002; Schunk & Ertmer, 2000) as self-efficacy is thought to be a generative ability not a fixed trait (Bandura, 1997; Bong, 2006). To increase students' writing self-efficacy beliefs and consequently writing achievement in a

classroom context, according to one of the most prominent theories of self-efficacy (Bandura, 1997), it is important for students to have enactive *mastery experiences* that provide feedback on their own capabilities, *vicarious experiences* that provide comparative information about the attainment of others, and *verbal persuasion*, which provides learners with information about what others believe they are capable of doing. For young students, especially low performers, to have mastery experiences in the domain of writing, they need to be supported to focus on the process rather than the final outcome (Cole et al., 1995; Hebert, 1992), to realize that they are able to set goals (Bong, 2006) and monitor their progress in achieving them through reflection and self-evaluation (Pajares, 2002, 2006; Schunk, 2003). For students to have vicarious experiences, they need to be exposed to successful peer models in the domain of writing (Bottomley, Henk & Melnick, 1998, Sheingold & Frederiksen, 1994). Lastly, verbal persuasion refers to the encouraging feedback that the student receives from important people in his/her life such as the teacher, peers and parents on his/her work and progress (Pajares 2006, Walker, 2003), which positively affects his/her self-efficacy beliefs. Empirical research with very young children has already shown that even struggling writers in the 2nd grade can be taught how to engage in goal setting and self-monitoring (Harris et al., 2006) and that children as young as kindergarten through Grade 3 "can engage in self-regulatory behaviors, such as planning, monitoring...and evaluating, during complex reading and writing tasks" (Perry, VandeKamp, Mercer & Nordby, 2002, p.5).

Walker (2003) made an explicit suggestion that having students create their own process portfolios is a way teachers can use to help students strengthen their writing skills and their writing self-efficacy beliefs. Abrami and Barrett (2005) also saw this potential.

Madden (2007) also argued that if portfolios are used for formative assessment they have the potential to raise students' self-efficacy. As part of an intervention to raise writing self-efficacy beliefs, this study implemented process portfolios both in paper-based and digital format as a systematic way to help students place more emphasis on the learning process rather than the final outcome and engage in the processes of documenting their progress monitoring, goal setting, reflection and self-evaluation (mastery experiences). Moreover, process portfolios were used to allow students access to peer models (vicarious experiences) and help them share their work to receive constructive feedback and support (verbal persuasion).

Overall, empirical research involving student portfolios in K-12 has been scarce (Barrett, 2005; Herman & Winters, 1994). Research on student portfolios in elementary school (grades 1-6) has been anecdotal at best. It has been comprised predominantly of case studies, perceived rather than measured benefits in most cases and merely descriptions of the way a process portfolio was implemented in a school setting (Hansen, 1992; Hebert, 2001a, 2001b; Hetterscheidt, Pott, Russell & Tchang, 1992; Kankaanranta, 1996; Knight, 1992;). However, ample anecdotal evidence supports the value of the use of paper-based portfolios (Case, 1994; Martin Kniep, 2000; Paulson & Paulson, 1996a, 1996b) and digital portfolios (Campbell, 1996; Moersch & Fisher, 1996; Niguidula, 1997; Stefanakis, 2002; Wade, Abrami, White, Nicolaidou, & Morris, 2006; Wade, Sclater, Abrami, Therrien & Severgine, 2005) for students' performance in various subject-matters in elementary school (grades 1 to 6), including the writing domain in Language Arts. A very limited number of studies, however, provide empirical evidence for the value of portfolios for writing performance in elementary school (Reidel,

Tomaszewski &Weaver, 2003) or middle school (Underwood, 1998). Ample anecdotal evidence supports the value of the use of both paper-based and digital process portfolios in an elementary school setting on aspects related to students' writing self-efficacy (Frazier & Paulson, 1992; Hebert, 1992; Palmer Wolf, 1996; Robert, 1994; Reidel et al., 2003). No empirical evidence was found for the value of portfolios for writing self-efficacy.

Most studies regarding process portfolios for writing in elementary school were conducted in North America (US and Canada). Despite anecdotal evidence from North America that shows the value of using process portfolios in elementary school settings, little evidence, even anecdotal appears in other contexts. One example for which there is no evidence -anecdotal or otherwise - is the Greek-Cypriot educational context, where there has never been a published formal attempt to integrate students' process portfolios in elementary education. In addition to this, research on young students' writing self-efficacy beliefs has been limited (Pajares, 2003), as it mostly involved high school students and college undergraduates (Pajares &Valiante, 1997; Shell, Murphy & Bruning, 1989).

Until 2007, anecdotal evidence indicated that the process approach was not generally implemented at a great extent in Cyprus elementary schools, as it was not supported by either the Language Arts curriculum or the Language Arts textbooks assigned by the Ministry of Education. As the results of a pilot study with 11 teachers and 12 elementary school students indicated, even though teachers identified the value of working on drafts by recognizing that there was a tremendous value in those practices, common every-day practice referred to a single draft that was not re-visited by students,

because the time was inadequate and the pressure to cover subject matter was high (Nicolaidou & Strobel, 2007). One of the most common problems that students were facing in writing was that they were reluctant in re-reading their work. Regarding their practices, teachers reported that students used their feedback in various ways to improve their work, but generally, they were not using this feedback to incorporate it in a future version of their initial piece of work. Overall, teachers seemed to focus more on writing conventions, such as spelling or grammar usage and therefore instructional practices that promote the development of drafting and revising were largely ignored.

Statement of the Problem

Writing performance is essential for academic success at all levels. To help elementary school students, especially low performers, become better and motivated writers, educators need to help them have functional writing self-efficacy beliefs that slightly exceed what a learner can actually accomplish (Pajares, 2006). Based on Bandura's (1997) self-efficacy theory, a suggested way to achieve this is having students create digital process portfolios (Abrami & Barrett, 2005; Walker, 2003) to: a) document the writing process and their progress monitoring, b) have access to peer models and c) receive feedback. Though portfolios have been used in elementary education for decades, empirical research involving student portfolios in K-12 has been scarce (Barrett, 2005; Herman & Winters, 1994) and research on student portfolios in elementary school (grades 1-6) has been anecdotal at best. Furthermore, no empirical evidence exists for the value of portfolios for writing self-efficacy.

Despite limited anecdotal evidence from North America that shows the value of using process portfolios in elementary school settings, little evidence, even anecdotal appears in other contexts. One example for which there is no evidence -anecdotal or otherwise - is the Greek-Cypriot educational context, where there has never been a published formal attempt to integrate students' process portfolios in elementary education. In addition to this, research on young students' writing self-efficacy beliefs has been limited (Pajares, 2003), as it mostly involved high school students and college undergraduates (Pajares &Valiante, 1997; Shell et al., 1989).

This dissertation study explored the implementation of process portfolio pedagogy in Cyprus elementary education to support students' writing performance and

writing self-efficacy. The students of two fourth grade classes (n_2=23, n_3=20) created paper-based process portfolios, while at the same time, in the researcher's class (n_1=20), to take advantage of the added benefits of technology, digital over paper-based portfolios were used. Digital portfolios allowed for enhanced portfolio access by a greater number of people, easier modification of work, and easier communication between the students, their teacher and their parents (Ash, 2000; Barrett, 2008; Wade, Abrami & Sclater, 2005; Yancey & Weiser, 1997). As there are no portfolio tools available in the Greek language, Barrett's (2005) idea of using a weblog to support a learning portfolio was taken one step further in this study, as a generic, open source weblog tool was transformed and localized into Greek to be used *as* a digital portfolio tool (Strobel & Nicolaidou, 2006). This digital process portfolio (set up in Greek through WordPress) was integrated into the Language Arts curriculum in a Cyprus elementary school class for one academic year (September 2007-June 2008) in grade four. Students were able to access the tool in the classroom or at home to: a) document and monitor progress by setting their own goals for writing, uploading versions of writing pieces that they could create and edit with a text-editor as well as reflect on those artifacts and conduct self-evaluation, b) have access to peers' portfolios that could be used as a model, and c) receive feedback from people with whom they shared their work, such as teachers, peers and parents. This research study focused on well-structured genres of writing that were instructed in elementary school, such as narrative writing, descriptive writing, letter and article writing (Iordanidou, Anastasopoulou, Galanopoulos, Kotta & Chalikias, 2005, p. 26-27). The objectives of the intervention were in accordance with recent changes in the Language Arts curriculum in

Cyprus and with recently published Language Arts books (2006) that promoted a process approach in writing and supported students' self-evaluation and peer feedback.

Purpose of the Study

The results of this study will contribute to our knowledge of process portfolio pedagogy, especially in terms of its implementation and impact on elementary school students' writing performance and writing self-efficacy. It is the goal of this research to provide empirical evidence for the potential value of both paper-based and digital process portfolios for fourth grade students in the domain of essay writing and to gain an understanding of the relationship between: a) the three main sources of young students' writing self-efficacy: mastery experiences, vicarious experiences and verbal persuasion, and b) portfolio affordances: such as peer and teacher feedback and progress monitoring through goal setting, self-evaluation and reflection.

Research Questions

This study explored the connection between students': a) process portfolios for progress monitoring (goal setting, reflection, self-evaluation) and feedback, b) writing performance and c) writing self-efficacy. It attempted to answer the following questions:

1. How are process portfolio affordances, such as peer and teacher feedback and progress monitoring (self-evaluation, goal setting, reflection) related to elementary school students' writing performance, over time?

2. How does elementary school students' writing self-efficacy change with the use of process portfolio pedagogy that supports a process approach in writing, progress monitoring (self-evaluation, goal setting), access to peers' work and feedback?

3. a) What are the benefits and obstacles of process portfolio pedagogy and of developing process portfolios as perceived by elementary school teachers?

b) What are perceived benefits and obstacles to implementing digital portfolios as perceived by elementary school students and how can they be overcome?

Definitions of Terms

The most important terms that this dissertation focuses on are briefly defined below.

Students' writing performance.

Students' writing performance is defined as fourth grade students' ability to write a structured, well-organized essay (descriptive, narrative, letter or article) to develop their ideas in distinct paragraphs using correct grammar, spelling, punctuation and accentuation.

Students writing self-efficacy.

The term "writing self-efficacy" and "writing self-efficacy beliefs" are used interchangeably to refer to fourth grade elementary school students' judgments of their capability to accomplish a well-structured writing task at designated levels.

Students' process portfolios.

In this study, the terms "portfolio", "process portfolio", "writing portfolio" and "process portfolio pedagogy" are used interchangeably to refer to the pedagogical strategy of having students create their own portfolios whereas the terms "portfolio tool" and "digital portfolio" are used interchangeably to refer to the medium for delivering the strategy. The term "process portfolio" in the context of this study refers to either a digital or paper-based collection of student essays that demonstrates the student's progress and

integrates key-elements such as goal-setting, self-evaluation, self-reflection, multiple drafts and students' receiving feedback on their work. In the literature, "process portfolios" are used synonymously with "progress portfolios", "learning portfolios", "growth portfolios", "developmental portfolios" and "educational portfolios".

Portfolio components.

Students' peer feedback.

Students' peer feedback is defined as the corrections and/or general comments that students provided to their peers' work. Student feedback to peers came as a result of them being paired up by the teacher to share their work in class. Students provided either direct corrective feedback or indirect corrective feedback to their peers, based on a feedback code sheet. Direct corrective feedback took the form of identifying both the error and providing the correct form. Indirect corrective feedback consisted of an indication of the error and its category (Beuningen, Jong, & Kuiken, 2008).

Teachers' feedback.

Teacher feedback is defined as the corrections and/or detailed remarks comprised of both positive comments and constructive comments that teachers provided to students' work. Teachers provided mostly indirect corrective feedback.

Students' self-evaluation of writing.

Students' self-evaluation of writing is defined as students' decision making as to whether each one of a number of given criteria was achieved in each writing piece.

Criteria include aspects of writing such as spelling, punctuation, accentuation, content and structure.

Students' goal-setting.

Goal setting is defined as students' attempt to describe one to four specific areas where improvement was needed either for the writing of their next piece or for their subsequent writing pieces. In many cases it came as a result of students' self-evaluation, through which weaknesses were made explicit.

Students' reflection.

Self-reflection is defined as students' attempt to revisit their writing piece and provide an answer to two prompts: a)What did you like best about your essay? What could you have improved on the next draft?

Process approach in writing.

A process approach in writing has an emphasis on process, setting up a classroom routine wherein students are expected to plan, draft, revise, edit, and publish their work and where students share in-progress and completed work with their peers and teacher.

CHAPTER 2: LITERATURE REVIEW

The chapter argues that there is a connection between process portfolios, writing self-efficacy and writing performance. The first section, **Importance of Self-efficacy,** defines the construct of students' writing self-efficacy, explains its mediational influence on writing performance and argues that interventions to raise it at an early age are both feasible and important. It concludes with the suggestion that process portfolio pedagogy can be used to raise students' writing self-efficacy in elementary school. The second section, **Process Portfolio Pedagogy,** describes the fundamental characteristics of process portfolios, the added advantages of digital portfolios, and portfolios' perceived benefits. It concludes with empirical and anecdotal research on the value of both paper-based and digital portfolios in elementary school, with an emphasis on writing performance and writing self-efficacy. The third section, **Connection of Process Portfolio Pedagogy, Writing Performance and Writing Self-efficacy,** explains the rationale behind the research problem of the study based on theory and empirical research. The fourth section, **Context of the Study,** presents the results of a pilot study with elementary school teachers and students in Cyprus with regard to their writing self-efficacy related practices such as: progress monitoring through goal setting, reflection and self-evaluation, and feedback in the context of writing in Language Arts.

Importance of Self-efficacy

According to the sociocognitive perspective, individuals are understood to possess self-beliefs that enable them to exercise a measure of control over their thoughts, feelings

and actions. The focus on students' self-beliefs as a principal component of academic motivation is grounded on the assumption that the beliefs that the students create, develop and hold to be true about themselves are vital forces in their success or failure in school (Pajares, 2003). One such self-belief that has high predictive power is self-efficacy. As already defined in the introduction, self-efficacy refers to learners' beliefs about their capabilities to learn or perform behaviors at designated levels (Bandura, 1997) and it is context-specific.

Bong (2006) explains that self-efficacy is often inappropriately equated with other constructs referring to the self that have existed longer in the literature. One such construct is self-esteem, which refers to one's evaluative orientations toward the self and represents a person's "general sense of worth and overall feelings of adequacy across different areas in life" (p.288). Self-efficacy is also distinguished from outcome expectancies, as the latter are "beliefs about contingent relations between successful task performance and received outcomes" (Shell et al., 1989, p.91). Self-concept is another construct frequently confused with self-efficacy. It refers to "a person's perception of himself formed through experiences with the environment and influenced by environmental reinforcements and significant others" (Bong, 2006, p.289). Self-efficacy is furthermore distinguished from self-knowledge (Cervone, Mor, Orom, Shadel & Scott, 2004, 2004). The most fundamental difference between self-efficacy and other self-referent beliefs is that self-efficacy beliefs represent context-specific judgments of confidence. Distinctive attributes of self-efficacy are its context specificity and generative nature as a predictive construct. Self-efficacy is considered "superior to other self-

referent constructs in predicting achievement outcomes because efficacy beliefs are judgments of capability tailored to a specific outcome" (Bong, 2006, p.295).

It has been repeatedly demonstrated that students with a strong sense of efficacy are motivated to engage in challenging tasks (Bandura & Schunk, 1981), invest greater effort in assigned tasks (Salomon, 1984), set higher goals (Schunk & Swartz, 1993), persist longer in the face of occasional setbacks (Lent, Brown & Larkin, 1984), express lower levels of anxiety (Bandura, Pastorelli, Barbaranelli & Caprara, 1999), use more effective learning strategies (Zimmerman & Kitsantas, 1999) and achieve at higher levels (Walker & Chapman, 2003) compared to those with low self-efficacy (as cited in Bong, 2006). "Some self-efficacy researchers have suggested that teachers and parents should pay as much attention to young people's self-efficacy beliefs as to actual competence, for research findings have demonstrated that the beliefs are better predictors of motivation and future academic choices and career decisions than are factors such as preparation, knowledge, competence, or interest" (Pajares, 2006, p.353). Pajares (2006) argued that "when low self-efficacy is identified early, youngsters can be helped to develop a better understanding of their potential to succeed...and identifying, challenging and altering low self-efficacy is essential to success and adaptive functioning" (p.355).

Higher self-efficacy perceptions generally promote superior achievement, but the relationship between the two seems to be reciprocal. "The influence of self-efficacy appraisals on subsequent behavior is well documented. This includes not only correlational data but also studies that manipulated self-efficacy experimentally or that related self-efficacy perceptions to future performance, while statistically controlling for the effects of past performance (Cervone, et al., 2004, p.192). Over the last two decades,

there have been enough empirical studies to allow for a meta-analysis of research on the relationship between self-efficacy beliefs and achievement outcomes, prompting researchers to conclude that "self-efficacy has proven to be a more consistent predictor of behavioral outcomes than have other self-beliefs" (Pajares, 2003, p.141). In fact "self-efficacy explains approximately 25% of the variance in the prediction of academic performances", therefore it is a psychological factor that merits attention (Pajares, 2006, p. 343). Empirical research with school-aged students, conducted mostly in the US, demonstrated that students' self-efficacy beliefs are essential because they influence their achievement in school (Cervone, et al, 2004; Horner & Shwery, 2002; Schunk, 2003; Schunk & Ertmer, 2000,), effective self-regulation (Schunk & Ertmer, 2000, p.632; Zeidner, Boekarts & Pintrich, 2000, p.754) and motivation (Horner & Shwery, 2002; Martinez-Pons, 2002; Winne & Perry, 2000).

In the domain of writing, writing self-efficacy refers to learners' beliefs about their capabilities to perform writing tasks at designated levels. Referring to self-efficacy for reading and writing in particular, Jinks and Lorsbach (2003) argued that "in the last two decades, self-efficacy has become a well-defined concept that is supported by a growing body of research and that can be a powerful tool for educators to meet the learning needs of students" (p.117). As Pajares and Valiante (1997) put it: " believing that they are capable writers...will serve students well when attempting an essay, not because the belief itself increases writing competence, but because it helps create greater interest in writing, more sustained effort, and greater perseverance and resiliency when obstacles get in the way of the task" (p.1). With regard to writing self-efficacy beliefs and writing performance in particular, research findings have consistently shown that they are

related. Self-efficacy beliefs have a predictive and mediational role on writing performance. Jinks and Lorsbach (2003) stated that "self-efficacy belief is one of the most powerful perceptions that predict performance" (p.115). Walker (2003) also agrees that research clearly shows that self-efficacy is related to reading and writing achievement and presents "a compelling case for understanding motivation and particularly self-efficacy when engaging students in literacy activities" (p.173). In a number of studies where participants were students from elementary school to college, self-efficacy was a significant predictor of performance (Pajares, 2003). "Regression analyses have been accompanied by path analyses that provide information about direct and indirect effects of belief on performance. In general, results reveal that writing self-efficacy makes an independent contribution to the prediction of writing outcomes and plays the mediational role that social cognitive theorists hypothesize. This is the case even when powerful covariates, such as writing aptitude or previous writing performance are included in statistical models" (Pajares, 2003, p.144). Pajares and Valiante (1997) for example, demonstrated that writing self-efficacy beliefs made an independent contribution to the prediction of essay writing performance of 218 fifth grade students. The same result was formerly demonstrated with 181 9^{th} grade students (Pajares & Johnson, 1996). Reported research was conducted mostly in the US.

Self-efficacy is thought to be a generative ability not a fixed trait (Bandura, 1997) and it is considered "relatively more malleable than are other trait-like perceptions" (Bong, 2006, p.300). According to Bandura (1997, 2006), there are four principal sources by which people gain information to influence their self-efficacy beliefs. These should be considered in designing an intervention to raise self-efficacy. Learners obtain information

to appraise their self-efficacy from their actual performances (enactive mastery experiences), vicarious (observational) experiences, forms of persuasion and physiological reactions (Schunk, 2003). There is evidence to suggest the importance of early interventions and the importance of the teachers' role to increase students' self-efficacy beliefs (Mccann & Turner, 2004; Pajares, 2002; Schunk & Ertmer, 2000). Bong (2006) argued that "numerous experiments with academically challenged students have demonstrated clearly the modifiable nature of self-efficacy as a consequence of successful instructional interventions. Relatively simple teaching procedures such as modeling, goal setting, and attributional feedback are able to enhance students' self-efficacy in a fairly short period of time" (p.301). "Educators face the critical challenge of making their students' positive self-beliefs automatic and habitual as early as possible, and teachers are influential in helping students develop the self-belief habits that will serve them throughout their lives" (Pajares, 2000, p.121). Mccann and Turner (2004) also agreed that the interactions, support and instruction students receive in their early lives are very important, as their growing sense of self, such as their self-efficacy, are shaped through these experiences.

With regard to writing self-efficacy in particular, empirical research by Graham and Harris (1989) with school-aged students with learning disabilities showed that teaching them a strategy for writing essays and stories using "student self-monitoring of their writing performance (checking on their progress) and self-evaluation of their progress by comparing goals with their achievement" improved their self-efficacy and composition (cited in Schunk, 2003, p.168). A recent empirical study by Garcia, Caso, Coco, Robledo and Alvarez (2009) showed that enhancing the writing self-efficacy of 40

fifth and sixth grade Spanish students with learning disabilities, based on Bandura's (1997) four sources of self-efficacy led to significant improvement of their writing products with regard to structure, coherence and quality.

Walker (2003) made an explicit connection between process portfolios and writing self-efficacy, based on a review of research focusing on students' writing self-efficacy beliefs. She suggested that teachers could use portfolios to help students evaluate their success on various activities and show them their progress over time and as a way to de-emphasize grades and a performance orientation:

> *"Creating a literacy portfolio can help students assess their literacy, allowing them to identify their strengths and what they know. As teachers and students discuss progress, students choose what is included in their literacy portfolio. Students revisit their work, discussing things that they did well, contributing to building confidence in their reading and writing. This rethinking of the learning process involves students in evaluating their learning and establishing future goals for learning rather than performance. They select artifacts or pieces of work that demonstrate what they know and can do. Along with deciding what to put in the portfolio, students write a reflection statement explaining what the artifact demonstrates about their reading and writing. This description of what the artifact represents and why it was selected is attached to the piece of work. Portfolios give students the opportunity to share their successes and talk about their literacy. Teachers and students focus on strengths and students define their successes, thus cultivating self-efficacy" (p.184).*

One of the most important affordances of portfolios is that they show student progress because they track performance over time (Abrami & Barrett, 2005). According to Abrami and Barrett (2005), "process portfolios are expected to have positive effects on attitudinal, motivational, and affective outcomes...and potentially increase intrinsic interest. Since the learner controls the construction of a portfolio and learning is student-centered, there are concomitant benefits to self-efficacy beliefs" (p.6). As Wyatt and Looper (1999) elaborate, "one of the most interesting factors with the developmental portfolio (term used synonymously with the process portfolio), is that if students preparing such portfolios see growth for themselves, they can take a great deal of pride in the ownership of their work...it is a reinforcement in their own minds of what they have

accomplished. If they have that reinforcement and have shown growth, then self-esteem builds and even the most developmentally slow student can show movement by showing improvement from piece to piece"(p.14).

Process Portfolio Pedagogy

Process portfolio pedagogy has been in existence in education since the early 1990s. There are different types of student created portfolios in K-12. The literature differentiates between two main types of portfolios: showcase (best work) and process (progress) (Nitko, 2001). In the first case the emphasis is on the outcome, in the second the emphasis is on the process. A showcase portfolio focuses on final accomplishments. In contrast, a process portfolio is defined as "a systematic and organized collection of evidence used by the teacher and student to monitor growth of the student's knowledge, skills and attitudes" (Vavrus 1990, as cited by Cole et al., 1995, p.9). Herman, Gearhart and Baker (1993) referred to progress portfolios as the ones that include responses to similar assignments from at least two points in time. Nitko (2001) explained that "a progress portfolio is used "to monitor a student's learning and thinking process, to diagnose learning and thinking difficulties, and to guide new learning and thinking" (p.257).

Either in paper-based format or digital format, a process portfolio pedagogy is student-centered, focuses on students` progress and supports an environment of goal setting, reflection, self-evaluation and collaboration and feedback. Cole et al. (1995) emphasized the student-centered nature of the process portfolio when they stated that "students must feel ownership of the portfolio, so they need to have decision-making power about the selected artifacts" (p.9). The student plays "a significant role in deciding

what should be included in the portfolio and learns to use it to understand and evaluate her own progress" (Nitko, 2001, p.257).

Blackburn and Hakel (2006) recommended that electronic portfolios provide the means for students to set learning goals and to monitor and regulate their progress toward those goals. They therefore argued that for an electronic portfolio to become an effective learning tool its design should explicitly include a goal setting element. Melograno (1994) argues that portfolios engage students in goal setting and should be linked to established learning goals. Wyatt and Looper (1999) explained the role of goal setting in the portfolio process and argued that if a teacher points out the value of goal setting before the artifact is accumulated, the students will more effectively search for or prepare their artifacts for their portfolios.

Reflection is one of the critical characteristics of portfolios (Ash, 2000; Mills-Courts & Amiran, 1991; Wyatt & Looper, 1999). As Zubizarreta (2004) put it: "it would be difficult today to find a portfolio system that does not incorporate some element of critical reflection, even if the reflection amounts to the most rudimentary and form-generated statements about individual exhibits collected in a portfolio" (p.5). "The durable value of portfolios in improving student learning resides in engaging students...in addressing vital reflective questions" (p.8), such as: what have I learned? Why? When? In what circumstances? Under what conditions? As Barrett (2007) explained, as used in the K-12 classroom, portfolios support reflection that can help students understand their own learning and provide a richer picture of student work to document growth over time" (p.436). Very little empirical research focused on reflection in elementary school portfolios. McLeod and Vasinda (2009) used a design-based

research approach to examine the electronic portfolios created by third and fourth grade students, and found that those students learned to reflect constructively on their work or on themselves as learners as a result of the portfolio process.

Those students created "learner's philosophy statements", which were "statements that guided them to reflect on themselves as a learner, how they learned best and what helped them most while learning" (p.31). Another innovation in that study was that auditory reflections were used instead of written reflections. Students were guided through the reflective process using an interview protocol to conduct peer-to-peer interviews which were digitally recorded using Personal Digital Assistants (PDAs). Students read their learner's philosophy statement immediately prior to their interviews to help them remember and reflect more deeply. Based on a content analysis of the podcasts of each electronic portfolio, the researchers concluded that students' skills in reflection improved. During the first six weeks, only 30% of student reflections were coded as "reflective", whereas during the second six weeks, half of the students were coded as "reflective". This showed that students' reflections progressed significantly over time.

Moreover, a process portfolio "should support an environment of...collaboration" (Barrett, 2005, p.14) and feedback (Butler, 2006). Process portfolios support a form of collaboration through inviting comments from people they are shared with or shown to, such as teachers, peers or parents (Sugiyama, Kakehi, Kura, & Takahashi, 2002). Students can clearly benefit from receiving feedback from multiple sources on their performance (Paris & Ayres, 1999, p.12). Empirical studies on peer feedback as an instructional strategy to affect students' writing showed that peer feedback can be

valuable for increasing students' writing performance (Althauser & Darnall, 2001, as cited in Gennip, Segers & Tillema, 2009; Lane & Potter, 1998; Olson, 1990). A study that focused on elementary school, which was conducted with sixth-graders showed that peer feedback helped students write superior rough drafts. Ninety-six students of six intact sixth grade classes met with peer partners to respond to and revise rough drafts over a four and a half months of routine classroom conditions. The results showed that peer feedback had positive effects on students' writing in the genre of personal narrative writing (Olson, 1990).

In the Language Arts curriculum in particular, writing portfolios have been widely used in the US (Herman & Winters, 1994; Purves, 1996; Zubizarreta, 2004). "With the shift from product to process approaches in teaching writing has come the shift from indirect to direct procedures in evaluating writing ability. As a result, portfolios have become a widely accepted... method which focuses on process over product, often assessing the written proficiency over time" (Blair & Takayoshi, 1997, p.357). According to Wyatt and Looper (1999), when the writing portfolio was introduced in the English/Language Arts field, it became a huge success. At that time, around 1999, "the portfolio for assessment was dominant at basically all levels of English education from early elementary through higher education" (Wyatt & Looper, 1999, p.6). Writing portfolios, either in paper or electronic format, were seen as a way of "enhancement of performance through evaluative feedback and reflection" (Lucas, 1992, p.1).

With advancements in technology there has been an attempt to replace or complement paper-based portfolios with digital portfolios (Wyatt & Looper, 1999). In the early 1990s "the electronic portfolio, or e-portfolio, began to emerge as an evolution of

the traditional portfolio but taking advantage of the increasing availability of digital media" (Madden, 2007). Often, the terms "electronic portfolio" and "digital portfolio" are used interchangeably. However, Barrett (2000) made a distinction: an electronic portfolio contains artifacts that may be in analog, such as a videotape or in computer-readable form. In a digital portfolio, all artifacts are transformed into computer-readable form. With the exception of the fact that all artifacts are transformed into computer-readable form, nothing else differentiates a digital portfolio from a paper-based one with regard to the pedagogy. As Butler (2006) notes, the same thinking about purpose, pedagogy and assessment lies behind paper portfolios and electronic portfolios.

As compared with traditional paper-based portfolios, digital portfolios have several added advantages, such as an easier, even instant, access to students' work by a wider audience (Barrett, 2008; McLeod & Vasinda, 2009), and students' increased motivation through the use of technology. As Yancey and Weiser (1997) stated: "we do know that traditional portfolio projects encourage students to reflect on their learning, thereby giving them an opportunity to enhance their performance through evaluative feedback and review. Electronic portfolios have the added advantage of permitting students to share their work instantly with their instructors and other students...at any time of day or night, (to communicate) asynchronously with other writers...and to revise (their work)" (p.320). With regard to access to portfolios by a wider audience, "technology is especially useful for work-in-progress portfolios, if peers outside the classroom or school will critique the work and recommend revisions. An electronic format makes access much easier" (Ash, 2000, p.9). Wade, Abrami and Sclater (2005) agreed that student work becomes easy to share with peers, teachers, parents and others,

and lets students and others provide feedback through a single electronic container. Butler (2006) also agreed that "electronic portfolios facilitate the exchange of ideas and feedback" (p.11). With regard to increased motivation through the use of technology, "integrating technology into the learning process motivates students to reach their full potential" (Ash, 2000, p.10). According to Butler (2006), student "motivation can be encouraged through...public access to and recognition of students' work over the web" (p.15). In addition to this, "teachers who encourage students to use technology as a tool to process and demonstrate knowledge promote content learning and technological expertise" (Ash, 2000, p.13).

Additional added benefits of electronic portfolios over paper portfolios refer to maintenance, storage and cost. The documentation of the learning process can be done through a significantly easier modification of work. Butler (2006) argues that "electronic portfolios are easier to maintain, edit and update...they are easier to search and records can be simply retrieved, manipulated, refined and reorganized " (p.11-12). In addition to this, they are easy and efficient to store because they do not rely on large binders full of paper. They are also inexpensive to reproduce.

There are numerous perceived benefits of paper-based and digital portfolios in published research. According to Zubizarreta (2004), "electronic portfolios foster active learning, motivate students, are instruments of feedback, are instruments of discussion on student performance, exhibit benchmark performance, are accessible, can store multiple media, are easy to upgrade and allow cross-referencing of student work" (p.40). According to Wade et al. (2005) "digital portfolios provide an effective means for cataloguing...learning materials, better illustrating the process of learner development".

Additional advantages of portfolios are that they encourage students to better understand themselves and focus and reflect on their strengths, needs, errors, interests, challenges, and objectives and allow students to reflect on their procedures, strategies, and accomplishments so that they can improve and correct them and ultimately succeed (Abrami & Barrett, 2005).

With regard to Language Arts in particular, Blair and Takayoshi (1997) refer to several benefits of digital portfolios for student writers: they accommodate an expanded notion of literacy which incorporates words, images, graphics, sound, and motion, they allow and encourage myriad ways of organizing thinking and support pedagogical goals of students' control over the organization of their portfolios and the kind of metacognitive awareness often associated with the reflective material found in traditional writers' portofolios" (p.365). They also argue that "electronic portfolios may support and encourage the development of reflection and understanding in student writers about their writing processes, the relationship between the parts of those processes, and the fluidity of writing processes" (p.358).

Most research on the use of portfolio pedagogy in K-12, either implementing paper-based or digital portfolios, comes from the US context, and is anecdotal rather than empirical. Empirical research involving student portfolios in K-12 has been scarce (Barrett, 2005; Herman & Winters, 1994). Carney (2001) confirmed that the research literature on portfolios had not changed much since Herman & Winter's (1994) work (as cited in Barrett, 2007). What makes portfolio research challenging among other reasons is that "as used in K-12 classrooms, portfolios are less an instruction strategy to be researched and more a means to an end" (Barrett, 2007, p.436). Research involving

student portfolios in elementary school (grades 1-6) has predominantly been comprised of case studies, perceived rather than measured benefits in most cases and merely descriptions of the way a process portfolio was implemented in a school setting (Hansen, 1992; Hebert, 2001a, 2001b; Hetterscheidt et al., 1992; Kankaanranta, 1996; Knight, 1992;). Ample anecdotal evidence supports the value of the use of paper-based portfolios (Case 1994; Martin Kniep, 2000; Paulson & Paulson, 1996a, 1996b) and digital portfolios (Campbell, 1996; McLeod & Vasinda, 2009; Moersch & Fisher, 1996; Niguidula, 1997; Stefanakis, 2002; Wade et al., 2005; Wade et al., 2006) for students' performance in various subject-matters in elementary school (grades 1 to 6), including Language Arts and writing performance.

A very limited number of studies provide empirical evidence for the value of portfolios for writing performance in elementary school (Reidel et al., 2003), or middle school (Underwood, 1998). Using a pre-test post-test case study design, Reidel et al. (2003) found an increase in reading comprehension and writing skills and increased confidence and motivation of fifth grade elementary school students who were using process portfolios. In the middle school context, conducting one of the few quasi-experiments in Language Arts portfolio assessment and comparing a portfolio group with a control group in middle school, Underwood (1998) found a significant effect on reading achievement and motivational goal orientation in favor of the portfolio group but no significant effect on writing achievement.

Ample anecdotal evidence supports the value of the use of both paper-based and digital process portfolios in an elementary school setting on aspects related to students' writing self-efficacy. Based on teachers' observations and reports, paper portfolios had an

effect on 1st-6th grade elementary school student's writing self-efficacy (Hebert, 1992; Robert, 1994), on fourth grade elementary school student's writing self-efficacy (Frazier & Paulson, 1992) on fifth grade students' writing self-efficacy (Reidel et al., 2003) and on 8th grade students' writing self-efficacy (Palmer Wolf, 1996). No empirical evidence was found for the value of portfolios for writing self-efficacy.

Connection of Process Portfolio Pedagogy, Writing Performance and Writing Self-efficacy

Mastery experiences relate to a process approach in writing and progress monitoring.

There are four principal sources by which people gain information to influence their self-efficacy beliefs according to Bandura (1997, 2006). Learners obtain information to appraise their self-efficacy from their actual performances, vicarious (observational) experiences, forms of persuasion and physiological reactions (Schunk, 2003). The first and most important source of self-efficacy, refers to enactive mastery experiences that provide feedback on learners' own capabilities. Students' own performances offer reliable guides for assessing efficacy. In general, successes raise self-efficacy and failures lower it (Schunk, 2003). Two components identified in research studies on the first source of self-efficacy directly relate to helping students realize their mastery experiences in writing: a) a process approach in writing and b) progress monitoring through goal setting, reflection and self-evaluation. Both of these components are supported by process portfolio pedagogy.

For young students, especially low performers, to have mastery experiences in the domain of writing, they need to be supported to reflect on the process rather than focus

on the final outcome (Cole et al., 1995; Hebert, 1992), hence a process approach in writing is preferred over a product approach at the elementary school level. According to Pajares (2003), writing programs that focus on a process approach in writing endeavor to build students' sense of efficacy in writing based on the belief that confidence is essential to skill improvement.

However, the process approach in writing is not only associated with strengthening children's self-efficacy beliefs. It is also associated with writing performance gains in elementary school (Anderson & Speck, 2001). There is an extensive body of research on the writing process in elementary school and different approaches to writing instruction, such as the product approach, the process approach and the genre approach (Caudery, 1997; Samway, 2006; White & Arndt, 1991), to name a few. According to Caudery (1997), the "process approach", otherwise known as "process writing" is a set of ideas about writing and how it should be taught that developed as a reaction to "traditional" types of writing teaching, which tended to be formulaic and model-based. According to this approach, there is "an emphasis on process...setting up a classroom routine wherein students are expected to plan, draft, revise, edit, and publish their work...(and where) students share in progress and completed work with peers and conference with the teacher and classmates about their writing" (Harris et al., 2006, p.300). There are different components of the process approach in writing suggested by various researchers, but the most typical ones include: prewriting, composing or writing, revising, editing, sharing, evaluating and publishing (Gunn, 1991, p.45). According to Ritter (1991), "the process approach to teaching writing encourages students to continually review their writing and revise as necessary. (Moreover), peer conferencing is

thought to be an established method for facilitating revision" (p.14). The process approach to writing is among the prominent paradigms for teaching writing in elementary school in the United States (Harris et al., 2006).

According to Gunn (1991), approaching writing instruction with an emphasis on the process of writing rather than the final product from the student is supported by research in composition that revealed that "teaching writing as a process rather than a product develops students' writing skills more effectively" (p.46). Ample empirical research including a meta-analysis synthesizing results from a number of studies, demonstrates the value of focusing on the writing process rather than simply the final product to help students of grade four and above become better writers (Graham, 2006, as cited in Harris et al., 2006). Graham (2006) examined effect size for studies in which strategies for planning, revising, or both were explicitly taught to school-aged students of grade four and above. In terms of overall writing quality, mean effect sizes were 0.82 (based on 13 calculated effect sizes) for average writers and 1.15 (based on 9 calculated effect sizes) for above-average writers. This provides indirect evidence that process portfolio pedagogy that emphasizes revision can be beneficial. In the proposed study, portfolios as seen as a means to implement the process approach in writing.

Another important component that relates to the first source of self-efficacy is goal setting, the first part of progress monitoring. Students who are verbally encouraged to set their own goals experience increases in confidence, competence and commitment to attain those goals. More specifically, with regard to goal setting and its connection with self-efficacy, research points out that proximal goals are preferred over distal goals. According to Pajares (2000), studies tracing the relationship between academic self-

efficacy and goal setting have demonstrated that "self-efficacy and skill development are stronger in students who set proximal goals than in students who set distal goals" (p.117). "Proximal goals have the added benefit of raising self-efficacy. Not only do they make a task appear more manageable, but the more frequent feedback can convey a sense of mastery" (Pajares, 2006, p.357). Cervone, et al (2004) agree that "when people set proximal goals, they more quickly and frequently receive feedback on their progress; thus they tend to have higher self-efficacy perceptions and in turn higher interest in, and performance of, the activities at hand" (p.197).

Research also points out that learning goals are preferred over performance goals (Boekaerts & Niemivirta, 2000). Students who pursue a learning goal, as opposed to a performance goal, are apt to experience a sense of efficacy for attaining it and be motivated to engage in task-appropriate activities (Schunk & Ertmer, 2000). "Performance goals focus attention on completing tasks and may not...raise self-efficacy for learning" (Schunk & Ertmer, 2000, p. 641). Specific rather than general goals are also preferred. Goals that incorporate specific performance standards are more likely to enhance learning and activate self-evaluative reactions than are general goals. "Specific goals promote self-efficacy because it is relatively easy to evaluate progress toward an explicit goal" (Schunk, 2003, p.164).

Page-Voth and Graham (1999) researched the relationship between goal setting and writing performance as well as writing self-efficacy. Using an experimental design, they demonstrated that goal setting had an effect on the writing performance of 7th and 8th grade students with writing and learning disabilities. Papers written in response to goals were longer, included more supporting reasons and were qualitatively better than essays

written by students in the control conditions. According to Page-Voth and Graham (1999), even though previous studies (Cervone et al., 2004; Shunk, 1989, 1994) showed that feedback on goal setting can alter one's perceptions of efficacy, students in *their* study did not evidence any difference in their self-efficacy for writing opinion essays. The researchers justified this unexpected finding by explaining that a) there was not enough time for such effects to materialize as the study's duration was only two weeks, b) the correspondence between the selected goals and the items included in the self-efficacy scale was not high and c) the judgments of students with learning disabilities are inordinately high to begin with, limiting the possibility for an enhancement due to successful performance experiences.

Progress monitoring toward goal attainment can be achieved through processes of self-reflection and self-evaluation. As Schunk and Ertmer (2000) put it: "goals, self-monitoring and self-reflection affect self-efficacy" (p.638). According to those researchers, empirical studies showed that self-monitoring and external-monitoring conditions led to higher self-efficacy, persistence, and achievement compared with the no-monitoring condition. "Without monitoring children may be less certain about how well they are learning" (Schunk & Ertmer, 2000, p.641).

Harris et al. (2006) empirically demonstrated that it is beneficial to explicitly and systematically teach struggling writers specific strategies for carrying out writing processes, including self-regulatory procedures such as goal setting, self-monitoring and self-instruction. More specifically, in their study, students learned about elements of two genres, story writing and persuasive essays, set goals to include them in their papers, monitored their success in meeting the goal, and linked the inclusion of those elements to

use of the target strategies. Referring to literacy activities, Walker (2003) argues that "establishing goals and discussing progress toward the goals are important aspects of maintaining accurate self-attributions and improving self-efficacy" (p.175). "During periods of self-reflection, learners evaluate their progress by comparing their performances to their goals. Self-evaluations of progress enhance efficacy and maintain motivation. Learners may decide to continue pursuing their goals, modify them, or set new ones" (Schunk, 2003, p.162). "Goal progress and accomplishment convey to students that they are capable of performing well, which enhances self-efficacy for continued learning" (Schunk, 2003, p.160). Positive self-evaluations of one's capabilities and progress in skill acquisition raise self-efficacy and motivation because students believe they are learning and are capable of further progress (Schunk, 2003).

Regarding a connection of the writing self-efficacy literature and portfolios, process portfolio pedagogy encourages students to set their own goals and select artifacts that demonstrate their work towards these goals, in other words demonstrate mastery experiences. Portfolios are furthermore used for students to self-reflect on their learning and self-evaluate to identify strengths and weaknesses. As the whole learning process, from creating a draft to reaching a final version, is documented, progress monitoring is facilitated and mastery experiences become obvious to students.

Vicarious experiences relate to access to peers' work.

The second source of self-efficacy refers to vicarious experiences that provide comparative information about the attainment of others (peer models). Students who observe similar peers perform a task are apt to believe that they too, are capable of accomplishing it (Schunk, 2003). Vicarious experience also "involves the social

CHAPTER 3: METHODOLOGY

The following chapter outlines the methodology for this exploratory case study initializing process portfolio implementation in three fourth grade elementary school classes in Cyprus for one academic year. The first section, **Research Questions,** revisits the research questions the study attempts to answer and the second section, **Selection of a Research Method,** describes the multiple case study design. The next section describes the **Participants**. In the fourth section, **Research Setting,** the setting of the elementary school classrooms is described and information on the Cyprus Language Arts curriculum is provided. The **Portfolio Tool and Portfolio Implementation** section elaborates on the idea of using a weblog as a portfolio tool localized into Greek and describes the major components of portfolio implementation: peer and teacher feedback, self-evaluation, goal setting and reflection. **Conducting the Study** goes into the details of portfolio implementation and consists of six phases: Phase 1: Conducting Initial Assessments of Students' Writing Performance and Writing Self-efficacy, Phase 2: Introducing and Using Portfolios, Phase 3: Conducting an Interim Assessment of Writing Self-efficacy, Phase 4: Conducting Post-portfolio Implementation Assessment of Writing Performance, Writing Self-efficacy and Connection with Portfolios, and Phase 5: Conducting Post-portfolio Implementation Interviews with Teachers and Students. **Ensuring Methodological Rigor** addresses issues of credibility and trustworthiness and describes the pilot tests that preceded this study and consisted of the pilot testing of the portfolio tool and of the two instruments used to assess students' writing self-efficacy.

Research Questions

The following research questions guided an exploration into how process portfolio practices that support peer and teacher feedback, progress monitoring and a process approach in writing may relate to elementary school students' writing self-efficacy beliefs and writing performance.

1. How are process portfolio affordances, such as peer and teacher feedback and progress monitoring (self-evaluation, goal setting, reflection) related to elementary school students' writing performance, over time?

2. How does elementary school students' writing self-efficacy change with the use of process portfolio pedagogy that supports a process approach in writing, progress monitoring (self-evaluation, goal setting), access to peers' work and feedback?

3. a) What are the benefits and obstacles of process portfolio pedagogy and of developing process portfolios as perceived by elementary school teachers?

b) What are perceived benefits and obstacles to implementing digital portfolios as perceived by elementary school students and how can they be overcome?

Selection of a Research Method

As research on e-portfolios is not yet validated and they are not yet ready for extensive summative research (Carliner, 2005), a more modest, formative approach was selected, focusing on the exploration of relationships between process portfolio practices and students' writing self-efficacy and performance. The proposed research project was a collective case study, in the sense that it was "an in-depth exploration of a bounded process based on extensive data collection" (Creswell, 2005, p.439). The process that was

explored was process portfolio implementation in a Cyprus elementary school. A collective case study includes multiple cases, therefore it is commonly referred to as a multiple case study. The cases were three fourth grade elementary school classes. Classes consisted of the students and the teacher who was teaching Language Arts. "Bounded means that the case is separated out for research in terms of time, place, or some physical boundaries" (Creswell, 2005, p.439). Boundaries of time referred to one academic year (September 2007-June 2008), boundaries of place referred to Cyprus and physical boundaries referred mostly to elementary school classrooms, where most of the work was done. Even though digital portfolio implementation exceeded the boundaries of the classroom, as students' parents also had access to their work, those interactions were not analyzed as part of this dissertation.

Participants

The research study was conducted in a public elementary school in Limassol, the second major city of Cyprus. The participants of the study were three Greek-Cypriot elementary school Language Arts teachers (one of whom was the researcher) and their 70 fourth grade students (convenience sampling). The students' age ranged from nine to ten years old (M=9.45, SD=0.34). One class (n_1=24, 13 boys and 11 girls), which was taught by the researcher, used digital portfolios and two classes (n_2=24, 11 boys and 13 girls and n_3=22, 10 boys and 12 girls), taught by Teacher 2 and Teacher 3, respectively, used paper-based portfolios over one academic year that started on September 10th of 2007 and ended on June 20th of 2008. All students were Greek-Cypriots and had Greek as their first language. The vast majority of students came from families of middle to high socioeconomic level. The vast majority of students' parents had high-school or university

degrees and Greek as their first language, with a few exceptions where one of the two parents had English, Finish or Chinese as a first language.

In class 1, four boys developed portfolios but were excluded from the study. One of them had severe learning difficulties, another two were officially classified by the school as illiterate, their writing did not make sense and they were not able to understand instructions for completing the writing self-efficacy instruments and the fourth student joined the class mid-way through the implementation. Nineteen out of the twenty students who participated in the study from class 1 had a computer at home with internet access. In class 2, a boy who joined the class mid-way through the implementation was also excluded from the study. In class 3 two students, a boy and a girl, were excluded as they did not understand instructions for completing the writing self-efficacy instruments. Therefore, the total number of participants was 63 (for class 1: n_1=20, 9 boys and 11 girls, for class 2: n_2=23, 10 boys and 13 girls and for class 3: n_3=20, 9 boys and 11 girls).

The two teachers, both in their early thirties, were Elena for class 2 and Dora for class 3. Elena had ten years of teaching experience and Dora had nine. Both teachers had two years of experience in teaching Language Arts in the fourth grade. The researcher taught class 1 and had three years of teaching experience, all of which were in the fourth grade.

Consent forms were signed by teachers (appendix J) and students (appendix L) who volunteered to participate in the study. Students' parents also gave permission for their children to participate in the study by signing a consent form (appendix K). Participants were assured that any information they provided would remain confidential in the sense that neither their identity nor their school would be disclosed in a future publication of

the study. Pseudonyms were used instead of the real names of all participants. In general, the treatment of participants was in accordance with the ethical standards of the APA.

Research Setting

The research setting was an elementary school in Cyprus, to which the researcher had easy access through her role as a teacher and technology coordinator employed by that school. The school was equipped with a very small computer lab with four desktop computers with high speed (DSL) Internet access. The researcher's classroom (class 1) was equipped with two desktop computers with high speed (DSL) Internet access, while the two other classes (class 2 and 3) were equipped with one desktop computer each with the same type of internet access, which was almost never used.

Context of the study.

Language Arts is taught for twelve 40-minute-periods per week in the fourth grade of elementary school in Cyprus. A revised Language Arts curriculum and the newly published Language Arts textbooks that focused more on a process than a product approach in writing were put in effect in Cyprus elementary schools starting in 2006-2007, after a year of teacher-training (2005-2006) in grades 1, 3, 5 and 6 and beginning in 2007-2008 they were put in effect in all six grades. The new Language Arts curriculum was used in the fourth grade for the first time in 2007. A preliminary analysis of the Cyprus Language Arts curriculum and books identified that they supported the process approach in writing, as well as students' self-evaluation and peer feedback. The process approach in writing consisted of three main stages: a) the pre-writing stage that consisted of brainstorming for ideas and planning, b) the writing stage that referred to text generation, and c) the meta-writing stage that referred to processes of self-evaluation and

peer feedback. The emphasis was on the following instructed genres: narrative writing, descriptive writing, letter writing and article writing (Iordanidou et al, 2005). Methodological guidelines provided to teachers indicated that students should be encouraged to conduct a self-evaluation by considering a list of 11 criteria for the first draft of their writing piece with the aim of improving it. Some of those 11 criteria referred to processes of goal setting ("What was my goal? Did I achieve my goal?"), reflection ("What did I like most of what I wrote?", "What could I have written better?", "What could I have added or removed?"), and a general sense of self-evaluation ("Did I organize my piece in different paragraphs?", "How is the spelling?", "Did I use full-stops and commas correctly?") (Iordanidou et al, 2005, p.20). Peer evaluation was also supported as students were encouraged to share their writing pieces with their peers "to discuss what parts they liked and what parts they did not understand" (Intzides, Papadopoulos, Sioutis, & Tiktopoulou, 2005a, p. 18).

It is interesting to note that in the Teachers' Methodological Guidelines book for the 3rd grade there was a brief reference to portfolios through a suggestion for students to create Language Arts process portfolios. There was reference to portfolios as a way for students to show their progress in multiple aspects of writing, to self-evaluate, to identify their weaknesses and to conference with the teacher for setting their next goals (Intzides et al, 2005b, p.11-12). However this was not pursued further nor was there another reference to it in the students' books. Moreover, there was no reference to portfolios for grades 4, 5 and 6.

Pedagogical strategies such as teaching students the process approach in writing with an emphasis on the meta-writing stage, goal-setting, reflection, self-evaluation and

peer feedback were considered innovative by teachers in 2007, as they were implemented in the elementary school for the first time. These practices of the revised curriculum in Language Arts were introduced in schools through a top-down approach from the Ministry of Education in Greece to the Ministry of Education in Cyprus, to the inspectors of Language Arts and finally to the elementary school teachers and students. As such, they received strong support from the schools' headmasters and inspectors who promoted their implementation in schools. Seminars and workshops, as part of teachers' in-service training, were organized throughout the year for the discussion of these ideas and their practical implementation in class. Each teacher who taught Language Arts in the fourth grade, for example, was invited to participate to two three-hour seminars on the revised curriculum in the beginning of the academic year. As part of these seminars, about 60 teachers who taught fourth grade Language Arts in different schools of the same province were divided into groups of four to six to design one lesson plan for the revised curriculum that incorporated the three main stages of the process approach: a) the pre-writing stage, b) the writing stage, and c) the meta-writing stage. At the end of the two seminars all lesson plans were presented in front of the whole group of teachers, Language Arts coordinators and inspectors from the Ministry of Education and were disseminated to all participants. As a result teachers had about ten lesson plans to their disposal that they could use throughout the year.

Portfolio Tool and Portfolio Implementation

Portfolio Tool.

There are no portfolio tools available in the Greek language. Therefore, a weblog was used as a digital portfolio tool in Greek. A weblog (or blog) is an example of a

generic tool that can be used in different ways and has become popular over the past years. It is most commonly used as a web-based personal journal, consisting of an individual's postings arranged in reverse chronological order. A weblog can be defined as "an online site with time-dated postings, maintained by one or more posters, that features links and commentary" (Hewitt, 2005, p.192) and resembles a short-form journal (Blood, 2002). A weblog is viewed by Barrett (2005) as "another technology that has potential to make electronic portfolios more engaging" (p.22). In this study, Barrett's (2005) idea of using a weblog to support a learning portfolio was taken one step further as a generic, open source weblog tool (WordPress) was transformed and localized into Greek and was used *as* a digital portfolio tool (Strobel & Nicolaidou, 2006). This idea was practically explored by Chuang, Liu & Huang (2007) who modified WordPress to use it as a customized weblog-based e-portfolio platform for student teachers. The results of their formative and summative evaluation showed that building learning portfolios using the functions of a weblog was feasible.

From a practical standpoint, according to Zubizarreta (2004), what is needed to determine the way of administering an electronic portfolio system is "a database application that establishes an area for each student, stores various file formats, and allows for annotated comments appended to each item" (p.42). Another important characteristic refers to "security features and password protection, so that the privacy of portfolios is not compromised" (p.42). Lastly, "the interface including ease of use and appearance (should be) "friendly" and "appealing" to both the teacher and the students" (p.42). Most features currently implemented in digital portfolio tools can be supported in a weblog environment. All features identified by Zubizarreta (2004) as necessary in a

digital portfolio system are supported by the selected tool. More specifically, the web-based tool of WordPress allows for the creation of a database that establishes a personal space for each student. Any file format can be uploaded to each student's personal space, including text, audio and video. The capability to allow for annotated comments by registered users such as the learner himself, peers or parents is embedded in the system. In addition to this, the capability for the teacher to moderate comments coming from non-registered users is also feasible. Students can have password-protected personal work spaces to adhere to security standards. Additional examples of digital portfolio features that can be supported by weblogs are the following: providing access to the portfolio anytime anyplace, creating, editing and posting work with a text-editor, defining and revising goals, and linking reflections and goals to specific pieces of work.

In the present study, a weblog was set up through WordPress for the researcher's class (http://iolie.textdriven.com/class1/). The weblog included all students in the class as registered users and the teacher/researcher as the administrator of the system. Each student had an individual password-protected account, set up by the researcher, and a personal space, which will henceforth referred to as the student's portfolio. A student could access his/her portfolio by clicking on his/her name on the class' weblog. Therefore the class' weblog consisted of a collection of students' individual portfolios. Fig 1 shows a screen capture of a student's (Andreas') portfolio. The latest essay Andreas uploaded in his portfolio was an essay titled: "Our friendship" that he wrote in English with Theodor on May 7th 2008, as part of the learning English as a foreign language lesson. Note that this was the only piece in the student's portfolio written in English, as all other pieces were written in Greek.

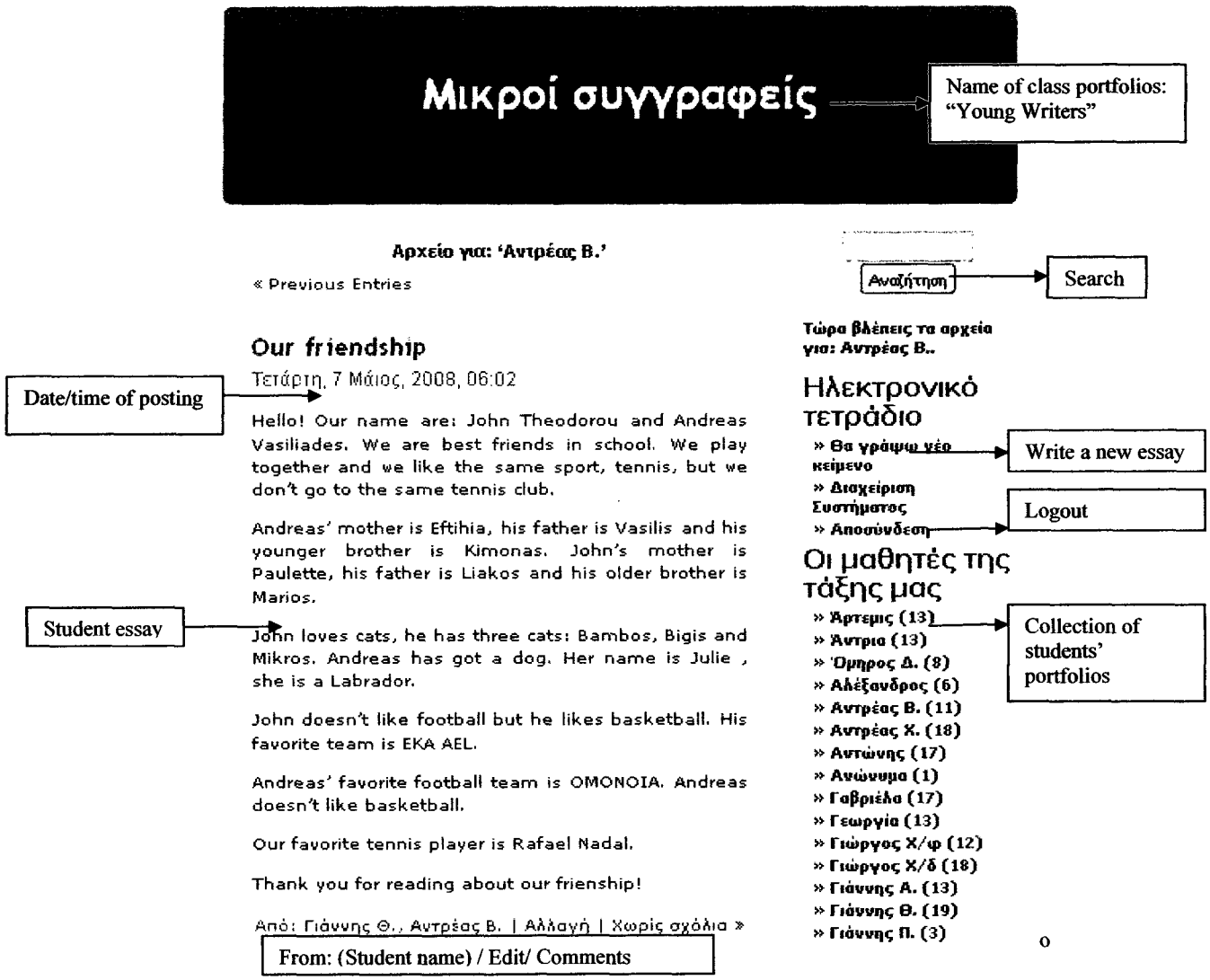

Figure 1. Screen capture of digital portfolio tool

When Andreas was logged in his portfolio, he had access to an "Edit" feature at the end of his posting, with which he could make changes to his work, and either "save and continue" or "save" his work (see Figure 2). Andreas also had to select his name

from a scrolling list of the names of the students in the class in order to have his posting appear in his own portfolio (see Figure 3).

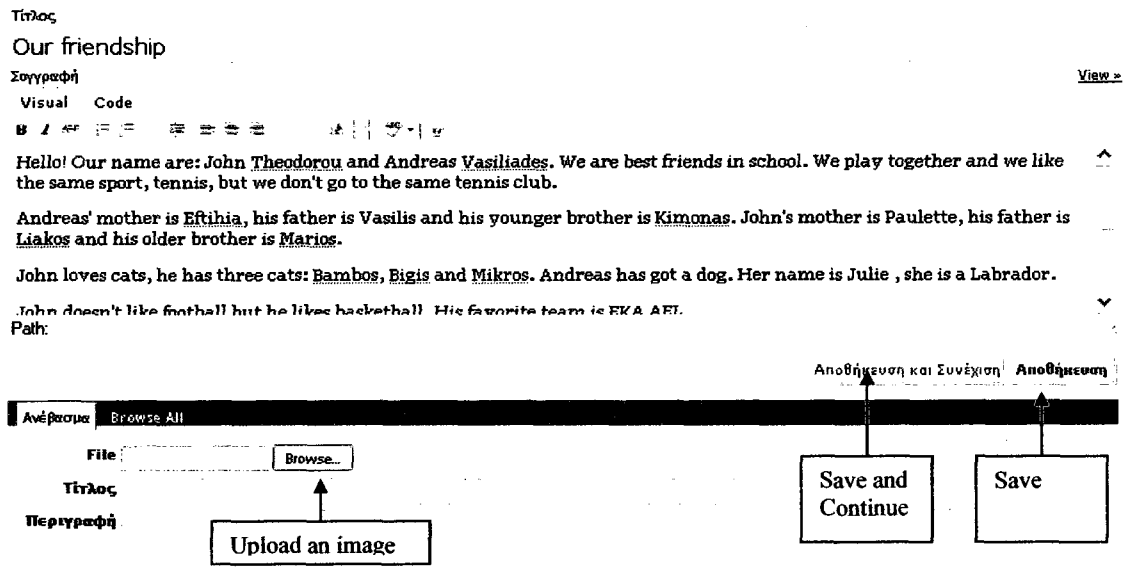

Figure 2. Screen capture of editing a piece in the digital portfolio tool

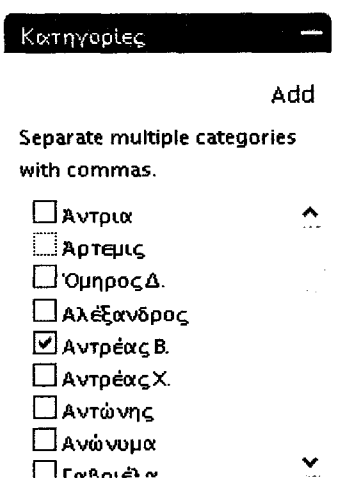

Figure 3. Screen capture of selecting a student's portfolio

When another student or the teacher was logged in he/she could click on "Comments" at the end of the posting (see Figure 1), to post a comment to Andreas' work (see Figure 4).

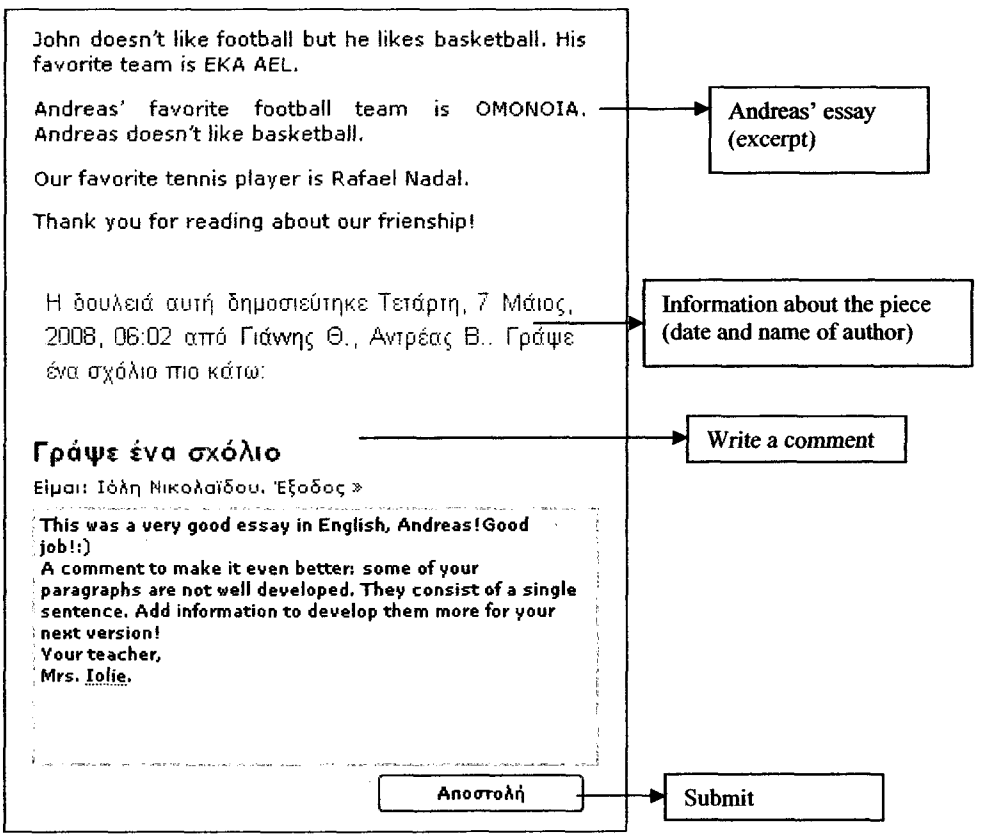

Figure 4. Screen capture of posting a comment to a student's portfolio work

Portfolio implementation.

Portfolio implementation was the same for paper-based and digital portfolio and it was guided by a structured approach aimed at raising students' writing performance and

their writing self-efficacy beliefs. Supporting paper-based learning materials, such as templates for scaffolding self-evaluation based on given criteria, templates for scaffolding goal setting, templates to facilitate providing peer feedback and prompts for self-reflection were developed in accordance with curriculum guidelines set in 2006 and were used in both paper-based and digital portfolios. Support structures were also built within the digital portfolio tool. They consisted of a combination of technical support: e.g. step-by-step directions on "how to write a new essay", and "how to add an image to your essay" and pedagogical support: e.g. "how to provide constructive feedback".

Students input their writing pieces in their portfolios throughout the academic year, shared their work with their peers and their teacher to receive feedback and incorporated that feedback to revise their piece in a second draft. Students then conducted a guided self-evaluation of their piece based on given criteria and a self-reflection, and also set goals for their writing. This procedure was repetitive for additional writing pieces. The portfolio implementation process, described in detail in the section "Conducting the study: Phase 2", included four important components:

a) Peer and teacher feedback.

Students' peer feedback.

Students' peer feedback is defined as the corrections and/or general comments that students provided to their peers' work. Student feedback to peers came as a result of them being paired up by the teacher to share their work in class. The corrections were based on a "feedback code sheet" using symbols (see Figure 5) and they were implemented in paper-based versions of students' essays. The general comments were

implemented in the digital version of peers' work. Students provided both direct and indirect corrective feedback, examples of which are provided in the following sections.

Following Gennip et al.'s (2009) interaction parameters about peer feedback, with respect to *directionality*, peer feedback was reciprocal, as peers worked in pairs to assess each other. With regard to *privacy*, peer feedback was public and with regard to *contact*, it was mostly provided face to face during class time, even though there were several cases in class 1 where students provided peer feedback at a distance through access to their peers' digital portolios.

Teachers' feedback.

Teachers' feedback is defined as the corrections and/or general comments, and the detailed remarks that teachers provided to their students' work. The corrections were based on a "feedback code sheet" using symbols (see Figure 5) and they were implemented in paper-based versions of students' essays (classes 1, 2 and 3). Teachers provided indirect corrective feedback. The general comments were implemented in the digital version of students' work. The detailed remarks were comprised of both positive comments and constructive comments and they were implemented in paper-based versions of students' essays (classes 2 and 3).

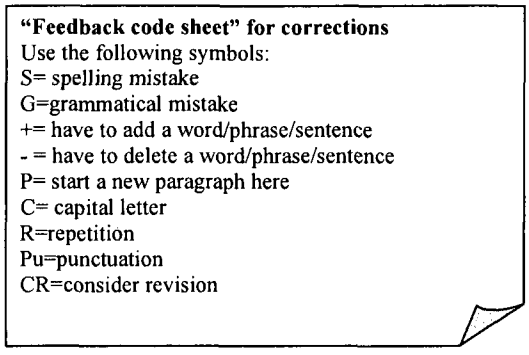

Figure 5. The "Feedback code sheet" used for peer and teacher feedback

For essay writing, students used a piece of paper that included two columns. They wrote the first draft of their essay on the left column, which was wider. The teacher indicated a peer with whom each student would share his/her work. The peer who would read this work would underline mistakes and provide his comments on the right column, which was narrower. Figure 6 shows an example of a student providing feedback to a peer's piece of work using the "feedback code sheet". In this example, the first student wrote the introductory paragraph in the left column. A second student commented on his writing in the right column. He first indicated that the first student should begin his writing in a new paragraph, by using the "P" symbol, which stands for paragraph. He then identified a grammatical mistake that he indicated using the "G" symbol. He used "C", which stands for capital letter to point out that first letter of the word "Skiathos", the name of a Greek island, should be capitalized. The last mistake was a spelling mistake of the word: "airplane" that was indicated with the use of the "S" symbol. It is important to note that students provided either direct corrective feedback or indirect corrective feedback to their peers. Direct corrective feedback took the form of identifying both the

error and providing the correct form. Indirect corrective feedback consisted of an indication of the error and its category (Beuningen et al., 2008). An example of direct corrective feedback is the word "airplane" as shown in Figure 6. An example of indirect corrective feedback in this case, would be to underline the misspelled word "aeroplane" in the text, to indicate the error and put an "S" to identify its category (spelling error).

Student's essay	Peer's comments
During the summer holidays I visited Greece with my family. We went to many island, such as Paros, Santorini and skiathos. My younger brother was afraid of the aeroplane.	P: make it into a new paragraph G: Many islands (plural) C: Skiathos S: airplane

Figure 6. Example from a student's work and a peer's corrections

The teacher then used a different color pencil to indicate her corrections, using the same "feedback code sheet" (see Figure 5). Teachers provided indirect corrective feedback.

b) Students' self-evaluation of writing.

Students' self-evaluation of writing is defined as students' decision making as to whether each one of 9 given criteria was achieved in each writing piece. Students indicated a "yes" or "no" for each criterion (see Figure 7).

Self-evaluation of essay

1. Did I organize my essay in paragraphs?
2. Is there an introduction, a main body and a conclusion in my essay?
3. Did I begin all sentences with a capital letter?
4. Did I accentuate all words?
5. Did I use adjectives and interesting expressions in my essay?
6. Did I check the spelling of difficult words?
7. Did I avoid repeating the same words?
8. Is my handwriting eligible?
9. Did I use punctuation correctly?

Figure 7. Guided self-evaluation of essay based on nine generic criteria

c) Students' goal-setting.

Goal setting is defined as students' attempt to describe one to four specific areas where improvement was needed either for the writing of their next piece or for their subsequent writing pieces. In many cases it came as a result of students' self-evaluation, through which weaknesses were made explicit.

d) Students' reflection.

Self-reflection is defined as students' attempt to revisit their writing piece and provide an answer to two prompts: a) What did you like best about your essay? and b) What can you improve on the next draft? (see Figure 8).

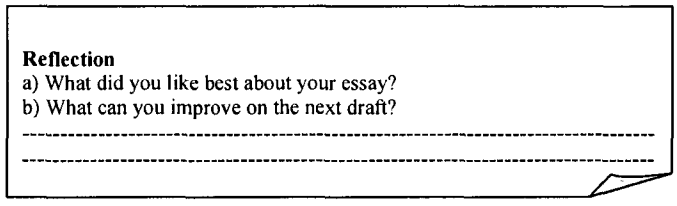

Figure 8. Students' prompts for self-reflection

Conducting the Study

Phase 1: Conducting Initial Assessments of Students' Writing Performance and Writing Self-efficacy.

Initial assessment of students' writing performance.

Students' writing performance is defined as students' ability to write a structured, well-organized essay (descriptive, narrative, letter or article) by developing their ideas in distinct paragraphs using correct grammar, spelling, punctuation and accentuation. It was

measured with a writing performance instrument for student-generated essays (appendix A) that was administered as a pre-test and a post-test.

All students were pre-tested with regard to their writing performance on September 10th 2007. Students were prompted to write an essay in the classroom in the beginning of the academic year, to introduce themselves. Students received some ideas on what could be included in the essay but received no further assistance in writing the essay and had 80 minutes available for the task (appendix A). The same activity was repeated as a post-test on June 12th 2008.

Students' writing performance pre-tests and post-tests were blindly scored based on an analytical rubric (appendix A). Interrater reliability was calculated and reported.

Initial assessment of students' writing self-efficacy.

Students were pre-tested with regard to their writing self-efficacy on September 24th 2007. Students' writing self-efficacy was measured in three ways:
a) Student Writing Self-Efficacy Instrument 1: the Writer Self-Perception Scale (WSPS) (appendix B), b) Student Writing Self-Efficacy Instrument 2: an instrument developed by Pajares, Hartley and Valiante (2001) (appendix C) and c) pre-portfolio implementation student semi-structured interviews with a selected sample of nine students(appendix F).

Semi-structured interviews with students were conducted with a small, random sample of nine class 1 students. The nine students were selected based on the results of the WSPS instrument administration, so as to include three students with low, three students with average and three students with high writing self-efficacy. Interviews were

conducted in the week following the instruments administration. All interviews were videotaped and transcribed in English.

Phase 2: Introducing and Using Portfolios.

Digital process portfolios (set up in Greek through WordPress) (n=20) and paper-based portfolios (n=44) were integrated into the Cyprus Language Arts curriculum in three fourth grade elementary school classrooms for the academic year starting in September 2007 and ending in June 2008. Portfolio implementation was guided by a structured approach aiming in raising students' writing performance and writing self-efficacy over three school terms: (a) September 6th to December 21st 2007, b) January 7th to April 19th 2008, c) May 5th -June 18th, 2008. The research study focused on well-structured genres of writing that were instructed in elementary school, such as narrative and descriptive writing, letter writing and article writing (Iordanidou et al., 2005). Students input their writing pieces in their portfolios, shared their work with their peers and their teacher to receive feedback and incorporated that feedback to revise their piece in a second draft. Students then conducted a guided self-evaluation of their piece based on nine given criteria and a self-reflection and also set goals for their writing. This procedure was repetitive for additional writing pieces. During the academic year students worked on eight or nine writing pieces: four narrative essays (E1: "My summer vacation", E5: "An accident I've had", E7: "The little olive tree and the lumberjack", E8: "The big, bad Red Riding Hood and the nice Wolf"), three descriptive essays (E2: "My school", E3: "A breathtaking scenery", E9: "My favorite pet"), a letter (E4: an official letter describing a problem) and an article (E6: The topic of the article was student-chosen). Some students worked in groups for the essays E4, E6, E7 and E8.

Digital process portfolios (WordPress) were integrated into the Language Arts curriculum in class 1, the researcher's fourth grade elementary school class (n=20). Class 1 students were trained in groups of four to six on using the tool (to sign in, add a new piece, submit and view comments, make modifications of their work, and add an image) in mid October 2007.They were able to access the tool in the classroom or at home as a process portfolio to: a) document and monitor progress by setting their own goals for writing, uploading versions of writing pieces that they could create and edit with a text-editor as well as reflect on those artifacts and conduct a self-evaluation, b) have access to peers' portfolios, and c) receive feedback from people with whom they shared their work, such as teachers, peers and, in some cases, parents. Paper portfolios were integrated into the Language Arts curriculum in two teachers' fourth grade of elementary school classes (class 2 and class 3) in the same school for the same duration and following the same pedagogy. In classes 2 and 3, students were using process portfolios as a way to: a) document and monitor progress by setting their own goals for writing, including different versions of writing pieces, reflecting on those artifacts and conducting a self-evaluation, b) share their work with peers at school, and c) receive feedback from people with whom they shared their work, such as teachers and peers. There were no fundamental differences between the pedagogical approach that was implemented for digital and paper-based portfolios.

Students' writing support structures were kept the same by the teachers of the three classes. There was previous discussion and coordination among the three teachers on a bi-weekly basis on how each essay topic would be approached. Examples of the support structures used by teachers for each one of the three writing stages can be found

in appendix Q. Time on task was kept the same in the three classes. For the pre-writing stage, the topic was discussed during a whole-class discussion for one 40min teaching period. The writing stage took place on the following day and its duration was three consecutive 40min teaching periods. The meta-writing stage, for which activities such as peer-feedback, self-evaluation, goal-setting or making revisions to the first draft of the essay was conducted one or two days after the writing stage and its duration varied from one to three 40min teaching periods, depending on how many of those activities were conducted. All 63 students, regardless of whether they were using paper-based or digital portfolios were taught how to set learning goals for writing, how to reflect, how to conduct a self-evaluation and how to provide feedback to peers, using the same teaching strategies.

Digital portfolio implementation.

Process approach- multiple drafts.

Twenty (20) fourth grade students in the researcher's class used digital portfolios. For nine writing pieces throughout the year, students wrote their first draft on paper and received peer comments and teacher's comments to improve it. The second draft was typically written in their digital portfolio as a way to share it with their peers and teacher and receive additional comments and feedback. After receiving comments, students modified their work and produced an improved third version in their digital portfolio. In some cases, after receiving peers' feedback and comments, students wrote their second draft on paper, as well. In those instances they then transferred this second draft in their

digital portfolio, where it would be easier to share, to receive more comments and produce their third version.

Peer and teacher feedback.

For the first drafts that were written on paper students' feedback was also given on paper. For peers' feedback, a "feedback code sheet" was used (see Figure 5), which included specific symbols the students were introduced to in the beginning of the year.

Students used a piece of paper that included two columns and wrote their essay on the left column, which was wider. A peer who would read their work would underline mistakes and provide his comments on the right column, which was narrower (see Figure 6).

When students sent comments via the digital portfolios they did not use the "feedback code sheet". In that case, students wrote general comments, for which the goal was to adhere to the guidelines of "providing constructive feedback", which emphasized that feedback always starts with a positive comment and then provides corrections or suggestions for improvement. An example of a general comment provided to a student's digital portfolio by a peer is the following: "Good job Maria! However, you need to pay attention to accentuation in your essay and also the word "airplane" is spelled like this". Students engaged in providing peer feedback for all nine essays.

Students' self-evaluation.

Upon completion of seven out of the nine writing pieces (E1, E2, E3, E4, E5, E7 and E9), students conducted a guided self-evaluation of their work based on nine generic criteria that were applicable to all genres of writing. Those criteria referred to aspects of

writing such as: a) organization (criteria 1 and 2), b) grammar-spelling (criteria 3, 4, 6 and 9), c) content-ideas (criteria 5 and 7), and d) handwriting (criterion 8) (see Figure 7).

Students' self-reflection.

The reflection was structured as students were asked to answer to two prompts: a) What did you like best about your essay? and b) What can you improve on the next draft? (see Figure 8). Students self-reflected on their work in essays E1, E2, E3, E5, E7 and E9.

Students' goal setting.

Students engaged in goal setting twice during the year. They set their goals for writing after their first self-evaluation, concentrating on the topics they did not master and evaluated and revised those goals midway through the portfolio implementation.

The main components of the digital portfolio implementation followed by class 1 is presented in a time-line format in Figure 9.

		Sep07		Oct07	Nov07	Dec07	Jan08	Feb08	Mar08	May08	Total
	Essay	E1	E2	E3	E4	E5	E6	E7	E8	E9	9
	Type[2]	N	D	D	L	N	A	N	N	D	4
Feedback	Student feedback (SF)	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	9
	Teacher feedback (TF)	TF1	TF2	TF3	TF4	TF5	TF6	TF7	---	TF9	7
Progress monitoring	Self-evaluation (SE)	SE1	SE2	SE3	SE4	SE5	----	SE7	---	SE9	7
	Goals	---	Goal setting for essays 2-6 and goal evaluation					Goal setting for essays 7-9.			2
	Reflection (R)	R1	R2	R3	---	R5	----	R7	---	R9	6
Process approach	Drafts	2	2	2	3	4	3	3	2	3	24

Figure 9. Digital portfolio implementation in a time-line for class 1

Paper-based portfolio implementation.

Process approach.

A total of 43 students from two fourth grade classes (n_2=23, n_3=20) implemented paper-based portfolios. As the teachers of class 2 and 3 worked closely together, their paper-based portfolio implementation was almost identical. For four out of eight writing pieces (E1, E4, E5 and E6) students wrote their first draft on paper and revised it by producing a second draft in their paper-based portfolio after receiving peer and teacher feedback.

[2] Type of essay: N=Narrative, D=Descriptive, L=letter and A=article

Peer and teacher feedback.

For four out of eight writing pieces (E1, E5, E7 and E8), students received peer and teacher feedback, based on the "feedback code sheet" (see Figure 5).Both teachers provided detailed remarks for improvement for all eight essays.

Students' self-evaluation.

Students conducted a self-evaluation of their work for four out of eight writing pieces (E1, E4, E6 and E7). For their first narrative piece (E1), the self-evaluation was based on nine generic criteria and students also attempted to reflect on their work. For three subsequent pieces, writing a letter (E4), writing an article (E6) and writing a narrative essay (E7), teachers chose to use self-evaluation criteria for students that were more applicable to the specific type of writing rather than being generic. For example, to evaluate their writing of an official letter, students used the self-evaluation criteria of Figure 10. Teachers also required that students answer the guiding questions in full sentences to form a paragraph for their self-evaluation rather than simply state a "yes" or "no" as an answer to each question.

Self-evaluation of writing an official letter

1. Did I write the place and date at the correct place in my letter?
2. Was I careful with the opening?
3. Did I carefully write everything I had to say in a simple, understandable and brief way?
4. Did I repeat the same words/things?
5. Did I close my letter with a valediction and my signature?
6. Did I organize my letter in paragraphs?
7. Is my handwriting eligible?

Figure 10. Self-evaluation based on seven criteria applicable to letter-writing

Students' goal setting.

With regard to goal-setting, in the second class (n_2=24), students set and evaluated goals for three specific writing pieces (E3, E4 and E5). The same thing happened in the third class (n_3=20), with the exception that students did not evaluate their essay 4 goals before setting essay 5 goals.

Students' self-reflection.

Students conducted a self-reflection only on the first writing piece (E1), as teachers made the deliberate choice not to include self-reflection prompts in subsequent self-evaluations, as they did not see their value.

The portfolio implementation followed by classes 2 and 3 is presented in a time-line format in Figures 11 and 12.

		Sep07		Oct07	Nov07	Dec07	Feb08	Mar08	May08	Total
	Essay	E1	E2	E3	E4	E5	E6	E7	E8	8
	Type[3]	N	D	D	L	N	A	N	N	4
Feedback	Student feedback (SF)	SF1	----	----	----	SF5	----	SF7	SF8	4
	Teacher feedback (TF) and comments (TC)	TF1 +TC1	TC2	TC3	TC4	TF5 +TC5	TC6	TF7 + TC7	TF8 + TC8	8
Progress monitoring	Self-evaluation (SE)	SE1	----	----	SE4	----	SE6	SE7	----	4
	Goals	----	----	Goal setting and evaluation	Goal setting and evaluation	Goal setting and evaluation	----	----	----	3
	Reflection (R)	R1	----	----	----	----	----	----	----	1
Process approach	Drafts	2	1	1	2	2	2	1	1	12

Figure 11. Paper-based portfolio implementation in a time-line for class 2

		Sep07		Oct07	Nov07	Dec07	Feb08	Mar08	May08	Total
	Essay	E1	E2	E3	E4	E5	E6	E7	E8	8
	Type	N	D	D	L	N	A	N	N	4
Feedback	Student feedback (SF)	SF1	----	----	----	SF5	----	SF7	----	3
	Teacher feedback (TF) and comments (TC)	TF1 +TC1	TC2	TC3	TC4	TF5 +TC5	TC6	TF7 + TC7	TC8	8
Progress monitoring	Self-evaluation (SE)	SE1	----	----	SE4	----	SE6	SE7	----	4
	Goals	----	----	Goal setting and evaluation	Goal setting. No evaluation	Goal setting and evaluation	----	----	----	3
	Reflection (R)	R1	----	----	----	----	----	----	----	1
Process approach	Drafts	2	1	1	2	2	2	1	1	12

Figure 12. Paper-based portfolio implementation in a time-line for class 3

[a] Type of essay: N=Narrative, D=Descriptive, L=letter and A=article

Portfolio implementation check.

Several components of students' portfolios for class 1 (writing pieces, goal-setting and evaluation, peer and teacher comments) were available for analysis electronically. Students' portfolios for classes 2 and 3, as well as class 1 portfolio components that were only available in paper format, such as self-evaluations and reflections, were photocopied for analysis.

An overview of the portfolio implementation based on the analysis of students' portfolios (see Figures 9, 11 and 12) showed similarities and differences among classes. In class 1, there was one case (E8) in which detailed teacher feedback was not provided. This happened because students provided very thorough comments to their peers' work for that particular essay that almost made the teacher's feedback redundant. In addition to this, there were two cases (E6 and E8) for which students' self-evaluation did not take place, and three cases (E4, E6 and E8) in which students did not reflect on their work (see Figure 9). Finally, goal setting took place twice during the year, at the beginning of portfolio implementation in September (E2) and mid-portfolio implementation in early February (E7).

The implementation in classes 2 and 3 was almost identical due to a very close coordination of the two teachers' teaching practices, which was conducted at school on a daily-basis. The most important portfolio component missing from the implementation in classes 2 and 3 was students' reflection. This was only conducted for the first essay and was then consciously abandoned by teachers. The teachers of class 2 and class 3 were very responsive to their students' work and provided detailed feedback and remarks to every single essay. However, they did not demand the same commitment from their

students, as students' peer feedback was conducted for four times in class 2 (E1, E5, E7 and E8) and three times in class 3 (E1, E5 and E7) from the total of eight essays. Students' self-evaluation was another portfolio component that was conducted for half of the essays as self-evaluations took place for E1, E4, E6 and E7. The same thing happened with the process approach in writing that included multiple drafts of students' essays. Students worked on a second draft of their essay for half of the essays during the year: E1, E4, E5 and E6 (see Figures 11 and 12). Finally, goal setting and goal evaluation took place three times during the year for three consecutive essays at the beginning to mid-portfolio implementation (E3, E4 and E5).

Phase 3: Conducting an Interim Assessment of Writing Self-efficacy.

Interim assessment of students' writing self-efficacy.

Student Writing Self-Efficacy Instrument 1, the Writer Self-Perception Scale (WSPS)(appendix B) and Student Writing Self-Efficacy Instrument 2, the instrument developed by Pajares et al. (2001) (appendix C) were re-administered to all students on March 12th 2008. Students' semi-structured interviews with the same students who were selected in the first term were also conducted during the week following the instruments' administration. Interviews were videotaped and transcribed in English.

Examination of students' perceptions on the connection of portfolios and their writing self-efficacy.

The students' videotaped semi-structured interviews which were conducted with the selected sample of nine students (of low, average and high writing self-efficacy) also served to identify students' perceptions of the connection between portfolio affordances and their writing self-efficacy (appendix G).

Phase 4: Conducting Post-portfolio Implementation Assessment of Writing Performance, Writing Self-efficacy and Connection with Portfolios.

Final assessment of students' writing performance.

All students were post-tested with regard to their writing performance on June 12th 2008 using the same instrument and procedure that were used as part of the pre-test (appendix A).

Final assessment of students' writing self-efficacy.

Student Writing Self-Efficacy Instrument 1, the Writer Self-Perception Scale (WSPS) (appendix B) and Student Writing Self-Efficacy Instrument 2, the instrument developed by Pajares, Hartley & Valiante (2001) (appendix C) were re-administered to all students on June12th 2008.

Examination of students' perceptions on the connection of portfolios and their writing self-efficacy.

Students' perceptions on the connection of portfolios and their writing self-efficacy were examined using a student questionnaire (appendix D) that was administered to students of class 1 on June 12th 2008. Students of classes 2 and 3 completed a modified version of this questionnaire that was more applicable to paper-based portfolios (appendix E) on June 12th 2008.

During the week following instruments' administration, student semi-structured interviews were also conducted with the selected sample of nine students (of low, average and high writing self-efficacy) to identify students' perceptions of the connection between portfolio affordances and their writing self-efficacy (appendix H).

Phase 5: Conducting Post-portfolio Implementation Interviews with Teachers and Students.

Post-portfolio implementation interviews with teachers.

Two 1-hour interviews with teachers on their teaching practices for portfolio use were conducted to investigate their teaching approach and their perceived benefits and obstacles regarding portfolio implementation (appendix I). The interview with the teacher of class 2 was conducted on July 3rd 2008 and the interview with the teacher of class 3 was conducted on July 6th 2008. Both interviews were videotaped and transcribed in English.

Post-portfolio implementation interviews with students.

The nine student interviews that were conducted post-portfolio implementation were also used to collect data on students' perceptions of the perceived benefits and obstacles regarding portfolio implementation, as well as students' ideas for improving the portfolio tool. Interviews were videotaped and transcribed in English (appendix H).

Ensuring Methodological Rigor

Methodological rigor in the qualitative part of the proposed study was achieved through processes of interrater reliability, triangulation and member checking. Interrater reliability was calculated and reported for the assessment of students' writing performance pre- and post-portfolio implementation and for the evaluation of their portfolio components. The analysis of a sample of randomly selected work from students' portfolios (including writing pieces, goals, reflections, self-evaluations and received feedback) was translated in English to allow sharing of the raw data and to confirm methodological rigor with professors of my committee. There was also more than one interpreter of results as teacher and students interviews were transcribed in English using Transana 2.12, a qualitative research analysis tool to allow sharing analysis results and reaching consensus on their meaning with the collaboration of another researcher.

Triangulation referred to having multiple sources of data. Portfolio artifact analysis complemented teacher interviews' qualitative data. A detailed analysis of students' portfolios provided a way for an implementation check, as it was fairly easy to evaluate whether process portfolio pedagogy was implemented as suggested. Student interviews provided another way to evaluate students'self-efficacy in addition to the two standardized, self-reported measures of self-efficacy. Finally, students` interviews on the connection between portfolio implementation and their writing performance and writing self-efficacy provided a more in-depth evaluation of students' perceptions collected through a questionnaire.

After transcribing and coding the video segments of teachers' interviews, as part of member checking, teachers were given a copy of selected excerpts and the researcher's

interpretation of their statements and were asked whether there was any misinterpretation of the meaning. The same procedure was followed with students with the difference that selected excerpts were read to them.

For the quantitative part of the study, standardized procedures were used for the administration of the writing performance and writing self-efficacy instruments. In addition to this, to address the alternative interpretation that potential changes in students' writing-self-efficacy could be due to general learning and maturation rather than the portfolio-related processes, two control groups were used. Control group 1 (N=85 fourth grade students) was administered the Student Writing Self-Efficacy Instrument 1 twice, as a pretest and as a posttest, in the beginning and at the end of the academic year 2008-2009, respectively. Control group 2 (N=60 fourth grade students) was administered the Student Writing Self-Efficacy Instrument 2 twice, as a pretest and as a posttest, in the beginning and at the end of the academic year 2008-2009, respectively. Access to the students' grades (A, B, C, D and E) of both the two control groups (N=85 and N=60) and of the students who participated in this study (N=63) allowed for examining the equivalence of the groups.

Methodological rigor in the quantitative part of the proposed study was achieved through pilot-testing of the portfolio tool and pilot-testing of instruments. Both took place prior to conducting the dissertation study and are described in the following section.

Pilot testing of the portfolio tool.

With regard to the user-friendliness of the tool, preliminary analysis of 12 (fourth to sixth grade) students' usability testing (Nicolaidou & Strobel, 2007) showed that

students did not have difficulty using the tool. All students were confident that they could use the portfolio tool at home on their own, with or without the use of a job-aid and all students were confident that they could teach the portfolio tool to a peer and/or to their parents. Ten students were asked to rate the difficulty of performing the main functions of the tool after receiving 30 minutes of one-on-one or two-on-one training consisting of a demonstration and a one-time student-practice of each function. Table 2 presents the number of students who provided each rating of the six main functions of the portfolio.

Table 2

Usability Testing Results of the Portfolio Tool (Nicolaidou & Strobel, 2007)

Functions	**Rated as "easy"**	**Rated as "a bit difficult"**
Access portfolio tool with login and password	9	1
Access my own portfolio	10	0
Write a new piece	9	1
Upload an image	6	4
Access a comment sent to me	10	0
Provide a comment to a peer	10	0

Pilot-testing of the two instruments used to assess students' writing self-efficacy.

a) Test-retest reliability of the Writer Self-Perception Scale (WSPS) in Cyprus.

The Writer Self-Perception Scale (WSPS) (Bottomley, Henk & Melnick, 1998) was chosen because it was specifically designed for fourth to sixth grade elementary school students and it is grounded on Bandura's (1997) theory of perceived self-efficacy. It focuses on the four sources of self-efficacy outlined in his theory: General and Specific Progress (enactive mastery experiences), Observational Comparison (vicarious

experiences), Social Feedback (verbal persuasion) and Physiological States. With regard to content validity, a rigorous content validity procedure was followed for the creation of the instrument, according to which conceptual and operational definitions were created, a scaling technique was chosen, a judgmental review of items was conducted, a response format was selected, drafts of the instrument were prepared and pilot data was gathered and analyzed (using techniques of factor analysis, item analysis and reliability estimation as well as the relationship of the scale to children's writing achievement). Final validity and reliability data was collected, analyzed and reported. There have been at least two previous validation studies of the instrument. In the latest one, it has been validated in the US with 964 students in grades 4, 5 and 6. With regard to internal consistency reliability, the Cronbach Alpha reliability estimates were General Progress: 0.90, Specific Progress: 0.89, Observational Comparison 0.90, Social Feedback: 0.87 and Physiological States: 0.91. Moreover, the WSPS correlated significantly with children's actual writing samples for criterion-related validity.

This instrument was translated in Greek. Back translation was used, in which the instrument was translated into Greek and then back into English to ensure that the two forms were equivalent and would yield comparable results. For content validity, the instrument was shown to four Greek elementary school teachers. Three of them had a Master's degree and teaching experience of five to six years and the fourth had almost thirty years of teaching experience. They examined the instrument assessing its applicability for the Greek Language Arts curriculum and the difficulty level of the terms used. Only minor modifications on wording have been made.

To examine test-retest reliability, the instrument was administered twice to 218 students in Cyprus (85 fourth graders, 64 fifth graders and 69 sixth graders). The time difference between the two administrations was approximately a week. Most individual items were normally distributed.

The overall scores of the first and second administration were strongly correlated ($r(218) = .87, p < .01$). The Cronbach Alpha reliability estimates were also very high; 0.94 for the first administration and 0.95 for the second using all three grades together as suggested by Bottomley et al. (1998).

b) Validation of the Student Writing Self-Efficacy Instrument 2(developed by Pajares et al. (2001).

To measure students' writing self-efficacy more accurately, in addition to the use of the Writer Self-Perception Scale (WSPS) (Bottomley et al., 1998), the Student Writing Self-Efficacy Instrument that was developed by Pajares et al. (2001) was also used. The Student Writing Self-Efficacy instrument developed by Pajares et al. (2001) has been validated in the US with 497 middle school students in Grades 6-8 (ages 11-14) and it has been extensively used in the literature in a number of previous studies. Pajares et al. (2001) demonstrated that results of the factor and reliability analyses showed that a writing self-efficacy scale with a 0-100 response format was psychometrically stronger than a traditional Likert format scale (Cronbach's alpha was 0.90 and 0.86, respectively). It was moreover shown that children at the middle school level could indeed make a discriminating judgment using a 0-100 scale. As part of instrument pilot testing, it was translated in Greek and it was simplified to target grades 4-6. Back translation was used,

in which the instrument was translated into Greek and then back into English to ensure that the two forms were equivalent. For content validity, the instrument was shown to four Greek elementary school teachers to examine its applicability for the Greek Language Arts curriculum and the difficulty level of the terms used. Only minor modifications on wording were made. To examine test-retest reliability, the instrument was administered twice to 60 fourth grade students in Cyprus in June 2007. The time difference between the two administrations was two weeks. The overall scores of the first and second administration were strongly correlated ($r(60) = .97, p < .01$). The Cronbach Alpha reliability estimates were also high; 0.86 for the first administration and 0.90 for the second.

CHAPTER 4: RESULTS

The following chapter describes the analysis of the quantitative and qualitative data of the study and its results. The first section, **Sources of Data** provides an overview of the quantitative data (portfolio components, writing performance tests, writing self-efficacy instruments and portfolio questionnaires) and qualitative data (interviews and research field notes) this study was based on. The second section, **Research Question 1** provides descriptive and inferential statistics for: a) the Assessment of Students' Writing Performance Pre- and Post-Portfolio Implementation and b) the Assessment of Students' Writing Performance Through Portfolios over Time. Next, the first research question is broken down to four parts to examine how: a) feedback, b) self-evaluation, c) goal-setting and d) reflection were related to students' writing performance over time. The third section, **Research Question 2** first provides descriptive and inferential statistics for the analysis of changes in students' writing self-efficacy over time using two different instruments. Next, the results of the qualitative data analysis of selected students' interviews are presented for a more in-depth examination of those changes. Following that, descriptive statistics of students' perceptions on portfolios are presented. Inferential statistics are then used to examine the association between the three main sources of self-efficacy, which were measured with Student Writing Self-Efficacy Instrument 1, with specific portfolio affordances, which were derived from students' responses to questionnaires on their perceptions on portfolios. More specifically, the associations that are examined are the following: a) the association of mastery experiences with a process approach in writing, progress monitoring, self-evaluation and goal setting, b) the association of vicarious experiences with access to peers' portfolios, and c) the

association of verbal persuasion with social feedback from peers, parents and the teacher. The fourth section, **Research Question 3** consists of two parts, the teachers' perspective on the benefits and obstacles of paper-based portfolio implementation and the students' perspective on the benefits and obstacles of digital portfolio implementation.

Sources of Data

A. Quantitative data.

a) Student portfolios: A total of 63 student portfolios in both digital and paper-based format were assessed. In class 1, students developed a total of 20 digital portfolios. In class 2 students developed 23 paper-based portfolios and in class 3 students developed 20 paper-based portfolios.

The content of portfolios included students' artifacts such as their essays, the comments they received from their peers and teachers, their goals, self-evaluations and reflections, as follows:

	Class 1	Class 2	Class 3	Total
Essays	176	181	157	514
Peer feedback	1306	1114	402	2822
Teacher feedback	1834	769	743	3346
Goals	73	215	189	477
Self-evaluations	140	88	80	308
Reflections	120	22	20	162

b) Writing performance: A total of 125 writing performance tests, as follows:

Administration	Class 1	Class 2	Class 3	Total
Pre-portfolio implementation	20	23	20	63
Post-portfolio implementation	20	22	20	62

c) Writing self-efficacy: A total of 186 writing self-efficacy instruments of type 1 and 187 writing self-efficacy instruments of type 2, as follows:

Student Writing Self-Efficacy Instrument 1

Administration	Class 1	Class 2	Class 3	Total
Pre-portfolio implementation	20	23	18	61
Mid-portfolio implementation	20	23	19	62
Post-portfolio implementation	20	23	20	63

Student Writing Self-Efficacy Instrument 2

Administration	Class 1	Class 2	Class 3	Total
Pre-portfolio implementation	20	23	18	61
Mid-portfolio implementation	20	23	20	63
Post-portfolio implementation	20	23	20	63

d) Students' portfolio perceptions: A total of 63 students' portfolio perceptions questionnaires were administered post-portfolio implementation. There were 20 questionnaires administered in class 1, 23 questionnaires administered in class 2 and 20 questionnaires administered in class 3.

e) Control group data on writing self-efficacy

Student Writing Self-Efficacy Instrument 1 was administered to 83 fourth grade students in a second school that did not use portfolios (referred to as control group 1) and Student Writing Self-Efficacy Instrument 2 was administered to 59 fourth grade students in a third school that did not use portfolios (referred to as control group 2). Both instruments were administered at the beginning and at the end of the academic year.

All quantitative data was analyzed using SPSS version 15 for Windows. An alpha level of .05 was used for all statistical tests. As an effect size measure, eta-squared (η^2) was used, qualifying values <.06 as small effect, values in the range between .06 and .13 as medium effect, and values >0.13 as large effect (see Cohen, 1988).

B. Qualitative data.

a) Twenty-seven student interview transcripts and two teacher interview transcripts, as follows:

	Students	**Teachers**
Pre-portfolio implementation	9	-
Mid-portfolio implementation	9	-
Post-portfolio implementation	9	2
Total	27	2

b) The researcher's field notes

Research Question 1

How are process portfolio affordances, such as peer and teacher feedback and progress monitoring (self-evaluation, goal setting, reflection) related to elementary school students' writing performance, over time?

Results showed that students' writing performance over time has increased. This was evident both from the comparison of the pre-test and post-test writing scores pre- and post- portfolio implementation and from the repeated measures analysis of variance on the writing samples included in students' portfolios. Both descriptive and inferential statistics are presented below. Next, the first research question is broken down to four parts to examine how: a) feedback, b) self-evaluation, c) goal-setting and d) reflection related to students' writing performance over time.

Assessment of students' writing performance pre- and post-portfolio implementation.

Students' writing performance is defined as students' ability to write a structured, well-organized essay (descriptive, narrative, letter or article) by developing their ideas in distinct paragraphs using correct grammar, spelling, punctuation and accentuation. It was measured with a writing performance instrument for student-generated essays (appendix A) that was administered as a pre-test and a post-test. The instrument was modified from previous work (Tombari & Borich, 1999). For content validity, the instrument was shown to four Greek elementary school teachers, who only had minor modifications for clarification of the scoring.

Students' writing was evaluated based on ten criteria, on a five-point scale (appendix A). Then the score was transformed into a percentage score. Maximum possible score was 100 and minimum possible score was 20. The ten criteria were the following:

1. Paragraphs
2. Introduction, main body and conclusion
3. Capital letters
4. Accentuation
5. Adjectives/expressions
6. Spelling
7. Repetition/redundancy
8. Handwriting
9. Punctuation
10. Content/Ideas/Vocabulary

One class 2 student's post-test score that was missing was replaced by the mean post-test score of class 2. Students' pre-tests (N=63) and post-tests (N=62) on writing performance were blindly scored by the researcher using the student writing performance evaluation instrument (appendix A). Interrater reliability was obtained with the help of an elementary school teacher and PhD candidate in Education, who blindly scored all 125 pre- post-essays. The interrater agreement was 95.8% and the disagreements were discussed and resolved between the coders.

Descriptive statistics.

The descriptive statistics of both the pre-test and post-test on writing performance are presented in table 3.

Table 3

Students' Pre-test and Post-test on Writing Performance for the Three Classes

Class	*n*	Pre-test		Post-test	
		M	*SD*	*M*	*SD*
1	20	62.60	9.82	76.50	12.63
2	23	69.35	12.45	82.60	11.63
3	20	66.2	10.45	81.74	8.99

Inferential statistics.

Group equivalence was established. There were no statistically significant differences among the three classes ($F=1.99$, $p>.05$, $df=2$) based on the pre-test on students' writing performance.

Establishing group-equivalence allowed for conducting a paired-samples t-test, in which the three classes were examined as one group. This t-test showed that there was a statistically significant difference between students' pre-test ($M=66.20$, $SD=11.22$, $N=63$) and post-test ($M=80.39$, $SD=11.36$, $N=63$) on writing performance ($t(62)= -14.19$, $p<.05$, $d=3.60$). Eta-squared was calculated to measure the effect size ($\eta^2=0.77$). It showed that 77% of the variance was accounted for.

Assessment of students' writing performance through portfolios over time.

Students' writing performance was also measured with process data through the analysis of writing pieces in their portfolios. Nine essays from class 1 and eight essays from classes 2 and 3 were included in the analysis. A total of 514 essays (176 essays from class 1, 181 essays from class 2 and 157 essays from class 3) were assessed. All students'

first versions of writing pieces were blindly scored by the researcher using the Student Writing Performance Evaluation Instrument, the same instrument that was used for the scoring of the pre-tests and post-tests (appendix A). Students' writing was evaluated based on 10 criteria, on a five-point scale (appendix A). Then the score was transformed into a percentage score. Maximum possible score was 100 and minimum score was 20. Interrater reliability was obtained with the help of an elementary school teacher and PhD candidate in Education, who blindly scored 23% of the total number of essays (120 essays out of the total of 514 essays). The interrater agreement was 94.9% and the disagreements were discussed and resolved between the coders.

Four students' scores from class 1 (three for E6 and one for E8) that were missing were replaced with the mean score of class 1 on E6 (M=94.71) and E8 (M=88.42), respectively. Three students' scores from class 2 (one for E5 and two for E7) that were missing were replaced with the mean score of class 2 on E5 (M=80.36) and E7 (M=81.33), respectively. Three students' scores from class 3 (one for E5 and two for E7) that were missing were replaced with the mean score of class 3 on E5 (M=80.42) and E7 (M=80.44), respectively.

Descriptive statistics.

Table 4 shows students' writing performance scores by type of essay and includes the mean and SD from essay 1 to essay 9 in class 1 (n=20). The total number of class 1 essays that were assessed was 176.

Table 4

Class 1 Students' Writing Performance Scores per Type of Essay

Essay	**Type**	*M*	*SD*
E1	Narrative	70.20	13.42
E2	Descriptive	74.90	13.08
E3	Descriptive	82.30	9.83
E4	Letter	85.10	7.09
E5	Narrative	79.30	10.14
E6	Article	94.71	4.25
E7	Narrative	88.10	7.69
E8	Narrative	88.42	9.87
E9	Descriptive	91.50	6.92

If we examine students' performance by type of essay, as can be seen from table 4, students' writing performance in the four narrative essays (E1, E5, E7 and E8) in class 1 was steadily increasing to reach an average score of 88.42 from an initial average score of 70.20. The same thing happened with students' writing performance in descriptive essays (E2, E3 and E9), as this increased from 74.90 to 91.50.

Table 5 shows students' writing performance scores by type of essay and includes the mean and SD from essay 1 to essay 8 in class 2 (n=23) and table 6 shows students' writing performance scores by type of essay and includes the mean and SD from essay 1 to essay 8 in class 3 (n=20). The total number of class 2 essays that were assessed was 181 and the total number of class 3 essays that were assessed was 157.

Table 5

Class 2 Students' Writing Performance Scores per Type of Essay

Essay	**Type**	*M*	*SD*
E1	Narrative	67.30	10.35
E2	Descriptive	70.09	10.30
E3	Descriptive	78.09	10.59
E4	Letter	81.65	6.40
E5	Narrative	80.36	12.01
E6	Article	94.70	3.28
E7	Narrative	81.33	9.15
E8	Narrative	87.65	4.29

Table 6

Class 3 Students' Writing Performance Scores per Type of Essay

Essay	**Type**	*M*	*SD*
E1	Narrative	74.90	9.00
E2	Descriptive	75.10	9.46
E3	Descriptive	80.80	8.69
E4	Letter	80.70	3.69
E5	Narrative	80.42	6.44
E6	Article	93.20	4.74
E7	Narrative	80.44	8.17
E8	Narrative	87.60	8.09

If we examine students' performance by type of essay, as can be seen from table 5, students' writing performance in the four narrative essays (E1, E5, E7 and E8) in class 2 was steadily increasing to reach an average score of 87.65 from an initial average score of 67.30.

The same observation can be made for class 3, where students' writing performance in the four narrative essays (E1, E5, E7 and E8) in class 3 was steadily increasing to reach an average score of 87.60 from an initial average score of 74.9.

Students' writing performance also increased in the two descriptive essays (E2 and E3) from 70.09 to 78.09 for class 2 and from 75.10 to 80.8 for class 3.

Students' writing performance as this was examined through their portfolio artifacts (tables 4, 5 and 6) followed a similar increasing trend in the three classes, as can be seen from Figure 13.

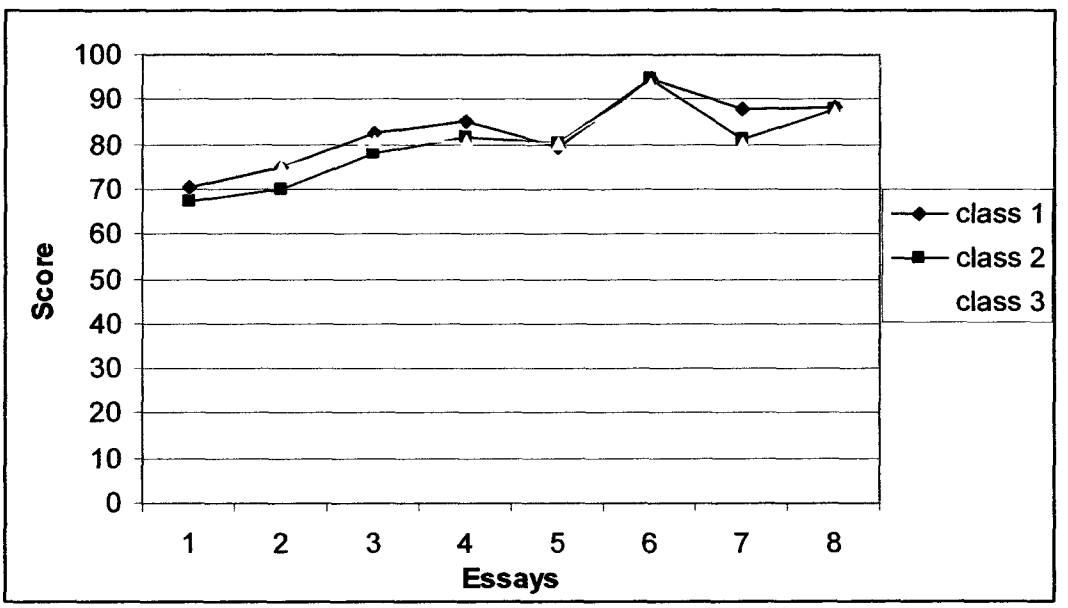

Figure 13. Students' writing performance over time for the three classes

Inferential statistics.

The students' writing performance score in their portfolios was analyzed in an analysis of variance with *time of measurement* (essay 1 in September, essay 2 in October...essay 8 in May) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was not met so the Huynh-Feldt correction was applied. The main effect of time of measurement was significant, F

(5.25, 325.69) = 103.22 , p<.01, η^2=0.63. Eta-squared is the effect size. It shows that 63% of the variance is accounted for. Post-hoc comparisons were performed using the Bonferroni adjustment for multiple comparisons. There was no statistically significant difference between the mean of the first (M=70.63, SD=11.32) and second essay (M=73.21, SD=11.10, p>.01) or between the mean of the third (M=80.29, SD=9.78), fourth (M=82.44, SD=6.13) and fifth essays (M=80.04, SD=9.78, p>.01). However, students writing performance increased from a mean of 73.21 (SD=11.10) at the second essay to a mean of 80.29 (SD=9.78, p<.01) at the third essay at the beginning stages of the portfolio implementation. This improvement was maintained midway though and until the end of the portfolio implementation at the sixth (M=94.22, SD=4.09, p<.01), seventh (M=83.19, SD=8.93, p<.01) and eighth essay (M=87.88, SD=7.53, p<.01).

It is also important to note that even though there was no difference between the mean score on the third, fourth and fifth essays, all three scores were significantly higher than the mean score of the first essay (p<.01).

a) How was feedback related to writing performance over time?

Peer feedback.

Students' peer feedback is defined as the direct and indirect corrective comments and/or general comments that students provided to their peers' work. The corrections were based on a "feedback code sheet" using symbols (see Figure 5) and they were implemented in paper-based versions of students' essays. The general comments were implemented in the digital version of peers' work. Peer feedback came as a result of students being paired up by the teacher to share their work in class. To score peer

feedback the number of corrections and the number of general comments received by peers for each student's first version of an essay were added.

Teacher feedback.

Teachers' feedback is defined as the indirect corrections, general comments, and detailed remarks that teachers provided to their students' work. The corrections were based on a "feedback code sheet" using symbols (see Figure 5) and they were implemented in paper-based versions of students' essays (classes 1, 2 and 3). The general comments were implemented in the digital version of students' work (class 1). The detailed remarks were comprised of both positive comments and constructive comments and they were implemented in paper-based versions of students' essays (classes 2 and 3).

To score teacher feedback the number of teacher indirect corrections based on the "feedback code sheet" and the number of general comments for each student's first version of an essay were added. Teachers' detailed remarks were organized in four categories: a) Structure/Organization, b) Writing conventions/Spelling/Grammar, c) Content/ideas and d) Other.

Class 1 Peer and Teacher feedback.

In class 1, students provided feedback to peers for all nine essays either using the "feedback code sheet" (essays 1, 2, 3 and 9) or by providing general comments in digital form (essays 6, 7 and 8) or by providing both types of feedback (essays 4, 5). For comments received in students' digital portfolios, the number of positive and the number of constructive comments received by peers for each student's essay were added together.

To score peer feedback the number of direct or indirect corrections based on the "feedback code sheet" and the number of general comments received by peers for each student's first version of an essay were added.

The teacher's feedback to the students' work was based on the feedback code-sheet (essays 1, 2, 3 and 9) or consisted of positive and constructive comments in digital form (essays 6 and 7) or both (essays 4 and 5). To score teacher feedback the number of corrections based on the "feedback code sheet" and the number of positive and constructive comments for each student's first version of an essay were added together.

Descriptive statistics.

Table 7 shows the average number of comments students in class 1 received from their peers and their teacher for each one of the nine essays.

Table 7
Descriptive Statistics for Student and Teacher Feedback for Class 1

	Student feedback			**Teacher feedback**		
Essay	*n*	*M*	*SD*	*n*	*M*	*SD*
E1	95	4.75	4.17	160	8.00	4.18
E2	123	6.47	4.99	312	15.60	5.38
E3	116	6.11	5.51	275	13.75	7.87
E4	105	5.25	3.55	203	10.15	6.38
E5	140	7.37	6.64	400	20.00	11.58
E6	101	5.32	1.20	77	4.53	1.37
E7	98	4.90	0.85	109	5.45	2.26
E8	245	12.26	7.45	---	---	---
E9	283	14.15	9.18	298	14.90	7.66

The general comments received by peers in their digital portfolios were also analyzed qualitatively. Peer feedback comments were assessed with a score from 1

(provided one general comment or identified one mistake) to 5 (provided a positive comment and more than three suggestions for improvement (appendix O).

Table 8 shows the total number of comments students of class 1 received from their peers in their digital portfolios month-by-month and the distribution of the comments according to three categories: the comments that received either a 1 or 2 rating (simple feedback), the comments that received a 3 rating (average feedback) and the comments that received either a 4 or 5 rating (constructive feedback).

Table 8

Qualitative Analysis of Peer Comments for Class 1

Month	n	% of comments rated with 1 or 2	% of comments rated with 3	% of comments rated with 4 or 5
October	9	90	0	10
November	40	50	2	48
December	19	31	0	69
January	30	33	3	64
February	31	45	3	52
March	39	46	0	54
April	11	63	0	37
May	23	57	4	39

Figure 14 shows the percentage of comments received in students' digital portfolios by month and by rating.

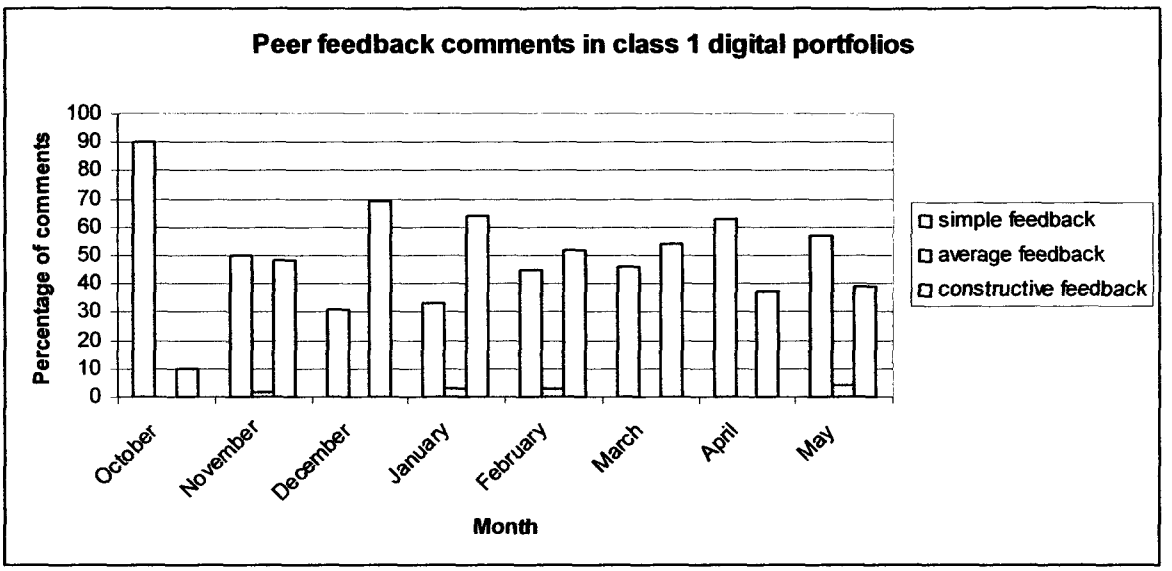

Figure 14. Qualitative analysis of peer comments in class 1

It is interesting to note that in a few cases, students' parents also developed an interest to check their children's work in their digital portfolios. Those parents were provided with a login name and password and had the ability to provide feedback to the students' work. Three parents provided a total of 9 comments in students' portfolios.

Class 2 Peer and Teacher Feedback.

In class 2, students provided feedback to peers for four out of eight essays using the "feedback code sheet" (essays 1, 5, 7 and 8). The teacher provided feedback using the "feedback code sheet" for the same essays. Table 9 presents the descriptive statistics for student and teacher feedback for class 2 (n=23) per essay.

Table 9

Descriptive Statistics for Student and Teacher Feedback for Class 2

	Student feedback			Teacher feedback		
Essay	*n*	*M*	*SD*	*n*	*M*	*SD*
E1	204	8.87	9.95	229	9.96	5.46
E5	247	10.74	4.69	160	7.30	4.68
E7	274	11.91	6.15	221	9.61	4.92
E8	389	16.91	13.91	159	6.91	3.91

Class 3 Peer and Teacher feedback.

In class 3, students provided feedback to peers for three out of eight essays using the "feedback code sheet" (essays 1, 5 and 7). The teacher provided feedback using the "feedback code sheet" for the same essays. Table 10 presents the descriptive statistics for student and teacher feedback[4] for class 3 (n=20) per essay.

Table 10

Descriptive Statistics for Student and Teacher Feedback for Class 3

	Student feedback			Teacher feedback		
Essay	*n*	*M*	*SD*	*N*	*M*	*SD*
E1	141	7.05	3.69	247	12.35	6.10
E5	130	6.50	3.22	229	11.45	4.88
E7	131	6.55	4.42	267	13.35	7.66

[4] In addition to providing corrections using the "feedback code sheet", the teachers of class 2 and 3 provided detailed positive and constructive comments. The analysis of teachers' feedback is provided in appendix M, as it does not directly relate to any of the research questions.

Trend analysis of the relationship between feedback and writing performance.

The results showed that feedback from peers and the teacher was inversely proportional to the students' writing performance. The term "inversely proportional" is used in the sense that when one variable was increased the other variable was decreased, and vice-versa. The results from class 1 demonstrate this relationship (see Figure 15). When students' writing performance was increased (from essay 2 to essay 3, from essay 3 to 4, and from essay 5 to 6) the number of comments they received from both their peers and their teacher followed a decreasing trend for those essays. Along the same lines, when students' writing performance decreased (from essay 4 to 5 and from essay 6 to 7) the number of comments they received from both their peers and their teacher was increased for the same essays. Table 11 shows class 1 students' writing performance and the total of feedback received from peers and the teacher, per essay.

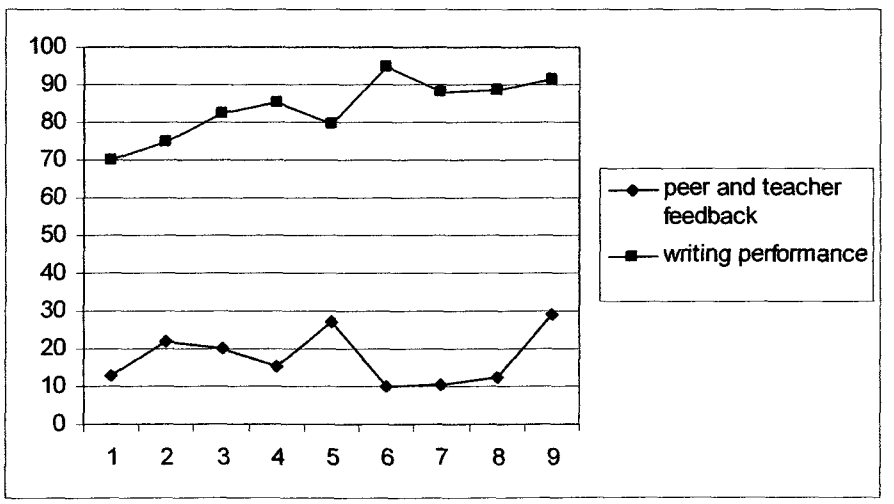

Figure 15. Graph showing the relationship of writing performance and feedback over time

Table 11

Class 1 Students' Writing Performance in Relation to Feedback

	E1		E2		E3		E4		E5		E6		E7		E8		E9	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Writing performance	70	13	75	13	82	10	85	7	79	10	95	4	88	8	88	10	92	7
Feedback	13	4	22	8	20	11	15	8	27	13	9	3	10	2	12	7	29	9

b) How was self-evaluation related to writing performance over time?

Students' self-evaluation of writing is defined as students' decision making as to whether each one of seven to nine given criteria was achieved in each writing piece. Students indicated a "yes" or "no" for each criterion. In scoring the students' self-evaluations, a "yes" answer received the score of 1, while a "no" answer received a zero score. An answer such as: "to some extent", or "so and so" received a score of 0.5. Students' answers were added and the total was transformed into a percentage score. Students' self-evaluation was conducted after students received peer and teacher comments for improvement but it was based on their first draft.

Students of class 1 conducted a self-evaluation of their work based on nine generic criteria that were applicable to all genres of writing (see Figure 7). Those criteria referred to aspects of writing such as: a) organization (criteria 1 and 2), b) grammar-spelling (criteria 3, 4, 6 and 9), c) content-ideas (criteria 5 and 7), and d) handwriting (criteria 8).

In class 1, students conducted a self-evaluation for seven out of nine writing pieces (E1, E2, E3, E4, E5, E7 and E9). For class 1, there were eight different students' self-evaluation scores missing. The four students' self-evaluation scores on essay 2, another student's self-evaluation score on essay 5, another two students' self-evaluation scores on essay 7 and a student's self-evaluation score on essay 9 that were missing were replaced with the mean score of self-evaluation for each student.

Descriptive statistics.

The mean scores of class 1 (n=20) students' self-evaluations per essay can be seen in table 12.

Table 12
Mean Scores of Students' Self-evaluations in Class 1

Self-evaluation	*M*	*SD*
E1	85.65	11.33
E2	82.88	13.25
E3	79.80	16.73
E4	96.05	8.60
E5	87.00	12.73
E7	85.54	12.55
E9	90.57	9.12

In classes 2 and 3, students conducted a self-evaluation for four out of eight writing pieces (E1, E4, E6 and E7). The same scoring technique used for class 1 was used for students' self-evaluations in classes 2 and 3. For class 2, there were four different students' self-evaluation scores missing. The two students' self-evaluation scores on essay 4 and another two students' self-evaluation scores on essay 6 that were missing were replaced with the mean score of self-evaluation for each student. One student who was missing three out of the four self-evaluation scores was not included in the analysis.

The mean scores of class 2 (n=22) students' self-evaluations per essay can be seen in table 13.

Table 13
Mean Scores of Students' Self-evaluations in Class 2

Self-evaluation	*M*	*SD*
E1	79.32	17.09
E4	88.09	10.77
E6	97.77	5.90
E7	88.03	12.67

For class 3, there were six different students' self-evaluation scores missing. The two students' self-evaluation scores on essay 4, another student's self-evaluation score on essay 6 and three students' self-evaluation scores on essay 7 that were missing were replaced with the mean score of self-evaluation for each student. The mean scores of class 3 (n=20) students' self-evaluations per essay can be seen in table 14.

Table 14
Mean Scores of Students' Self-evaluations in Class 3

Self-evaluation	*M*	*SD*
E1	78.90	19.18
E4	85.53	15.98
E6	96.05	9.48
E7	76.71	11.88

Inferential statistics.

Table 15 shows the correlations between students' self-evaluations of their writing and their actual scores on writing performance.

Table 15

Correlations between Students' Writing Performance and Self-evaluation per Essay

	SE1	SE2	SE3	SE4	SE5	SE6	SE7	SE9
E1	0.50 **							
E2		0.50 *						
E3			0.60 **					
E4				0.49 **				
E5					0.14			
E6						0.32*		
E7							0.38 **	
E9								0.84 **

* p < .05, **p < .01

Specifically,

- The correlation of students' self-evaluations of their writing for essay 1 (M= 81.23, SD=16.27, N=62) and their actual score on writing performance on essay 1(M=70.63, SD=11.32) was highly significant r(62)=0.50, p=0.00).
- The correlation of students' self-evaluations of their writing for essay 2 (M= 82.88, SD=13.25, n=20) and their actual score on writing performance on essay 2 (M=73.21, SD=11.10) was significant r(20)=0.50, p=.03).
- The correlation of students' self-evaluations of their writing for essay 3 (M=79.80, SD=16.73, n=20) and their actual score on writing performance on essay 3 (M=80.29, SD=9.78) was highly significant r(20)=0.60, p=0.00).
- The correlation of students' self-evaluations of their writing for essay 4 (M=89.83, SD=12.74, N=62) and their actual score on writing performance on essay 4 (M=82.44, SD=6.13) was highly significant r(62)=0.49, p=0.00).
- The correlation of students' self-evaluations of their writing for essay 5 (M=87.00, SD=12.73, n=20) and their actual score on writing performance on essay 5 (M=80.04, SD=9.78) was not significant.

- The correlation of students' self-evaluations of their writing for essay 6 (M=96.95, SD=7.76, n=42) and their actual score on writing performance on essay 6 (M=94.22, SD=4.09) was significant r(42)=0.32, p=.04).
- The correlation of students' self-evaluations of their writing for essay 7 (M=83.57, SD=13.12, N=62) and their actual score on writing performance on essay 7 (M=83.20, SD=8.93) was highly significant r(62)=0.38, p=0.00).
- The correlation of students' self-evaluations of their writing for essay 9 (M=90.57, SD=9.12, n=20) and their actual score on writing performance on essay 9 (M=91.50, SD=6.92) was highly significant r (20)=0.84, p=0.00).

Trend-analysis of the relationship of self-evaluation and writing performance.

The analysis showed that students' self-evaluations of their writing and their actual scores on writing performance were significantly correlated for all essays with the exception of Essay 5 (Table 15). Figure 16 shows how their self-evaluations changed

over time in relation to changes in their writing performance.

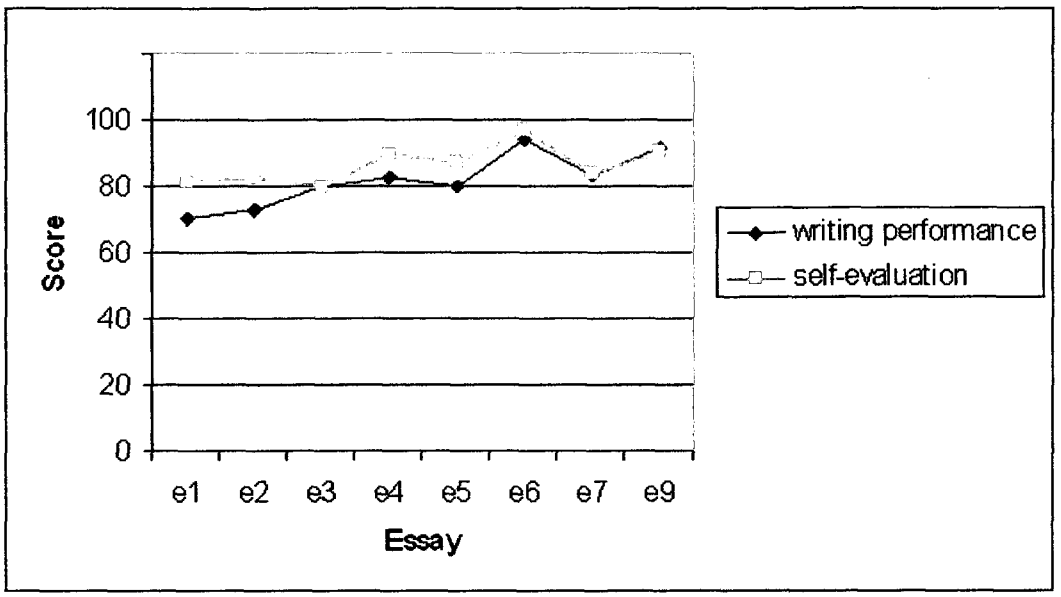

Figure 16. Graph of students' writing performance and self-evaluation over time

Figure 16 shows that students' average self-evaluation score was higher than their actual writing performance for their first six essays. An exception was essay 3 where their average self-evaluation score (M=79.80) was extremely close to their actual writing performance (M=80.29). As can be seen from table 16, for essay 7 students' self-evaluation score (M=83.57) and writing performance score (M=83.20) were extremely close. The same thing was observed for essay 9 as students' self-evaluation score (M=90.57) and writing performance score (M=91.50) were also extremely close.

Table 16
Students' Writing Performance and Self-evaluation Scores

	E1 n=62		E2 n=20		E3 n=20		E4 n=62		E5 n=20		E6 n=42		E7 n=62		E9 n=20	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Writing performance	71	11	73	11	80	10	82	6	80	10	94	4	83	9	92	7
Self-evaluation	81	16	83	13	80	17	90	13	87	13	97	8	84	13	91	9

c) How was goal-setting related to writing performance over time?

Goal setting is defined as students' attempt to describe one to four specific areas where improvement was needed either for the writing of their next piece or for their subsequent writing pieces. In most cases goal setting came as a result of students' self-evaluation, through which weaknesses were made explicit.

Goal setting for class 1

In class 1 students set goals for essays E2 to E6, they evaluated those goals and set new goals for essays E7 to E9. In general, students had chosen one to three main goals to focus on each time. They set an average of 3.7 goals during the year (n=20, SD=0.93). Student goals were read by the researcher and classified in 23 categories, which were then collapsed in four general areas (appendix N):

a) Structure/Organization: This category included goals that revolved around the structure and organization of the essay

b) **Writing conventions/Spelling/Grammar:** This category included goals that were related to the spelling of words or the grammar used in sentences

c) **Content/ideas:** This category included goals that concentrated on the content and ideas of the essay

d) **Other:** This category included goals that did not fit in any of the three previous categories.

Descriptive statistics.

Goal setting for class 1

Table 17 shows the number and percentage of goals set by class 1 students.

Table 17

Class 1 Students' Goal Setting Analysis

Goal category	Goals for essays 2 to 6	Goals for essays 7 to 9	Total of goals
Structure/Organization	4 (10%)	5 (15.1%)	9 (12.3%)
Writing conventions	15 (37.5%)	13 (39.4%)	28 (38.4%)
Content/ideas	12 (30%)	9 (27.3%)	21(28.8%)
Other	9 (22.5%)	6 (18.2%)	15(20.5%)
Total number/ percentage of goals	40 (100%)	33 (100%)	73(100%)

The majority of goals concentrated on aspects related to the second category: writing conventions, spelling and grammar, as can be seen from table 17.

Goal setting for class 2

In class 2 students set goals for essay 3. Upon its completion they evaluated those goals. They repeated this process for essays 4 and 5. In general, students had chosen one to five goals to focus on each time. Students set an average of 9.3 goals during the year (n=23, SD=1.22). The same analysis strategy used for class 1 goals was used for class 2. Table 18 shows the number and percentage of goals set by class 2 students.

Table 18

Class 2 Students' Goal Setting Analysis

Goal category	Goals for essay 3	Goals for essay 4	Goals for essay 5	Total of goals
Structure/Organization	7 (7.4%)	2 (3.2%)	1 (1.7%)	10 (4.7%)
Writing conventions	35 (37.2%)	32 (51.6%)	28 (47.4%)	95 (44.2%)
Content/ideas	22 (23.4%)	10 (16.1%)	10 (16.9%)	42 (19.5%)
Other	30 (31.9%)	18 (29%)	20 (33.9%)	68 (31.6%)
Total number/ percentage of goals	94 (100%)	62 (100%)	59 (100%)	215 (100%)

The majority of goals for class 2 concentrated on aspects related to the second category: writing conventions, spelling and grammar, as can be seen from table 18.

Goal setting for class 3

In class 3, students set goals for essay 3. Upon its completion they evaluated those goals. They set goals for essay 4 and without evaluating them they set new goals for essay 5, which they then evaluated. In general, students had chosen one to five goals to focus on each time. In class 3 students set an average of 9.35 goals during the year (n=20, SD=1.89). Table 19 shows the number and percentage of goals set by class 3 students.

Table 19

Class 3 Students' Goal Setting Analysis

Goal category	Goals for essay 3	Goals for essay 4	Goals for essay 5	Total goals
Structure/Organization	7 (10.6%)	3 (5.5%)	16 (23.2%)	26 (13.7%)
Writing conventions	24 (36.4%)	19 (35.2%)	21 (30.4%)	64 (33.9%)
Content/ideas	21 (31.8%)	11 (20.4%)	6 (8.7%)	38 (20.1%)
Other	14 (21.2%)	21 (38.9%)	26 (37.7%)	61 (32.3%)
Total goals	66 (100%)	54 (100%)	69 (100%)	189 (100%)

The majority of goals for class 3 for essay 3 concentrated on aspects related to the second category: writing conventions, spelling and grammar, as can be seen from table 19.

Overall, students of classes 2 and 3 set a higher number of goals (n_2=215 and n_3=189) compared to the number of goals set by class 1 students (n_1=73).

Inferential statistics.

There were inadequate data to analyze how students' goal setting skills changed over time in relation to writing performance. Only correlational analysis was feasible,

which showed that students' goals for their writing strongly correlated with their writing performance score post-portfolio implementation. Goal setting was a portfolio affordance which was not used for every essay so as to allow a quantitative analysis for trend. Students set goals for two or three times a year in each class. The correlation of students' goal setting (M=7.52, SD=3, N=63) and students' post-test writing score (M=81.9, SD=11.86) was significant, $r(63) = .29$, $p = .02$.

d) How was reflection related to writing performance over time?

Self-reflection is defined as students' attempt to revisit their writing piece and provide an answer to two prompts: a) What did you like best about your essay? and b) What can you improve on the next draft? Students received a score from 1 (no reflection) to 5 (answered both prompts adequately, e.g. identified parts of the essay that were successful and identified areas where improvement was needed) for their self-reflection (appendix P).

Descriptive statistics.

Reflection in class 1.

Students of class 1 completed a reflection for seven out of nine essays (E1, E2, E3, E4, E5, E7 and E9).

For class 1, there were five different students' reflection scores missing. The two students' reflection scores on essay 2, another student's reflection score on essay 5 and another two students' reflection scores on essay 7 that were missing were replaced with

the mean score of reflection for each student. Table 20 presents the average reflection scores for class 1(n=20) on a scale of 1 to 5.

Table 20

Average Reflection Scores for Class 1

Essay	*M*	*SD*
E1	4.55	0.76
E2	3.63	1.22
E3	4.40	0.75
E5	3.95	1.05
E7	4.11	0.79
E9	3.80	0.83

Reflection in classes 2 and 3.

Students of classes 2 and 3 only reflected on their work for essay1. Table 21 presents the average reflection scores for classes 2 and 3 on a scale of 1 to 5 for essay 1.

Table 21

Average Reflection Scores for Classes 2 and 3

Reflection	*n*	*M*	*SD*
Class 2	22	3.55	0.91
Class 3	20	1.85	1.42

Inferential statistics.

There was inadequate data to analyze how students' reflection skills changed over time in relation to their writing performance. Furthermore, reflection was not implemented in classes 2 and 3. It was used for six out of the nine essays in class1, with results that did not follow a specific trend over time. Therefore, only a correlational

analysis was possible. The correlation of class 1 students' average reflection score (M = 24.44, SD = 3.32, N = 20) and their writing performance at the end of the implementation (M = 91.50, SD = 6.92) was statistically significant $r(20) = 0.5$, $p = .02$.

Research Question 2

How does elementary school students' writing self-efficacy change with the use of process portfolio pedagogy that supports a process approach in writing, progress monitoring (self-evaluation, goal setting), access to peers' work and feedback?

Assessment of students' writing self-efficacy over time.

Two instruments were used to measure students' writing self-efficacy: the Writer Self-Perception Scale (WSPS) and the Pajares et al. (2001) Student Writing Self-Efficacy Instrument. First, descriptive and inferential statistics are presented to show the changes in students' writing self-efficacy over time using both instruments. Next, the results of the qualitative data analysis of selected students' interviews are presented for a more in-depth examination of those changes. Following that, descriptive statistics of students' perceptions of portfolios are presented. Inferential statistics are then used to examine the association between the three main sources of self-efficacy, which were measured with Student Writing Self-efficacy Instrument 1, with specific portfolio affordances, which were derived from students' questionnaires on their perceptions on portfolios. More specifically, the associations that are examined are the following: a) the association of mastery experiences with a process approach in writing, progress monitoring, self-

evaluation and goal setting, b) the association of vicarious experiences with access to peers' portfolios, and c) the association of verbal persuasion with social feedback from peers, parents and the teacher.

Descriptive statistics from the administration of Student Writing Self-Efficacy Instrument 1.

The Writer Self-Perception Scale (WSPS) consisted of 38 items using a 5-point Likert-scale (1= Completely Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Completely agree) (appendix B). Each one of these answers received a point from 1 to 5, respectively. Students' writing self-efficacy score consisted of the sum of their responses. The minimum possible score was 38 and the maximum possible score was 190.

Two students from class 3 did not participate in the pre-portfolio implementation administration of the Writer Self-Perception Scale (WSPS) and one student from class 3 did not participate in the mid-portfolio implementation administration of the Writer Self-Perception Scale (WSPS). Those students' scores were not included in the analysis.

In classes 2 and 3, there were 29 missing values in several questions of the pre-test (one missing value in questions 1, 9, 18, 20, 22, 24, 26, 28, 29, 30, 31 and 36, two missing values in questions 3, 6, 16, 25, 32, 33 and 35 and three missing values in question 7). Those values were replaced with the mean score of class 2 and class 3 on each question. In classes 2 and 3 there were 9 missing values in some questions of the mid-test (one missing value in questions 6, 8, 23, 25, 27 and 29 and three missing values on question 33). Those values were replaced with the mean score of class 2 and class 3 on

each question. There were no missing values on the post-test. The results of the pre-, mid- and post-portfolio implementation administration of the Writer Self-Perception Scale (WSPS) for each one of the three classes are presented in table 22.

Table 22

Students' Writing Self-efficacy Scores per Class over Time Using the WSPS

	Pre-test		**Mid-test**		**Post-test**	
Class	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	137.45	20.36	146.28	13.37	145.7	19.7
2	149.30	17.50	153.20	18.91	156.78	16.04
3	142.68	28.85	155.30	20.87	160.35	15.19

Group equivalence was first established. As there were no statistically significant differences among the three classes ($F=1.53$, $p>.05$, $df=2$) based on the pre-test on students' writing self-efficacy, subsequent analysis was conducted with all three classes examined as one group. The results of the pre-, mid- and post-portfolio implementation administration of the Writer Self-Perception Scale (WSPS) for all three classes are presented in table 23.

Table 23

Students' Writing Self-efficacy Scores over Time Using the WSPS

WSPS score	*N*	*M*	*SD*
Pre-portfolio implementation	61	143.46	22.46
Mid-portfolio implementation	62	151.61	18.10
Post-portfolio implementation	63	154.40	17.86

The Writer Self-Perception Scale (WSPS) consists of four factors: a) General progress (items 3, 6, 12, 14, 15, 17, 18, 19 and 20) and specific progress (items 22, 25, 29, 31, 34, 36 and 38), b) Observational Comparison (items 1, 4, 8, 11, 16, 21, 23, 26 and 30), c) Social feedback (items 5, 9, 10, 13, 28, 33 and 37) and d) Physiological Sate (items 2, 7, 24, 27, 32 and 35). The first three factors in the WSPS instrument correspond to the three main sources of self-efficacy according to Bandura's theory: a) Mastery Experiences, b) Vicarious experiences and c) Verbal persuasion. Students' scores on the four different sources of self-efficacy in the WSPS instrument: a) General and Specific Progress (=Mastery Experiences), b) Observational Comparisons (=Vicarious experiences), Social Feedback (=Verbal persuasion) and Physiological State, pre- mid- and post-portfolio implementation for the three classes are presented in table 24. The minimum and maximum possible scores for each factor are also presented in table 24.

Table 24

Students' Writing Self-efficacy Scores per Component of the WSPS

			Pre-test		**Mid-test**		**Post-test**	
WSPS components	**Min**	**Max**	*M*	*SD*	*M*	*SD*	*M*	*SD*
a) General and specific progress	16	80	64.97	10.14	69.61	8.71	71.67	8.27
b) Observational Comparison	9	45	29.26	5.07	29.72	5.15	30.29	5.02
c) Social feedback	7	35	26.09	4.80	27.62	3.91	28.32	4.24
d) Physiological State	6	30	23.13	6.61	24.71	5.59	24.50	6.44

To address the alternative interpretation that the reported increase in students' writing-self-efficacy for the students who participated in this study was due to general learning and maturation rather than portfolio-related processes, a control group from a different school was used. Control group 1 (N=83 fourth grade students) was administered the Student Writing Self-Efficacy Instrument 1 twice, as a pretest and as a posttest, in the beginning and at the end of the academic year 2008-2009, respectively. Access to the students'grades (A, B, C, D and E) of both the control group (N=83) and of the students who participated in this study (N=63) allowed for examining the equivalence of the groups. Table 25 shows the control group students' writing self-efficacy scores obtained with the use of the Writer Self-Perception Scale. The 63 participants of the study ($M = 3.19$, $SD = 1.05$) and the 83 participants in the control group ($M = 3.57$, $SD = 1.27$), did not demonstrate a significant difference in writing performance, based on their Language Arts grade ($t[144] = -1.91$, $p > .05$). Group equivalence was therefore established.

Table 25

Control Group Students' Writing Self-efficacy Using the WSPS

WSPS score	*n*	*M*	*SD*
Pre-test	83	144.61	20.73
Post-test	83	147.17	20.81

There was no statistically significant difference between the control group's pretest score on writing self-efficacy (M=144.61, SD=20.73) and their posttest score on writing self-efficacy(M=147.17, SD=20.81), $t(82) = -1.93$, $p > .05$.

Descriptive statistics from the administration of Student Writing Self-Efficacy Instrument 2.

The Pajares et al. (2001) Student Writing Self-Efficacy Instrument consisted of ten items using a 0 to 10 point scale indicating how certain students were that they could perform specific writing tasks (0= "Not certain at all" to 10= "Completely certain") (appendix C). Each one of these answers received a point from 1 to 10, respectively. Students' writing self-efficacy score consisted of the sum of their responses. The minimum possible score was 0 and the maximum possible score was 100.

Two students from class 3 did not participate in the pre-portfolio implementation administration of the Pajares et al. (2001) Student Writing Self-Efficacy Instrument. Those students' pre-test scores were excluded from the analysis. There was one missing value on question 1 from class 2 and one missing value on question 7 from class 1 in the pre-test administration. Those were replaced with the mean score of class 2 for question 1 and the mean score of class 1 for question 7, respectively. In the mid-portfolio implementation administration there was one missing value in class 2 on question 1. This was replaced with the mean score of class 2 for question 1. In the post-portfolio implementation administration there was one missing value in class 2 on question 1. This was replaced with the mean score of class 2 for question 1.

Table 26 shows the students' writing self-efficacy scores pre- mid- and post-portfolio implementation. As there were no statistically significant differences among the three classes ($F=1.53$, $p>.05$, $df=2$) based on the pre-test on students' writing self-efficacy, subsequent analysis was conducted with all three classes examined as one group.

Table 26

Students' Writing Self-efficacy Scores over Time Using Instrument 2

Pajares et al. (2001) Student Writing Self-Efficacy Instrument	*n*	*M*	*SD*
Pre-portfolio implementation	61	79.02	15.34
Mid-portfolio implementation	63	83.56	10.05
Post-portfolio implementation	63	83.30	13.58

To address the alternative interpretation that the reported increase in students' writing-self-efficacy for the three classes that participated in this study was due to general learning and maturation rather than portfolio-related processes, a control group from a different school was used. Control group 2 (N=59 fourth grade students) was administered the Student Writing Self-Efficacy Instrument 2 twice, as a pretest and as a posttest, in the beginning and at the end of the academic year 2008-2009, respectively. Access to the students' grades (A, B, C, D and E) of both the control group (N=59) and of the students who participated in this study (N=63) allowed for examining the equivalence of the groups. The 63 participants of the study ($M = 3.19$, $SD = 1.05$) and the 59 participants in the control group ($M = 3.49$, $SD = 1.21$), did not demonstrate a significant difference in writing performance, based on their Language Arts grade ($t[120] = -1.47$, $p > .05$). Group equivalence was therefore established.

Table 27 shows the control group students' writing self-efficacy scored obtained with the use of the Pajares et al. (2001) Student Writing Self-Efficacy Instrument.

Table 27

Control Group Students' Writing Self-efficacy Scores Using Instrument 2

WSPS score	*n*	*M*	*SD*
Pre-test	59	84.67	15.27
Post-test	59	85.19	16.68

There was no statistically significant difference between the control group's pretest score on writing self-efficacy (M=84.67, SD=15.27) and their posttest score on writing self-efficacy (M=85.19, SD=16.68), $t(58) = -0.89, p > .05$.

Inferential statistics from the administration of Student Writing Self-efficacy Instrument 1.

Repeated measures analysis results showed that students' writing self-efficacy increased over time. The students' writing self-efficacy score obtained using the WSPS instrument was analyzed in an analysis of variance with time of measurement (pre-portfolio implementation vs mid-portfolio implementation vs post-portfolio implementation) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was met. The main effect of time of measurement was significant, $F(2, 118) = 13.03$, $p<.05$, $\eta^2=0.34$. Eta-squared is the effect size. It shows that 34% of the variance is accounted for. Post-hoc comparisons were performed using the Bonferroni adjustment for multiple comparisons. Students' writing self-efficacy was increased from a mean of 144.50 (SD=21.13) pre-portfolio implementation of portfolios to a mean of 151.61 (SD=18.39, $p<.05$) midway through the portfolio implementation. There was no difference between the mid- portfolio implementation score and the post-portfolio implementation score ($p>.05$).

Separate analyses were conducted for the students' writing self-efficacy score for the three different sources of self-efficacy in the WSPS instrument (appendix B): General and Specific Progress (=Mastery Experiences), Observational Comparisons (=Vicarious experiences) and Social Feedback (=Verbal persuasion). Physiological State was not part of the analysis.

First source of self-efficacy: Mastery Experiences.

The students' writing self-efficacy score on mastery experiences was analyzed in an analysis of variance with time of measurement (pre-portfolio implementation vs mid-portfolio implementation vs post-portfolio implementation) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was met. The main effect of time of measurement was significant, $F(2, 116) = 19.15$, $p<.01$, $\eta^2=0.25$. Eta-squared is the effect size. It shows that 25% of the variance is accounted for. Post-hoc comparisons were performed using the Bonferroni adjustment for multiple comparisons. Students' writing self-efficacy with regard to their general and specific progress was increased from a mean of 65.30 (SD=9.98) pre-portfolio implementation of portfolios to a mean of 69.32 (SD=8.72, $p<.05$) midway through the portfolio implementation. There was no difference between the mid-portfolio implementation score and the post-portfolio implementation score ($p>.05$). However, the post-portfolio implementation score on general and specific progress (M=71.81, SD=8.16) was significantly higher than the pre-portfolio implementation score on general and specific progress ($p<.05$).

Second source of self-efficacy: Vicarious experiences.

The students' writing self-efficacy score on vicarious experiences was analyzed in an analysis of variance with time of measurement (pre-portfolio implementation vs mid-portfolio implementation vs post-portfolio implementation) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was met. The main effect of time of measurement was not significant, $F(2, 118) = 1.15$, $p>.05$, $\eta^2=.02$. The analysis of students' writing self-efficacy with regard to observational comparisons did not have any significant results.

Third source of self-efficacy: Verbal persuasion.

The students' writing self-efficacy score on verbal persuasion, which corresponds to the social feedback coming from peers, teacher and parents from the WSPS instrument, was analyzed in an analysis of variance with time of measurement (pre-portfolio implementation vs mid-portfolio implementation vs post-portfolio implementation) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was met. The main effect of time of measurement was significant, $F(2, 118) = 7.08$, $p<.01$, $\eta^2=0.11$. Eta-squared is the effect size. It shows that 11% of the variance is accounted for. Post-hoc comparisons were performed using the Bonferroni adjustment for multiple comparisons. Students' writing self-efficacy with regard to Social Feedback coming from peers, teacher and parents was increased from a mean of 26.32 (SD=4.47) pre-portfolio implementation of portfolios to a mean of 28.40 (SD=4.23, $p<.05$) post- portfolio implementation.

To specify which of the three sources of verbal pursuasion were most important, separate repeated measures analyses were conducted for the students' writing self-efficacy score for social feedback coming from a) peers, b) the teacher or c) parents, with time of measurement (pre-portfolio implementation vs mid-portfolio implementation vs post-portfolio implementation) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was met. The main effects of time of measurement for social feedback from peers ($F(2, 118) = 4.59$, $p<.05$, $\eta^2=.07$) and the teacher ($F(2, 118) = 6.48$, $p<.01$, $\eta^2=0.10$) were significant, as opposed to social feedback from parents which was not. Eta-squared is the effect size. The effect sizes were low as social feedback from peers accounts for only 7% of the variance while social feedback from the teacher accounts for only 10% of the variance.

Inferential statistics from the administration of Student Writing Self-efficacy Instrument 2.

The students' writing self-efficacy score obtained using the Pajares et al. (2001) instrument was also analyzed in an analysis of variance with time of measurement (pre-portfolio implementation vs mid-portfolio implementation vs post-portfolio implementation) as a within-subjects factor. The assumptions of normality and homogeneity of variance were met. The sphericity assumption was not met so the Huynh-Feldt correction was applied. The main effect of time of measurement was significant, $F(1.62, 97.2) = 3.76$, $p<.05$, $\eta^2=.06$. However, post-hoc comparisons performed using the Bonferroni adjustment for multiple comparisons did not yield any statistically significant

differences between the three means and eta-squared, which is the effect size was very low as only 6% of the variance can be explained.

Qualitative data analysis for changes in students' writing self-efficacy.

To better understand the changes in students' writing self-efficacy over time, semi-structured interviews with students were conducted with a small, random sample of nine class 1 students. The nine students were selected based on the results of the WSPS instrument administration, so as to include three students with low, three students with average and three students with high writing self-efficacy. Students were ranked according to their pre-portfolio implementation score on writing self-efficacy. The three students with the lowest writing self-efficacy scores (Artemis, Maria, Stamatis), the three students with the highest writing self-efficacy scores (Andria, Andreas, Marina) and three students from the middle of the distribution of scores (Apostolides, Gabriela, Theodor) were selected. Pseudonyms were used in place of students' real names to facilitate the reporting of findings. Table 28 shows the actual writing self-efficacy (SE) scores (out of 190) of those nine students pre- portfolio implementation and the transformation of those scores into a percentage score.

Table 28

Writing Self-efficacy Scores of Selected Students

Name	Gender	Age (years)	SE (raw score)	SE (% score)
Artemis	F	9	89	47
Maria	F	9.5	117	62
Stamatis	M	9.75	125	66
Apostolides	M	9.25	135	71
Gabriela	F	9	139	73
Theodor	M	9.83	144	76
Andria	F	9.5	161	85
Andreas	M	9	171	90
Marina	F	9.08	172	91

Students' writing self-efficacy score (out of 190) was transformed into a percentage score so as to allow for easier comparisons with students' writing performance score, which is also presented as a percentage score. Until the first time that students' self-efficacy was evaluated they wrote one essay, E1. For the purposes of this analysis, that essay's score constituted "students' writing performance pre-portfolio implementation". Until the second time that students' self-efficacy was evaluated (mid-portfolio implementation) they wrote essays E2 to E7. The average of students' scores on essays 2 to 7 constituted "students' writing performance mid-portfolio implementation". Until the third time that students' self-efficacy was evaluated (post-portfolio implementation) they wrote essays E8 and E9. The average of students' scores on essays 8 and 9 constituted "students' writing performance post-portfolio implementation".

Table 29 presents students' self-efficacy (SE) scores and students' writing performance (WP) scores pre-, mid- and post-portfolio implementation, in percentage format. Four out of the nine students' writing self-efficacy pre-portfolio implementation (Apostolides, Gabriela, Theodor, Andreas) corresponded to their actual writing

performance, meaning that if they had low, average or high writing performance they had low, average or high self-efficacy, accordingly. Five out of the nine students' writing self-efficacy pre-portfolio implementation did not correspond to their actual writing performance, meaning that their self-efficacy score was either higher or lower than their measured writing performance. Specifically, three students (Stamatis, Maria and Artemis) underestimated their writing performance. As a result their self-efficacy score pre-portfolio implementation was significantly lower than their writing performance score. Two students (Andria, Marina) overestimated their writing performance. As a result their self-efficacy score pre-portfolio implementation was higher than their writing performance score.

Table 29

Selected Students' Self-efficacy (SE) Scores[a] and Writing Performance (WP) Scores[b] over Time

		Pre- portfolio implementation		Mid-portfolio implementation		Post- portfolio implementation	
Name	**G[c]**	**SE**	**WP**	**SE**	**WP**	**SE**	**WP**
Artemis	F	47 (low)	82 (avg)	65(low)	89.67 (high)	52(low)	97 (high)
Maria	F	62 (low)	92 (high)	64(low)	92 (high)	69(low)	98 (high)
Stamatis	M	66(low)	84 (high)	89(high)	91.33 (high)	93(high)	100 (high)
Apostolides	M	71(avg)	76 (avg)	75(avg)	83 (avg)	83(high)	94 (high)
Gabriela	F	73(avg)	82 (avg)	83(high)	90.33 (high)	73(avg)	99 (high)
Theodor	M	76(avg)	62 (avg)	79(avg)	79.33 (avg)	73(avg)	90 (high)
Andria	F	85(high)	74 (avg)	81(high)	92 (high)	85(high)	97 (high)
Andreas	M	90(high)	96 (high)	88(high)	93.78 (high)	91(high)	92 (high)
Marina	F	91(high)	60 (avg)	78(avg)	82.67 (avg)	82(high)	80 (avg)

There was a difference noticed from pre- to mid-portfolio implementation with regard to the accuracy of students' evaluations of their abilities. By mid-portfolio implementation, almost all students (seven out of nine students) had a more accurate self-efficacy score that better corresponded to their actual writing performance, compared to their pre-portfolio implementation scores. This means that if they had low, average or high writing performance they had low, average or high self-efficacy, accordingly. For example, Stamatis, who had low self-efficacy pre-portfolio implementation, had high self-efficacy both mid- and post-portfolio implementation that corresponded to his high

[a] Note. Students' writing self-efficacy that ranged between the minimum possible score of 38 to 70 (inclusive) was coded as "low". Students' writing self-efficacy that was higher than or equal to 71 and lower than or equal to 80 was coded as "average". Students' writing self-efficacy that was higher than or equal to 81 and lower than or equal to 100 was coded as "high".

[b] Note. Students writing performance that ranged between the minimum possible score of 20 to 61 (inclusive) was coded as "low". Students' writing performance that was higher than or equal to 62 and lower than or equal to 83 was coded as "average". Students' writing performance that was higher than or equal to 84 and lower than or equal to 100 was coded as "high".

[c] Note. G=Gender (M=male, F=female).

writing performance (table 29). However, Artemis' and Maria's writing self-efficacy remained low throughout the academic year despite the fact that their writing performance was very high.

Examination of students' perceptions on portfolios.

Descriptive statistics.

Students' perceptions on the connection of portfolios and their writing self-efficacy were examined using a student questionnaire (appendix D) that was administered to students of class 1 post-portfolio implementation on June 12th 2008. The instrument consisted of 11 items using a 5-point Likert-scale (1= Completely Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Completely agree). Each one of these answers received a point from 1 to 5, respectively. Students' score on their perceptions on the connection of portfolios and their writing self-efficacy consisted of the sum of their responses. The minimum possible score was 11 and the maximum possible score was 55. The 11 questionnaire items addressed different portfolio affordances and their connection to students' writing self-efficacy, as follows: item 1 referred to goal setting, item 2 referred to self-evaluation, items 3 and 4 referred to progress monitoring, item 5 referred to the process approach in writing, items 6, 7 and 8 referred to access to peers' work, item 9 referred to teacher feedback, item 10 referred to peer feedback and item 11 referred to parent feedback. Table 30 shows class 1 students' responses for each item of the instrument on a 1 to 5 scale.

Table 30

Class 1 Students' Perceptions on Portfolios

	Statement	*M (out of 5)*	*SD*
1	Setting goals in my portfolio helped me get better in writing.	3.95	1.36
2	Self-evaluation in my portfolio helped me get better in writing.	3.75	1.12
3	I can see progress in my writing in my portfolio.	4.40	0.68
4	When I monitor my progress in my portfolio I get better in writing.	4.21	1.18
5	Working on more than one drafts in my portfolio helped me get better in writing.	4.20	0.83
6	I read my peers' portfolio essays online.	4.55	0.76
7	I read my peers' portfolio essays online to get better in writing.	3.70	1.56
8	Having access to my peers' writing portfolios helped me get better in writing.	3.89	1.33
9	My teacher's feedback in my portfolio helped me get better in writing.	4.15	1.09
10	My peers' feedback in my portfolio helped me get better in writing.	4.15	1.14
11	I would like to receive my parents' feedback in my portfolio.	4.55	1.05

Overall, class 1 students had positive perceptions of the value of portfolios for their progress in writing skills (M=45.10 out of 55, SD=8.26, n=20), post-portfolio implementation.

Students of classes 2 and 3 completed a modified version of this questionnaire that was more applicable to paper-based portfolios (appendix E) post-portfolio implementation on June 12th 2008. This paper-based portfolio version of the questionnaire was identical to the digital portfolio version with the exception of the removal of item 11, which referred to parental feedback and it was not applicable to paper portfolios, and the modification of item 9, which referred to teacher feedback, so that it would specifically address the teacher's detailed remarks. The instrument consisted

of 10 items using a 5-point Likert-scale (1= Completely Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Completely agree). Each one of these answers received a point from 1 to 5, respectively. Students' score on their perceptions on the connection of portfolios and their writing self-efficacy consisted of the sum of their responses. The minimum possible score was 10 and the maximum possible score was 50. Table 31 shows class 2 and 3 students' responses for each item of the instrument on a 1 to 5 scale.

Table 31

Class 2 and 3 Students' Perceptions on Portfolios (n=43)

	Statement	M (out of 5)	SD
1	Setting goals in my portfolio helped me get better in writing.	4.49	0.59
2	Self-evaluation in my portfolio helped me get better in writing.	4.28	0.96
3	I can see progress in my writing in my portfolio.	4.53	0.74
4	When I monitor my progress in my portfolio I get better in writing.	4.74	0.58
5	Working on more than one drafts in my portfolio helped me get better in writing.	4.23	0.84
6	I read my peers' portfolio essays.	3.70	1.35
7	I read my peers' portfolio essays to get better in writing.	3.65	1.36
8	If I read my peers' portfolio essays I will get better in writing.	4.14	1.04
9	My teacher's detailed remarks in my portfolio helped me get better in writing.	4.00	1.13
10	My peers' feedback in my portfolio helped me get better in writing.	3.40	1.29

Overall, class 2 students had positive perceptions of the value of paper-based portfolios for their progress in writing skills (M=40 out of 50, SD=3.71, n=23), post-portfolio implementation. The same observation can be made for class 3 students who

also had positive perceptions of the value of paper-based portfolios for their progress in writing skills (M=42.55 out of 50, SD=5.86, n=20), post-portfolio implementation.

In the next section that breaks down the second research question into three parts, both inferential statistics and qualitative data on the relationship between each source of self-efficacy and specific portfolio affordances are presented.

a) How were mastery experiences related to progress monitoring, self-evaluation and goal-setting?

The correlation of students' perceptions of portfolios ($M = 42.41$, $SD = 6.39$, $N = 63$) and students' writing self-efficacy post portfolio implementation ($M = 154.78$, $SD = 18$) was highly significant $r(63) = .40$, $p = .001$. It was examined whether portfolio affordances such as goal setting (item 1, appendix D), progress monitoring (items 3 and 4, appendix D), self-evaluation (item 2, appendix D), as well as the process approach in writing (item 5, appendix D) related to the first source of self-efficacy in the WSPS instrument, mastery experiences (cumulative score of items 3, 6, 12, 14, 17, 18, 19, 20, 22, 25, 29, 31, 34, 36 and 38, appendix B). The correlations of each one of those portfolio affordances (the process approach in writing, progress monitoring, self-evaluation and goal setting) with students' writing self-efficacy, post-portfolio implementation is presented in table 32.

Table 32

Correlations of Portfolio Affordances and Writing Self-efficacy (Mastery Experiences)

Portfolio affordances	Students' writing self-efficacy (N=63)
Process approach	0.53**
Progress monitoring	0.66**
Self-evaluation	0.39**
Goal setting	0.40**

**p < .01

The above statistically significant positive correlations indicated that process portfolio affordances, such as a approach in writing, progress monitoring, self-evaluation and goal setting related to the most important source of self-efficacy, according to the Bandura model of self-efficacy, mastery experiences.

Process approach in writing.

The results of the administration of the instrument examining students' perceptions on portfolios showed that 80.9% of students (N=63) agreed or strongly agreed that working on more than one drafts in their portfolios helped them improve their writing performance.

As table 32 shows, the correlation of students' perceptions of the process approach in portfolios, defined as having multiple versions of their work included in portfolios ($M = 4.22$, $SD = 0.83$, $N = 63$) and their post-portfolio implementation writing self-efficacy score of their mastery experiences from the WSPS instrument ($M = 71.67$, $SD = 8.27$) was highly significant, $r(63) = .53$, $p = 0.00$.

Most students saw the value of having multiple drafts of their work from the early stages of portfolio implementation, even though some of them thought that the drafts'

purpose was for their mistakes not to be shown. The following excerpt from Artemis' interview pre-portfolio implementation showed this view:

Researcher: *What do you think of this year's approach in working on a 2nd draft of our essay?*
Artemis: *I don't think it's a bad idea. It's good to write it, correct it and then re-write it.*
Researcher: *Even though it's a bit of trouble to re-write an essay?*
Artemis: *It's better this way. Cause we avoid showing the mistakes in this way, the 2nd draft is "clean".*

Progress monitoring.

The results of the administration of the instrument examining students' perceptions on portfolios showed that 90.5% of students (N=63) agreed or strongly agreed that being able to monitor their progress in portfolios helped them improve their writing performance.

As table 32 shows, the correlation of students' perceptions of progress monitoring post-portfolio implementation ($M = 4.49$, $SD = 0.72$, $N = 63$) and their post-portfolio implementation writing self-efficacy score of their mastery experiences from the WSPS instrument ($M = 71.67$, $SD = 8.27$) was highly significant, $r(63) = .66$, $p = 0.00$.

From the beginning of the portfolio implementation, students realized the fact that portfolios were a mechanism through which they could monitor their progress and most of them pointed out that they did make progress. Artemis had a way of monitoring her progress from the beginning of the year, as the following excerpt from her pre-portfolio implementation interview in September 2007 showed:

Researcher: *Do you have a way to monitor your progress? In other words, how do you know if you're progressing? How do you know whether you're achieving your goals?*

Artemis: *When I read my essays in my portfolio to complete the next self-evaluation I fist check if I achieved my goal of the previous essay. Then I check my next essay and then I write the self-evaluation... I may not have achieved my goal yet and if so, I will state that.*

Researcher: *Do you think your essays in your portfolio show progress?*

Artemis: *Yes, I believe that they do.*

Marina, on the other hand, might not have been able to see progress in her portfolio but, during the mid-portfolio implementation interview, she could actually identify that her writing performance was not steadily improving; it was sometimes higher and sometimes lower.

Researcher: *Can you tell if you made progress from the beginning of the year until now if you see your portfolio?*

Marina: *(Accessing some of her essays in her portfolio, she reads some of the teacher's comments but does not answer the question)*

Researcher: *What do you think? You don't have to answer based on your teacher's comments only.*

Marina: *I have ups and downs, one essay is bad, the next is good and again the same course...*

During the post-portfolio implementation interview, without being prompted to refer to his progress, Andreas, while browsing through his portfolio, indicated with some pride that he made some progress.

Andreas: *(logs in to his portfolio, browses through some of his essays, and remembers an essay that he liked). Now I see that I write lengthier essays. Look, I write lengthier essays here (points out to the fairy tale "The big, bad Red Riding Hood and the nice Wolf" to prove his point).*

Researcher: *Yeah, the fairy tale was really long.*

Andreas: *I used a metaphor here (reads a paragraph): "The little Wolf is no longer afraid of the Big, Bad Red-Riding Hood. He remembers his grandma's advice that said: There are many bad people but the worst people of all hide behind a mask: the mask of kindness".*

Researcher: *So you think you gradually became better?*
Andreas: *Yes!...But I was good at the first stages, too.*
Researcher: *Yes, indeed you were.*
Andreas: *I remember when you wrote to me that I was good.*

Students realized the value of portfolios as a way to help them monitor their progress:

Researcher: *Do you have a way to monitor your progress? In other words, how do you know if you're progressing? How do you know whether you're achieving your goals?*

Stamatis: *When I read them(my essays) I may compare (them) with the previous essays in my portfolio and they may be better compared to the beginning.*

Researcher: *Do you have a way to monitor your progress? In other words, how do you know if you're progressing? How do you know whether you're achieving your goals?*

Gabriela: *I read the previous essays in my portfolio two-three times and then (I read) the next one and then my mother reads them to me, too and tells me what she thinks.*
Researcher: *How often do you do this?*
Gabriela: *Almost every day. I compare the essays*
Researcher: *What is your conclusion when you read or compare previous essays?*
Gabriela: *In each essay I was writing more and I was using the punctuation correctly.*

Self-evaluations.

As table 32 shows, the results of the administration of the instrument examining students' perceptions on portfolios showed that 69.8% of students (N=63) agreed or strongly agreed that conducting self-evaluations helped them improve their writing performance.

The correlation of students' perceptions of self-evaluation in portfolios ($M = 4.11$, $SD = 1.03$, $N = 63$) and their post-portfolio implementation writing self-efficacy score of mastery experiences from the WSPS instrument ($M = 71.67$, $SD = 8.27$) was highly significant, $r(63) = .39$, $p = 0.00$.

Data from the qualitative analysis of nine students' interviews showed that students realized the value of self-evaluation, and associated self-evaluations with their progress in writing performance.

Researcher: *What do you think about the self-evaluation we conduct this year?*
Andreas: *It is very easy because I can see the aspects where I have weaknesses and this helps me to be able to correct them (those aspects) in my next essay.*

Researcher: *Do you think the self-evaluation we conduct this year helps us?*
Apostolides: *Yes it helps us.*
Researcher: *How?*
Apostolides: *It helps us improve in each writing piece we have, for each topic (...)*

Researcher: *Does our self-evaluation help?*
Stamatis: *Yes, very much (taking a look at his self-evaluation in his portfolio). When I saw it (the self-evaluation) last time I knew that I did better.*

Goal setting.

The results of the administration of the instrument examining students' perceptions on portfolios showed that 85.7% of students (N=63) agreed or strongly agreed that goal setting in their portfolios helped them improve their writing performance.

Results from the portfolio content analysis confirmed this finding. The correlation of the actual number of goals set in students' portfolios ($M = 7.52$, $SD = 3$, $N = 63$) and their mid-portfolio implementation writing self-efficacy score of their mastery experiences from the WSPS instrument ($M = 69.61$, $SD = 8.71$, N=61) was significant, $r(61) = .29$, $p = .02$.

Data from the qualitative analysis of nine students' interviews showed that students did realize the value of goal setting and were able to differentiate between goals that were achieved and goals that needed additional work, as the following excerpts from students' mid-portfolio implementation interviews show:

Researcher: *Do you think that setting goals in your portfolio helped you get better in writing?*

Andria: *Yes.*

Researcher: *How?*

Andria: *My peers and teacher did not understand my handwriting. So I had to increase its size, as one of my goals was for my handwriting to be eligible and they (the goals) helped me because I made it (the font) bigger so that people can actually read my essay. It might be good and just because of the handwriting you may not realize that it's good cause it's not legible!*

Researcher: *So one of your goals was to improve your handwriting? And you think you achieved that?*

Andria: *Yes, because I increased the size compared to my handwriting before.*

Researcher: *What other goals did you set?*

Andria: *To improve on spelling.*

Researcher: *What do you think of this one?*

Andria: *I'm doing better than before I think. I need some more effort.*

Researcher: *So you'll set the same goal again?*

Andria: *Yes. Also I set the goal of not repeating the same words*

Researcher: *How are you doing with that goal?*

Andria: *Somewhat better. For example instead of writing "my mother and my sister and my father and my brother" I may write: "my mother, comma, my sister,* ***comma****, my father* ***comma****, my brother* ***comma****, or I may write "and my brother" to finish the sentence".*

Researcher: *Do you think goal setting helped you improve?*

Stamatis: *Yes.*

Researcher: *How?*

Stamatis: *When I had the goal of improving my handwriting, I did succeed in that. And I succeeded in writing more adjectives (...)*

Researcher: *Did you set a more challenging goal?*

Stamatis: *Yes, to write a lengthier conclusion.*

Researcher: *Did you achieve in this?*

Stamatis: *Yes, I wrote a conclusion that was a bit bigger.*

b) How were vicarious experiences related to access to peers' portfolios?

The results of the administration of the instrument examining students' perceptions on portfolios showed that 73% of students (N=63) agreed or strongly agreed that having access to their peers' portfolios helped them improve their writing performance.

It was examined whether portfolios affordances such as access to peers' portfolios and peer feedback (items 6, 7 and 8, appendix D) related to the second source of self-efficacy, vicarious experiences (cumulative score of items 1, 4, 8, 11, 16, 21, 23, 26 and 30). The correlation of students' perceptions of access to peers' work post-portfolio implementation ($M = 4.06$, $SD = 1.13$, $N = 62$) and their post-portfolio implementation writing self-efficacy score of vicarious experiences from the WSPS instrument ($M = 30.29$, $SD = 5.02$, $N = 63$) was significant, $r(62) = .27$, $p = .03$.

This statistically significant positive correlation indicated that access to peers' work in portfolios related to vicarious experiences, which is identified as the second source of self-efficacy, according to the Bandura model of self-efficacy.

Data from the qualitative analysis of nine students' interviews showed that they thought that having access to their peers' work was important, as the following excerpt from Gabriela's interview shows:

Researcher: *Do you think it helps you to see the essays of students who are as good as you or better than you?*
Gabriela: *Yes, because they may have better expressions.*
Researcher: *So do you like to see your peers' work?*
Gabriela: *Yes.*

The qualitative data showed that only two students (Andria and Maria) mentioned peers as a source of their writing self-efficacy beliefs, meaning that only those students had a clear idea on what their peers thought about their writing ability. Andria's interview excerpt can be used as an example:

Andria: *They (peers) do think I'm good because they say: "Bravo it was a good essay, I liked it but in order to improve more you should correct the following spelling mistakes, or use the correct tense". Some peers' comments I understand, others' I may not, because they simply point out a spelling mistake. I can't tell from those peers' comments what they think of me as they don't say: "Good job, it was a good essay" and then provide feedback. I don't understand this. I don't understand if they feel that I'm good in writing or not.*
Researcher: *They should first provide a positive comment and then feedback, which is what we're learning and emphasizing in class, right?*
Andria: *(nodding yes)*
What do you think of peer-feedback?
Researcher: *It's good because you can see another person's (identified) mistakes, when a person points out something I forgot to include, this helps me learn. I learn from that person. It doesn't matter if that person needs help, too, he can still identify a mistake and you can improve from that.*
Andria: *If you had to choose between self-feedback and peer-feedback what would you prefer?*
Researcher: *I would like both. But I may not identify my own mistakes, so it might be better for my teacher or my peer to correct mistakes so that I can learn more...So, first my peer should correct it (my essay) and then I should correct it myself.*

Another two students (Andreas, Stamatis) were hesitant to answer to the question whether their peers thought they were good in writing. When they were prompted to think about it through guiding questions, they admitted that peers' positive comments in their portfolios probably indicated that their peers thought that they were good in writing.

Researcher: *Do your peers think you're good in writing?*
Andreas: *I didn't ask anyone therefore I don't know.*
Researcher: *From peers' feedback on the internet (in your digital portfolio) can you tell?*
Andreas: *I think, from the comments, which help us because we understand what they mean, e.g. instead of telling us eg. Andreas your essays is "blah blah" and you wrote something "blah blah", they write it to us, then we see it, we correct our mistakes and we become perfect. And we move from "bad" to "the best", we improve as much as we want. If someone, for example, wants to become a professional writer he can do that.*
Researcher: *So you think our peers' feedback helps?*
Andreas: *Yes.*
Researcher: *Do you think your peers think you're good in writing?*
Andreas: *I think yes.*
Researcher: *Do they write anything positive as well?*
Andreas: *Constantly. They don't have a choice, they have to do it!*

When asked if peer feedback was important or useful, students had strong ideas in its favor.

Apostolides: *(...)I improved very much in writing essays. From the comments of my peers I realized every mistake I made. And then I got better.*
Researcher: *Did you like the fact that your peers identified your mistakes?*
Apostolides: *Yes.*
Researcher: *Did you like finding mistakes to other students' work?*
Apostolides: *Yes so that they would also correct their mistakes.*

c) How was verbal persuasion related to social feedback?

Feedback from peers.

The results of the administration of the instrument examining students' perceptions on portfolios showed that 58.7% of students (N=63) agreed or strongly agreed that receiving feedback from their peers in their portfolios helped them improve their writing performance.

Feedback from the teacher.

With regard to teacher feedback, 76.2% of students (N=63) agreed or strongly agreed that receiving feedback from their teacher in their portfolios helped them improve their writing performance. Moreover, 93% of class 2 and 3 students (n=43) agreed or strongly agreed that receiving detailed remarks from their teachers in their portfolios helped them improve their writing performance.

Feedback from parents.

As far as parent feedback is concerned, 85% of class 1 students (n=20) agreed or strongly agreed that they would like to receive feedback from their parents in their portfolios. Data from the qualitative analysis of nine students' interviews showed that all nine of them mentioned parents as a source of their writing self-efficacy. For example, when they were asked how they knew that they were good in writing they replied that they knew it from comments that their parents made on their writing. Class 2 and 3 students did not receive feedback from parents.

It was examined whether portfolio affordances such as feedback from peers, the teacher and parents (items 9, 10, 11 appendix D) related to the third source of self-efficacy in the WSPS instrument, verbal persuasion (cumulative score of items 5, 9, 10, 13, 28, 33 and 37, appendix B). The correlation of class 1 students' perceptions of social feedback coming from parents, peers and the teacher post-portfolio implementation (M = 12.85, SD = 2.58, N = 20) and their post-portfolio implementation writing self-efficacy score of verbal pursuasion from the WSPS instrument (M = 26.75, SD = 4.33) was significant, $r(20)$ = .49, p = .03. This statistically significant positive correlation indicated that social feedback in portfolios related to verbal persuasion, which is identified as the third source of self-efficacy, according to the Bandura model of self-efficacy. In addition to this, the correlation of the sum of comments received by class 1 students from both peers and their teacher throughout the year (M = 149.26, SD = 38.45, N = 19) and students' perceptions on social feedback post-portfolio implementation (M = 26.75, SD = 4.33, n=20) was significant, $r(19)$ = -0.48, p = .04. For classes 2 and 3, students' perceptions on peer, teacher or parent feedback did not significantly correlate with their writing self-efficacy.

Research Question 3

The teachers' perspective.

a) What are the benefits and obstacles of process portfolio pedagogy and of developing process portfolios as perceived by elementary school teachers?

The first part of research question 3 focused on the teachers' perceptions about paper-based portfolio implementation. Both teacher interviews were transcribed in English using a qualitative research analysis tool. Data sources were two videotaped teachers' interviews on their teaching practices for portfolio implementation and their perceived benefits and obstacles regarding this portfolio implementation (appendix I).The qualitative analysis followed an inductive grounded theory approach (see Glaser & Strauss, 1967) to build an understanding of benefits and obstacles of portfolio implementation as perceived by the two teachers. The rational of using grounded theory refers to the fact that an explanation of a process is needed and there are no existing theories to address the problem or the participants (Creswell, 2005). In the present study the process to be explained was *the portfolio pedagogy implementation in Language Arts for writing*. Grounded theory has several advantages: "it fits the situation, actually works in practice, is sensitive to individuals in a setting, and may represent all of the complexities actually found in the process" (Creswell, 2005, p.396).

According to Strauss and Corbin (1990), (as cited in Creswell, 2005), a systematic design in grounded theory emphasizes the use of data analysis steps of open, axial, and

selective coding, and the development of a logic paradigm or a visual picture of the theory generated. In this definition, three phases of coding exist: open coding, axial coding and selective coding.

Transcribing and coding the video segments of teachers' interviews using Transana 2.22, a qualitative analysis software, constituted step one of the analysis. After transcribing and coding the video segments of teachers' interviews, teachers were given a copy of selected excerpts and the researcher's interpretation of their statements and they were asked whether there was any misinterpretation of the meaning (member checking).

In the first phase, open coding, initial categories of information about the phenomenon being studied were developed by segmenting information. As teacher interview transcripts and the researcher's field notes were reviewed, categories or themes were grouped together. The categories were arranged and rearranged until "saturated". Eleven major categories emerged in the open coding process (see appendix Q).

These categories were named:

- Teacher support structures for students' writing
- Systematic and guided approach for portfolio implementation
- (Low ability) students' difficulties
- Second version of essays
- Teacher feedback to students' work
- Students' goal setting
- Students' self-evaluations
- Students' peer feedback
- Teachers' concerns about portfolio implementation

- Parental involvement
- Teachers' reaction to (digital) portfolio implementation-Perceived obstacles and benefits.

Axial coding for portfolio implementation strategies.

Once major themes were identified, a second level coding procedure, axial coding, was conducted. Axial coding puts the data back together in new ways by interconnecting information.

The open coding category that was positioned at the center of the process being explored, as the **core phenomenon**, was "portfolio implementation in Language Arts". Other categories were related to the core category. The "**causal conditions**", the *factors that influence the core phenomenon*, were "low-ability students' difficulties, especially in relation to goal setting, self-evaluation, peer feedback and working on a second version of their essays" and "teachers' concerns about portfolio implementation". The "**strategies**", the *actions taken in response to the core phenomenon*, were teachers' decision to follow "a systematic, structured and guided approach for portfolio implementation" in the Language Arts curriculum in the Greek-Cypriot context. "**Contextual conditions**", the *specific situational factors that influence the strategies*, were "teachers' reaction to portfolio implementation – perceived obstacles/difficulties of portfolio implementation", such as "the lack of adequate computer access for all students and students' lack of typing skills", "students' peer feedback competitiveness" and "parental involvement". "**Intervening conditions**", the *general contextual conditions that influence strategies*, were "teacher support structures for students' writing". "**Consequences**", *outcomes of employing the strategies,* referred to the "perceived

benefits of portfolio implementation for students" and to "hypothetical benefits of digital portfolio implementation for students".

In axial coding a paradigm model was created, which visually portrays the relationship among the categories (Strauss and Corbin, 1990). Figure 17 represents the axial coding paradigm model for portfolio implementation in Language Arts.

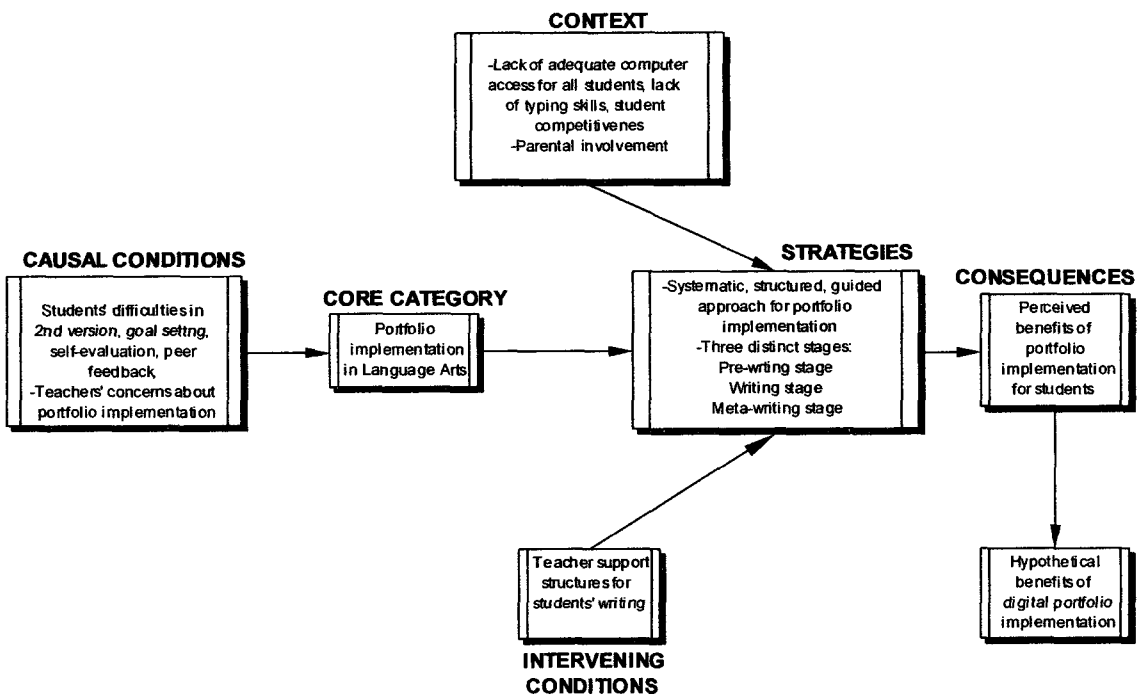

Figure 17. Axial coding paradigm model for portfolio implementation in Language Arts

Causal conditions.

Low-ability students' difficulties, especially in relation to working on a second version of their essays, goal setting, self-evaluation and peer feedback.

Students, especially low-ability students, faced difficulties in taking their teacher's or peers' corrections into consideration when they wrote a second draft of their work and they tended to repeat the same mistakes from the first to the second draft. They also had difficulty in identifying mistakes when they were asked to evaluate their peers' work. As Elena commented:

> *Elena:* *"I had to correct the students' second version, too because some students copied it with mistakes! So, I did not see the point of them writing it for a second time if they were to copy it wrongly!...I only had them write a second draft a couple of times during the year, in the essay "My summer holidays" and the "formal letter" they wrote.*

However, Dora had a difference experience with her students. She said:

> *Dora:* *I noticed that they (students) were very careful in writing the second versions- and their handwriting was good, too. They were not making any mistakes, while I remember that Elena noticed the exact opposite and she was disappointed in having them write a second version. For one particular essay, I don't remember which one, I became stubborn and I wanted to correct* ***all*** *of students' mistakes (this happened after students received peer feedback). Even one of my students who was doing pretty bad in spelling really tried to correct all of his mistakes in the second version and succeeded in copying his essay without a single mistake!"*

When asked why she did not have her students work on a second draft of their work more often she explained that:

> *Dora:* *"We only had a second draft in a few cases throughout the year. It was time-consuming to have different drafts... The whole process was very time-consuming, the pre-writing stage took one teaching period(40 minutes), on the next day we had the writing stage, which took two to three periods, then we had peer feedback for one more period...just to correct their mistakes, (on their first draft) students needed one extra period. Let alone having to re-write the whole essay!"*

Students had difficulties in setting goals, especially at the beginning of the year, and needed teacher support for the process, but they gradually improved in goal-setting.

> *Dora:* *"They (students) initially needed a lot of support about what to write when they were asked to set goals, where to focus, what we (teachers) were expecting. They were first asked to set three goals and they couldn't, they only wrote two. Gradually they got the point. Generally speaking, they set general goals rather than specific ones, they did not focus on the meaning or the content of their essays, or grammar. They mainly set goals about improving their handwriting, accentuation, about not making (spelling) mistakes in their writing...It was gradually easier for them to set goals, yes, they learned how to set goals.*

Elena also noted that students had a preference towards goals that could be measured easily. For example, students could set a goal about "not forgetting to use accentuation marks in their essays" and then count accentuation marks to decide whether they could say that their goal was achieved. She also struggled to make her students realize that "what was important was not setting many goals but setting the most appropriate goals according to their writing ability".

Students also had difficulties engaging in self-evaluation, especially at the beginning of the year, and needed teacher support for the process. However, by the end of the year they had a clear idea on what expectations were.

> *Dora:* *For self-evaluation it was the same thing (as goal setting). They (students) needed extensive support at first. Some questions (of the self-evaluation criteria) were left unanswered. This was a bit my fault, too because I did not insist on them (students) answering all of the criteria/questions. However, in self-evaluation we started with small steps, initially students had to place a √ or X mark for each criterion. I encouraged them to do it and initially I asked the whole class to think about it, e.g. I*

would ask a student to read the first question, which said: e.g. Did I write a good introduction? And I would ask the whole class. "Take a look at your introduction...what do you think? Place a √ or X mark according to your decision. Be careful because I know who wrote a good introduction and who did not!"(smiling). We also did this when they (students) had to answer with a "yes" or "no". Gradually we had them write a sentence and then a paragraph for their self-evaluation. So at some point they could answer by themselves. By the time that they were asked to answer with a sentence or paragraph they already knew what was expected of them. I also noticed that they were quite honest and in many cases very strict with themselves!

Regarding students' difficulties in relation to providing peer feedback, Elena commented on the difficulties students had in learning how to use the feedback code, especially in the beginning of portfolio implementation:

Elena: *"It was not easy to learn them (the symbols of the feedback code) but gradually they (students) became used to them. My high performance students could in fact identify practically all mistakes, with regard to spelling and also punctuation. Grammatical mistakes were hard to find. "Repetition" and "consider revision" (=symbols of the feedback code, see Figure 5) were very common. As far as "repetition" goes, students really erased words and tried to find different ones. It was very good".*

Dora was using the feedback code for providing comments to her students for the first couple of essays, so that, as a first step, she would show them how the feedback code was supposed to be used. As a second step, she had students try to use it to provide feedback to peers' work.

Teacher's concerns about portfolio implementation.

Both teachers expressed their concerns about the high time demands of portfolio implementation. They characterized it as an "extremely time-consuming process". When they were asked about the reasons they did not pursue certain aspects of portfolio implementation for every essay students wrote, such as, for example, having students share their work to provide peer feedback, or having students work on a second draft of their work, or reflect on their work, they both mentioned time restrictions as the most important obstacle.

Teachers were also puzzled about several issues that were related to the portfolio approach that was followed, such as: "Was this approach limiting students? Were we offering too much guidance to students? Were we restricting students' creativity in writing?" There was a dilemma between a) providing extensive support in the form of having students work on a common structure for their essay, which was decided with the whole class and it was written on the whiteboard, and b) providing minimal support. As Dora pointed out, when structure was provided there were certainly many common themes among essays, even though she would not say that essays were identical. When structure was not provided and students were left unassisted they faced problems with the structure of their essay but they were more creative.

Among teachers' concerns was also the dilemma of "quality over quantity". They both recognized that their fourth grade students wrote fewer essays during the year that portfolios were introduced as compared to the number of essays their fourth grade students wrote during the previous year when portfolios were not used. However, quality-wise, students spent more time preparing for and writing their essays and spent a

significant amount of time at the meta-writing stage, engaging in activities such as goal setting, self-evaluation and peer-feedback, all of which were innovative steps and they were considered as beneficial and important by both teachers.

The fact that this was the first time that portfolios were implemented in elementary school Language Arts created feelings of confusion and uncertainty to teachers as to what steps should be followed and when. For example, Dora first provided her detailed feedback on her students' work and then had them conduct their self-evaluation. As expected, students relied on their teacher's comments for their self-evaluation. So, after noticing this, the teacher changed her strategy. She had students conduct their self-evaluation first and then she provided her own comments, so that students would not be influenced by them to the same extent.

Core category.

The core category, portfolio implementation in Language Arts, referred to the integration of portfolios into the Cyprus Language Arts curriculum in the fourth grade of elementary school for one academic year. The portfolio implementation aimed in raising students' writing self-efficacy and writing performance in well-structured genres of writing that were instructed in elementary school, such as narrative and descriptive writing, letter writing and article writing. As a general course of action, students input their writing pieces in their portfolios, shared their work with their peers and their teacher to receive feedback and incorporated that feedback to revise their piece in a second draft or incorporated that feedback to make corrections directly on their first draft. Students then conducted a guided self-evaluation of their piece based on nine given criteria, and a

self-reflection and also set goals for their writing. This procedure was repetitive for additional writing pieces. The topics of the essays were given by the teacher in most cases. However, in essays that were written by a group of students, such as the "formal letter" and the "article", students chose the topic they wanted to write about.

Context.

Contextual conditions referred to the "teachers' reaction to portfolio implementation-perceived obstacles/difficulties of portfolio implementation". These obstacles referred to the "lack of adequate computer access for all students and students' lack of typing skills", "students' peer feedback competitiveness", and "parental involvement".

Lack of adequate computer access for all students and students' lack of typing skills.

Teachers chose to implement paper-based portfolios and did not even consider the possibility of trying out digital portfolios because of the lack of adequate computer access for all of their students. They had one desktop computer in their class, which was not always working properly and at the time, the computer lab of the school was not well equipped, as it consisted of only four to five desktops computers. The policy of the school was that teachers who were interested in using computers to support the teaching or learning process could take a computer from the lab in their own classroom after obtaining the headmaster's permission. A sufficient number of new desktop computers only arrived at the school in early June, a couple of weeks before the end of the academic

year. The computer lab was equipped with eight to ten desktop computers and one to two new computers were added to each classroom, but it was too late in time for teachers to integrate technology in the curriculum. Teachers' self-efficacy with regard to their ability to use computers was high. They did not anticipate any difficulty concerning learning the portfolio tool per se or teaching it to students.

As students did not have access to or work with computers at school, teachers thought that their typing skills would be limited and they would need a lot of time to be able to type their essays in digital portfolios. This was another reason paper-based portfolios were preferred over digital ones.

Students' peer feedback competitiveness.

Elena reported that she used peer feedback two to three times during the year[5] and she was not sure if it was beneficial for her students.

> *Elena:* *Regarding peer-feedback, students became very competitive with each other, they had the sole goal of finding mistakes and sometimes they did not accept the mistakes identified by peers- at least in my class. I was not a big fan of peer-feedback because it resulted to fights and misunderstandings in class when students engaged in it. Or, students said: "look at how many mistakes you made" and they had the tendency to diminish their peers. Not all of them, of course, but some of them did.*
> *They (students) usually compared the length (of the essay). I'm not sure about it (peer feedback). It has both advantages and disadvantages. I think that peer comparison is not helpful and was certainly not encouraged by me, for example I never asked my students to compare the length of their essays. This is something they (students) did on their own. They felt pressure because my best student was writing two pages during the same time that others would only write one page. I did not ask them to*

[5] Data trianglulation with portfolio artifact analysis indicated that peer feedback was used for four times during the year in class 2.

compare. They had to see how well they were doing compared to themselves, only. This is what I was struggling to teach them.

Parental involvement.

Parental involvement was another contextual factor that influenced teachers' strategies. Dora indicated that parents played a supportive role for students in their preparatory stage for essay writing (pre-writing stage) and she encouraged that. However, when portfolio implementation was at its beginning stages, parents tended to correct students' mistakes and did not realize that students should be responsible for correcting their own mistakes. When this was pointed out to parents they stopped interfering.

Both teachers would have liked to see parents getting involved and having had a more active role in portfolio implementation but could not see how this could be done with paper-based portfolios. Those were rarely sent home through students, because of the teachers' fear that they might be lost. Teachers had no way of knowing whether students actually showed them to their parents, with the exception of a few cases when parents signed on the portfolios to show that they actually reviewed their children's work. Dora pointed out that with the use of digital portfolios parents would have had easy access to the students' work and she saw this perspective in a positive way.

Intervening conditions.

Teacher support structures for students' writing.

Teachers used a variety of support structures to help students in their writing. They used different support structures for each one of the three stages of essay writing.

For the pre-writing stage, a common form of support structure was having students brainstorm for ideas. The teacher was writing those ideas on the whiteboard in a pre-defined structure decided by students and students engaged in note-taking if they wanted. Student-suggested phrases and expressions that could be used in an essay could also be added to this structure. The suggested structure of the essay that was written on the whiteboard was characterized by teachers as very helpful, if not necessary, for low ability students. Another strategy used was a set of guiding questions for each paragraph, which was combined with students' note-taking for ideas to be developed further.

To help students in the "narrative essay that involved narrating an accident", a sequence of eight pictures was used to help students narrate the accident in a correct chronological order and structure, developing one paragraph for each picture. To help students in the "descriptive essay that involved describing a scenery", photographs of places in Cyprus were used. Students could select their favorite one to describe or could describe a place out of their imagination. To help students in the "narrative essay of having a lumber-jack communicate with an olive-tree that came to life", acting-out of the story was used in class, with a pair of students having a dialogue in front of the whole class, one impersonating a tree and one pretending to be a lumber-jack. For the same narrative essay students worked in groups to access a PowerPoint presentation and learn about the history and benefits of the olive tree. Peer-collaboration was also used as a way to support low-ability students, for example for "formal letter writing" students worked in groups of four to identify a problem, its causes, consequences and solutions.

For the writing stage, both teachers systematically read all students' introductory paragraph and beginning paragraphs while students were busy writing and provided

support where it was needed. For example, they pointed out some mistakes that mostly referred to spelling, accentuation and punctuation, without correcting them though for students. During this process, teachers sometimes chose to read an exemplary paragraph to students, or in some cases an exemplary essay from a student of another class. Teachers also had their students collaborate in groups for some essays for developing their ideas in writing. It is important to note that at some point midway though the portfolio implementation, teachers noticed that most students had some difficulty developing their ideas in structured paragraphs that contained a main idea. They therefore decided to teach students how a paragraph is developed. For this purpose, instead of having students write an essay, students were asked to develop a single paragraph for the description of the external appearance of a person they chose, using adjectives and details.

For the meta-writing stage teachers commented on students' self-evaluation, to help them identify criteria that they claimed they were successful at but they were not, or vice versa, to help them identify criteria that they were successful at but they were too strict with themselves to realize it. Teachers also commented on students' peer feedback, praising them when they could identify mistakes to help their peers improve and praising them when they took their peers' and teacher's feedback into consideration and corrected their own mistakes either on the same draft or on a second one.

Strategies.

Contextual and intervening conditions influenced teachers' decision to follow a systematic, structured and guided approach for portfolio implementation in the Language Arts curriculum in the Greek-Cypriot context. According to this approach, teachers used three distinct stages: the "pre-writing", "writing" and "meta-writing" stages that took place on different days. The two teachers also made the deliberate choice to implement paper-based portfolios rather than digital portfolios.

With regard to goal-setting, they supported and encouraged their students to engage in goal setting and goal evaluation. Regarding self-evaluation, they revised the suggested support-structure for self-evaluation, which referred to the use of nine generic criteria (see Figure 7), to make it more genre-specific and more applicable to each type of writing students worked on (see Figure 10). They had students put a √ of X mark for each criterion, but they then decided to have them answer with a word: "yes" or "no" and then gradually, with a phrase and then with a paragraph. So by the end of the year, their students were composing a paragraph for their self-evaluation, based on given criteria that acted as guiding questions that they needed to answer in full sentences.

Both teachers dismissed reflection, as they did not find it useful. Students conducted a self-reflection only on the first writing piece (E1), but teachers made the deliberate choice not to include self-reflection prompts in subsequent self-evaluations, as they did not see their value. They also dismissed the idea of having students work on a second draft of their essay, even though they implemented this approach for four times during the year. The two main reasons behind this decision were "high time demands"

and "teachers' questioning of their value". Peer-feedback was also not used extensively for all essays but it was implemented for three to four essays during the year, because of its time-consuming nature and because of problems created with students' diminishing comments to their peers in class 2.

Consequences.

Consequences referred to "teachers' perceived benefits of portfolio implementation for students". Teachers identified important benefits of portfolio implementation, which the quantitative analysis of this research study confirmed. They were happy to see an improvement of students' writing performance and commented that even their low ability students could by the end of the year develop their ideas in a structured essay with minimal teacher assistance. Students also developed skills in accepting and providing peer feedback, in goal setting, in self-evaluation and in re-reading their essay, all of which was evident through their paper-based portfolios.

The category "teachers' reaction for a digital portfolio implementation" referred to the two teachers' view on hypothetical benefits and obstacles of digital portfolio implementation in particular. In a potential digital portfolio implementation, teachers admitted that there would be multiple benefits. Changes and revisions of students' work could have been made very easily, without the need to re-write the whole essay once it would be typed in, the use of computers would have been very motivating for students and students would have been enthusiastic with the potential of using computers for their portfolios. Teachers could see most students feel proud of their work as it typically gave them joy to share it. Digital portfolios would have allowed for a wide access to students'

work, an affordance that could potentially engage parents in the process. Students' capability to have access to peer feedback and comments at home would have been beneficial and having to provide this type of feedback would have helped them develop their "writing for communication" skills, which is very important. It would also have helped them become more responsive to feedback, and become better in accepting and providing feedback.

Digital portfolios would have also solved the problem of some students' ineligible handwriting.

> *Dora: "It can also be helpful for students whose handwriting is lousy. I have a student in mind, whose handwriting is really ineligible. You can't read what he has to say and he usually has good ideas. So if this student's work is written on a computer, the aesthetics of his work is taken care of. The way his work is presented is much better. You can factor out handwriting and marks from writing and re-writing on paper that make reading impossible, and move parts of text easily from one place to another without destroying the way the paper looks. This particular student would feel really good if we did this. It would help him. And I know that he likes to type on the computer".*

Overall, despite an initial hesitant to negative reaction to the question whether they could see themselves using digital portfolios next year, both teachers saw digital portfolio implementation as a good and interesting idea that they could consider if they had access to a computer lab and if they had students first work with paragraphs rather than whole essays.

A discursive set of propositions was generated and validated against the story (Strauss and Corbin,1990). The suggested theory is presented in the form of propositions/hypotheses that describe the interrelationships illustrated in the coding paradigm.

Theoretical propositions.

1. As portfolio pedagogy was an initiative that was never attempted before in the Greek-Cypriot context, teachers had some uncertainty about the process. Both had major concerns about the high time demands of portfolio implementation, and identified students' difficulties in relation to portfolio components such as the process approach in writing, goal setting, self-evaluation and peer feedback, from the early stages of portfolio implementation.
2. The lack of adequate computer equipment, the lack of students' typing skills, and peer feedback competitiveness were factors that influenced teachers' decision not to consider digital portfolios as an option.
3. Teachers developed support structures for students' writing and followed a systematic and guided approach of portfolio implementation that included three distinct stages: prewriting, writing and meta-writing stages. Through this approach they encouraged goal setting and self-evaluation to a great extent, they

provided students with opportunities for peer feedback and second drafts of their work for half of the time but completely dismissed reflection.

4. Teachers reported an improvement in students' writing performance and the development of students' skills in goal setting, self-evaluation and accepting and providing peer feedback, all of which were evident in students' paper-based portfolios.
5. Despite initial hesitation, both teachers would consider a digital portfolio implementation to facilitate students' working on multiple drafts, increase parental involvement, encourage peer feedback and take advantage of the motivational role that computers have for students of this age-group.

The students' perspective.

b) What are perceived benefits and obstacles to implementing digital portfolios as perceived by elementary school students and how can they be overcome?

The second part of research question 3 focused on the students' perceptions about digital portfolio implementation. Data sources were nine videotaped student interviews on benefits and obstacles of portfolio implementation (appendix H) as well as the researcher's field notes. All interviews were transcribed in English using a qualitative research analysis tool. The qualitative data analysis followed an inductive grounded theory approach (see Glaser & Strauss, 1967) to build an understanding of students' perceptions on portfolio implementation and its perceived benefits and obstacles. The analysis of students' interviews showed that they identified benefits and limitations of both the digital portfolio implementation process and the digital tool itself. These are presented in Figure 18 and are described in detail in the sections that follow.

	Perceived benefits	Perceived obstacles	Solutions
Digital portfolio implementation process	Students: • took pride of their published work • realized progress monitoring • had increased typing skills • found ways to circumvent limitations of the tool • provided peer feedback that was constructive and detailed	• Lack of adequate computer equipment • Working in class while the lesson was in progress was, at times, problematic • Peer feedback was not always correct and was sometimes repetitive • Need to protect their privacy	• Increased computer equipment in classroom or use of well-equipped computer lab. • Peer- or teacher-provided scaffolding preferred over technology-provided scaffolding • Choosing more difficult passwords that are changed often
Digital portfolio tool	• portfolio tool=user friendly and easy to use • search function • "save and continue" option • uploading pictures • password-protection • month-to-month chronological order • support structures • wider audience • access to peers' work • receiving peer feedback • possible use in earlier grades • solved the problem of ineligible handwriting • was used as a means of communication	• interface could be clearer • difficulty of uploading images • difficulty at the early stages of login, remembering URL, learning how to make comments • problems of ownership and commenting in groupwork • limited personalization of portfolio tool • search functionality was case-sensitive and accentuation-sensitive	• cleaner interface by removal of unnecessary functionality • add buttons "make a comment", "insert an image", "write a new essay" • add "underline" function in text-editor • increase flexibility for personalization (e.g. ability to change fonts, colors) • add indication of "completed" and "in progress" work • place scaffolding exactly where it is needed • show total number of comments • translate all English words into Greek

Figure 18. Qualitative analysis of students' interviews

Benefits of digital portfolio implementation.

Students identified a great number of benefits of digital portfolio implementation. They took pride of their published work and could easily identify specific parts they liked (Andreas). Most of them realized that portfolios can be used for progress monitoring and also made reference to the progress they made throughout the year (Andreas, Andria, Theodor, Apostolides). Students appreciated the fact that portfolios could be shared with a great number of people outside of the classroom environment, such as parents and relatives (Maria). Access to peers' work (Gabriela, Theodor), receiving peers' feedback on their work (Theodor, Apostolides) and posting comments to peers (Andria, Theodor) were identified as benefits of portfolios. Several students could see the specific portfolio tool be used from earlier grades of elementary school, even from the first grade (Theodor, Apostolides, Andria, Andreas) and would like to continue using it during the next academic year (Andreas, Andria, Apostolides, Theodor). Overall students liked portfolio implementation (Theodor, Gabriela, Maria, Andreas, Andria, Apostolides) despite some identified limitations of the tool. They also referred to how their typing skills developed over time, with practice (Andria) and how at the end of the year they could type better and faster (Gabriela).

With regard to the portfolio tool functionality, students generally thought that the tool was user-friendly (Maria, Marina, Andreas, Stamatis, Theodor) and they found it easy to use (Apostolides, Marina, Andreas, Stamatis, Theodor), despite some initial difficulties with regard to the login procedure and posting comments to peers

(Apostolides, Marina, Maria), or finding where they should click on the portfolio to write a new essay (Maria) which were faced at the beginning of the year. They referred to how easy it was to write a new essay (Andria, Marina, Stamatis) and how easy it was to post comments to peers (Anria, Stamatis). Moreover, the ability to search through portfolios (Apostolides, Andria), the ability to "save and continue" rather than simply "save" or "publish" (Apostolides, Maria, Andria) the ability to upload images to their work (Gabriela, Andreas, Andria, Marina), the ability to have the peer's essay be visible while posting a comment (Gabriela) and the automatically inserted time-stamp indicating the date and time of each posting (Marina) were seen as advantages of portfolios. Students saw the value of password-protection of their personal space (Gabriela, Andreas and Marina) and password-protection of work-in-progress, as well (Andreas). They also liked the month-by-month chronological presentation of the portfolios (Apostolides, Andreas, Andria, Marina, Stamatis).

Student support structures within the tool referred to teacher-provided instructions about "how to insert a writing piece", "how to provide constructive feedback" and "how to upload an image". Concerning this type of scaffolding on demand, students commented that it was useful, for both themselves and their peers (Stamatis, Andria, Marina, Theodor). However, some students expressed a strong preference to scaffolding provided by peers or the teacher, as opposed to technology-provided scaffolding. This means that that if a person could show them how to do things they preferred to have that option instead of trying to figure things out on their own using the online instructions (Theodor, Maria, Marina, Andria, Andreas). One student (Apostolides) found scaffolding neither useful nor necessary.

Students' spontaneous use of portfolios.

Among the interesting aspects of portfolio implementation was the fact that two students (Artemis, Theodor) were able to send comments to their peers from home before they were even taught how to do so (researcher's field notes). In addition to this, portfolios were spontaneously used by students as a means of communication with their peers and teacher (Andreas). For example, students posted "get well soon" messages to their teacher while she was absent from school (Gabriela), posted wishes for a happy holiday season to their peers during a period when the school was closed (Maria), or posted a message that they were sick and could not come to school when they had to stay at home (Andria). They also used the portfolio capability that allowed providing comments to others in another way, without ever being asked to do so; to provide a self-comment, a comment to their own work (researcher's field notes). In some instances students commented on their own work to express their wish that peers would like their essay (e.g. "I hope that you liked my essay", posted by Maria, on June 3rd 2008) or commented on their work to as a way to commit themselves in achieving their goals (e.g. "I hope that I was able to achieve my goal of not making spelling mistakes in this essay", posted by Marina, on Dec. 12th 2007).

Digital portfolios solved the problems of ineligible handwriting (researcher's field notes). Over time, peer feedback from specific students, mostly girls, became very detailed (researcher's field notes). Students spent time identifying mistakes and communicating them to their peers. They also paid attention to the way those comments were communicated, e.g. a positive comment was included as part of the constructive

feedback rules the students were taught. An example demonstrating constructive feedback is the following provided from a student to her peer:

"Dear Loucia, your writing attempt was fantastic, but there were a few mistakes that I will help you locate. For example: in the second paragraph where you said: "he has to sit on the bed" you should have said "he has to lie down or stay in bed". Also you did not use accentuation marks. However, overall...Bravo!" Posted by Georgia on June 2nd.

Limitations of digital portfolio implementation.

Students identified several limitations of the digital portfolio tool, the most important of which was the fact that a clearer interface would be preferred for the "writing a new essay" page (see Figure 2) (Theodor, Maria, Andria, Marina, Stamatis, Gabriela, Andreas, Artemis). Overall, most students answered positively in the question whether they would like several features of the tool that were not used in the portfolio implementation removed. These refer to features that are an integral part of weblog, such as "trackbacks", "post timestamp", "ping", "RSS feed", but are nevertheless unnecessary for the functionality of the portfolio for educational purposes. When students were given an option, they preferred to have features they did not know removed from the tool. However, none of the students thought that the added functionality constituted a major problem, as they did not access unnecessary features (Artemis, Gabriela, Stamatis). Two of them, however, had the curiosity to find out what those features did (Andreas, Marina).

Of all the functionality features that students worked with, they had the most trouble with uploading an image in their essay (see Figure 2) (Artemis, Stamatis). A couple of students had some difficulty login in their portfolio at the beginning of the year (Maria), or had trouble remembering the URL of portfolios (Andria) or thought that the

way with which they could make comments to peers was not intuitive (Maria, Apostolides). Two students would prefer to have a button saying: "make a comment" rather than the current link saying "no comments" when they had to comment on their peers' work and also a button saying: "insert an image" to make the procedure of uploading an image more straight-forward (Maria, Stamatis). A student pointed out that the scrolling that was involved in finding their name (see Figure 3) was a bit problematic (Maria). Two students indicated that the fact that they had to remember to select their name was a bit difficult, as they sometimes forgot to do it (Marina, Maria). Students would like to have more flexibility with regard to being able to change their work's font size and color and the home-page color (Artemis, Maria, Andria), personalize their portfolio (Andria) and add pictures on the home page (Andria). A student found that the search function was not very powerful and thought that it did not work properly because it was case-sensitive and accentuation sensitive, therefore if you couldn't remember exactly how you spelled a word you were looking for it did not retrieve any results (Marina). The same student (Marina) would have liked to see this feature improved. A student also commented on one incident where there has been a misuse of portfolios, when a student logged in to a peer's portfolio and changed her work, "which was something unacceptable" (Andreas). With regard to scaffolding on demand that most students found useful, three students mentioned that it was not easily visible (Apostolides, Maria, Andria) and two students did not find it particularly useful (Apostolides, Artemis), as they could figure things out on their own after the teacher showed it once in class.

Students also identified limitations that did not have to do with the portfolio tool per se, but rather with the portfolio implementation strategy in the classroom. The lack of adequate computer equipment was identified as a limitation, as students would like to have more computers (Andreas, Andria, Apostolides). The fact that students sometimes had to work on their portfolio during the time that the lesson was in place was a bit problematic at times for some students (Theodor, Andreas, Maria) despite every effort being made so that students would only do that when the activities in the classroom allowed it, e.g. in times of drill and practice activities. Another problem identified by students that did not have to do with the portfolio tool per se was the fact that peer feedback was not always correct, e.g. peers would ask students to correct the spelling of words in cases when this was not wrong (Apostolides), or the fact that peer feedback was sometimes repetitive, in other words, two students could have identified the same mistake (Gabriela).

As far as group work is concerned, there have been a few problems of ownership and commenting, as when a group of four students, for example, worked on a piece and this was put in each student's portfolio, any comments received would only appear in one portfolio (researcher's field notes). This made it difficult for students to work as a group to make corrections because they had to login from that particular student's portfolio to be able to edit the piece (Andreas). Another limitation was the fact that any changes students made to their work overwrote their previous work, hence they didn't have the ability to have the history of previous versions of their work (researcher's field notes). This limitation could be overcome if students were asked to copy their work and paste it as a new posting, with an indication that that was version 2 of their work. However, this

strategy would add another level of complexity to students' learning of the tool, as it would constitute an extra step, so it was not attempted.

How can identified limitations and obstacles to implementing digital portfolios be overcome?

Regarding solutions, students indicated that a lab approach would be preferred over the classroom implementation of portfolios (Theodor, Apostolides, Andreas, Maria, Andria, Marina, Gabriela, Stamatis). A lab approach was defined as having all students visit the lab at specific times and work on their portfolios at the same time, in groups of three. Andreas also saw the fact that low ability students did not have as many pieces in their portfolios as other students in the class as a problem that could be solved by a potential lab approach as in that case all the students of the class would be working on their portfolios at the same time and they would eventually have the same number of pieces.

With regard to the type of changes that students would make to the portfolio tool to make it more user-friendly, one student found the "save and continue" feature of portfolios as confusing and would like it to be removed from the tool (Gabriela) and several students who were familiar with the different text-editor icons, pointed out the need to add the "underline" capability to the text-editor (Theodor, Apostolides, Andreas). Two students would also like to have an indication as to whose work was completed (Gabriela, Stamatis). At the time of implementation, when students wanted to provide comments to peers they had to go into their work to see if it was completed or if it was a work-in-progress (Gabriela). The same student also pointed out that she would like to be

able to see the total number of comments that each student received. It would be better if some terms that were in English in the portfolio tool were translated to Greek (Apostolides, Gabriela, Marina). Lastly, a student would like to see the teacher's postings appear on top of all other postings as he thought they were the most important ones (Stamatis).

As far as scaffolding-on-demand is concerned, students indicated that scaffolding should be placed exactly where it is needed (Gabriela, Artemis) and thought that printed instructions in the form of a job-aid would be helpful (Gabriela). For increased security, a student pointed out that students should choose more difficult passwords and should change them often (Andreas). Another thing that could be changed to have a cleaner interface was the removal of the unnecessary functionality of the tool, which was at the time, hidden from students and could be accessed only if needed (Stamatis). Moreover, the place of important links, such as "Write a new piece" could be changed to make them more obvious to students (Maria). The addition of a button saying: "make a comment" was also suggested (Maria), which would only provide access to peers' work that was indicated as completed (Stamatis). Generally speaking, some students were able to find solutions that circumvented the problems and limitations of the portfolio tool, on their own. For example, one of the limitations of the tool was that, at the time of portfolio implementation, a user should first read all comments and then go back to her work to edit it. As the number of comments increased, so did the number of times the user had to go back and forth to edit her work. Marina, however, thought of a way to circumvent this problem. She had the idea of opening two windows in the same screen, a window

showing peers' comments on her piece and another window allowing her to edit that particular piece.

CHAPTER 5: DISCUSSION

This chapter discusses the results of the study. The first two sections discuss the first research question. The first section, **Learning Gains in Writing Performance over Time** discusses how students' writing performance changed over the one academic year of portfolio implementation. The second section, **Learning Gains with Respect to Portfolio Affordances over Time** specifically refers to peer feedback, self-evaluation, goal setting and reflection, and how those changed over time in relation to writing performance. The third and fourth sections discuss the second research question. The third section, **Changes in Students' Writing Self-efficacy** explains how students' writing self-efficacy beliefs changed over the one academic year of portfolio implementation. The fourth section, **Connection of Writing Self-efficacy and Portfolio Affordances** discusses the relationship between self-efficacy sources, according to Bandura's (1997) theory and portfolio affordances. It connects: a) mastery experiences to a process approach in writing, progress monitoring, self-evaluation and goal setting in portfolios, b) vicarious experiences to access to peers' work in portfolios and c) verbal persuasion to feedback from peers, the teacher and parents in students' portfolios. The fifth and sixth sections discuss the third research question. The fifth section, **Benefits and Obstacles of Process Portfolio Pedagogy** documents the teachers' perspective. The sixth section, **Benefits and Obstacles of Digital Portfolios** documents the students' perspective. Next, the **Conclusion** section refers to the contribution of this study. ***Implications for Practice*** *builds on what is learned about portfolio design and* implementation. **Limitations of the Study** identifies weaknesses of the research and

ways in which they can be overcome and, finally, **Implications for Future Research** suggests directions for further research on portfolios, based on questions that are left unanswered.

While there is much to understand regarding the impact of portfolios on students' writing performance and writing self-efficacy the results of this study produced several important findings and practical implications related to portfolio use and the added pedagogical benefits of portfolio components, such as having students engage in peer feedback, goal setting, self-evaluation and reflection. There were explicit suggestions in the literature that having students create their own process portfolios was a way that teachers could use to help students strengthen their writing skills and their writing self-efficacy beliefs (Abrami & Barrett, 2005; Walker, 2003). Building upon these suggestions, it was the goal of the study to measure changes in students' writing performance and writing self-efficacy over time and examine the relationship of those two variables with both digital and paper-based portfolio implementation in elementary school. It was hypothesized in this study that there was a connection between Bandura's (1997) theory of self-efficacy and portfolio affordances. Process portfolios were used as a systematic way to help students place more emphasis on the learning process rather than the final outcome and engage in the processes of documenting their progress monitoring, goal setting, reflection and self-evaluation (mastery experiences). Process portfolios were moreover used to allow students access to peers' work (vicarious experiences) and to help them share their work to receive constructive feedback and support (verbal persuasion). As part of an intervention to increase students' writing performance and to

support students in having accurate writing self-efficacy beliefs, this study implemented process portfolios in paper-based and digital format for the first time in the Cyprus educational system. The students of two fourth grade classes (n_2=23, n_3=20) created paper-based process portfolios, while at the same time, in the researcher's class (n_1=20), to take advantage of the added benefits of technology, digital portfolios were integrated into the Language Arts curriculum for one academic year (September 2007-June 2008). As there are no portfolio tools available in the Greek language, Barrett's (2005) idea of using a weblog to support a learning portfolio was taken one step further in this study, as a generic, open source weblog tool was transformed and localized into Greek to be used *as* a digital portfolio tool (Strobel & Nicolaidou, 2006).

The key findings revealed that students' writing performance on well-structured genres such as narrative and descriptive writing increased over time. Learning gains were also found in students' ability to provide constructive comments to their peers' work, to set goals and to provide accurate self-evaluations of their work. Students' writing self-efficacy also increased and became more accurate over time.

The results of this study supported a connection between the three main sources of learners' writing self-efficacy, according to Bandura's (1997) theory of self-efficacy, mastery experiences, vicarious experiences and verbal persuasion, and portfolio affordances. Specifically, results indicated that the primary source of self-efficacy, mastery experiences related to portfolio affordances such as the process approach in writing, progress monitoring, self-evaluation and goal setting. The second source of self-efficacy, vicarious experiences related to the access to peers' work affordance of

portfolios. Finally, the third source of self-efficacy, verbal persuasion related to the social feedback affordance of portfolios, which allowed for peer and teacher feedback.

As process portfolios in Language Arts constituted an innovation in the Greek-Cypriot educational system, another contribution of the present study refers to the documentation of the benefits and obstacles of process portfolio pedagogy as perceived by elementary school teachers and students. Building on students' suggestions of how obstacles of digital portfolio implementation in particular can be overcome, guidelines are offered that could facilitate a large-scale implementation of digital and paper-based portfolios in Cyprus in the future. These results are discussed in detail in the next sections.

The present study attempted to provide an answer to three research questions. The first one was the following:

Research question 1: How are process portfolio affordances, such as peer and teacher feedback and progress monitoring (self-evaluation, goal setting, reflection) related to elementary school students' writing performance, over time?

Learning gains with respect to writing performance were observed for all students, as their writing performance over time has increased. This was related to process portfolio pedagogy, as through portfolios, students gradually learned how to provide constructive and thorough feedback to their peers, conduct accurate self-evaluations, set goals and reflect on their work. The results of students' writing

performance and the results of each one of the portfolio affordances in relation to writing performance, over time, are discussed in detail.

Learning Gains in Writing Performance over Time

Results showed that students' writing performance over time has increased (see Figure 13). This was evident both from the analysis of their pre-test and post-test writing scores (table 3), which compared students' writing performance pre- and post- portfolio implementation and from the repeated measures analysis of variance on the essays included in students' portfolios. As an effect size measure, eta-squared (η^2) was used, qualifying values <.06 as small effect, values in the range between .06 and .13 as medium effect, and values >0.13 as large effect (see Cohen, 1988). The effect size in the paired-samples t-test on students' writing performance pre- and post-portfolio implementation was η^2 =0.77 and the effect size in the repeated measures analysis of variance, which examined the change in students' writing performance over time was η^2 =0.63. Both effect sizes qualify as large effects.

Students' writing performance followed a very similar trend of gradual increase in the three classes. The separate analyses of students' writing performance by type of essay in each one of the three classes showed that their writing performance increased over time for both descriptive and narrative essays (tables 4, 5 and 6). This finding confirmed the anecdotal evidence that existed in the literature regarding the value of the use of both paper-based and digital portfolios for students' performance in various domains, including the writing domain in elementary school Language Arts (Campbell, 1996; Case, 1994; Martin Kniep, 2000; Moersch & Fisher, 1996; Niguidula, 1997; Paulson & Paulson, 1996a, 1996b; Stefanakis, 2002; Wade et al., 2005; Wade et al., 2006).

There were no significant differences in students' writing performance with respect to the use of either digital (class 1) or paper-based portfolios (classes 2 and 3) as the pedagogical strategies used were the same across classes and across portfolio format. This confirms previous arguments that the same thinking about purpose, pedagogy and assessment lies behind paper portfolios and electronic portfolios (Butler, 2006). However, it is important to emphasize that digital portfolios had some added advantages over paper-based portfolios in this study that led to differences in their implementation process. These advantages included easier access to students' work which, in turn, facilitated peer feedback, interactivity and communication, easier making of editorial changes by students on multiple drafts, students' increased motivation through the use of technology and the potential of parental involvement in portfolio implementation.

Learning Gains with Respect to Portfolio Affordances over Time

Peer feedback.

The analysis of students' portfolios showed that there were learning gains with respect to all portfolio components. The descriptive statistics of students' peer feedback as this was reflected in the number of comments they provided to their classmates showed that students provided more thorough peer feedback over time. If we compare the beginning to the latter stages of portfolio implementation, in class 1 the average number of comments students provided to their peers increased over time (table 7). The data seems to indicate that students became gradually more capable of identifying their peers' mistakes over time and of providing direct and indirect corrective feedback. This is important, as previous research (Althauser & Darnall, 2001) has shown that students who

receive high-quality peer feedback derive more learning benefits from peer assessment than those who receive low-quality feedback (as cited in Gennip et al., 2009).

This finding was also observed in class 2, where students' average number of peer feedback comments steadily increased from the beginning to the last stages of portfolio implementation (table 9). This finding was confirmed with the observations expressed in the interview of Teacher 2, who said that she was amazed at the fact that several students could identify almost all of their peers' mistakes by the end of the year.

In class 3 the average number of peer feedback comments did not change from the beginning to the end of portfolio implementation (table 10). One possible reason for the fact that progress was not observed might be the fact that in class 3 peer feedback was only implemented three times during the year, as opposed to nine times of implementation in class 1.

In addition to this, a qualitative analysis of the comments class 1 students received in their digital portfolios showed a gradual improvement, which was particularly evident in the first four months of portfolio implementation. During the first month of peer feedback (October 2007), the percentage of comments that were classified as "simple feedback" was extremely high, as 90% of the comments students submitted fell into this category. Students could only provide one general comment to their peers' work and identify one or two mistakes in their work. Gradually, by January 2008 this percentage dropped to 33% (table 8). Over a period of four months, 64% of the students' comments consisted of not only a positive comment to their peers' work but also of more than one suggestion for improvement. This showed that students were better able to provide their peers with constructive feedback and suggestions for improvement over time.

However, during the last two months of portfolio implementation (April and May 2008), the average number of students' comments was decreased. This was probably due to the fact that students did not work on a new writing piece in April; hence they had fewer peer feedback opportunities. During those two months, students' comments that fell into the category of "simple feedback" was increased, while students' comments that fell into the category of "constructive feedback" was decreased. It seemed that in May 2008 students were not as enthusiastic with peer feedback anymore and they were reluctant to spend the time needed to provide good constructive feedback.

How did peer and teacher feedback relate to students' writing performance over time?

An attempt to examine the relationship of feedback and students' writing performance over time showed that a higher number of peer and teacher feedback comments was associated with lower writing performance (see Figure 15). Of the three classes, only class 1 provided a complete set of data to examine this relationship over time. The results showed that in general, feedback from peers and the teacher was inversely proportional to the students' writing performance. The term "reversely proportional" is used in the sense that when one variable was increased the other variable was decreased, and vice-versa (see Figure 15). For most of the essays, when students' writing performance was increased the number of comments they received from both their peers and their teacher followed a decreasing trend, and vice versa. A possible explanation for this trend is the fact that students whose writing was poor received the most comments, while students whose writing was excellent did not receive as many

constructive comments. This may relate to the teachers' observation that their best students were able to identify almost all the errors in a peer's essay. The findings of previous research also indicated that "better students were better reviewers" (Gennip et al., 2009). It seemed that higher ability students provided many comments of corrective feedback to their lower ability peers, while the latter were not in the same position to identify as many errors in their peers' work.

The amount of feedback that low performers were receiving from their peers was one of teachers' concerns. Elena, in particular, was worried about her low ability class 2 students. Those students ended up with an essay full of identified mistakes and comments after receiving peer feedback. She observed that those students were unmotivated to make all those corrections, and did not seem to understand that peer feedback had a positive effect on their progress in writing. It seemed that peer feedback was more valuable to and it was appreciated more by average and higher ability students, rather than by low performers. In general, the average and higher ability students were better able to incorporate the feedback they received in their work to produce an improved second draft. As both direct and indirect corrective feedback was provided to students by their peers it is possible that lower ability students had difficulty incorporating indirect peer feedback to their work. In her own study, Chandler (2003) found that some students who revised their text based on indirect error correction were unable to internalize the correct form, since they did not know whether their own hypothesized correction was accurate. This might be an explanation for the fact that indirect peer feedback might not have been as beneficial for lower ability students as it has been for average and higher ability students in this study.

Self-evaluation.

It was hard to expect Greek-Cypriot students to have accurate self-evaluation scores of their writing (Strobel & Nicolaidou, 2006). A Cyprus Ministry of Education policy did not allow for the submission of numerical ratings to elementary school students, especially in the domain of Language Arts and writing essays. Students' writing was typically assessed by the teacher in a holistic way, with the use of general comments, such as "good", "very good", "excellent". In addition to this, the students who participated in this study were never before given the opportunity to conduct a self-evaluation of their writing. As a result there was no expectation that they would posses this skill.

Despite students' total lack of previous experiences with self-evaluation, the analysis showed that when provided with specific criteria to focus on, students of the fourth grade succeed in conducting very accurate self-evaluations that reflect their actual writing performance. This was shown through the fact that students' self-evaluations of their writing and students' actual scores on writing performance were significantly correlated for all essays with the exception of Essay 5 (table 15)[6]. Post-portfolio implementation, students' essays were evaluated analytically rather than holistically. From a research stand-point, a very accurate result of students' writing performance and how that changed over time was achieved. However, the students themselves did not have access to those ratings. The fact that there was no discrepancy between the two scores, the subjective score of students evaluating their writing and the objective score

[6] A closer examination of the data revealed that the reason students' self-evaluation for E5 did not correlate with their writing performance was that 30% of students overestimated their writing performance and gave themselves a perfect score (100/100) in their self-evaluation of E5. Note that the highest writing performance score achieved by a student in E5 was 94/100.

obtained through the assessment of their writing performance using interrater agreement showed that students of this age can be taught how to provide an accurate self-evaluation based on given criteria, which reflects reality and therefore neither overestimates nor underestimates their writing ability.

How did self-evaluations relate to students' writing performance over time?

Students tended to over-estimate their writing performance at the beginning of the portfolio implementation. For their first six essays, their average self-evaluation score was higher than their actual writing performance (see Figure 16). An exception was essay 3 where their average self-evaluation score was very close to their actual writing performance. However, over time, students succeeded in having a very accurate self-evaluation. This was evident from the comparison of their last two essays' self-evaluations with their writing performance. For essay 7, their self-evaluation score and their writing performance score almost coincided, while for essay 9, their self-evaluation score and their writing performance score were extremely close (table 16). This showed that as students' writing performance increased over time, so did their ability to accurately self-evaluate their writing performance.

Goal setting.

Several researchers showed that portfolios engage students in goal setting and should be linked to established learning goals (Blackburn & Hakel, 2006; Melograno, 1994; Wyatt & Looper, 1999). The results of this study showed that students in the three classes set goals that focused on writing conventions, spelling and grammar (tables 17, 18 and 19). A probable reason for this might be the fact that these constitute more tangible

aspects of writing and as a consequence aspects that could be considered easier to measure and perhaps easier to achieve as well. This agrees with the results of research that showed that proximal goals make a task appear more manageable, and can convey a sense of mastery, through frequent feedback (Cervone et al., 2004; Pajares, 2006).

Data from the qualitative analysis of the students' interviews showed that students realized the value of goal setting, became more accurate in their judgments of their goals over time, and they were able to differentiate between goals that were achieved and goals that needed additional work. Data from the qualitative analysis of the teachers' interviews indicated that students gradually learned to set more challenging goals that better corresponded to their writing performance level. This was related, according to the two teachers, to the type of goals that students chose, which mostly focused on tangible aspects of writing such as spelling, accentuation and grammar, which they could easily observe and evaluate from essay to essay to be able to track their progress. As an example, there were students who set a proximal goal, such as "to put more accentuation marks in my next essay" and counted the number of accentuation marks they missed in an essay to evaluate whether they succeeded in achieving that particular goal.

How did goal-setting relate to students' writing performance over time?

As students only set general goals for their writing twice a year in class 1 and for three consecutive times in classes 2 and 3, there were inadequate data for analyzing goal setting over time. However, a correlation analysis showed that a higher number of goals set was associated with higher writing performance, post-portfolio implementation. What this means is that the more capable students were in writing essays the more goals they

set and achieved. This is not to say that goals should be evaluated numerically. What is suggested is not that it is important to set a great number of goals in a portfolio implementation. The quality of goal setting, as well as setting goals that correspond to a student's ability, which were not assessed as part of this study, are also very important. Data from teachers' interviews indicated that lower ability students were helped by goal-setting as long as they understood that what was important was not setting many goals but setting the most appropriate goals for each person's writing ability.

Reflection.

Even though reflection is one of the critical characteristics of portfolios (Ash, 2000; McLeod & Vasinda, 2009; Mills-Courts & Amiran, 1991; Wyatt & Looper, 1999), it was missing from the implementation in classes 2 and 3. Teachers of classes 2 and 3 had students conduct a self-reflection only on their first writing piece to try it out and then made the deliberate decision to abandon reflection (table 21). The reflection task required students to think about their writing and answer to two prompts: "What did you like best about your essay?" and "What could you have improved on the next draft?" Reflection as an activity came immediately after conducting a self-evaluation. Dora, the teacher of class 3, explained that most students ignored the prompts of reflection and simply conducted their self-evaluation. She felt that they needed extensive support at the beginning to understand what each criterion of self-evaluation meant. Therefore, when she saw that there was no time to engage in reflection in the class after the first essay she did not ask students to complete their reflection at home, where they would be unassisted. She admitted that her students' reluctance to engage in reflection was partly her fault as she did not insist on them completing the task or supported them in doing so. Elena, the

teacher of class 2, felt that she already had a lot of new things to teach students as part of the portfolio implementation innovation. She was therefore reluctant to have students struggle with reflecting on their work and try to answer to open ended questions, which was something fourth grade students typically have difficulty at. She preferred to have her students learn how to answer to specific self-evaluation criteria in full sentences to be able to compose a short paragraph for their self-evaluation rather than engage in reflection.

How did reflection relate to students' writing performance over time?

The analysis of students' reflections was based on data from class 1. Even though this data were adequate to examine the trend of how students' reflection ability changed over time, as there were six evaluations of their reflections over the year, the results did not follow a specific trend as students' performance on reflection varied greatly from essay to essay. There was no evidence of gradual increase of students' reflection skill. A probable reason for that might be the fact that it typically takes up to five times of students' use of a reflection protocol for them to notice profound differences (McLeod & Vasinda, 2009). The intervention cannot be considered as successful with respect to the component of reflection, as it did not adequately support students to develop this skill. There were only two prompts for students to reflect on their writing. Initially, the two reflection prompts were considered as adequate or appropriately challenging for children of this age, as according to Zubizarreta (2004), portfolio systems incorporate at least some elements of critical reflection, even if the reflection amounts to the most rudimentary and form-generated statements about individual exhibits collected in a

portfolio. In retrospect, those two reflection prompts did not constitute adequate scaffolding for fourth grade students, as the latter tended to ignore prompts or answer laconically without giving the questions any serious thought.

As reflection is a difficult skill to develop, especially for this age-group, unless students are scaffolded and supported by their teachers to engage in reflection activities they cannot reflect on their own simply because they are provided with prompts for reflection. Nevertheless, a higher score on reflection was associated with higher writing performance post-portfolio implementation. It seems that the higher ability students were better able to reflect on their work, to identify the parts they liked best, justify their opinion and also identify their weaknesses and parts that could be improved. This result indicated that the intervention was inadequate to support lower ability students in their reflection attempts.

The second research question this study attempted to provide an answer to was the following:

Research question 2: How does elementary school students' writing self-efficacy change with the use of process portfolio pedagogy that supports a process approach in writing, progress monitoring (self-evaluation, goal setting), access to peers' work and feedback?

The results of this study showed that students' writing self-efficacy increased over time, with the significant change happening between pre and mid-portfolio implementation. This was an expected finding as students' writing performance also increased over time for this period of time, and the relationship between the two variables seems to be reciprocal. Students' writing self-efficacy also became more accurate. By mid-portfolio implementation, almost all students who were interviewed (seven out of nine students) had a more accurate self-efficacy score that better corresponded to their actual writing performance, compared to their pre-portfolio implementation scores (table 29).

This finding was strengthened by the fact that two control groups in different schools that did not use portfolios did not experience a statistically significant change with regard to writing-self efficacy when this was measured at the beginning and at the end of academic year. It is also important to note that the probability that those control groups were affected to a great extent by the curricular reforms that paralleled the affordances of portfolios was minimal. Curricular reforms, even though in theory should have taken effect in 2007, in reality they take a significantly long period of time before

they are implemented in classrooms' every-day practice and before their effect can be experienced.

Isolating the three main sources of self-efficacy to identify which of them changed over time showed that "mastery experiences" and "verbal persuasion" scores increased over time but "vicarious experiences" did not have a significant change. Nevertheless, students' perceptions on the connection of portfolios and their writing self-efficacy were also very positive post-portfolio implementation.

The analysis of data that examined the connection of self-efficacy sources to portfolio affordances showed that students' writing self-efficacy as this was perceived from their mastery experiences related to a process approach in writing, progress monitoring, self-evaluation and goal setting. In other words, working on multiple drafts, monitoring progress, conducting self-evaluations and setting and achieving goals in their portfolios seemed to help students have more accurate writing self-efficacy beliefs.

As far as vicarious experiences as a source of self-efficacy are concerned, data supported a connection between vicarious experiences and the access to peers' work affordance of portfolios even though portfolios were not primarily used to take advantage of peer modeling and even though students' "vicarious experiences" score did not change significantly over time.

Regarding the third source of self-efficacy, results showed that students' writing self-efficacy as this was perceived from verbal persuasion related to the social feedback affordance of portfolios. It seems that peer and teacher feedback might have helped students in having accurate writing self-efficacy beliefs.

Changes in Students' Writing Self-efficacy

Students' writing self-efficacy increased over time (table 23). The effect size (η^2 =0.34) qualified as a large effect size according to Cohen (1988). Repeated measures analysis results showed that there was a statistically significant difference in students' writing self-efficacy beliefs from pre- to mid-portfolio implementation. A statistically significant difference in students' writing self-efficacy beliefs was not observed from mid- to post-portfolio implementation. The most probable explanation for the latter is related to the timing of the administration of the instrument measuring students' writing self-efficacy beliefs. The mid- and the post-portfolio implementation administrations were too close in time to observe differences in students' beliefs. The pre-portfolio implementation administration of the instrument was conducted on September 24th 2007, the mid-portfolio implementation administration of the instrument was conducted on March 12th 2008 and the post- portfolio implementation administration of the instrument was conducted on June 12th 2008. This means that important changes in students' beliefs were observed within the first period of portfolio implementation in approximately five months (September 24th to December 21st 2007 and Jan7th to March 12th 2008) rather than within the second period of portfolio implementation in the last two months of the year (March 12th to April 19th and May 5th to June 18th 2008).

To address the alternative interpretation that the reported increase in students' writing self-efficacy was due to general learning and maturation rather than portfolio-related processes, a control group from a different school was used. The two instruments assessing students' writing self-efficacy were administered to the students of the control group at the beginning and at the end of the academic year. Group equivalence on

writing performance was established. Analyses showed that the control group students' writing self-efficacy did not change significantly from the first to the second administration. This provided support for the hypothesized connection between portfolio pedagogy processes and students' writing self-efficacy.

Three sources of writing self-efficacy according to Bandura's (1997) theory of self-efficacy were measured in this study through the WSPS instrument: mastery experiences, vicarious experiences and verbal persuasion. "Mastery experiences" and "verbal persuasion" scores increased over time but "vicarious experiences" did not have a significant change.

Mastery experiences as a source of students' writing self-efficacy increased significantly from pre-to mid-portfolio implementation administration (table 24). The effect size (η^2=.25) qualified as a large effect size according to Cohen (1988). This finding was expected, as mastery experiences, a primary source of self-efficacy have to do with performance and students' writing performance also had an increasing trend from pre-to mid-portfolio implementation administration (see Figure 13). Enactive mastery experiences are considered the first and most important source of self-efficacy, mostly because they provide feedback on learners' own capabilities. Students' own performances offer reliable guides for assessing efficacy. In general, successes raise self-efficacy and failures lower it (Schunk, 2003).

Vicarious experience did not have a statistically significant difference from pre-to post- portfolio implementation. A possible explanation for the fact that students' self-efficacy with regard to vicarious experience, which provide comparative information about the attainment of others, remained unchanged might be the fact that peer modeling

was not actively pursued as an important component of the portfolio intervention. According to Schunk and Ertmer (2000), "students acquire efficacy information by socially comparing their performances with those of others. Similar others offer a valid basis for comparison. Observing similar peers succeed (fail) at a task may raise (lower) observers' efficacy" (p.633). However, in this study, students had the chance to see their peers' work only in the context of the need to provide peer feedback. They were paired-up with their peers randomly, hence there was no expectation that they would realize that "if similar peers perform a task, they too are capable of accomplishing it", as the expectation would have been had homogeneous pairs of students with regard to their writing performance ability were formed.

In addition to this, the qualitative data showed that only two students mentioned peers as a source of their writing self-efficacy beliefs, meaning that only two out of the nine students who were interviewed had a clear idea on what their peers thought about their writing ability. The fourth grade students who participated in this study had difficulty associating their peers' positive comments to their work with their peers' perceptions on their writing ability. In other words they did not realize that the fact that their peers provided positive comments to their work meant that the latter thought that they were good in writing.

Verbal persuasion as a source of students' writing self-efficacy increased significantly from pre-to mid-portfolio implementation administration. The effect size (η^2 =0.11) qualified as a medium effect size according to Cohen (1988). This signifies the important role that significant others, such as peers, the teacher and parents play for students of this age. Data from the qualitative analysis of students' interviews also

showed that all of them mentioned their parents and teachers as sources on which they based information about whether they were good concerning writing essays.

The qualitative data analysis from the students' interviews also confirmed that there was a noticed difference from pre- to mid-portfolio implementation with regard to the accuracy of students' writing self-efficacy. By mid-portfolio implementation, almost all students who were interviewed (seven out of nine students) had a more accurate self-efficacy score that better corresponded to their actual writing performance, compared to their pre-portfolio implementation scores (table 29). This means that if they had low, average or high writing performance they had low, average or high self-efficacy, accordingly. For example, Stamatis, who had low self-efficacy pre-portfolio implementation, had high self-efficacy both mid- and post-portfolio implementation that corresponded to his high writing performance (table 29). However, the fact that Artemis' and Maria's writing self-efficacy remained low throughout the academic year despite the fact that their writing performance was very high remained puzzling. A possible explanation could be that, as students' self-efficacy assessment was primarily based on the results obtained from two self-efficacy instruments, those two students were excessively modest during the completion of the instruments and basically underestimated their writing ability. Their data interview did not agree with the result obtained from the instrument as interviews showed that they answered positively both when asked if they were good in writing as well as when asked if they progressed with regard to their writing performance.

Connection of Writing Self-efficacy and Portfolio Affordances

Results supported a connection between the three main sources of learners' writing self-efficacy, according to Bandura's (1997) theory of self-efficacy; mastery experiences, vicarious experiences and verbal persuasion, and portfolio affordances. Specifically, results indicated that the primary source of self-efficacy, mastery experiences related to portfolio affordances such as the process approach in writing, progress monitoring, self-evaluation and goal setting. Vicarious experiences as a self-efficacy source related to the access to peers' work affordance of portfolios, despite the fact that the latter was not used to its full potential, as peer modeling. Finally, verbal persuasion related to the social feedback affordance of portfolios, which allowed for peer and teacher feedback.

Connection of mastery experiences with a process approach in writing, progress monitoring, self-evaluation and goal setting in portfolios.

Regarding a connection of the writing self-efficacy literature and portfolios, process portfolio pedagogy encourages students to set their own goals and select artifacts that demonstrate their work towards these goals, in other words demonstrate mastery experiences. Portfolios are furthermore used for students to self-reflect on their learning and self-evaluate to identify strengths and weaknesses. As the writing process is documented over time, it was hypothesized in this study that progress monitoring would be facilitated and mastery experiences would become obvious to students through process portfolios.

The correlations of several of the most important portfolio affordances, such as the process approach in writing, progress monitoring, self-evaluation and goal setting,

with students' writing self-efficacy about their general and specific progress in writing post-portfolio implementation were highly significant (table 32). This indicated that process portfolio affordances, such as a process approach in writing, progress monitoring, self-evaluation and goal setting related to the most important source of self-efficacy, according to Bandura's (1997) theory of self-efficacy, mastery experiences.

Process approach in writing.

A process approach in writing has an emphasis on process, setting up a classroom routine wherein students are expected to plan, draft, revise, edit, and publish their work and where students share in-progress and completed work with their peers and teacher. It encourages students to continually review their writing and revise as necessary (Ritter, 1991). It was argued in the literature that for young students, especially low performers, to have mastery experiences in the domain of writing, they need to be supported to reflect on the process rather than focus on the final outcome (Cole et al., 1995; Hebert, 1992), hence a process approach in writing is preferred over a product approach at the elementary school level. Moreover, according to Pajares (2003), writing programs that focus on a process approach in writing endeavor to build students' sense of efficacy in writing based on the belief that self-efficacy is essential to skill improvement.

In this study, 81% of students agreed or strongly agreed that working on more than one drafts in their portfolios helped them improve their writing performance. Students identified the process approach in writing as a way that helped them improve their performance in writing, and students' perceptions about the process approach in writing significantly correlated with their writing self-efficacy beliefs with regard to

mastery experiences. The results of this study therefore confirmed the hypotheses of previous research as they supported that the process approach in writing was associated with strengthening children's writing self-efficacy beliefs.

Monitoring progress.

Portfolios provided a way for students to make their progress in writing visible to them. Students were specifically asked about their perceptions of progress monitoring through portfolios, both via questionnaires that were administered to all participants and via interviews from a small sample of students that allowed getting more in-depth information about those perceptions. The analysis of quantitative data showed that students realized the value of portfolios as a way to help them monitor their progress, as the vast majority of students (90%) agreed or strongly agreed that being able to monitor their progress in portfolios helped them improve their writing performance. In addition to this, students' perceptions about progress monitoring through portfolios significantly correlated with their writing self-efficacy beliefs regarding mastery experiences.

This finding was confirmed by the analysis of the student interviews, which showed that from the beginning of the portfolio implementation, students realized the fact that portfolios were a mechanism through which they could monitor their progress and most of them pointed out that they did make progress. In other cases students could identify that their progress was not steadily increasing and that therefore they should put more effort to the writing process. This agrees with Barrett's (2008) recent work, in which it was found that the majority of students thought that their e-portfolios were good for showing their progress to other people.

Progress monitoring was essentially achieved through the processes of goal setting and self-evaluation, which are analyzed separately. Interviews revealed that students associated progress monitoring with self-evaluation and goal-setting and they used these terms when they were asked to explain how they knew if they were progressing in writing. This finding confirmed empirical research conducted by Graham and Harris (1989) with school-aged students. Those researchers also found an improvement of students' self-efficacy through the use of self-monitoring and having students check their progress by comparing goals and achievement.

Goal setting.

Setting and achieving goals in portfolios was also associated with higher writing self-efficacy in this study. The majority of students (86%) agreed or strongly agreed that goal setting in their portfolios helped them improve their writing performance. In addition to this, students' perceptions about goal setting significantly correlated with their writing self-efficacy beliefs regarding their mastery experiences.

This finding was triangulated through the qualitative analysis of students' interviews, which showed that students realized the value of goal setting and were able to differentiate between goals that were achieved and goals that needed additional work. Furthermore, results from the portfolio content analysis confirmed the connection of goal setting and writing self-efficacy, as the number of goals students set in their portfolios correlated with their writing self-efficacy beliefs regarding their general and specific progress. This result showed that the students who set more goals were the ones who had higher writing self-efficacy beliefs. This finding agrees with the results of the study of

Graham and Harris (1989) who found that comparing goals with achievement improved students' self-efficacy. It also agrees with Walker (2003) who argued that "establishing goals and discussing progress toward the goals are important aspects of maintaining accurate self-attributions and improving self-efficacy" (p.175).

Students in classes 2 and 3 engaged in goal setting at a greater extent compared to class 1 students. In class 1, students set four goals on average during the year, while in classes 2 and 3 students set nine goals on average during the year. In all classes, however, the majority of students' goals focused on writing conventions, spelling and grammar. Students in this study generally set proximal goals, which they felt they had more control of and which they could measure easily. This finding agrees with Cervone, et al. (2004) who supported that "when people set proximal goals, they more quickly and frequently receive feedback on their progress; thus they tend to have higher self-efficacy perceptions" (p.197) and with Pajares (2000) who found that "self-efficacy (is) stronger in students who set proximal goals than in students who set distal goals" (p.117).

Self-evaluation.

The majority of students (70%) agreed or strongly agreed that conducting self-evaluations helped them improve their writing performance. Furthermore, there was a strong correlation between students' perceptions of self-evaluation in portfolios and their post-portfolio implementation writing self-efficacy, regarding their mastery experiences. This indicated that conducting self-evaluations in their portfolios allowed students to see where their strengths and weaknesses lied and led to more accurate self-efficacy over time. This finding was confirmed with data from the qualitative analysis of students'

interviews, which showed that students realized the value of self-evaluation, and associated self-evaluations with their progress in writing performance. This finding is in accordance with previous research, which showed that self-evaluations of progress enhance efficacy and maintain motivation (Schunk, 2003). Positive self-evaluations of one's capabilities and progress in skill acquisition raise self-efficacy and motivation because students believe they are learning and are capable of further progress (Schunk, 2003).

Connection of vicarious experience with access to peers' portfolios.

Portfolio pedagogy supports interaction among students through which students share their work with peers. It was hypothesized in this study that allowing students to have access to peers' portfolios and exposing them to peer models succeeding at a task might relate to their writing self-efficacy.

Vicarious experience did not have a statistically significant difference from pre- to post- portfolio implementation. Vicarious experience involves the social comparisons that students make with each other. The literature explained that "these comparisons, along with peer modeling can be powerful influences on self-efficacy beliefs" (Pajares, 2006, p.346). In fact, "peer models may, under certain conditions, have more desirable effects on students than teacher models" (Schunk, 2003, p.163). This was not observed in the present study because the peer modeling aspect of portfolios was not implemented to its full potential. Portfolios could potentially have been a good way to make students' beliefs about their peers' writing performance more explicit had they been used in a way to encourage peer modeling or increase peers' interaction with respect to their beliefs

about each other. In any case, triangulated results from the administration of questionnaires to all participating students and the analysis of selected students' interviews showed that most students thought that having access to peers' work was useful.

The correlation of students' perceptions of having access to peers' work post-portfolio implementation and their post-portfolio implementation self-efficacy, as perceived by vicarious experience was significant. This statistically significant positive correlation indicated that having access to peers' work in portfolios related to vicarious experiences, which is identified as the second source of self-efficacy, according to Bandura's (1997) theory of self-efficacy.

Connection of verbal persuasion with social feedback in portfolios from peers, the teacher and parents.

Process portfolio pedagogy encourages comments provided by the teacher, parents or peers on students' work and their learning. It was hypothesized in this study that positive or constructive comments and feedback that students receive from peers, teachers and parents might relate to their writing self-efficacy beliefs.

Verbal persuasion as a source of students' writing self-efficacy, which provides learners with information about what others believe they are capable of doing increased significantly from pre-to mid-portfolio implementation administration of the WSPS instrument, signifying the important role that significant others, such as peers, the teacher and parents or siblings play for students of this age. Furthermore, a connection of verbal

persuasion as a source of self-efficacy and social feedback in portfolios was evident from class 1 data.

"Learners often receive persuasive information from teachers, parents, and others, suggesting that they are capable of performing a task" (Schunk & Ertmer, 2000, p.633). This verbal persuasion is one of the important sources for students' writing self-efficacy. Results showed that students' writing self-efficacy as this was perceived from verbal persuasion related to the social feedback affordance of portfolios. Specifically, students identified peer and teacher feedback as helpful for their progress in writing. Peer and teacher feedback probably helped students in having more accurate writing self-efficacy beliefs. This finding confirmed Schunk's (2003) claim that positive persuasive information raises efficacy and Walker's (2003) claim that positive verbal responses of parents and teachers that convey to students their capability of performing literacy tasks is a powerful source for developing self-efficacy. It seems probable that portfolios provided an opportunity for students to realize the progress in their writing ability and not only to demonstrate it to themselves but also to other people whose opinion is important for this age, such as their teacher, peers and parents.

Feedback from peers.

Fifty nine per cent of students agreed or strongly agreed that receiving feedback from their peers in their portfolios helped them improve their writing performance. The fact that 40% of students did not agree with this statement is an indication that some students might have felt that feedback was the responsibility of the teacher. Ballantyne et

al. (2002) concluded that students lack confidence in both their own and peers' abilities as assessors (as cited in Gennip et al., 2009).

Students were taught how to provide comments to their peers' work based on a feedback code sheet (see Figure 5). The feedback code sheet was implemented in the case of paper-based portfolios in classes 2 and 3. It was also used for providing comments on the first draft of students' work which was always written on paper in class 1. Teaching students how to provide peer feedback was important, as previous studies revealed that students who had been introduced to the concept of peer assessment by means of extensive training made the most changes per draft of their written papers (Lane & Potter, 1998, as cited in Gennip et al., 2009).

Feedback from the teacher.

With regard to teacher feedback, 76% of students agreed or strongly agreed that receiving feedback from their teacher in their portfolios helped them improve their writing performance. The feedback received from the teacher was also based on the feedback code sheet (see Figure 5). The teachers used the feedback code sheet to model the skill of providing thorough feedback for their students. The teacher-provided feedback was indirect corrective feedback. Students' perceptions that the teacher-provided feedback was useful for the improvement of their writing performance is in agreement with the results of recent empirical research that showed a positive effect of both direct and indirect corrective feedback from the teacher on the improvement of Dutch secondary school students' writing performance (Beuningen et al., 2008).

In classes 2 and 3 the teachers furthermore provided detailed remarks to their students for every essay in their portfolios. Those remarks modeled constructive feedback to students as they identified several aspects of writing in which the students did well and also provided suggestions for improvement. The majority of class 2 and 3 students found this useful, as 93% of those students agreed or strongly agreed that receiving detailed remarks from their teachers in their portfolios helped them improve their writing performance.

Feedback from parents.

As far as parent feedback is concerned, 85% of class 1 students agreed or strongly agreed that they would like to receive feedback from their parents in their portfolios. Data from the qualitative analysis of students' interviews showed that all nine of them mentioned parents as a source of their writing self-efficacy. For example, when they were asked how they knew that they were good in writing they replied that they knew it from comments that their parents made on their writing. Class 2 and 3 students did not receive feedback from parents in their portfolios.

With regard to a connection of portfolio affordances and writing self-efficacy, only data from class 1 showed a connection of verbal persuasion as a source of self-efficacy and social feedback in portfolios. For classes 2 and 3, students' perceptions on peer, teacher or parent feedback did not significantly correlate with their writing self-efficacy. This finding signaled a potential difference between the implementation that used digital portfolios in class 1 and the implementation that used paper-based portfolios in classes 2 and 3. In the first case of digital portfolio implementation, peer feedback was

promoted to a greater extent compared to the second case. In the digital portfolio implementation peer feedback was used for all nine essays that were included in students' portfolios throughout the year while in paper based portfolio implementation peer feedback was only used in half of the essays included in students' portfolios. In addition to this, parental involvement, which the digital portfolio made feasible, was nearly impossible for the classrooms implementing paper-based portfolios. This may be an indication that digital portfolios as compared to paper-based portfolios have a much stronger social feedback role as they allow for sharing with peers and parents more easily. This finding agrees with Barrett (2009), who explained that the development of the so called Web 2.0 tools, a classification under which weblogs are included was based on an architecture of participation, collaboration and interaction. This in turn can also facilitate a pedagogy of interaction, through the use of those technologies to support interpersonal communication. Barrett (2009), in refining her thinking from her previous publications in 2000, believes that the technology is changing the portfolio pedagogy by making interaction and feedback easier for teachers and more motivating for students. While it is true that the same thinking about purpose, pedagogy and assessment applies for paper-based and electronic portfolios, the implementation process is different, leading to a very different experience for students, as well.

Further repeated measures analysis that distinguished among the social feedback coming from the teacher, peers and parents for students' writing self-efficacy showed that the first two were significant but the latter was not. The effect size for the social feedback coming from the teacher was $\eta^2=0.10$ while for the social feedback coming from peers it was $\eta^2=.07$, both qualifying as medium effect sizes, according to Cohen (1988). This

finding can be easily explained, as students' capability to share their work with parents was only possible for students of class 1, who used digital portfolios. The paper-based portfolios were rarely sent at home for parents to see. Even in class 1 though, parents were not actively involved in the portfolio implementation, as feedback from parents was only provided to three out of twenty students. However, the fact that the majority of class 1 students agreed that they would like to receive feedback from their parents in their portfolios in the instrument examining their portfolio perceptions combined with the fact that all nine students who participated in individual interviews mentioned parents as a source of self-efficacy, provided an indication that students would probably have been positive to the idea of involving the parents in portfolio implementation. Student interviews also showed that in some cases siblings and other family members read students' work in their digital portfolios.

Benefits and Obstacles of Process Portfolio Pedagogy

Research question 3 part 1: What are the benefits and obstacles of process portfolio pedagogy and of developing process portfolios as perceived by elementary school teachers?

The first part of research question 3 focused on the teachers' perceptions about paper-based portfolio implementation. Data sources were two videotaped teachers' interviews conducted at the end of the academic year on their teaching practices for portfolio implementation (appendix I).The qualitative analysis followed an inductive

grounded theory approach (see Glaser & Strauss, 1967) to build an understanding of benefits and obstacles of portfolio implementation as perceived by the two teachers.

The two teachers, Elena (class 1) and Dora (class 2) were young professionals in their early thirties with nine to ten years of teaching experience, which included two years of teaching experience in fourth grade Language Arts teaching. Both were very conscientious and enthusiastic. As portfolio pedagogy was an initiative that was never attempted before in the Greek-Cypriot context, teachers had some uncertainty about the portfolio implementation process as a whole. Pedagogical strategies that were part of portfolio implementation, such as teaching students the process approach in writing with an emphasis on the meta-writing stage, goal-setting, reflection, self-evaluation and peer feedback were considered innovative by teachers in 2007, as they were implemented in the elementary school for the first time.

Teachers expressed uncertainty about several issues that were related to the portfolio approach that was followed. They expressed specific concerns in retrospect: "Was this approach limiting students? Were we offering too much guidance to students? Were we restricting students' creativity in writing?" There was also a dilemma between providing extensive support and providing minimal support for the students' writing process. Among teachers' concerns was also the dilemma of "quality over quantity". They both recognized that their fourth grade students wrote fewer essays during the year that portfolios were introduced as compared to the number of essays their fourth grade students wrote during the previous year when portfolios were not used. However, quality-wise, their students who participated in portfolio implementation spent more time preparing for their essays. They also spent a significant amount of time at the meta-

writing stage, engaging in activities such as goal setting, self-evaluation and peer-feedback, all of which were innovative steps and they were considered as beneficial and important by both teachers. Nevertheless, it is worth mentioning that the practices of the revised curriculum in Language Arts, which were introduced in schools through a top-down approach, received strong support from the schools' headmasters and inspectors who promoted their implementation in schools. This acted as a catalytic factor for the two teachers' acceptance of portfolios and their willingness to implement portfolio affordances in their teaching.

Both teachers had major concerns about the high time demands of portfolio implementation. The time-consuming nature of portfolios was identified by both teachers as the most important obstacle for their implementation in elementary school, which is consistent with prior research (Barrett, 2008; McLeod & Vasinda, 2009). Time restrictions was also the main reason certain aspects of portfolio implementation, such as peer feedback and having students work on multiple versions of their writing, were not pursued at a greater extent and in a more systematic way by these teachers.

Even though teachers realized the benefit of having students create multiple drafts of their work as part of the process approach in writing, and the benefits of having students engage in goal setting, self-evaluation and peer feedback, they also identified students' difficulties in relation to these portfolio components from the early stages of portfolio implementation. Teachers emphasized that students of this age need extended support before they can engage in such processes. This finding confirmed the results of the pilot study that preceded this dissertation (Nicolaidou & Strobel, 2007). Some students, especially low-ability ones, faced difficulties in taking their teacher's or peers'

corrections into consideration when they wrote a second draft of their work and they tended to repeat the same mistakes from the first to the second draft. In addition to this, in class 2 there were problems with peer feedback competitiveness. This observation agrees with Barron's (2003) multiple case-studies of sixth-grade triads where she found that relational issues, such as competitiveness hindered students' progress in the less successful groups that she studied (cited in Gennip et al., 2009).

Students had difficulties in setting goals, especially at the beginning of the year, and needed teacher support as they initially did not know what type of goals to set, where to focus on and what the expectations were. Students also had difficulties engaging in self-evaluation, especially at the early stages, as they were uncertain about how to use given criteria to evaluate their writing. Teachers developed support structures for students' writing and followed a systematic and guided approach of portfolio implementation that included three distinct stages: prewriting, writing and meta-writing. Through this approach they encouraged goal setting and self-evaluation to a great extent, they provided students with opportunities for peer feedback and second drafts of their work for half of the essays throughout the year but completely dismissed reflection.

The lack of adequate computer equipment and the lack of students' typing skills were factors that influenced teachers' decision not to consider digital portfolios as an option. Both were reluctant to go into the effort that a digital portfolio implementation would require. This is consistent with previous research that documented that "adding technology (to the portfolio process) created a level of complexity that was frustrating for many teachers" (Barrett, 2008, p. 19). The teachers in this study were happy to try out paper-based portfolios though as those did not require any major changes in their way of

teaching. Paper-based portfolio implementation allowed teachers to continue teaching in the way they felt comfortable with. Both teachers explained that they built on their previous experience of what worked and what not in the classroom and they only had to modify and adjust some components of their Language Arts teaching to make them more applicable to portfolio practices.

Despite initial hesitation, both teachers would consider a digital portfolio implementation in the future for several reasons; to facilitate students' working on multiple drafts, encourage peer feedback, take advantage of the motivational role that computers have for students of this age-group, and increase parental involvement. Teachers furthermore reported an improvement in students' writing performance and the development of students' skills in goal setting, self-evaluation and accepting and providing peer feedback, all of which were evident through the analysis of their students' paper-based portfolios.

Benefits and Obstacles of Digital Portfolios

Research question 3 part 2: What are perceived benefits and obstacles to implementing digital portfolios as perceived by elementary school students and how can they be overcome?

The second part of research question 3 focused on the students' perceptions about digital portfolio implementation. Data sources were nine videotaped student interviews on benefits and obstacles of portfolio implementation (appendix H) as well as the researcher's field notes. The qualitative data analysis followed an inductive grounded theory approach (see Glaser & Strauss, 1967) to build an understanding of students'

perceptions on portfolio implementation and its perceived benefits and obstacles. The analysis of students' interviews focused on either the digital portfolio implementation process in the class or the digital portfolio tool itself.

Students identified a great number of benefits of digital portfolio implementation. They overall enjoyed the innovation, they were enthusiastic about it and considered it very important, especially when they realized that they were the only class in the school involved in digital portfolios, as the other two fourth grade classes were using paper-based portfolios. Students' excitement with and added motivation about the use of technology agrees with McLeod and Vasinda's (2009) observations about the third and fourth grade students who participated in their study and they were excited to be using PDAs for recording their portfolio reflections. Students in this dissertation study furthermore took pride of their published work, used portfolios as a way to monitor their progress, and identified that their typing skills developed over time. The direct and indirect corrective feedback students provided to their peers also improved, at least with regard to quantity, and students generally provided detailed feedback that adhered to the guidelines of constructive feedback.

However, students also identified limitations of the digital portfolio implementation. The main limitation of digital portfolio implementation, as identified by students was the fact that their typing skills were low at the beginning stages. It should be noted that typing skills are typically low in this age group among Greek-Cypriot students. Students showed that through practice they became better but their lack of typing skills added to the already high time demands of portfolio implementation (researcher's field notes). The fact that they sometimes had to work on their digital portfolios while the class

was working on something else was at times problematic. This necessity was caused by the lack of adequate computer equipment in the classroom, where only two desktop computers were available. Another problem that students identified had to do with their peers' feedback, which was not always correct and sometimes it was repetitive in the sense that more than one person identified the same mistake. This finding agrees with Gennip et al. (2009) who noted that it is unclear under what conditions peer assessment is effective and referred to problems that might arise given the social context of peer assessment, such as a lack of trust in others as assessors. Lastly, students identified the need to protect their privacy.

Students were asked what they could propose as a solution to these obstacles. They suggested the use of additional computer equipment in the classroom. Moreover, most of them preferred that they went to a well equipped computer lab for their portfolio work. They also stated a preference towards peer- or teacher-provided scaffolding, e.g. for learning how to provide peer feedback, rather than using the technology-provided scaffolding that was built within the tool. Lastly, to protect their privacy they also suggested the selection of difficult passwords and identified the need to change them often.

With regard to the advantages of the digital portfolio tool students thought that it was user-friendly and easy to use. This agrees with the result of the previous usability pilot-testing of the tool (Nicolaidou & Strobel, 2007), as well as with the results of a later use of the same tool (WordPress MU) as a digital portfolio used in English with elementary school students in New Zealand (Rate, 2008). Students in the present study liked several features of the tool, such as the wider audience to which their work was

exposed to, having easy access to their peers' work, receiving peer feedback over the internet, the search function of the contents, the "save and continue" option, the fact that they could upload pictures to their work, password-protect it and have it presented in chronological order. They also thought that reading their peers' work in digital portfolios solved the problem of some students' ineligible hand-writing on paper. They could easily see the portfolio tool being used in earlier grades of elementary school and spontaneously used the tool as a means of communication without being asked to do so. This spontaneous use of portfolios provides testament to the motivational power of online publishing, and the social nature of weblogs that facilitates communication and feedback on students' work.

Students identified limitations of the tool, such as the fact that they faced some difficulties, especially at the beginning stages of portfolio implementation with regard to uploading images, login in, remembering the URL of portfolios and learning how to make comments. They also pointed out that the interface was a bit cluttered with unnecessary functionality for their level, and that the search functionality was case-sensitive and accentuation-sensitive. Students also commented that the ability to personalize their portfolio was limited. This agrees with Barrett's (2008) finding of students' desire to express their own individuality, choice and creativity in their portfolios. Students in that study requested those features despite the fact that they did not have prior experience with either paper-based or electronic portfolios. The same thing was observed with the participants in the present study. In addition to these limitations, in cases of groupwork there were problems of ownership and commenting as the essay

could easily be inserted in the portfolios of all group members but the comments submitted would only show in one student's portfolio.

When asked about ways to circumvent these problems, students suggested to have a clearer interface by removing the functionality that was unnecessary for them, add buttons for functionality such as "make a comment", "insert an image", and "write a new essay" rather than having links, adding the "underline" function in the text editor, add an indication of "in progress" work, place scaffolding exactly where it is needed, show the total number of comments received, increase the personalization ability of the tool and translate some words in the tool from English to Greek so that it would be easier to understand them.

Conclusion

A growing literature explored how paper-based and digital portfolios can be used in elementary school, mainly for large-scale assessment. Small-scale studies focused on perceived rather than measured benefits of portfolios on students' achievement, attitudes and motivation and most research cited theoretical underpinnings of portfolios with scant systematic and empirical evidence. According to Barret (2005), portfolio literature is challenging because of the many reasons people create portfolios and the many contexts in which they are used. Furthermore, research surrounding portfolios in higher education and adults is significantly more common than research surrounding portfolios in K-12 education. Empirical research on student portfolios in K-12 has been scarce. More specifically, empirical research on the value of process portfolios on elementary schools students' writing performance has been extremely limited, while research on the value of process portfolios on elementary schools students' writing self-efficacy has been only

anecdotal. Additionally, most of this research has been conducted in North America. This study took advantage of what was already known from research conducted in the North American context to apply it to the Greek-Cypriot context, where process portfolio implementation in 2007 was an innovation. What is more, it also provided empirical evidence on a connection between the use of process portfolio as a pedagogical strategy, writing performance and writing self-efficacy by examining how the last two variables changed over time, within a one academic year of portfolio implementation in elementary school. It showed that fourth grade students' writing performance increased over time, as this was evident from students' digital and paper-based portfolios. It is, however, important to note that learning gains in writing performance cannot be attributed to portfolio pedagogy. Learning gains were also found in students' ability to provide constructive comments to their peers' work, to set goals and to provide accurate self-evaluations of their work. Students' writing self-efficacy increased over time and became more accurate as it reflected students' actual performance by the end of portfolio implementation. This study contributed to our knowledge of process portfolio pedagogy, especially in terms of its implementation, connection with elementary school students' writing performance and impact on students' writing self-efficacy. A rich descriptive examination in this study spoke to the portfolio process and contained both achievement and affective data that can inform practice.

With regard to elementary school students' writing performance in particular, an extensive body of empirical literature on the process approach for writing in US elementary schools indicated its value for increasing students' writing performance (Harris et al., 2006; Graham, 2006). Recent Language Arts curriculum changes in Cyprus

materialized in recently published Language Arts books that were put in effect in 2006 at a pilot phase in grades 1, 3, 5 and 6 and in 2007 in all six grades of elementary school. These curriculum changes supported the process approach in writing and emphasized planning, drafting, revising and sharing work with peers. This study implemented a combination of this approach and portfolio pedagogy. By measuring students' writing performance over time as this was documented in their process portfolios over one academic year, this study provided some preliminary, empirical, small-scale results of the potential benefits of implementing a process approach combined with portfolio affordances, such as goal setting, self-evaluation, reflection and feedback, in the Cyprus elementary school context.

Research on elementary school students' self-efficacy beliefs in various subject matters already exists (Schunk, 2003, Cervone et al., 2004). However, this literature was based on research conducted largely in the US (Zeidner et al., 2000, p.761). This study responded to this gap in the literature. With regard to research on writing self-efficacy in particular, Pajares (2003) argued that "self-beliefs about writing have received modest attention both from researchers in the field of composition and from self-efficacy researchers" (p.141) and stated that this is unfortunate, given the critical role that writing plays at all levels throughout the academic curriculum. This study spoke to Pajares' (2003) call for research as it examined students' writing self-efficacy beliefs and how these changed over a year-long intervention. Students' writing self-efficacy was measured using data from two standardized and validated instruments that were reinforced with interviews with selected students for a more in-depth study of their beliefs. Moreover, Pajares and Valiante (1997) stated that investigations on writing self-

efficacy have generally involved high school students and college undergraduates and they recommended that such studies be conducted at lower academic levels, especially at those in which self-beliefs are taking root. Shell et al. (1989) also referred to the lack of research examining the relation between beliefs and writing for younger populations. This study spoke to these calls for research as well, as it examined students' writing self-efficacy beliefs at the elementary school level and showed how, through portfolio pedagogy, these beliefs can not only increase over time but also become more accurate to reflect students' actual performance.

A methodological contribution of this study referred to the development of a writing performance instrument that can be used to objectively measure students' writing performance in well-structured essays in a systematic, analytical way. This instrument was developed based on the Greek Language Arts curriculum guidelines and validated in the Greek context through teachers' input. Interrater reliability that was computed when two researchers independently used the instrument was very high (94.9%), suggesting that this can be made available for other researchers interested in measuring writing performance in elementary school. The instrument might potentially be useful not only for writing portfolios' implementation in Language Arts but also as a starting point for establishing Cyprus' national standards for writing at the elementary school level.

The study has a contribution in the field of educational technology, as it resulted in an improved version of an open source weblog tool that can easily be used as a digital portfolio tool. As there was no portfolio tool available in Greek, for the purpose of this study, a weblog was used as an open-source portfolio tool localized into Greek and customized to respond to the needs of elementary school teachers and students. The

bottom-up approach that was followed in the pilot study that preceded this dissertation study (Nicolaidou & Strobel, 2007) yielded important recommendations that informed the enhancement of the tool with additional support structures. The revised version of the portfolio tool was used in this dissertation study, which followed the same bottom-up approach to document the participants' perspectives and recommendations for further improvement of the tool. Upon implementation of minor changes, this will result in an improved open source digital portfolio tool that can easily become available in more languages. The future development of the tool based on the recommendations of this study, which will incorporate support structures that can facilitate teachers' practices in the classroom and can make it more user-friendly for elementary school students, is expected to encourage its introduction in elementary school classrooms in Cyprus for a large-scale portfolio implementation that will be responsive to teachers' needs and practices.

At a theoretical level, findings of this study also provided evidence that indicated that Bandura's (1997) self-efficacy theory applies to portfolio practice in the research setting and ones like it. This hypothesized applicability of theory into practice is based on the identified correspondence between the three main sources of self-efficacy: a) enactive mastery experiences, b) vicarious experiences and c) verbal persuasion and portfolio affordances of a) progress monitoring (goal setting, reflection and self-evaluation), b) access to peers' work and c) feedback.

Implications for Practice

The results of this study can offer some insight for educators who wish to implement portfolios in their practice in elementary school. One of the most important

goals of process portfolios is to have students take responsibility for learning and to focus on the process rather than the end result. Process portfolios support progress monitoring through goal setting, self-evaluation and reflection. They can also promote collaboration and interaction among students as, by nature, when shared they encourage feedback from peers and the teacher. Feedback from people outside of the classroom barriers, such as parents, siblings and friends is also encouraged, as it is facilitated through the use of digital portfolios, in particular.

One implication for practice refers to the need of students for support, especially if they engage in portfolio processes for the first time. Students do not intuitively engage in practices such as goal setting, self-evaluation, reflection and peer feedback. It therefore takes time and effort to teach them each one of these processes. Teacher modeling of how constructive feedback to an essay is provided is crucial. Teacher modeling also seemed to be effective in this study for showing students the use of the feedback code sheet (see Figure 5). Showing examples of anonymous students' work and having students practice providing peer feedback is another helpful strategy that can be implemented, along the lines of what Pattison (2008) also suggested to address the challenge of teaching students how to provide meaningful peer feedback.

It is important that step-by-step instructions be given for students of this age group. For example, students may need extensive support for the first stages of self-evaluation of their writing. One strategy that can be used to support students is having the whole class go through the self-evaluation criteria one by one, making sure that adequate time is provided so that students think through each criterion and actually understand what it means. Teachers can evaluate students' self-evaluation at the beginning stages to

make sure that students' rating does not significantly deviate from their actual writing performance. A student self-evaluation rubric based on given criteria was implemented successfully in this study. This self-evaluation rubric can be used by educators interested in helping their students develop their self-evaluation skills and focus on specific aspects of their writing.

With regard to the support students need to engage in goal-setting processes, it is advisable for teachers to encourage students to start with proximal goals that are easier to set and evaluate and gradually prompt them to set more challenging goals that correspond to their increasing writing ability. At the beginning stages, students' goal setting can also be evaluated by the teacher to make sure that a close correspondence between goals and competence is achieved. A systematic approach, according to which students learn to set goals as a routine for each one of their subsequent essays, rather than set goals sporadically during the academic year, will help them make a closer and clearer connection of their goals to their future work.

Digital portfolios have some affordances that differentiate their implementation in the classroom in a way that makes them more accessible, as compared to paper-based portfolios. The use of a weblog as a portfolio tool was successful in this study, as several fourth grade students intuitively figured out its functionality when provided with a login name and password and watched a brief demonstration by the teacher of how to write a posting. Without additional training on the use of the tool they were able to send comments to their peers. Fourth grade students learned how to use the tool easily and effortlessly and could even see it being used in earlier grades of elementary school. Peer teaching was implemented as a way to scaffold lower ability students who did not have

much experience with computers. It was also identified as the preferred way for students to learn the functionality of the tool. Some students dismissed technology-provided scaffolding because they already possessed the necessary skills, while some others dismissed it because it was more difficult to follow as compared to having a person guide them through the process. In order to provide students with support when they work independently at school or at home, it is recommended that a re-design of scaffolding templates within the tool take place to place scaffolding exactly where it is needed. It is also advisable for teachers to use scaffolding in the form of a printed job-aid with screenshots.

Limitations of the Study

One of the limitations of the study was the fact that the researcher was one of the participating teachers. A researcher has pre-established understandings, beliefs and biases, including, in this case, a belief of the value of the portfolio intervention that might have interfered with data analysis and interpretation. This problem was addressed with several ways. First of all, research field notes in the form of a detailed daily record was kept by the researcher throughout the year, regarding all informal interaction that took place between her and participating teachers that might have resulted in modifications of the intervention. Second, the researcher and her students were not the only participants. The study implemented a multiple case-study design and the three classes as cases were compared and contrasted. Third, additional interpreters of results were used and interrater reliability was calculated for the assessment of students' writing performance. Finally, using member checking as well as triangulating the results offered additional ways to protect against researcher-bias.

There were specific limitations with regard to the variables this study attempted to measure, writing performance and writing self-efficacy. Assessing students' writing is not an objective task. It involves an inference by the reader of the quality of a written work, and such inference may include biases and interpretations that can make the assessment an imperfect reflection of actual writing ability. Nonetheless, researchers in the field of composition believe that timed, in-class writing samples provided reliable assessments (Foster, 1983, Shell et al, 1989 as cited by Pajares and Valiante, 1997). Measuring a construct such as self-efficacy, which is a self-reported measure, has challenges when working with young children. The use of two validated standardized tests, whose results were highly correlated ($r(63) = .51, p < .01$), accompanied by additional in-depth interviews with selected students, as well as the computation of a correlation of students' self-efficacy with their actual writing performance (r=0.31, p=.01, N=63) provided ways to address these challenges. However, it is important to acknowledge that "self-efficacy is important, but not the only influence on achievement. Other important influences are skills, knowledge, outcome expectations and perceived value" (Schunk, 2003, p.161). Those were not examined in this dissertation.

An important limitation was the design of the study, which falls into the category of pre-experimental designs. Students had higher writing performance over time and more accurate writing self-efficacy beliefs in this study. This provided an indication that the intervention in the three classes was successful. However, it is important to acknowledge that the design of the study did not allow for causal claims. It therefore cannot be claimed that changes to students' writing performance or writing self-efficacy were due to the portfolio pedagogy. What can be argued is that there is a potential

connection between portfolios, writing performance and writing self-efficacy. Had a pre-test post-test control group quasi-experiment been used results could be stronger. There were prohibiting reasons for not using a comparative design. As this was an exploratory case study of a pedagogical strategy that was considered an innovation in Cyprus, there was a strong desire to have multiple cases of portfolio introduction. Each class is considered as a case according to the collective case study design (Creswell, 2005). Therefore portfolios were introduced in the three fourth grade classes of the school where the researcher was employed. Ethical considerations did not allow having one of these classes act as a control group. In general, this study aimed for an in-depth study of portfolios in three cases, following a smaller group of students and teachers for a longer period of time, rather than going for "breadth" and trying to involve as many classes and schools as possible (Barrett, 2008).

The findings of this exploratory multiple case study should therefore be considered preliminary due to many inherent limitations of the design that was used. To alleviate the uncertainty regarding the strength of findings that was introduced by the design of the study, there was an attempt to use a control group, which consisted of three fourth grade classes at a different school. Those students were only pre-tested and post-tested with regard to their writing self-efficacy. This attempt to measure the self-efficacy variable aimed to address the alternative interpretation that changes in self-efficacy were due to general learning, maturation or a testing effect. However, another limitation is that in the design, writing self-efficacy is measured three times during the year and not just pre and post. So there remains also the possibility that the increase of writing self-efficacy in the groups of this study was due to a testing effect.

Every effort was made in order for a structured implementation to be followed by teachers. As part of this effort, supporting instructional materials that were in accordance with curriculum guidelines were developed and provided to teachers. However, an implementation fidelity issue refers to the fact that teachers deviated from this approach and followed their own teaching practices in some instances. For example, in this study teachers chose to use process portfolio pedagogy without using digital portfolios. The teachers' practices were identified, described and documented separately, as this dissertation was a multiple case study, and qualitative similarities and differences between cases were drawn.

The Language Arts syllabus, textbook, and even the topics for students' essays were common in the three classes. This makes it unlikely that any one group matured at a different rate than any other group. However, there were some differences among classes, such as the observation of competitiveness among students when providing peer feedback, which was only evident in class 2 but not in classes 1 or 3. Each class is influenced by the personality of the instructor and the dynamics of the class which are bound to vary from class to class. Moreover, as the use of technology in the classroom and digital portfolios in particular was something new for students of class 1, another limitation and at the same time a factor that may account for their positive perceptions of portfolios could be the "novelty effect" that this study did not control for. Barrett (2008) identified this effect in her study, where "by having an electronic portfolio, students used the computer more often, which prior research in Educational Technology has shown to be more motivating for students' learning" (p.19).

As this was an exploratory case study with a limited sample of participants and a focus on teachers' and students' use of portfolios, its results cannot easily be generalized. Any generalizations to a similar context have to be made with caution, keeping in mind that some of the findings may be culturally bound, that is applicable only in the Greek-Cypriot context. Results from this study may therefore be transferable to other elementary school settings where the conditions under which portfolios are implemented in the Language Arts curriculum for essay writing approximate those described in Chapter 3 (Methodology) of this dissertation. Some of the findings have value as part of a bottom-up approach that takes teachers' and students' views into consideration before large-scale implementation of portfolios is suggested and attempted in Cyprus.

Lastly, the intervention did not adequately support lower ability students to develop their reflection skills. Improvements should be made to the pedagogical approach followed for teaching reflection in this study if we are to achieve what Barrett (2007) suggested for portfolios in the K-12 classrooms: that through their reflection component they can help students understand their own learning and provide a richer picture of student work to document growth over time through engaging students in addressing vital reflective questions such as: "What have I learned? Why? When? In what circumstances? Under what conditions?". One possible improvement would be to build on Rate's (2008) suggestion that "reflections need to be varied and use different media, such as written comments, rubrics/checklists, videotaped discussion and other digitally recorder reflections" (p.65). For example, in McLeod and Vasinda (2009)'s research study, which examined whether third and fourth grade students who created electronic portfolios could learn to reflect constructively on their work, those students created "learner's philosophy

statements", which were "statements that guided them to reflect on themselves as a learner, how they learned best and what helped them most while learning" (p.31). An innovation in that study was that auditory reflections were used instead of written reflections. Students were guided through the reflective process using an interview protocol to conduct peer-to-peer interviews which were digitally recorded using Personal Digital Assistants (PDAs). Students read their learner's philosophy statement immediately prior to their interviews to help them remember and reflect more deeply. The results of that study were promising, as the content analysis of the podcasts of each electronic portfolio showed that students' reflections progressed significantly over time. In order to help students learn to reflect constructively on their work or on themselves as learners as a result of the portfolio process, perhaps a strategy such as the implementation of learner's philosophy statements or the use of auditory rather than written reflections should be used.

Implications for Future Research

The results of this study provided a foundation for future study. The findings suggested that portfolio implementation is associated with more accurate writing self-efficacy beliefs, learning gains in students' goal setting, self-evaluations and students' providing of constructive and detailed peer feedback. Future studies may examine if there is a causative effect of portfolios on writing performance, in other words if process portfolio pedagogy is the independent variable responsible for learning gains in writing performance, instead of other variables, such as, for example, teacher support in the classroom. Future research might overcome some of the identified limitations of this

study if additional classes participate to increase sample size and if a quasi-experimental research design is used that also makes use of one or more control groups.

There are several questions worth pursuing by future research. A potential strength of portfolios, especially of digital portfolios lies in their ability to provide learners with feedback from multiple sources: peers, teacher, parents. Given that in many educational settings today, peer assessment for the support of student learning is still experienced by teachers and students as quite a revolutionary change in assessment practice and given that empirical studies on the effect of peer assessment on learning seem to be restricted in higher education, it is important to understand the conditions under which peer feedback can enhance student learning (Gennip et al., 2009). What influence did the various forms of feedback have on students' writing performance? Was a great number of editorial changes overwhelming for students of this age group? Was the combination of peer and teacher feedback a problem for low ability students who found it hard to implement changes? Was the teachers' detailed feedback useful for students' writing performance? Did students incorporate teachers' suggestions in subsequent drafts? How much did students rely on their teachers' feedback to shape their writing self-efficacy beliefs?

There are many indications that engaging students in processes such as progress monitoring, goal-setting, self-evaluation and reflection through portfolios is valuable. Specifically, to what extent are these processes useful for students' writing performance? How much of the variance in students' writing performance and writing self-efficacy would each one of these variables account for?

Finally, technology takes too much time and effort to integrate in the elementary school class, especially if adequate computer equipment is an issue. Taking that into consideration what is needed to convince teachers who are novices with regard to technology use, to consider digital portfolios as a valuable resource that can be used effectively in the elementary school classroom?

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Appendix

Appendix A: Student Writing Performance Evaluation Instrument

(modified from Tombari & Borich, 1999)

Prompt to students:

Write an essay to introduce yourself without revealing your name. Remember to write an introduction to attract the reader's attention and a conclusion to end the essay. You can include any information you like, such as your age, gender, physical description, character description, school-teacher-family description, hobbies, likes/dislikes, interests, ambitions, dreams.

You have 80 minutes to plan and write this essay. You cannot receive any assistance from your teacher in writing this essay. At the end of this period your teacher will read your essay aloud in class and your peers will be asked to guess who it belongs to.Good luck!

Evaluation of essays

Students' writing was evaluated based on 10 criteria, on a five-point scale. Then the score was transformed into a percentage score. Maximum possible score was 100 and minimum score was 20. The ten criteria are the following:

	Pre	E1	E2	E3	E4	E5	E6	E7	E8	E9	Post
1. Paragraphs (1 to 5 points)											
2. Introduction, main body conclusion (1 to 5 points)											
3. Capital letters (1 to 5 points)											
4. Accentuation (1 to 5 points)											
5. Adjectives/expressions (1 to 5 points)											
6. Spelling (1 to 5 points)											
7. Repetition/redundancy (1 to 5 points)											
8. Handwriting (1, 3 or 5 points)											
9. Punctuation (1 to 5 points)											
10. Content/ideas/vocabulary (1 to 5 points)											
Total (out of 50 points)											
Total (out of 100 points)											

Scoring of individual criteria

1. Paragraphs:

Rating	Description
1	There are no paragraphs, the text consists of a single paragraph.
2	Paragraphs do not have topic sentences or main ideas. Sentences and paragraphs do not fit together.
3	Paragraphs have somewhat good topic sentences or main ideas. Sentences and paragraphs fit together to some extent as some ideas that should be in one paragraph are found in another. Paragraphs are not well-developed.
4	Paragraphs have good topic sentences or main ideas. Sentences and paragraphs fit together well.
5	Each idea is developed in one paragraph, paragraphs have very good topic sentences or main ideas. Sentences and paragraphs fit together very well.

2. Introduction, main, body conclusion

Rating	Description
1	The organization of the essay does not make sense. There is no introduction, main body or conclusion.
2	The organization of the essay is attempted but does not make sense. Two of the three parts are missing.
3	The organization of the essay makes sense for the most part. One of the three parts is missing.
4	The organization of the essay makes sense. All three parts are present but may not all be well developed. It is a well-organized and well-sequenced paper that has a good introduction, body and conclusion.
5	The organization of the essay clearly makes sense. All three parts are present and well developed. It is a very well-organized and very well-sequenced paper that has a very good introduction, body and conclusion.

3. **Capital letters**

Rating	Description
1	Sentences start with/main names are written with a lower case letter in most cases.
2	Sentences start with/main names are written with a lower case letter in several cases (more than 5 mistakes).
3	Sentences start with/main names are written with a lower case letter in some cases (3-5 mistakes).
4	There are a few mistakes where sentences start with/main names are written with a lower case letter (1-2 mistakes).
5	There are no mistakes with regard to the use of capital letters.

4. Accentuation

Rating	Description
1	1=There is no accentuation.
2	2= Only some words are accentuated.
3	3= Most words are accentuated but there are some mistakes (3-5 mistakes).
4	4= Most words are correctly accentuated (1-2 mistakes).
5	5= All words are correctly accentuated.

5. Adjectives/expressions

Rating	Description
1	There are no adjectives or interesting expressions.
2	There are a few adjectives or interesting expressions (1-2).
3	There are some adjectives or interesting expressions (3-4).
4	There are several adjectives or interesting expressions (5-6).
5	There are many, different adjectives or interesting expressions (more than 7).

6. Spelling

Rating	Description
1	The spelling mistakes interfere with meaning.
2	There are a lot of spelling mistakes, but they do not interfere with meaning.
3	There are some spelling mistakes (some mistakes are severe, as they are made at the ending of the word).
4	There are a few spelling mistakes (1-3 mistakes that are **not** in the ending of words. Students are expected to know the grammatical rules for the ending of words e.g. words are spelled differently depending on the gender of the word (e.g. feminine, masculine and neutral words), depending on whether the word is a verb, depending on whether the word is singular or plural, depending on the person (1st person, 3rd person etc).
5	There are no spelling mistakes.

7. Repetition/redundancy

Rating	Description
1	There is a lot of repetition or redundant words/phrases (more than 7 cases).
2	There are many cases of repetition or redundancy (5-6 cases).
3	There are some cases of repetition or redundancy (3-4 cases).
4	There are a few cases of repetition or redundancy (1-2 cases).
5	There is no repetition or redundancy.

8. Handwriting

Rating	Description
1	The handwriting is so ineligible it interferes with making meaning.
3	The handwriting is ineligible, but the text is readable with some effort.
5	The handwriting is eligible.

9. **Punctuation**

Rating	Description
1	Lacks understanding of punctuation.
2	Only some forms of punctuation are used, e.g. full stops and commas. Errors in the use of writing conventions interfere with meaning.
3	The use of punctuation conventions is somewhat effective. Most forms of punctuation are used, but incorrectly. Errors don't interfere with meaning.
4	The use of punctuation conventions is effective. Errors don't interfere with meaning. Most forms of punctuation are used correctly. Only minor errors evident
5	The use of punctuation conventions is very effective. No errors evident. All forms of punctuation are used correctly.

10. Content/Ideas/Vocabulary

Rating	Description
1	The content is irrelevant to the topic. Very limited vocabulary.
2	The content is for the most part irrelevant to the topic. Only a few ideas are developed. Limited vocabulary.
3	The content is somewhat relevant to the topic. Ideas are interesting but lack detail. Adequate vocabulary.
4	The content is mostly relevant to the topic. Some ideas are interesting and well developed. Good vocabulary.
5	The content is relevant to the topic. Interesting ideas are well developed. Extensive vocabulary.

Appendix B: Student Writing Self-Efficacy Instrument 1

APPENDIX A

The Writer Self-Perception Scale

Listed below are statements about writing. Please read each statement carefully. Then circle the letters that show how much you agree or disagree with the statement. Use the following scale:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

Example:	**I think Batman is the greatest super hero.**	SA	A	U	D	SD

If you are *really positive* that Batman is the greatest, circle SA (Strongly Agree).
If you *think* that Batman is good but maybe not great, circle A (Agree).
If you *can't decide* whether or not Batman is the greatest, circle U (Undecided).
If you *think* that Batman is not all that great, circle D (Disagree).
If you are *really positive* that Batman is not the greatest, circle SD (Strongly Disagree).

(OC)	1. I write better than other kids in my class.	SA	A	U	D	SD
(PS)	2. I like how writing makes me feel inside.	SA	A	U	D	SD
(GPR)	3. Writing is easier for me than it used to be.	SA	A	U	D	SD
(OC)	4. When I write, my organization is better than the other kids in my class.	SA	A	U	D	SD
(SF)	5. People in my family think I am a good writer.	SA	A	U	D	SD
(GPR)	6. I am getting better at writing.	SA	A	U	D	SD
(PS)	7. When I write, I feel calm.	SA	A	U	D	SD
(OC)	8. My writing is more interesting than my classmates' writing.	SA	A	U	D	SD
(SF)	9. My teacher thinks my writing is fine.	SA	A	U	D	SD
(SF)	10. Other kids think I am a good writer.	SA	A	U	D	SD
(OC)	11. My sentences and paragraphs fit together as well as my classmates' sentences and paragraphs.	SA	A	U	D	SD
(GPR)	12. I need less help to write well than I used to.	SA	A	U	D	SD
(SF)	13. People in my family think I write pretty well.	SA	A	U	D	SD
(GPR)	14. I write better now than I could before.	SA	A	U	D	SD
(GEN)	15. I think I am a good writer.	SA	A	U	D	SD
(OC)	16. I put my sentences in a better order than the other kids.	SA	A	U	D	SD
(GPR)	17. My writing has improved.	SA	A	U	D	SD
(GPR)	18. My writing is better than before.	SA	A	U	D	SD
(GPR)	19. It's easier to write well now than it used to be.	SA	A	U	D	SD
(GPR)	20. The organization of my writing has really improved.	SA	A	U	D	SD
(OC)	21. The sentences I use in my writing stick to the topic more than the ones the other kids use.	SA	A	U	D	SD
(SPR)	22. The words I use in my writing are better than the ones I used before.	SA	A	U	D	SD
(OC)	23. I write more often than other kids.	SA	A	U	D	SD

APPENDIX A (cont'd.)

The Writer Self-Perception Scale

(PS)	24. I am relaxed when I write.	SA	A	U	D	SD
(SPR)	25. My descriptions are more interesting than before.	SA	A	U	D	SD
(OC)	26. The words I use in my writing are better than the ones other kids use.	SA	A	U	D	SD
(PS)	27. I feel comfortable when I write.	SA	A	U	D	SD
(SF)	28. My teacher thinks I am a good writer.	SA	A	U	D	SD
(SPR)	29. My sentences stick to the topic better now.	SA	A	U	D	SD
(OC)	30. My writing seems to be more clear than my classmates' writing.	SA	A	U	D	SD
(SPR)	31. When I write, the sentences and paragraphs hit together better than they used to.	SA	A	U	D	SD
(PS)	32. Writing makes me feel good.	SA	A	U	D	SD
(SF)	33. I can tell that my teacher thinks my writing is fine.	SA	A	U	D	SD
(SPR)	34. The order of my sentences makes better sense now.	SA	A	U	D	SD
(PS)	35. I enjoy writing.	SA	A	U	D	SD
(SPR)	36. My writing is more clear than it used to be.	SA	A	U	D	SD
(SF)	37. My classmates would say I write well.	SA	A	U	D	SD
(SPR)	38. I choose the words I use in my writing more carefully now.	SA	A	U	D	SD

Appendix C: Student Writing Self-Efficacy Instrument 2

(modified from Pajares et al., 2001)

Directions: On a scale from ***0*** **(no chance)** to ***10*** **(completely certain)**, how sure are you that
you can perform each of the ***writing skills*** below? Remember that you may use ***any*** number between 0 and 10.

0 1 2 3 4 5 6 7 8 9 10

No chance **Completely certain**

_____ 1. Correctly *spell* all words in a one page essay.
_____ 2. Correctly *accentuate* and *punctuate (use comma, full stop, question mark etc.)* a one page essay.
_____ 3. *Correctly use all parts of speech (verb, noun, adjective, etc.)* in a written composition.
_____ 4. Write *simple sentences* with good *grammar.*
_____ 5. Correctly use *singulars, plurals and verb tenses.*
_____ 6. Write a strong *paragraph* that has a good *topic sentence* or *main idea.*
_____ 7. Structure paragraphs in the right order to *support ideas.*
_____ 8. End paragraphs with *proper conclusions.*
_____ 9. Write a *well-organized and well-sequenced paper* that has a good introduction, body, and conclusion.
_____ 10. Get ideas across in a clear manner by staying focused without getting off the topic.

Appendix D: Student Questionnaire on Digital Portfolios

(The purpose of this questionnaire was to examine students' perceptions on the connection of portfolios and their writing self-efficacy. It was administered in class 1).

Name:_____ **Grade:**_____ **Date:**_____

Listed below are statements about portfolios and writing. Read each sentence carefully. Then circle the letters that show how much you agree or disagree with the statement. Use the following scale.

SA= Strongly agree	A= Agree	U=Undecided	D=Disagree	SD=Strongly disagree

Example:

I think Superman is the greatest super hero. SA A U D SD

- If you are really positive that Superman is the greatest, circle SA (Strongly agree)
- If you think that Superman is good but maybe not that great, circle A (Agree)
- If you can't decide whether or not Superman is the greatest, circle U (Undecided)
- If you think that Superman is not all that great, circle D (Disagree)
- If you are really positive that Superman is not the greatest, circle SD (Strongly Disagree)

SA= Strongly agree	A= Agree	U=Undecided	D=Disagree	SD=Strongly disagree

1	**Setting goals in my portfolio helped me get better in writing.**	SA	A	U	D	SD
2	**Self-evaluation in my portfolio helped me get better in writing.**	SA	A	U	D	SD
3	**I can see progress in my writing in my portfolio.**	SA	A	U	D	SD
4	**When I monitor my progress in my portfolio I get better in writing.**	SA	A	U	D	SD
5	**Working on more than one drafts in my portfolio helped me get better in writing.**	SA	A	U	D	SD
6	**I read my peers' portfolio essays online.**	SA	A	U	D	SD
7	**I read my peers' portfolio essays online to get better in writing.**	SA	A	U	D	SD
8	**Having access to my peers' writing portfolios helped me get better in writing.**	SA	A	U	D	SD
9	**My teacher's feedback in my portfolio helped me get better in writing.**	SA	A	U	D	SD
10	**My peers' feedback in my portfolio helped me get better in writing.**	SA	A	U	D	SD
11	**I would like to receive my parents' feedback in my portfolio.**	SA	A	U	D	SD

Appendix E: Student Questionnaire on Paper-based Portfolios

(The purpose of this questionnaire was to examine students' perceptions on the connection of portfolios and their writing self-efficacy. It was administered in classes 2 and 3).

Name:_____ **Grade:**_____ **Date:**_____

Listed below are statements about portfolios and writing. Read each sentence carefully. Then circle the letters that show how much you agree or disagree with the statement. Use the following scale.

SA= Strongly agree	A= Agree	U=Undecided	D=Disagree	SD=Strongly disagree

Example:

I think Superman is the greatest super hero. SA A U D SD

- If you are really positive that Superman is the greatest, circle SA (Strongly agree)
- If you think that Superman is good but maybe not that great, circle A (Agree)
- If you can't decide whether or not Superman is the greatest, circle U (Undecided)
- If you think that Superman is not all that great, circle D (Disagree)
- If you are really positive that Superman is not the greatest, circle SD (Strongly Disagree)

SA= Strongly agree	A= Agree	U=Undecided	D=Disagree	SD=Strongly disagree

1	**Setting goals in my portfolio helped me get better in writing.**	SA	A	U	D	SD
2	**Self-evaluation in my portfolio helped me get better in writing.**	SA	A	U	D	SD
3	**I can see progress in my writing in my portfolio.**	SA	A	U	D	SD
4	**When I monitor my progress in my portfolio I get better in writing.**	SA	A	U	D	SD
5	**Working on more than one drafts in my portfolio helped me get better in writing.**	SA	A	U	D	SD
6	**I read my peers' portfolio essays.**	SA	A	U	D	SD
7	**I read my peers' portfolio essays to get better in writing.**	SA	A	U	D	SD
8	**If I read my peers' portfolio essays I will get better in writing.**	SA	A	U	D	SD
9	**My teacher's detailed remarks in my portfolio helped me get better in writing.**	SA	A	U	D	SD
10	**My peers' feedback in my portfolio helped me get better in writing.**	SA	A	U	D	SD

Appendix F: Student Interview Protocol for Writing Self-efficacy 1

This semi-structured interview protocol was used for student interviews prior to portfolio implementation at the beginning of the academic year.

Name: _____ **Date:** _____

Self-efficacy

- Do you like writing essays?
- Would you say you're good in writing essays? Why do you think that?
- In what aspects are you good and in what aspects do you have difficulty?

Goal setting

- Do you set goals for your writing? If so, what type of goals?
- Do you document your goals?
- Do you set goals on your own or with someone's help?
- Have you ever set goals before (in grades 1 to 3)?

Self-reflection

- Do you ever do a self-reflection?
- Do you think about questions such as what do you like best/least about a piece of writing, what does a piece say about you as a writer or what do you want to improve on the next draft? whether there are things you'd like to do differently next time?
- Do you ever think about your weaknesses? Upon finishing an essay, do you ever think of the difficulties you may have faced while writing it? Or whether you're satisfied with your effort?
- Have you ever reflected on your work before (in grades 1 to 3)?

Self-evaluation

- Do you ever do a self-evaluation?
- Do you think about the extent to which a goal was achieved? Or how well you did?
- Have you ever conducted a self-evaluation of your work before (in grades 1 to 3)?

Monitoring progress

- Do you have a way to monitor your progress? In other words, how do you know if you're progressing?
- How do you know whether you're achieving your goals?
- Have you ever had a way to monitor your progress before (in grades 1 to 3)?

Technology related question

- How fluent are you with using

	Not at all									Very fluent
Word processors?	1	2	3	4	5	6	7	8	9	10
Web browsers?	1	2	3	4	5	6	7	8	9	10

Appendix G: Student Interview Protocol for Writing Self-efficacy 2

This semi-structured interview protocol was used for the mid-portfolio implementation assessment of students' writing self-efficacy and connection with portfolios.

Name: _____ **Date:**_____

Self-efficacy

- Do you like writing essays?
- Would you say you're good in writing essays? Why do you think that?
- In what aspects are you good and in what aspects do you have difficulty?

Goal setting

- Do you set goals in your portfolio? What type of goals?
- Do you set goals in your portfolio on your own or with someone's help?
- Do you think that setting and achieving goals in your portfolio helped you get better in writing?

Self-reflection

- Do you do a self-reflection in your portfolio?
- Do you think about questions such as what do you like best/least about a piece of writing, what does a piece say about you as a writer or what do you want to improve on the next draft? whether there are things you'd like to do differently next time?
- Do you ever think about your weaknesses? Upon finishing an essay, do you ever think of the difficulties you may have faced while writing it? Or whether you're satisfied with your effort?
- Do you think that self-reflection in your portfolio helped you get better in writing?

Self-evaluation

- Do you do a self-evaluation in your portfolio?
- Do you think about the extent to which a goal was achieved? Or how well you did?
- Do you think that self-evaluation in your portfolio helped you get better in writing?

Monitoring progress

- Does the portfolio provide you with a way to monitor your progress? How?
- How do you know whether you're achieving your goals when you look at your portfolio?
- Do you think that monitoring your progress in your portfolio helped you get better in writing?

Process approach in writing

- Do you think that revising your work in your portfolio helped you get better in writing?

Peer modeling

- Do you think that having access to your peers' portfolios helped you get better in writing?

Feedback

- Do you think that feedback from your teacher in your portfolio helped you get better in writing?
- Do you think that feedback from your peers in your portfolio helped you get better in writing?
- Do you think that feedback from your parents in your portfolio helped you get better in writing?

Technology related question

- How fluent are you with using

	Not at all									Very fluent
Word processors?	1	2	3	4	5	6	7	8	9	10
Web browsers?	1	2	3	4	5	6	7	8	9	10

Appendix H: Student Interview Protocol for Portfolio Tool Assessment

This semi-structured interview protocol was used for the post-portfolio implementation assessment of the portfolio tool and portfolio process.

Portfolio implementation

- What do you think are some of the benefits of using portfolios in the classroom?
- What do you think are some of the disadvantages of using portfolios in the classroom?
- What are the difficulties of using portfolios in the classroom?
- How do you think the use of portfolios can be improved in the classroom?
- How do you think the digital portfolio tool can be improved?

Appendix I: Teacher Interview Protocol on Process Portfolio Implementation

Name: _____ Date:_____

A. Teaching practice

- Years of teaching experience ___
- Years of teaching experience in Language Arts in each grade level
  ___ years in 4th grade
  ___ years in 5th grade
  ___ years in 6th grade
- Do you follow a process approach to support students' writing?

A process approach in writing has an emphasis on process, setting up a classroom routine wherein students are expected to plan, draft, revise, edit, and publish their work and where students share in-progress and completed work with their peers and teacher.

- How have you implemented process portfolios in your classroom?

(How much and how were students using them during class-time? Were students using them at home? Were the parents involved?)

- What type and how much support do you provide students before, during and after the writing process?
- How much support do students need for goal setting, self-reflection, self-evaluation, progress monitoring and providing feedback?
- How do you provide feedback for your students' writing in their portfolios?
- How do you share that feedback with parents? How often?
- Do students set goals in their portfolios?
- Do students reflect on their work in their portfolios?
- Do students self-evaluate in their portfolios?
- Do students share their portfolios with their peers to provide comments or feedback on peers' work?
- Do parents provide comments or feedback on students' work?
- Are students working on another draft after receiving feedback on their writing?

- What are the benefits of process portfolio pedagogy and of having students develop (digital) process portfolios?

- What are the obstacles to implementing process portfolio pedagogy and digital portfolios as tools with elementary school students? How can they be overcome?

B. Technology access and integration

- Number of computers in your classroom: _____
- Do you have Internet access? YES NO
- How are you currently implementing technology in your classroom?

_____

_____

_____

- How fluent are you with using

	Not at all									Very fluent
Word processors?	1	2	3	4	5	6	7	8	9	10
Web browsers?	1	2	3	4	5	6	7	8	9	10

Appendix J: Consent Form to Participate in Research (Teachers)

CONSENT FORM TO PARTICIPATE IN RESEARCH (teachers)

This is to state that I agree to participate in a program of research being conducted by Iolie Nicolaidou of the Education Department of Concordia University.

Contact info: Iolie Nicolaidou, Department of Education, Concordia University, 357-99-329897, Iolie.nicolaidou@education.concordia.ca

A. PURPOSE

I have been informed that the purpose of the research is as follows: to improve students' writing performance and writing self-efficacy by using portfolios in Language Arts.

B. PROCEDURES

The research will be conducted in your classroom from September 2007 until June 2008.

In September you will administer a writing test to your class (2 periods) and two brief questionnaires about their writing self-efficacy (1 period). These three instruments will be re-administered in June. The two instruments on writing self-efficacy will also be administered in March. You will also administer a brief student questionnaire about portfolios in June (20 minutes).

Portfolio implementation will be guided by a structured approach. This approach is merely a suggestion. You will have the flexibility to follow your own approach. Students will be using process portfolios as a way to: a) document and monitor progress by setting their own goals for writing, including different versions of writing pieces, reflecting on those artifacts and conducting a self-evaluation, b) share their work with peers at school, and c) receive feedback from people with whom they shared their work, such as teachers and peers.
Students will have to be taught how to reflect and how to set their learning goals for writing. They will be incorporating feedback to revise their piece in a second draft in their portfolio and will be conducting a self-evaluation to assess the extent to which they achieved their goal. The same procedure will be repeated for additional writing pieces for the rest of the academic year. It will be up to you to decide whether you want the parents to have access to their children's portfolios.

At the end of the year you will be asked to participate in a 2-hour interview about portfolio implementation that will be videotaped. You will be given a copy of selected excerpts and Iolie's interpretation of your statements and will be asked whether there was any misinterpretation of the meaning. You will receive a copy of the results of the study. Neither your name nor the school will be identified in a future publication of the study. You will be asked for your permission for a presentation of this study in Cyprus.

C. RISKS AND BENEFITS

There is no risk of participation. There are multiple benefits for your students as they will learn how to set their own goals to improve writing, how to provide and receive feedback to improve their work, how to self-evaluate and how to monitor their progress.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences.

- I understand that my participation in this study is:

CONFIDENTIAL (i.e., the researcher will know, but will not disclose my identity)

- I understand that the data from this study may be published.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at (514) 848-2424 x7481 or by email at areid@alcor.concordia.ca.

Appendix K: Consent Form to Participate in Research (Parents)

CONSENT FORM TO PARTICIPATE IN RESEARCH (parents)

This is to state that I agree that my child can participate in a program of research being conducted by Iolie Nicolaidou of the Education Department of Concordia University.

Contact info: Iolie Nicolaidou, Department of Education, Concordia University, 357-99-329897, Iolie.nicolaidou@education.concordia.ca

A. PURPOSE

I have been informed that the purpose of the research is as follows: to improve students' writing performance and confidence in writing by using a web-based tool in Language Arts from September 2007 until June 2008.

B. PROCEDURES

- The research will be conducted in the classroom and will not disrupt classroom procedures.
- Your child's teacher will show him/her how to use the tool at school. The teacher will decide whether the children will be allowed to use it at home if they want to, but it is not compulsory to use it at home nor are you required to have either a computer or Internet access at home.
- Your child will be asked to complete two brief questionnaires in class about his/her confidence in writing, and a brief questionnaire about the tool at the beginning and at the end of the year. These results can be discussed with you in private.
- The child will use the tool in the classroom to set goals, type some of his/her writing pieces, and receive feedback on his/her work from peers, the teacher and maybe parents, too.
- Your child may be chosen by Mrs. Iolie Nicolaidou to participate in an interview. If this happens, Mrs. Iolie Nicolaidou will ask your child some questions at school and will videotape the answers.
- All answers will be confidential. This means that the child's real name or the name of the school will not be identified in a future publication of the study.

C. RISKS AND BENEFITS

There is no risk of participation. There are multiple benefits for your child. Your child will learn how to write better essays, how to set his/her own goals to improve his/her writing, how to use technology to upload work on the Internet so that the child and other

people can access it, how to receive feedback from peers, the teacher and maybe parents to improve his/her work, how to self-evaluate and how to monitor his/her progress. The tool can also be used for communication with the teacher to discuss your child's progress throughout the year.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue the participation of my child at anytime without negative consequences.
- I understand that the participation of my child in this study is:

  CONFIDENTIAL (i.e., the researcher will know, but will not disclose his/her identity)
- I understand that the data from this study may be published.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

STUDENT'S NAME (please print)_____

PARENTS' NAME (please print)_____

SIGNATURE _____

If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at (514) 848-2424 x7481 or by email at areid@alcor.concordia.ca.

Appendix L: Consent Form to Participate in Research (Students)

CONSENT FORM TO PARTICIPATE IN RESEARCH (students)

This is to state that I agree to participate in a program of research being conducted by Iolie Nicolaidou of the Education Department of Concordia University.

Contact info: Iolie Nicolaidou, Department of Education, Concordia University. 357-99-329897, Iolie.nicolaidou@education.concordia.ca

A. PURPOSE

I have been informed that the purpose of the research is as follows: to improve students' writing performance and confidence in writing by using a web-based tool in Language Arts from September 2007 until June 2008.

B. PROCEDURES

- The research will be conducted in the classroom.
- Your teacher will show you how to use the tool on the Internet at school. Your teacher will decide if you can use it at home, but it is not compulsory to do so. You do not need to have a computer or Internet access at home.
- You will be asked to write a short essay and to complete two brief questionnaires in class about your confidence in writing, and a brief questionnaire about the tool at the beginning and at the end of the year.
- You will use the tool in the classroom to set goals, type some of our writing pieces, and receive feedback on our work from your peers, teacher and maybe your parents, too. You will be using feedback to improve your essays to show everybody how much progress you can make during the year. You will also learn how to self-evaluate.
- You may be chosen by your teacher to participate in an interview. If this happens, Mrs. Iolie Nicolaidou will ask you some questions at school and will videotape your answers.
- All your answers will be confidential. This means that your real name or the name of your school will not be used.

C. RISKS AND BENEFITS

There is no risk of participation. There are multiple benefits. You will learn how to write better essays, how to set your own goals to improve your writing, how to use technology to upload your work on the Internet so that you and other people can access it, how to receive feedback from your teacher, peers and maybe parents to improve your work, how to self-evaluate and how to monitor your progress.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences.

- I understand that my participation in this study is:

CONFIDENTIAL (i.e., the researcher will know, but will not disclose my identity)

- I understand that the data from this study may be published.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at (514) 848-2424 x7481 or by email at areid@alcor.concordia.ca.

Appendix M: Analysis of Teachers' Feedback

Category	Definition	Examples of positive feedback	Examples of constructive feedback
Structure/ Organization	This category included teacher feedback that revolved around the structure and organization of the essay.	"You wrote a lengthier conclusion this time. Good for you". "You had a very good start in your essay. Congratulations!"	"You should try to write a lengthier conclusion in your next essay so as to make it more complete". "...However, I found your ending a bit abrupt. Try to work on your conclusion for your next essay".
Writing conventions/ Spelling/ Grammar	This category included teacher feedback that was related to the spelling of words or the grammar used in sentences.	"Good job! You correctly accentuated almost every word in your essay. I had difficulty finding a mistake in your piece!"	"You should be more careful in the use of capital letters. We start all sentences with a capital letter. We also use capital letters in the names of people, places, counties".
Content/ideas	This category included teacher feedback that concentrated on the content and ideas of the student's essay.	"This was a very well written official letter. You paid attention so as to include all important aspects: causes of the problem, consequences of the problem and your suggestions for the solution of the problem. Good job!".	"Your essay did not make sense in the third paragraph in your main part where you tried to explain the consequences of the problem. Try to frequently re-read what you're writing to identify the parts that do not make sense and correct them before submitting your essay".
Other	This category included teacher feedback that could not be classified in one of the previous three categories.	"Your portfolio is very tidy and your drawings are very nice!".	"Your work is unfinished! I expect you to only submit essays that are completed". "I expect you to be more careful in copying your essay to your portfolio. Several of the corrections your peers and teacher identified in your first draft were not included in your next version!".

Classes 2 and 3 detailed teacher feedback.

In addition to providing corrections using the "feedback code sheet" (see Figure 5), the teachers of class 2 and 3 provided detailed positive comments, praising students for what they were able to achieve in their essay and identifying parts they liked (positive comments). Teachers also provided specific suggestions and ideas for improvement identifying what students could have written better in their essays (constructive comments).Teacher feedback, both positive comments and constructive comments were read by the researcher and classified in 46 categories initially, which were then collapsed in four general areas.

a) **Structure/Organization:** This category included teacher feedback that revolved around the structure and organization of the essay

b) **Writing conventions/Spelling/Grammar:** This category included teacher feedback that was related to the spelling of words or the grammar used in sentences

c) **Content/ideas:** This category included teacher feedback that concentrated on the content and ideas of the student's essay

d) **Other:** This category included teacher feedback that could not be classified in one of the above categories.

Tables M1 and M2 show the number of positive comments (PC), the number of constructive comments (CC) and the number and percentage of the total of the comments provided by the teacher of class 2 and class 3, respectively, to their students per category.

Table M1

Teacher Feedback in Class 2

Teacher feedback area	Positive comments	Constructive comments	Total comments (n)	Total comments (%)
Structure/Organization	47	23	70	10%
Writing conventions	49	98	147	20.9%
Content/ideas	292	87	379	54.1%
Other	26	79	105	15%
Total	414	287	701	100%

Table M2

Teacher Feedback in Class 3

Teacher feedback area	Positive comments	Constructive comments	Total comments (n)	Total comments (%)
Structure/Organization	42	58	100	16.9%
Writing conventions	31	52	83	14.1%
Content/ideas	225	101	326	55.3%
Other	52	29	81	13.7%
Total	350	240	590	100%

As can be seen from tables M1 and M2, the majority of teacher feedback in both classes 2 and 3 concentrated on the content-ideas aspect of students' writing, as more than half of teacher's 2 positive and constructive comments (54.1%) and more than half of teacher's 3 positive and constructive comments (55.3%) related to the content and ideas in students' essays.

Appendix N: Analysis of Students' Goals

Category	Definition	Examples of Student goals
Structure/ Organization	This category included goals that revolved around the structure and organization of the essay	"I will try to write a lengthier conclusion in my next essay", "My goal is to develop my ideas in distinct paragraphs", "I will write a better introduction in my essay in one paragraph"
Writing conventions/ Spelling/ Grammar	This category included goals that were related to the spelling of words or the grammar used in sentences	"I will start all my sentences with a capital letter", "I will try to correctly accentuate all words", "I will try not to make spelling mistakes in my essay", "I will use all forms of punctuation correctly", "I will write smaller sentences with good grammar".
Content/ideas	This category included goals that concentrated on the content and ideas of the student's essay.	"I will use adjectives and nice expressions to make my descriptions interesting", "I will develop my ideas more", "I will write nice sentences and more details".
Other	This category included student goals that could not be classified in one of the previous three categories.	"I will improve my handwriting", "I will try to re-read what I wrote in order to make corrections", "I will write words closer to each other from the beginning until the end of each line", "I will not write words in English in my essay".

Appendix O: Peer Feedback Evaluation Rubric

Rating	Description
5	Provides a positive comment and offers three or more suggestions for improvement.
4	Provides a positive comment and offers one or two suggestions for improvement.
3	Provides a positive comment and states very clearly for what reasons the essay was good.
2	Provides one general comment and identifies two or more mistakes on any aspect of writing (spelling, accentuation, punctuation, structure, content).
1	Provides one general comment OR identifies one mistake on any aspect of writing (spelling, accentuation, punctuation, structure, content).

Appendix P: Reflection Evaluation Rubric

Rating	Description
5	States very clearly what he/she likes most about the essay (prompt 1) and identifies areas where improvement is needed (prompt 2).
4	States clearly and gives details on how the work can be improved (prompt 2) but does not clearly state what he/she likes most about the essay (prompt 1).
3	States what he/she likes most about the essay (prompt 1) but does not clearly state how the work can be improved (prompt 2).
2	Some attempt of reflection. The student is vague about what he/she likes most about the essay (prompt 1) or about how to improve the work (prompt 2).
1	No evidence of any reflection on the work.

Appendix Q: Qualitative Analysis of Teachers' Interviews

Open coding of portfolio implementation strategies

Category	Subcategories
Teacher support structures for students' writing	Pre-writing stage: • brainstorming for ideas, • use of guiding questions for each paragraph and students' note-taking for ideas to be developed further, • suggested structure of the essay on the whiteboard (very helpful, if not necessary, especially for lower ability students), • student-suggested phrases and expressions that can be used in an essay • use of photographs to help students describe a scenery • use of a sequence of pictures to help students narrate an accident writing one paragraph for each picture • use of peer-collaboration: e.g. for formal letter writing students worked in groups of four to identify a problem, its causes, consequences and solutions and for a narrative essay e.g. students worked in groups to access a PowerPoint presentation and learn about the history and benefits of the olive tree. • students acting-out the story, e.g. impersonating a tree to have a dialogue with a lumber-jack Writing stage: • The teacher read an exemplary essay or paragraph to students • Both teachers systematically read all students' introductory paragraph and beginning paragraphs and provided support where it was needed (e.g. pointed out some mistakes that mostly referred to spelling, accentuation and punctuation) • peer-collaboration: e.g. students work in groups of four to develop their ideas in writing. • In one specific lesson to teach how a paragraph is developed the students were asked to develop a single paragraph (description of the external appearance of a person they chose) using adjectives and details. Meta-writing stage: • Teacher commenting on students' self-evaluation • Teacher commenting on students' peer feedback

Systematic and guided approach for portfolio implementation	Three distinct stages: • Pre-writing stage • Writing stage and • Meta-writing stage Innovations: • pre-writing stage: more time devoted to it, takes place one day before the writing stage. • writing stage: knowing that time would be allowed for editing allowed teachers to leave students write without much interruption on their part • meta-writing stage: did not exist in the past: students' goal setting and self-evaluation were tried for the first time, meta-writing stage was promoted by the revised Language Arts curriculum and the school unit's inspector
(Low ability) students' difficulties	• in identifying and correcting mistakes in peers' work or their own • in taking their teacher's or peers' corrections into consideration • in setting goals • in self-evaluation • in learning the feedback code use • students repeated mistakes when copying their essay into a second version
Second version of essays	• time consuming task to have students write a second version • because of the low-ability students' difficulties in copying correctly and correcting identified mistakes, it was not particularly beneficial • the strategy of students working on a second version of a paragraph instead of an essay, (e.g. re-writing the conclusion of the essay only) was used to simplify the task
Teacher feedback for students' work	• teacher feedback and comments influenced students' self-evaluation and goal setting • was very helpful • teacher feedback based on the feedback-code was helpful for students as a model for their peer-feedback, as a way to know which aspects were the most important and as a source of information for their self-evaluation
Students' goal setting	• was derived from teacher comments. There was no clear link between students' self-evaluation and goal-setting • was difficult at first • was effective and helped students realize their

	weaknesses and work on them
Students' self-evaluations	• followed a structured approach: either nine generic criteria or genre-specific criteria: e.g. applicable to letter writing • at first students needed teacher-support, e.g. whole class completion of each criterion, question-by-question.
Students' peer feedback	• students needed time to learn how to provide it using the feedback code • several students became very good at it by the end of the year and were able to identify practically all editorial mistakes of their peers' work • some students became very competitive and made demeaning comments to peers
Teachers' concerns for portfolio implementation	• portfolio implementation was extremely time-consuming • Was this approach limiting students? Were we offering too much guidance? Were we restricting students' creativity in writing? (teacher dilemma: when structure was provided essays may not have been identical but there were many common themes, when structure was not provided and students were left unassisted they had problems with structure) • first time portfolio implementation created feelings of confusion and uncertainty to teachers as to what steps should be followed and when • quantity over quality dilemma
Parental involvement	• parents had a supportive role for students in their preparatory stage for essay writing • parents initially corrected students' mistakes and did not realize that students should be responsible for correcting their own mistakes. When this was pointed out to them they stopped interfering.
Teachers' reaction for (digital) portfolio implementation	*Perceived obstacles/difficulties of portfolio implementation* • Practical difficulties (lack of computer equipment in class, need for an equipped computer lab at school) • Finding extra time to implement digital portfolios • Need for very strong teachers' organization skills • Low ability students may make comparisons with regard to the number of pieces in each student's portfolio or the length of students' essays, or they may have insecurity sharing their work • Students have very low level typing skills; hence typing their essay will be difficult and time-consuming. Potential solution would be to have them type essays at home

	Perceived benefits of portfolio implementation • Improvement of writing performance (of low ability students as well) was evident through paper-based portfolios • Development of students' skills in accepting and providing peer feedback, in goal setting, in self-evaluation and in re-reading their essay was evident through paper-based portfolios In a potential digital portfolio implementation: • Changes and revisions of students' work made easily, without the need to re-write the whole essay once it is typed in. • Use of computers is very motivating for students • Most students will feel proud of their work as it gives them joy to share it • Wide access to students' work • At-home student access of peers' work will be beneficial • Capability for students to have access to peer feedback and comments • Students will develop their writing for communication skills • Students will learn to accept and provide feedback • Digital portfolios will solve the problem of some students' ineligible handwriting • Can potentially engage parents • Digital portfolio implementation is a good and interesting idea that they could consider if they had access to a computer lab and if they had students first work with paragraphs rather than whole essays