

Cite as: Theodosiadou, D., & Konstantinidis, A. (2015). Introducing e-portfolio use to primary school pupils: Response, benefits and challenges. *Journal of Information Technology Education: Innovations in Practice*, 14, 17-38. Retrieved from <http://www.jite.org/documents/Vol14/JITEv14IIPp017-038Theodosiadou0669.pdf>

# Introducing E-portfolio Use to Primary School Pupils: Response, Benefits and Challenges

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## Abstract

Electronic portfolios (e-portfolios) have a positive impact on the learning process in a broad range of educational sectors and on learners of all ages. Yet because most e-portfolio-related studies are about their implementation in higher education, this type of research is less usual in the early childhood context, and there is no available research for Greek schools. This study aims to investigate the impact of e-portfolios on learning in a Greek primary school and to provide a resource regarding the educational benefits of e-portfolio in primary education. To do that, it employs the qualitative naturalistic method to collect data, along with mixed methods which were used to achieve triangulation and strengthen confidence in the outcomes. Participants in the research were fourteen 8-year-old pupils, and one of the researchers was their regular teacher. Data evaluation revealed that the e-portfolio added value in pupils' learning, acted as a medium to involve parents, promoted pupils' self-esteem, and was acknowledged as a valuable assessment tool and a challenge for the school community. Based on the experience of the e-portfolio implementation, the authors provide some suggestions that would possibly help researchers and primary school teachers adopt and develop e-portfolio systems in their particular settings.

**Keywords:** e-portfolio, Greek primary school, learning, PowerPoint, qualitative method.

## Introduction

With the proliferation of technology across the educational spectrum, electronic portfolios (hereafter e-portfolios) have gained popularity as a means of assessment and learning. Nonetheless,

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most studies concerning e-portfolios focus on and are related to the implementation of e-portfolios in higher educational contexts, while studies referring to their adoption in primary education are relatively few (see for example Hertzog & Klein, 2005; Wang, Kedem, & Hertzog, 2004). In Greek educational institutions, no implementation of portfolios (either traditional paper-based or electronic) in primary education is doc-

**Editors: Chris Cope and Lynn Jeffrey**

Submitted: April 21, 2014; Revised: March 9, 2015; Accepted: March 15, 2015

umented, and research is mostly based on international literature and theories. The (Greek) Organization for Teacher Training issued a qualitative study related to portfolio use and evaluation (Vitsilaki-Soroniati et al., 2007) in which it is reported that the use of paper-based portfolios in the classroom is considered as an optional alternative means of monitoring students' progress, and thus it is rarely and not systematically used by teachers. In fact, most of the in-service teachers have no training and professional experience in using portfolios either in the classroom or for their own professional documentation.

Given the wider international acceptance of e-portfolios as a learning tool, yet its infrequent implementation in primary education and in Greek educational settings, this research aims to narrow this gap by providing a case study of the impact of e-portfolios on learning in a Greek primary school environment.

The rest of the article will proceed as follows. First, available literature is reviewed as regards the benefits and challenges of e-portfolio implementation. Next, the aim of this research is briefly explained, and the methodology employed is described. A discussion of the main findings of the study follows, and we then provide some suggestions that address the basic steps for developing an e-portfolio system that could help researchers and primary school teachers adopt and develop e-portfolio systems in their particular settings. Finally, in the last section, the study is summarized, its limitations are discussed and potential enhancements are identified.

## **E-portfolio Implementation**

### ***Benefits***

E-portfolios are valuable tools in learning and assessment procedure. The digitized form facilitates the documentation of the owner's learning and understanding and better represents the owner's personality and achievements (Doig, Illsley, McLuckie, & Parsons, 2006; Irvine & Barlow, 1998). However, e-portfolios are more than mere collections of personal work and artifacts; they encourage reflection, feedback, and exchanging ideas in the depth of time (Doig et al., 2006; Lorenzo & Ittelson, 2005; Maher & Gerbic, 2009; Paulson, Paulson, & Meyer, 1991). They go beyond the limits of paper-based portfolios in which we find an aggregation of paper with text and pictures in loose-leaf binders documenting the owner's progress and skills. E-portfolios are more flexible and facilitate the owner's control of input over time (Paulson et al., 1991; Whitworth, Deering, Hardy, & Jones, 2011), while their ability to include learning documentation in various forms, such as videos, recordings, images, links to websites, and so on, can offer a better view of the owner's progress, evidence of learning and proof of skills (Doig et al., 2006; Hewett, 2004; Ntuli, Keengwe, & Kyei-Blankson, 2009).

Paper-based portfolios and e-portfolios should be examined on a different basis. Challis (2005) identifies their differences and highlights the flexibility, bigger capacity with reduced size, unrestricted access concerning time, place, and people/audience, wider range and types of materials employed, while Jarrott and Gambrel (2011) add environmental friendliness as a reason for their popularity among students and institutions.

Much of the attention around e-portfolios can be attributed to the recognition of the value of the embodied constructivist pedagogies and the student-centered philosophies related to meaningful, authentic activities (Abrami & Barrett, 2005; Barrett & Wilkerson, 2004; Maher & Gebic, 2009). E-portfolios promote nontraditional and multidimensional assessment and, thus, provide a better understanding of student learning and a fair evaluation from the teachers' side (Weller, 2002). Adding to that, proponents of socio-cognitive models emphasize that in order to develop effective self-regulated learning strategies, "students need to be involved in complex meaningful tasks, choosing the products and processes that will be evaluated, modifying tasks and assessment crite-

ria to attain an optimal challenge, obtaining support from peers, and evaluating their own work” (Perry, 1998, p. 716).

Portfolios require the students to reflect on their learning which, itself, constitutes a learning exercise (Doig et al., 2006; Rhodes, 2010; Wang et al., 2004). What is more, different intelligences that may be overlooked by traditional assessment (Dixon & McPhee, 2001) can be incorporated in e-portfolios and provide more in-depth evidence of students’ development. As e-portfolios can have a long life span, they are valuable tools in education, allowing teachers to formulate a direct opinion of students’ previous learning and learning needs without relying solely on others’ judgments (Abrami & Barret, 2005).

According to Becta’s (2007) report, e-portfolios are considered to have a positive impact on the learning process in a broad range of educational sectors and on users/learners of all ages (see also Abrami & Barrett, 2005). Learners who face difficulties in planning and organizing their learning find that the portfolio structure scaffolds their attempts and hosts evidence and records of their work. The results of the study also indicate that students think more about their learning while adding work in e-portfolios, and thus reflection is promoted. They feel engaged in their tasks and become more motivated. As the e-portfolios enable students to select and present part of their work to a specific audience, be it teachers, parents, or peers, at the same time they encourage creativity and cultivate the students’ self-esteem. When students reach the stage of setting goals and making decisions about the future, then e-portfolios turn into a powerful tool for their professional development.

It has been demonstrated that types of computer-based education can promote learning (Wozney, Venkatesh, & Abrami, 2006); hence it can be assumed that e-portfolios help users develop their technological skills, develop a positive attitude towards learning with technology, learn how to learn, and, thus, encourage life-long learning (Abrami & Barrett, 2005).

## **Challenges**

However, several issues remain under discussion, although they don’t necessarily constitute an impediment to e-portfolio implementation and development (Lorenzo & Ittelson, 2005).

Concerning the daily practice in the classroom, there is the argument from both teachers and students that building an e-portfolio can be time-consuming (Attinello, Lare, & Waters, 2006; Hall & Hewitt-Gervais, 2000; Ntuli et al., 2009; Ocak & Ulu, 2009) and discouraging for the non-experts in ICT skills.

Since portfolios vary as much as the students who create them, they offer a different way of assessment from the traditional one; this assessment is not easily measured using the usual numerical ranking (Ocak & Ulu, 2009; Paulson et al., 1991). In addition, Rhodes (2010) mentions the arguments about e-portfolios’ lack of reliability and validity compared to standardized tests, when there is a need for comparison.

Valencia (1990) offers reasons on why it is difficult to prescribe what to include in a portfolio or how and when it should be evaluated. She argues that all depends on the curriculum goals and the students, yet she offers suggestions for organizational strategies to make portfolios more useful.

The question about ownership of the portfolio (Rhodes, 2010; Ring & Ramirez, 2012; Woodward, 2000) is raised among researchers and students, though mostly in secondary or tertiary education. The students build their portfolios, decide on the content, reflect on the procedure, and so on. The teachers assist the students but also assess the work that has been done, meaning that they have access to the students’ work (Hall & Hewitt-Gervais, 2000). Similarly, parents can visit, comment and thus get involved and control their children’s portfolios (Ocak & Ulu, 2009).

Lastly, technical issues such as connectivity and network infrastructure, hosting, access, authentication and security, accessibility, technical standards, and interoperability are widely examined and analyzed and suggestions for measures are made (Becta, 2006; Doig et al., 2006; Irvine & Barlow, 1998; Jarrott & Gambrel, 2011).

## **Aim of the Research**

The aim of this research is to investigate the impact of e-portfolios on learning in a Greek primary school environment; so far there has been no available research since the use of even paper-based portfolios in Greek education is sparse, unsystematic, and basically non-existent. The purpose of this decision for the research is twofold. Firstly, the introduction of e-portfolios will be monitored in relation to the educational benefits and the pupils' response and active engagement during the process. Secondly, it will provide a resource in Greek literature regarding the educational benefits of the e-portfolio in the primary level of education.

## **Methodology**

The presented case study employs the qualitative naturalistic method (Creswell, 1998) to collect data following the principles that Cohen, Manion, and Morrison (2005) suggest; the researcher works in a natural context (Bassegy, 1999) such as an ordinary classroom in a primary school, the data are detailed and analyzed inductively, and the concern is on the process rather than only on the outcome. The study also follows the descriptive approach as it undertakes the goal to present "a complete description of the phenomenon within its context" (Yin, 1993, p. 5). Thus, the study can be considered valid in terms of honesty and objectivity of the researcher, the triangulation on collecting data, and the participants approached (Cohen et al., 2005, p. 105).

Although the research is conducted within a specific class, it aspires to gain valuable insights regarding e-portfolio benefits from this individual setting that would not have come to light with other types of research (Denscombe, 2007). It can be characterized as an evaluative case study according to Bassegy (1999) on account of its attempt to explore the worthwhileness of the e-portfolio in the learning procedure.

## **Data Collection Methods**

The research used mixed methods to achieve triangulation and strengthen confidence in the outcomes and was based on three of the major types of collecting data suggested by researchers: questionnaires, interviews, and documents.

Firstly, a brief written questionnaire (see Appendix A) was chosen as the most suitable to be distributed to the parents of the pupils with the concept of them taking their time in answering. As the questionnaire is voluntary, anonymous, and is addressed to people that are able to read and understand, it allows honest answers and straightforward information. Emphasis was placed on avoiding leading, biased, and vague questions and a combination of closed and open-ended questions was included. These question types were deliberately chosen as the researcher's aim was to gather specific information without discouraging the respondents from the closed questions and catch the authenticity, honesty, and depth of their responses (Cohen et al., 2005, p. 255) with the open-ended questions.

Secondly, a group interview was selected for the teachers of the school since, according to Denscombe (2007, p. 176) and Oppenheim (1992, p. 79) the intention is for a lively discussion to develop, generating a variety of ideas, opinions, and suggestions. More specifically, during the semi-structured interview a hard copy of the questions was distributed to each participant, and a voice recorder was used, allowing the researcher to pay attention to the direction and not the details of the discussion (Bassegy, 1999, p. 81).

Finally, pupils' PowerPoint products were seen as diary documents (Denscombe, 2007, p. 229) and evaluated in a qualitative manner; researchers looked for evidence of learning in relation to established standards (Helm & Gronlund, 2000); in improvement of narrative, reflective and writing skills; and in active engagement to the tasks (Irvine & Barlow, 2006; Wang et al., 2004).

## Participants

The participants in this research were 14 children (12 boys and two girls) 8 years of age, pupils of the third grade of a public primary school in a provincial town in northern Greece. For a four-month period the pupils had weekly meetings, of about two teaching hours each, in the school lab and were taught and assisted in building their personal e-portfolios on the school's laptops.

## Stages

The data collection of the research was divided into three stages.

**First stage.** An individual folder was created for each pupil using Google Drive so that the researcher could keep a backup for safety reasons. The folder contained a PowerPoint file, which is considered as easy-to-use software for eight-year-olds. Several researchers suggest that by using PowerPoint, reflection is scaffolded and learning is promoted (Barrett, 2000; Hertzog & Klein, 2005; Hunt, Wood, Terrell, & Isom, 2006; Wang et al., 2004). The PowerPoint file consisted of several slides with a consistent layout and a format of questions regarding description of activity, newly gained knowledge, likes, and difficulties with respective justification (see Appendix B). These would help pupils concentrate and effectively focus on each activity (Wang et al., 2004).

Each slide referred to a specific activity and was accompanied by a distinctive photo of the activity (Hertzog & Klein, 2005). The use of photos was considered significant for the procedure since children interact with images in multiple ways in their lives (Oblinger & Oblinger, 2005; Schiller & Tillett, 2004). Thus, the photos would establish an apt connection between the previously done activity with the pupil's entry and reflection in the PowerPoint presentation. Some slides with personal information (see Appendix B) were also included to strengthen the sense of ownership and raise motivation for participation and contribution (Becta, 2007; Hewett, 2004).

Children's participation in the planning of classroom activities, although not frequent, plays an important role in strengthening collaboration among peers and educators (Sheridan & Pramling-Samuelson, 2001; Woodhead, 2006). In their study Leinonen and Venninen (2012) suggest that it is essential that teachers not only facilitate pupils' participation in planning and decision making in the learning process, but also incorporate their perspectives of what is important for them in terms of learning. Thus, the input for the e-portfolio entries was determined by the pupils during class discussions. Consequently, there was a variety of subjects based on school and extracurricular activities that were of pupils' interest (Clark, 2005; Seitz & Bartholomew, 2008; Sinclair, 2004) beyond what they deemed as ordinary or indifferent.

The idea was for the e-portfolios to be a natural part of the learning process and to help pupils concentrate on learning (Garthwait & Verrill, 2003; Hewett, 2004). The type of process and showcase e-portfolio was decided and the intention was to monitor pupils' progress in narrative skills, reflection, critical thinking, and active engagement in learning.

The e-portfolios made by the pupils were evaluated by their teacher with reference to indications of (a) progress that the children made in narrative skills, (b) their reflection in activities that took place, (c) critical thinking on what they learned, enjoyed doing or found difficult during the activity, and (d) active engagement in learning with reference to their willingness to build and work on their e-portfolios.

**Second stage.** At the end of the project, parents were invited to a class meeting and the pupils presented their e-portfolios, describing the process, explaining their work, and informing them about content. Seitz and Bartholomew (2008) explain that although the e-portfolio is the child's celebration, the parent as audience is also a key component. Furthermore, displaying and sharing children's work in the classroom and parental involvement have a strong impact on child development and on strengthening family relationships (Knopf & Swick, 2007; Seitz & Bartholomew, 2008; Souto-Manning & Swick, 2006).

Parents were asked to answer a brief questionnaire (Appendix A) that investigated their opinions with regards to their children's learning progress related to the e-portfolio use. This action was deemed important for it is a way to monitor children's progress from the families' perspective.

Nine parents answered the questionnaire that followed the e-portfolio presentation. They reported their observations on the portfolio work of their children and how this affected their children's learning. They also put down their opinions about their children's responses to learning and made comments on the portfolio as a learning tool in general.

**Third stage.** The process of building and working on an e-portfolio and examples from pupils' work were presented to teachers of the school and were followed by a group interview that examined teachers' views and opinions on e-portfolio's contribution to learning. The interview focused on suggestions on how-to-use in the classroom, future use, and challenges (see Appendix C). The notion of this action was to explore teachers' perceptions prior to and after the presentation, but also to bridge issues of validity and objectivity (Cohen et al., 2005).

Ten colleagues attended a two-hour session about the e-portfolio project, which included the presentation of some randomly selected e-portfolios, and volunteered to participate in the group interview. During the group interview almost all colleagues contributed with noticeable and encouraging remarks, based mostly on their previous professional experience. They made suggestions for possible uses of the e-portfolios, pondered over their continuation, and discussed added-value in pupils' learning.

## Findings

### ***Portfolios Adding Value in Pupils' Learning***

During the evaluation procedure of the pupils' e-portfolios the findings that emerged were similar to previous studies (Calfee & Perfumo, 1993; Irvine & Barlow 1998; Hall & Hewitt-Gervais, 2000; Hertzog & Klein, 2005; Wang et al., 2004). It became clear that the pupils presented significant progress in their writing. In the early stages, they usually merely filled in the rest of a text line or wrote a semi-finished sentence. For instance, under the heading: "Goals for the year" many pupils wrote a sentence in the form "is to get good marks" or "to be better at maths". As the e-portfolio project was evolving and the pupils were assisted by the prompting questions, they showed improvement in articulating detailed and more carefully structured sentences regarding each activity. Adding to that, the pupils expressed their feelings and disposition for each activity every time. The process of reflection, though completely new in their learning practice, became gradually visible in most portfolios. The pupils were answering the prompting questions with full sentences; they accompanied them with meaningful reasoning that explained their choices and opinions on their entries, thus creating more sophisticated texts. As an example, under the heading: "Recording my reading" a pupil wrote:

In my class we read a poem about bread and my teacher was recording our reading. I had to read it many times. This way I learned to read it much better and I liked the poem be-

cause it had a very nice content. In the beginning it was difficult for me to read because it had many difficult words. I usually read texts from Greek language much better.

Additionally, another pupil, with a level of learning difficulties and several spelling mistakes in the original Greek text that cannot be presented in the translation, wrote:

We read a poem about bread. Then, our teacher had our voice on the computer, using a small voice recorder. I was happy hearing myself from the computer. Additionally, I was happy that I managed to read such a big text. I succeeded in reading it well because I knew all the words. I had practiced reading the text at home. Yet, there were some words that I couldn't pronounce well. From this activity I also learned to type better.

All parents agreed that the e-portfolios added value to their children's learning; more specifically, the parents answered that they observed improvement in their children's ability of articulating their thoughts while the majority of them also admitted improvement in their children's understanding, narrative skills, and critical thinking. The following are comments from two of the parents:

I am very pleased with my child as he managed to describe the activities in his portfolio in an eloquent way and gave me clear proof of his new learning and understanding on the role of him having a school portfolio.

Given the child's age, he presented a very good and complete work. With his presentation he helped me understand what my child does at school and expressed his personal opinion on several subjects.

In almost all e-portfolios, consistent with Irvine and Barlow (1998) and Jarrott and Gambrel (2011), it was evident and became generally accepted from the parents that the pupils became more adroit and skilled in using the technology. The overall procedure of building the e-portfolio made the pupils more competent in taking initiatives in their learning as it is also described in the relevant literature (Barrett, 2000; Jarrott & Gambrel, 2011; Paulson et al., 1991). A pupil who usually had no interest in correcting his mistakes said, "I know I have spelling mistakes, yet I will correct them later" which he meticulously did before the presentation to parents.

Each week, a vivid discussion initiated by the pupils, lead to the selection of the activity. Henceforth they were able to perform all necessary steps on their own: start the laptop, synchronize with Google Drive, locate and open their folder, insert images, type fast without having to keep notes on paper, revise and save their work.

Throughout the four-month period, the pupils showed constant interest and active engagement in working on the e-portfolio project. The parents unanimously answered that they observed high motivation and commitment levels, that the pupils found substantial purpose in their learning and they were enjoying their work. For example, two parents wrote:

Although my child does not usually speak about school activities at home, he kept mentioning the portfolio project and the potential educational activities he could add to it.

I believe that the portfolio motivated my child, promoted his initiative and his resourcefulness and that it is mostly an alternative and interesting method which, in conjunction with the standard teaching procedure, will have the desirable results.

Added to that, the texts within e-portfolios showed that the pupils who usually provided texts with poor syntax on paper or made many spelling errors and showed no interest in correcting these on paper now put effort into improving their texts in the e-portfolio as regards both spelling and syntax. A day prior to inviting parents and presenting their e-portfolios, some pupils revised their entries trying to correct many of their errors.

Responding to the question about changes that parents observed while their children were building the portfolios, a mother described the e-portfolio as “a quite pleasant activity that, although completely unknown to the child, made the child show a positive attitude towards the experience.”

All pupils but one, via the respective answer to the parents’ questionnaire, expressed the wish to continue using the e-portfolio. Yet, there was also a divergence among parents’ answers as to whether there was an issue of too much effort over the project. Four parents answered positively to the question: “Would you say your child wasted too much effort over it?” while one parent remained neutral and the other four parents disagreed with that statement. This could be attributed to the fact that the two teaching hours per week that are, according to the national curriculum, open for a variety of teaching initiatives or cross-curricular activities, were spent on a single project, the e-portfolio.

When the colleagues were asked, they also recognized that the e-portfolios added value in many fields of pupils’ learning: in documenting progress, organizing thoughts and activities, and assisting evaluation. They went on with comments regarding the ways these are materialized; a colleague described the portfolio as a medium to approach the child as a learner and a personality. For instance, two colleagues said:

These e-portfolios seem to assist pupils with low self-esteem and help them improve their self-image since they have their time to work and create something that is their own effort.

The children became apt in using technology in a way that is meaningful to them.

A teacher who was also teaching this class commented, “I can see much clearer now how certain pupils feel and respond to school work.”

Yet, similarly to several academics (e.g., Attinello et al., 2006; Hall & Hewitt-Gervais, 2000; Ntuli et al., 2009; Ocak & Ulu, 2009), many of the colleagues agreed that a large amount of time is required for teachers to monitor and gradually evaluate the children’s progress.

### ***Portfolios for Parent Involvement***

Marks cannot always represent the potential, the abilities or the weaknesses of the pupils in depth (Carver, Lehrer, Connell, & Erickson, 1992; Frederiksen & Collins 1989; Meisels, 1995; Wardle, 2007). Added to that, parents do not have enough time for frequent meetings with the school teachers where they can discuss issues that concern their children’s learning progress and needs.

Keeping a portfolio is a way to inform parents about children’s achievements and help them better understand children’s learning, skills and abilities (Becta, 2007; Hertzog & Klein, 2005; Hall & Hewitt-Gervais 2000; Valencia, 1990; Warwick, 2009). A parent expressed his satisfaction and wrote that “this portfolio gives me an opportunity to see the work that is done at school”. Another parent described the e-portfolio as “a medium to present the things pupils do, how they react to these things and their personal opinion about them”, while a mother, denoted her satisfaction and wrote after the PPT presentation:

The portfolio was excellent! I was impressed by the topics’ presentation and I am full of happiness because my child did this on her own. I could see progress from slide to slide.

Another parent commented:

Today’s presentation was for me the only time I could be at school during a regular school day and see how my child spends his day here.



A colleague that participated in the group interview admitted that pupils' portfolios could assist teachers in informing parents efficiently:

An e-portfolio is useful to the teacher as s/he has all the information and details regarding the student at hand. She/he then can be well informed and prepared for the parental meeting and the school counselor briefing.

Similar to related literature (Hall & Hewitt-Gervais, 2000; Irvine & Barlow, 1998; Valencia, 1990) one colleague went on to explain that portfolio files can be gradually enriched by the pupil and the teacher with selected documentation of the pupil's school work for the purpose of parental information and collaboration. Further, another colleague expressed the thought that e-portfolios may assist in creating or strengthening bonds between parents and children over their mutual pride in the children's work. The following are comments from the colleagues during the group interview:

The qualitative content of the e-portfolio is a tool for the teacher. She/he can better inform the parents and help them see the progress or weaknesses of their children. It is not convenient for the teacher to carry all the paperwork to parental meetings and find quickly what is needed.

We can include documentation of physical activities, like sports or artwork in the portfolio. This cannot be done but in a digital form.

This may prove valuable in cases of parents who are feeling insecure about their children's potential or are not so pleased with the children's school marks and achievements. In fact a mother commented:

I feel insecure about how my child reacts and responds to the school environment. I thought that he has minimum abilities and cannot cope with school. I am astonished by the way my son deals with school activities. The portfolio presentation helped me see how my child actually feels.

In all cases, in accord with the literature (Becta, 2007; Calfee & Perfumo, 1993; Hall & Hewitt-Gervais, 2000; Irvine & Barlow 1998; Kasse, 1994; Valencia, 1990), parents get the opportunity to discuss their children's learning with the children and not only with the teacher.

### ***Portfolios Promoting Self-esteem***

In every classroom there are pupils that are more reserved than others, with a low profile, or slow learners. Quite often these children fail to succeed in the standardized tests or hesitate to participate in the class activities (Blatchford, Bassett, & Brown, 2011; Harlen & Deakin Crick, 2002; Peters, Hartley, Rogers, Smith, & Carr, 2009).

The integration of technology and computer use in the classroom (Becta, 2007; Hatzigianni & Margetts, 2012; Irvine & Barlow, 1998; Wardle, 2007) can be used to strengthen and develop pupils' self-esteem. Building and owning a portfolio is an opportunity for the child to present evidence of learning, abilities and strengths or needs (Arter & Spandel, 1992; Becta, 2007; Grace, 1992; Notari-Syverson & Losardo, 2004; Sewell, Marczak, & Horn, 1998; Smith & Tillema, 2003). A colleague realized that this was also the case for certain pupils in the present case study. When presenting their portfolios, they felt proud, and it was obvious that their self-image had improved. Some pupils discussed their ability to use the laptop:

I like learning to type and write on the laptop rather than on paper.

I want to write many things in my portfolio but I do not type fast enough and I run out of time.

I see that I now can type much faster than before.

I can choose what to write about and I can add and change things.

I learned to use the laptop for other reasons than playing computer games.

The presentation of the e-portfolios to the parents was an opportunity for pupils to find substantial meaning in their work. They felt proud of themselves and their accomplishments. For example, one pupil said, “I want to show my mom that I did it all by myself”, and after the presentation he went on to say, “It was easier to explain our activities with the portfolio to my mom because I kept forgetting things earlier.” A pupil wrote about the e-portfolio, “When I am a grown-up I will be able to see what I accomplished when I was little” while another one spontaneously exclaimed, “Did we actually do all these? I had almost forgotten we did them.”

They did not have to worry about comparison and judgment. Confidence and joy were apparent in all pupils. A parent mentioned that he liked the way the child expressed himself and a couple of parents noticed that their children were very enthusiastic about the prospect of presenting their work to their families. Following comments from two parents:

My son was smiling in joy and anxiety all day till the moment of his presentation.

The work highlights facets of the child’s personality that may not be so visible otherwise. It is an opportunity for us to better know our child and for the child to better know himself.

### ***Portfolios as a Tool for Assessment***

Not all learners have the same learning pace or manage to learn with the same methods; not all pupils share the same interests, motivation and emotions related to learning, yet, a teacher is called to assess these pupils and evaluate their learning with a range of letters or numbers.

E-portfolios bring to light abilities of the learners that were not previously apparent (Becta 2007; Cooper & Love, 2002; Mueller, 2012; Notari-Syverson & Losardo, 2004; Sewell et al., 1998). The presentation of pupils’ portfolios made colleagues realize during the interview that the e-portfolio is much more than an accumulation of tests, essays, and other school paperwork. It is an attractive and flexible learning tool that encompasses broader possibilities in learning. To the researchers, colleagues acknowledged that portfolios could include personal information and other details that reflect the child’s personality and, thus, make the way that the child perceives and apprehends things more evident. The presented e-portfolios included documentation of pupils’ achievements which, in tandem with the pupils’ reflections and comments, indicated their level of understanding and facilitated the evaluation process.

A colleague from the included department, similarly to Hatzigianni and Margetts (2012) and Notari-Syverson and Losardo (2004), pointed out how useful the e-portfolio could be in special education for pupils with learning difficulties since these children can more easily focus on things that are important and meaningful to them. They realize their weaknesses and this is a way for them to prove their value. Indeed, these pupils took their time to work without facing criticism of their errors or their slow working rates by peers.

In the case of two pupils sharing one school laptop and one of them having certain learning difficulties (dyslexia), the collaboration came naturally. The first boy volunteered to type the texts for his classmate and remarked:

this made me practice and improve myself in typing but most of all I learned a lot from my classmate who knew much more about some activities than I did.

Concurrently, the second boy said in a podcast:

I am pleased for having, for once, written a sufficient documentation (of his thinking and knowledge which was not previously possible in the usual school work on paper) compared to my textbooks.

In all cases, the digital form of the portfolio added further value allowing the use of documentation in the form of video, images and podcast (Doig et al, 2006; Irvine & Barlow 1998; Valencia, 1990).

The discussion during the interview brought to the surface the issue of time cost for creating and supporting a portfolio on behalf of the pupil. Even more, there was serious questioning from many colleagues about the time that a teacher needs to evaluate and assess a pupil via his or her portfolio. Thus, a colleague pondered:

How much time can each pupil spend when we have less than thirty PCs for the entire school? Who will be responsible for scanning the docs of each class and supervise the portfolio entries? How much time do we need to read and evaluate each portfolio?

Added to that, teachers expressed their fear of parental interference when pupils work on their e-portfolios at home, which would destroy the genuine pedagogical role of the e-portfolio. The importance is for each pupil to find meaning and intrinsic motivation in the e-portfolio use (Becta, 2007; Grace, 1992; Paulson et al., 1991). When a colleague suggested that pupils may also work on their portfolios at home at their own rate another colleague countered: “If the e-portfolio goes home then all the work will be done from interfering parents and how can we then evaluate the pupil?”

### ***Portfolios: A Challenge for the School Community***

During the teachers’ interviews the challenges in adopting the e-portfolio use school-wide were also discussed. A variety of suggestions were made concerning the type of questions, topics, and activities to be included in the pupils’ portfolios. Among them was the idea of thematic portfolios (e.g., book presentations or reviews) which will be exchanged with or presented to the other pupils. The colleagues also considered the idea of creating a school portfolio where all pupils will contribute with works, feelings, opinions, and comments.

The teachers also realized what Paulson et al. (1991) originally denoted, that the e-portfolios should be under the pupils’ control, and thus suggested that they can include individual topics, allowing the e-portfolios to evolve in a form of learning diaries. A tech-savvy pupil could also work from home. In general, with the necessary teacher assistance and guidance, the idea was for the e-portfolio to become a life-long documentation of pupils’ progress, to use in high school or other educational levels, and even as memorabilia with emotional value.

All teachers that participated in the interviews were positive and willing to use the e-portfolio, and they requested a thorough briefing as they felt that it was interesting, offered easy access, and it was beneficial for both pupils and teachers. Yet, they claimed that they were not qualified enough to carry out this endeavor without training and technical assistance, a point also reported in other empirical studies (e.g., Earle, 2002; McMahon, Gardner, Gray, & Mulhern, 1999; Wardle, 2007). In addition, they noted the need for additional computers (there is only one computer lab with ten laptops in the school).

## **Recommendations**

Based on this experience with e-portfolios some suggestions for their use in primary schools are provided. Although implementation experience at the age level of these pupils may not be entirely applicable to the needs of other classes, the following suggestions address the basic steps for

developing an e-portfolio system and can serve as an outline that teachers may adapt to suit their own particular circumstances. The overall process is illustrated in Figure 1.

### **Step 1**

**Determine portfolio's purpose.** The purpose for developing an e-portfolio system may range from subject-specific to general educational goals. In this implementation the aims were to (a) add value to pupils' learning by developing their reflection skills, practicing their narrative, and writing skills and increasing their motivation and engagement, (b) assist parental involvement and understanding of children's progress, and (c) monitor and evaluate the pupils' progress.

**Decide the types of portfolios to be used.** There are various portfolio types and, depending on the established purposes, some types may serve specific needs better than others. Yet, in general, the process and showcase portfolios are preferable for young pupils.

**Select construction and storage methods.** A variety of software is currently available, and their specifications are analyzed and presented in relevant literature.

### **Step 2**

**Specify a collection process.** The criteria on the selection of the activities that will be included in the e-portfolios have to be established in advance: what to include, how to select, when to collect, and who will make the final decision. In this study these were communicated and explained to pupils during the introduction of the e-portfolio project.

**Promote reflection.** Reflection is the core element of the portfolio. This was accomplished by visualization (photos and videos of the activities were selected and inserted in each slide) and by asking prompting questions that bridged images with activities and triggered self-evaluation.

**Cultivate interaction/collaboration/dialogue/feedback.** These are important factors that promote life-long learning in various educational environments. The group discussions over the selection of the activities, the spontaneous peer feedback while working in pairs (sharing a laptop), and the on-action, timely teacher feedback (the teacher was present and guided and supported the pupils while they worked) promoted learning and increased pupils' motivation and active engagement.

### **Step 3**

**Develop an evaluation procedure.** After a period of work, its worthwhileness and impact on the learning procedure should be evaluated and summarized by both pupils and teachers. The evaluation process promotes deeper reflection and may offer valuable information to the teacher for future application. The pupils looked back their overall work, discussed their inputs and experience in learning, and created a new page where they selected their best work and reasoned over it. A podcast reinforced the procedure in a lively manner. Finally, the teacher evaluated pupils' portfolios based on the pre-specified learning aims.

### **Step 4**

**Identify presentation/publishing options.** Through the e-portfolio presentation the pupils find actual meaning in their efforts throughout the school year. When the e-portfolios were completed the pupils presented their work to their parents. This was also a fine opportunity to strengthen family bonds, involve parents, and improve the relations between teachers, parents and pupils. Finally, each pupil received a CD with a copy of his/her e-portfolio.

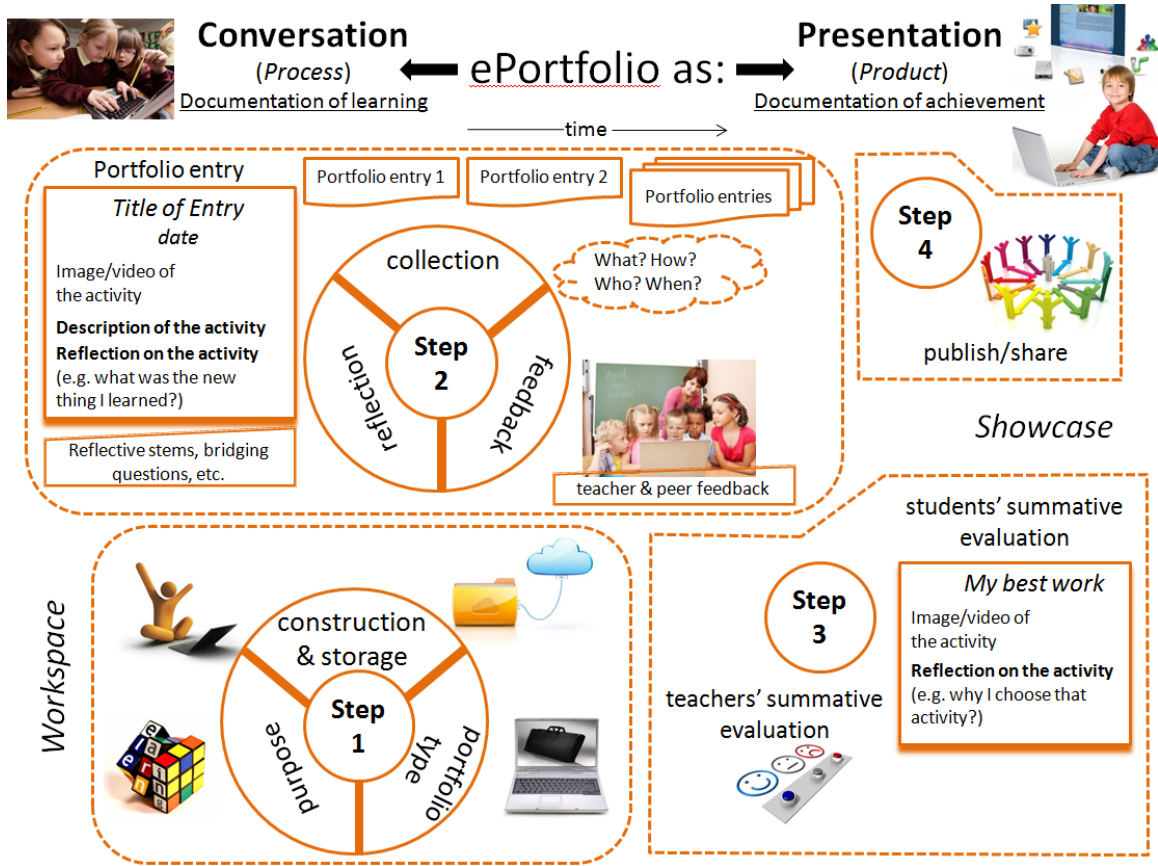


Figure 1: The e-portfolio development process (adapted from Barrett, 2009).

## Conclusion

Teaching and learning in Greek schools is based on reading books and textbooks, drills, and practice exercises. Students' evaluation and assessment is heavily related to written tests or other essays, depending on the students' age and level of education, as these are provided in the textbooks and by the teachers of the school. The use of paper-based portfolios is suggested as optional and auxiliary to the existing methods, therefore, it is rarely applied. The present study purports to investigate the impact of e-portfolio practice in a primary school environment. For this purpose, three distinct yet complementary data collection methods were employed: the analysis of pupils' e-portfolios, a questionnaire addressing parents, and a group interview with colleagues at the school.

The pupils worked on the portfolios over a four-month period using PowerPoint software under their teacher's guidance. They decided the activities and they had to reflect on each activity answering the same pattern of pre-set questions. Their work was evaluated with reference to evidence of improvement in narrative, reflective and writing skills and active engagement in the task. The e-portfolio products were presented and explained to parents by the pupils, while a questionnaire followed the presentation to gather parents' opinions related to their children's assumed learning. Finally, some e-portfolios were presented to a group of teachers from the school and the procedure was analyzed and explained to the colleagues. A group interview followed this presentation with the intention of exploring the professional opinions of the colleagues and triangulating the data gathered from the two aforementioned methods.

The findings were in accordance with relevant research (Calfe & Perfumo, 1993; Hall & Hewitt-Gervais, 2000; Valencia, 1990) since the value of the e-portfolio as an effective tool that promotes learning became visible. The analysis recorded progress in writing that became visible through the well-structured sentences. Improvement in understanding, critical thinking, and narrative skills was monitored while describing and presenting the activities. The reflection process was revealed throughout the meaningful descriptions, the reasoning, and the related feelings. The pupils became adroit in using the technology and showed continuing interest and commitment during the four-month period.

The e-portfolios served as a medium for better communication and effective collaboration between teachers, pupils, and parents. The parents expressed their satisfaction at the opportunity they were given to understand their children's learning, skills, abilities, and opinions over the work done at school. It became evident that the e-portfolios contributed to strengthening and increasing pupils' self-esteem, which is also considered valuable in cases of pupils with learning difficulties (Becta, 2007). Furthermore, similarly to relevant literature (Becta, 2007; Cooper & Love, 2002; Mueller, 2012; Notari-Syverson & Losardo, 2004) the colleagues discussed the support that the e-portfolios offer in terms of the opportunity for multiple abilities and skills to become apparent and thus to be appreciated and favourably assessed.

The colleagues were very impressed with the learning benefits of the e-portfolios and they expressed their desire to adopt the e-portfolio in their daily teaching practice. At the same time though, they expressed certain reservations concerning the required technical equipment, as well as the proper training and support for both teachers and pupils.

The present study is also a demonstration that e-portfolios can be fostered and are worthy of the effort by deploying simple tools like presentation software.

### ***Limitations***

Although findings were encouraging, there are certain factors that are considered to be limitations and weaknesses of the study.

The novelty of this study in terms of its application in a Greek primary school classroom constitutes a limitation since the pupils reacted positively to an innovative learning practice. One cannot assume that pupils' responses would be the same if the e-portfolio was a part of the usual and ordinary learning procedure. Adding to that, the researchers cannot be sure that the monitored progress is credited mainly to the e-portfolio use or from the overall teaching practice and the natural growth of the maturity level of the pupils.

The fact that the study was conducted in the researcher's working environment and more specifically with the pupils she regularly teaches should also be taken into consideration. The familiarity had already been gained between the teacher and the pupils; yet, it is difficult to perceive how this would work with newcomers, either teachers or newly enrolled pupils, or with a larger group of pupils and the considerably larger workload for the teacher.

### ***Dissemination***

The above mentioned limitations of the study can open new avenues for educational research. More research into pupils of the same age is essential, implemented in many schools to add value to the present study. Verification and validity could be controlled by having a control group with a representative sample of pupils who will not use the e-portfolios and merely continue following the regular learning process.

Additionally, an extensive study on pupils of the entire primary-school age-range (6-12) can be employed for the possibility of verification and generalization in findings. Furthermore, a com-

parative study with pupils of different ages, like eight-year-olds and twelve-year-olds, will also contribute to the field since the latter hold a distinct level of maturity and they are on the transition borderline to secondary education.

Future research may also expand to other types of e-portfolio (e.g., thematic, internet-based, group, etc.) in relation to how this may affect pupils' learning and self-esteem, the teachers and parents' collaboration, peer collaboration or socialization and interaction within the school community.

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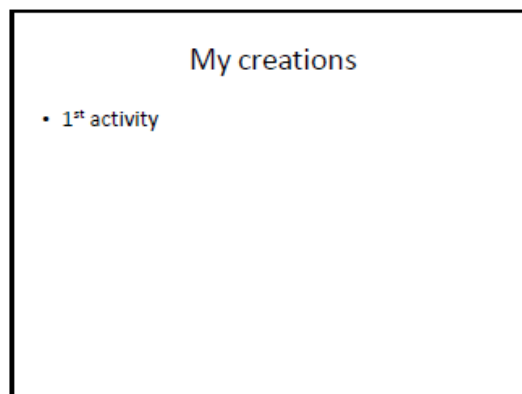
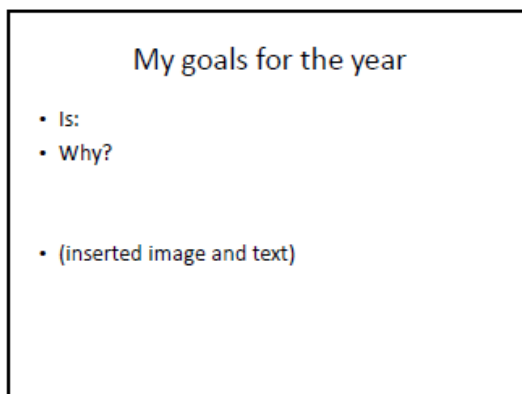
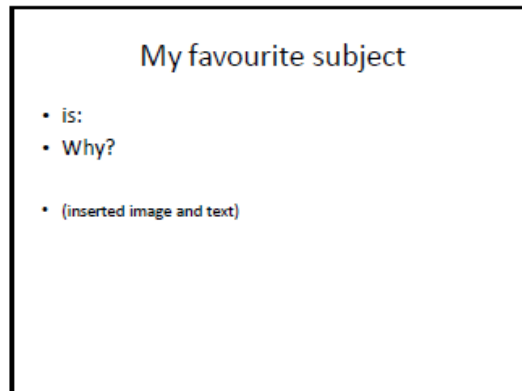
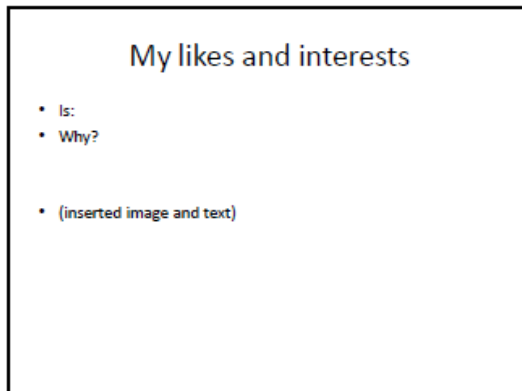
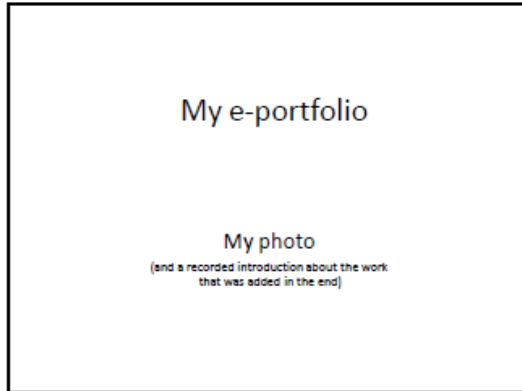
## Appendix A

### ***Survey questions to parents that followed the pupils' e-portfolio presentation***

1. Do you think that the e-portfolio added any value to your child's learning?
2. If yes, to which topic? You may choose all that apply: ICT skills, understanding, articulating his/her thoughts, critical thinking, narrative skills, other:.....(please specify)
3. Would you say your child: (Rate 1-5, strongly agree-strongly disagree + I don't know/I don't want to answer)
  - a. Enjoyed the e-portfolio work
  - b. Showed significant interest during building the portfolio
  - c. Found it challenging
  - d. Learned by doing the e-portfolio
  - e. Wasted too much effort over it
  - f. Would like to continue using it
4. Did the e-portfolio help you better understand your child's learning than before?
5. Did the e-portfolio help you realize your child's skills/abilities?
6. What changes did you observe when your child was building his/her e-portfolio?
  - a. As regards his/her motivation
    - a. More motivated
    - b. Less motivated
    - c. No change
    - d. I don't know/I don't want to answer
  - b. As regards his/her interest
    - a. More interested
    - b. Less interested
    - c. No change
    - d. Don't know/don't answer
  - c. As regards his/her commitment to the task
    - a. More committed
    - b. Less committed
    - c. No change
    - d. I don't know/I don't want to answer
  - d. Other ..... (please state)
7. In general, what do you think of your child's portfolio?

## Appendix B

### *PowerPoint Layout*



1<sup>st</sup> activity  
Image of the activity  
(or video)

- My title:  
Date:
- (Text answering the prompting questions)

\*A brief description of the activity  
\*What was the new thing I learned?  
\*What did I like the most of this activity? Why?  
\*What was the difficult part in this activity? Why?

2<sup>nd</sup> activity etc.  
Image of the activity  
(or video)

- My title:  
Date:
- (Text answering the prompting questions)

\*A brief description of the activity  
\*What was the new thing I learned?  
\*What did I like the most of this activity? Why?  
\*What was the difficult part in this activity? Why?

My best work

- (inserted image and text)

Something to share

- A phrase, an image, a story that I liked very much and I chose to share with others and why
- (inserted image and text)

## Appendix C

### ***Teachers' interview questions that followed the pupils' e-portfolio presentation***

1. What was your opinion regarding e-portfolios prior the presentation?
2. What do you think now (after the presentation)?
3. What do you imagine the e-portfolio could be used for?
4. Do you have any suggestions on how to use the portfolio idea in the classroom?
5. Do you feel there was added value for the pupils? What kind?
6. What do you envisage the challenges to be for the continuation of these e-portfolios?
7. Would you try to use the e-portfolio with your pupils? Why/why not?

## Biographies



**Dimitra Theodosiadou** received her Master's degree with distinction in e-learning and interactive teaching technologies from the University of Ulster, UK and has 18 years of teaching experience in primary education. At the present, she is assistant principal and teacher in a state school in Drama, Greece. During her teaching career she has taught all primary school subjects in all ages of pupils.

She implements ICT in her daily teaching and applies innovative teaching methods in order to raise motivation and group work, active engagement and interest in learning among her students. With her work she aspires to promote humanism, the value of education and culture, and respect of the environment. Dimitra values the importance of collaboration and knowledge exchange, thus she implements collaborative projects with her class and other European partners that promote ICT literacy and European consciousness among pupils. In general, she pursues initiatives that promote in-school colleague training, extra-curricular activities and collaboration as well as working on topics of international and European interest. The previous year she received training and became Ambassador for the in-service teacher training action of Teachers4Europe, a project run by the European Commission Representation in Greece. Under this mentoring role she organizes workshops to train and guide new teachers/candidates for the action. In collaboration with a group of colleagues, Dimitra started the ICT4ALL initiative (<http://ict4all.gr/>) for organizing and running professional development courses on digital technologies for in-service teachers.

Her research interests are focused in the use of web 2.0 technologies in primary education and teacher training.



**Angelos Konstantinidis** has a Master's degree in e-learning from the University of Edinburgh, UK and he is a teaching associate at the University of Nottingham, UK and an Information and Communication Technology teacher at the Directorate of Secondary Education of Drama, Greece. He has extensive experience in teaching ICT and computer science subjects to students of all ages – from primary school children to mature adults – as well as guiding in-service teachers on how to integrate digital tools effectively and in a meaningful way in their courses. Angelos believes that teacher collaboration, though challenging it may be, is the basis for creativity and innovative teaching as it allows for a synergy of minds and skills bonded in a synthetic endeavor that no single member could have completed independently. Therefore, he has been actively involved in several pedagogical projects (eTwinning and Comenius - now Erasmus+) in collaboration with teachers across Europe. Additionally, in collaboration with a small group of teachers, Angelos started an initiative titled ICT4ALL ([http://ict4all.gr](http://ict4all.gr/)) with the aim to organise and run professional development courses on digital technologies for in-service teachers. At the University of Nottingham he developed and currently tutoring the module “Telecollaboration in Language Learning” for the distance learning MA “Digital Technologies for Language Teaching” and supervises students in their dissertation research. His research interests revolve around the use of social media for educational purposes, online course design, assessment as learning, and telecollaboration.