

TURKISH EFL STUDENT TEACHERS' PERCEPTIONS ON THE ROLE OF ELECTRONIC PORTFOLIOS IN THEIR PROFESSIONAL DEVELOPMENT

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ABSTRACT

There has been vast evidence to support the potential of electronic portfolios (e-portfolio) as tools for enhancing reflective thinking and professional development of student teachers. However, no study has been carried out to specifically determine English as a Foreign Language (EFL) student teachers' perceptions on the role of e-portfolios in their professional development. Therefore, this descriptive study investigated the perceptions of EFL student teachers on e-portfolios as a learning tool. Results of analysis of student teachers' interviews identified several themes, indicating that e-portfolios helped student teachers keep current with innovations in the digital world; a fancy tool that serves them in the job search; and a collection of materials that showed their best work; an opportunity to work collaboratively which in turn support their ongoing professional development. However, the student teachers in this study did not believe that electronic portfolios can be an important tool to develop reflective thinking.

Keywords: Foreign Language Teacher Education, Reflective Thinking, Teaching Portfolios, Electronic Portfolios

INTRODUCTION

Although portfolios have been used extensively in arts and architecture, they have been introduced to teacher education in the 1980s (Lyons, 1998a). Since then, educational researchers and practitioners cite the increasing use of portfolios as an assessment and learning tool in teacher education programs (Barton and Collins, 1993; Loughran and Corrigan, 1995; whole issue of *Teacher Education Quarterly*, Winter 1998). A portfolio in teacher education could simply be defined as a collection of information about a student teacher's abilities gained in different contexts over time. This information could include a wide variety of materials, such as lesson plans, tests, learner work, photographs of classroom, philosophical statements, self-assessment and written commentaries, formal evaluations, certificates and transcripts (Wade & Yarbrough, 1996). However, portfolio is not just used as a collection of evidence of learning but also as an effective learning tool. Portfolio-based learning is an approach based on experiential learning. Experiential learning is a cycling learning process that begins with experience, continues with reflection and later leads to action, which itself becomes an evidence and an experience for reflection (Kolb 1981). Portfolio development is also a cyclical process of collecting, reviewing/reflecting, and learning from experience. Therefore, for educational purposes, it is essential that portfolio does not become a mere scrapbook of artifacts and narratives, but should contain reflections on learning and teaching experiences. In sum, several studies (Borko, Michalec, Timmons & Siddle, 1997; Davies and Willis, 2001; Loughran and Corrigan, 1995; Lyons, 1998b; Shulman, 1998; Wade and Yarbrough, 1996; Winsor and Ellefson, 1995; Zubizaretta, 2004) have reported that developing portfolios promote reflective thinking because they "provide a systematic, continuous way of planning, supporting and monitoring a teacher's professional advance" (Bird, 1990, p.244).

On the other hand, several studies (Dutt-Doner and Gilman, 1998; McKinney, 1998; Stone, 1998) also showed some limitations of using portfolios in teacher education such as storage, maintenance, and accessibility. Student teachers collect a variety of artifacts in their portfolios. Most portfolios that are being used in teacher education programs are mainly printed and compiled in a 3-rings binder (i.e., paper portfolios). As Georgi and Crowe (1998) argued, this storage, maintenance, and accessibility problems can be solved through the use of technology, i.e., through developing electronic portfolios.

ELECTRONIC PORTFOLIOS IN TEACHER EDUCATION

An electronic portfolio, sometimes referred to as "multimedia portfolio, e-folio, webfolio" (Kilbane & Milman, 2003, p. 7) is similar to paper portfolio; however, the medium used to present and organize the portfolio artifacts is different. It is organized by using a combination of media tools such as audio/video recordings, multimedia programs, database, spreadsheet and word processing software as well as CD-ROMs and the World Wide Web with hypermedia links connecting that evidence to the objectives of the course and program (Kilbane & Milman, 2003). According to Barrett (2000), an electronic portfolio includes the use of electronic technologies that allows the portfolio developer to collect and organize artifacts in many formats. Numerous advantages associated with the use of electronic portfolios have been suggested by the literature (see for example, Barrett, 2005; Strudler & Wetzel, 2005; Tosh, Light, Fleming and Haywood, 2005; Williams, Wetzel, & Wilhelm,

2004): (1) increase in the technology knowledge and skills, (2) facility in distribution, (3) storage of many professional documents, and (4) increase in accessibility. With the creation of electronic portfolio, student teachers not only can showcase the best work as a professional, but also exhibit the knowledge and skills in using technology. Therefore, teacher education programs have begun to explore the use of technology as a tool in the development of portfolios. However, still remains a question to be answered, such as student teachers' perceptions of electronic portfolio development and its impact on their professional development. The literature in this area describes what electronic portfolios are, how they are used, and why they are used in teacher education. However, there is little research to discuss preservice teachers' perception of developing e-portfolios. Wilson, Wright, and Stallworth (2003) and Wright, Stallworth, and Ray (2002) investigated 111 preservice majors (foreign language, language arts, mathematics, and science) about electronic portfolio development in science and/or math teacher education. For the knowledge of the researcher, no study was conducted on perspectives about electronic portfolio development in EFL teacher education. Therefore, the main purpose of this study was to describe EFL student teachers' perceptions on the role of electronic portfolios in their professional development.

THE RESEARCH CONTEXT

The present study was conducted at the Faculty of Education in the Department of Foreign Language Education at a Turkish University. From 1998, all faculties of education in Turkey follow a standardized curriculum prescribed by the Higher Education Council (YOK, 1998) to train and educate future teachers for the schools of the Ministry of Education (cited in Cakiroglu & Cakiroglu, 2003). In their fourth-year of their teacher education program, the student teachers must satisfy a practice teaching requirement. During the 1st semester of their senior year, student teachers are given opportunities to observe EFL classes in primary and secondary schools. In the 2nd semester of their senior year, student teachers are engaged in student teaching. In the department the present study was conducted, the student teachers were also required to develop teaching portfolios as one of the requirements of practice teaching component of the program. For these portfolios, they are required to do some tasks that encourage them to reflect on their teaching such as writing journals, making lesson plans and presentations, writing self- and peer-evaluations, and engaging in written dialogues with the cooperating teachers and university supervisors.

THE PARTICIPANTS

The sample for this study included five senior level teacher candidates (one male and four females) completing their undergraduate degree in the Department of Foreign Language Education at a large Turkish University. All these student teachers were graduates of Teacher Lyceum age range between 20-22 years old. These participants volunteered to participate in the study, and met the criteria required for a purposive sample, that is, they are "the sources that will most help to answer the basic research questions and fit the basic purpose of the study" (Erlandson, Harris, Skipper, and Allen, 1993).

THE DATA COLLECTION AND ANALYSIS

Primary source of data collection for this study was interviews with the student teachers. The interview questions were developed by the researcher based on the literature she reviewed. Each student teacher who volunteered to participate in the study was interviewed concerning preparation of e-portfolio before and after the completion of the portfolio by the researcher herself. The interviews were conducted in English and were recorded.

Since the participants talked about their electronic portfolios in the interviews, it is essential to mention briefly about the portfolios they develop even though they were not the primary source of data for this study.

All the student teachers in this department were required to collect artifacts such as lesson plans, self- evaluation and peer-evaluation sheets, or reflective narratives required by the instructors in pen/paper portfolios. These portfolios were 3-ring notebooks or folders, organized with dividers and sections for paper-based documents demonstrating each task or activity for particular courses. The documents under investigation in this study, however, were electronic portfolios each participant voluntarily prepared during the methods course (Fall 2002-1st semester) and subsequent semester of practice teaching (Spring 2003-2nd semester). Each student teacher decided which software he/she would use to develop and organize his/her electronic portfolio. The portfolio artifacts included several classroom observation tasks, evaluation papers, student teacher narratives and student teachers' journals.

In order to find out the perspectives of the student teachers regarding the impact of e-portfolio preparation on their professional development, a content analysis by using Miles and Huberman's model (1994) was conducted to identify conceptual themes, i.e., what the participants mainly talked about in interviews.

First the interviews were transcribed, and then by reading each participant's transcripts, the researcher identified the conceptual themes by finding out the recurring words and ideas. Then, she coded them into "conceptual categories" and used these categories to create a matrix of major themes of each participant. Then, the researcher compiled all of the themes first, and then sorted these themes under possible headings to answer the research question. Under each heading, supporting quotes from each participant were listed and discussed. Some themes seemed to overlap one another, but it was impossible not to mention one theme within another in order to support the result. The reader will find some themes fully discussed in one section while only mentioned in another.

The findings will be reported in two sections. First section is about the pre-portfolio construction phase when student teachers were introduced to the e-portfolio. Second section is about the post-portfolio construction phase when the student teachers were finalizing their e-portfolios. In both sections, student teachers' perceptions about e-portfolios were reported.

RESULTS AND DISCUSSION

Pre-portfolio construction phase

The pre-portfolio construction phase was the beginning of the 1st semester when student teachers started to go to cooperating schools to observe, the same semester in which data collection also began. In this phase, pre-interviews were conducted with the student teachers. In the content analysis of these interviews, two themes on early beliefs about e-portfolio preparation emerged: "Portfolio as a tool for job search" and "Portfolio preparation as an overwhelming and time-consuming process."

Portfolio as a tool for job search

The e-portfolio as a 'tool for job search' is the term used by student teachers in pre-interviews to express how they saw their portfolios. Four of the five student teachers said that they would use it as a "fancy" document in their search for a job.

When asked how she saw her portfolio in the future, Didem immediately replied

I want it to be a fancy portfolio, and I want to have something that I could take to job interviews. It will show that I had a different experience from other teachers when I applied for the job.

Burcu also visualized herself with her portfolio in a job interview situation "I want to show my portfolio to the person who is interviewing me. I want my portfolio to put me in the market as a teacher." Furthermore, she said, "right now, my goal is to prepare my portfolio with good work so that I can present myself and get a job." She expected the portfolio to present her and open the doors for job opportunity.

One student Mete, on the other hand, indicated that the portfolio was not for an employer, but for themselves. She would use it for her own purposes. It would help her remember what worked and did not work in her practice teaching:

I do not believe that it is for other people. I do not see my portfolio as a tool to find a job. But I see it as a tool for myself to look at it when I am a teacher, to look what I did right or wrong. Actually, it shows how I develop as a teacher.

Student teachers, therefore, expressed a big advantage over other teacher candidates in the job process with their portfolios by showing the future employer the knowledge and the skills they learned in their teacher training. This finding is consistent with the findings of Hurst, Wilson and Cramer (1998) and Anderson and DeMeulle (1998), which suggested that the portfolio would help them to obtain a teaching position when they applied for a job.

Portfolio preparation as an overwhelming and time-consuming process

Student teachers knew that the portfolio preparation process would not be an easy one: in their terms, it was going to be a "tiresome" and "time-consuming" process. They were introduced to the requirements of practice teaching and observation of schools as well as to the requirements of portfolios when the data collection started. Ayşe's sense of frustration was evident when she said, "I don't know where to begin." Burcu expressed similar distress. She remarked, "I knew that we would prepare a portfolio for school experience course because my friends told me before. But I am really scared about this project." Ahmet was also uncertain: "It (portfolio)

seems an overwhelming activity.” Didem’s reaction was even more dramatic: “I am not sure what I will put in there. I am a little bit scared by this idea.”

The student teachers in this study also expressed their concerns about the amount of time involved in portfolio preparation. Comments from them during the pre-interview revealed some frustrations about developing their first portfolio in the first semester. Ayşe expressed her feelings by saying that

Finding time and preparing good material for this portfolio is going to be hard because I am not sure how to make them. I think in the first couple of weeks it will be hard to figure out what and how I should prepare them, and when I should prepare them.
On the other hand, when asked how much time he might spend on preparing his electronic portfolio,

Ahmet said “Very little. I will be honest about that. Hopefully I will spend a little bit of time since I know a lot about computers, but I think I will spend more time on deciding what kind of things I will prepare rather than how I will prepare.”

The participants also emphasized that working on the appearance of the portfolio made the process even more time-consuming. Student teachers were very concerned about how their artifacts would look and often talked about the need to type their artifacts. Esra was especially concerned with typing in order to improve the appearance: “I am typing them on the computer because it looks better.” Like Esra, Burcu also saw the need to make revisions based on appearance. She used the term “polished,” which means anything in the portfolio “that needs to be changed or corrected. I want no mistakes in it. I want it polished and look nice.”

It is evident that developing electronic portfolios were seen overwhelming and time-consuming by the student teachers at the beginning of the project. The participants reported that one of the most time consuming part of the process would be preparing the required portfolio items and the appearance of the portfolio. Additionally, they also revealed that finding time to develop the necessary technical skills was a challenge, and would require more attention. Zidon (1996) also reported that student teachers stated that time was a limiting factor when constructing their portfolios. Many of them did not start working on their portfolios on time because of their time commitments to their responsibilities as a student teacher during their practice teaching. A lack of time to prepare the portfolio was the major challenge student teachers faced as reported in the literature (Dutt-Doner & Gilman, 1998; Harris & Curran, 1998; McKinney, 1998; Stone, 1998).

Post-portfolio construction phase

The post-portfolio construction phase was after the student teachers completed their portfolios at the end of 2nd semester. They reflected upon their experiences and thoughts about portfolios in their post-interviews. The content analysis of these interviews revealed five aspects of the portfolio construction process: support; collection of best work; opportunity for continuing learning; the development of technological skills and reflective thinking.

Support in the form of collaboration

The student teachers cited difficulties with the portfolio preparation and sought solutions to those problems. One solution came in the form of support from their classmates and from the researcher herself. These student teachers revealed that their portfolio preparation process was collaborative with support from each other as well as from faculty members and the researcher. This agrees with what Burke, Fogarty, and Belgrad, (1994) had to say about collaboration. She says, “though schools usually focus on students working alone, the real world allows and encourages people to talk, ask questions, get help and receive feedback” (p. xvi). The student teachers in the present study talked with each other, their cooperating teachers and the researcher. For instance, Didem explained that the help and support she received from her classmate Ayşe was important to her success:

She helped me because I was having problems with the portfolio, especially with the electronic journal. I talked with her, asked her what she wrote. She described what she did and it helped me in writing my reflective statements.

Student teachers in this study reported that support from peers was very important in their success in developing their electronic portfolios. Working with peers gave student teachers an opportunity to view ideas and experiences from a different perspective. Student teachers’ verbal interaction with each other is not only stimulating, but also it acts as a principle catalyst for reflective development as Korthagen found in his study (1992). Peers acted as consultants with each other and participated in the sharing of knowledge and information.

They also collaborated with the faculty members and the researcher herself. The researcher provided technical support to them by scheduling individual lab hours for help or providing assistance during chosen lab hours. Student teachers expressed how they felt the lab hours helped them with the development of the electronic portfolios. As Burcu said, “I think you (the researcher) did a good job for organizing those lab hours for us.”

As evidenced, collaboration and support are essential elements in this project, which is consistent with the findings of other studies. For instance, Kieffer, Faust, Morrison and Hilderbrand (1996) study also supported the notion of collaboration for portfolio users. They indicated that portfolios provided opportunities for student teachers to gather a variety of responses by communicating to peers and instructors either orally or through electronic journals.

Collection of best works

Student teachers have revealed another aspect of portfolio preparation that agreed with many other researchers. They saw their portfolios as a physical product of their own that showed their professional development. They wanted to document their practice teaching in an organized way, and the portfolio provided them with an opportunity to create a professional collection of materials that represented an important period of their training and development as a foreign language teacher. Ayşe’s words provided the code for this section by saying that: “the portfolio shows your best works . . . shows where you started and where you are now at the end of the year.” She thought that

I think I have grown as a teacher and a learner. I see this in my lesson plans I put in my portfolio. The lesson plans in the beginning of the semester were not as creative as the ones at the end of the semester.

Didem wrote in one of her journal entries “it (portfolio) helps me to reflect back. I looked the previous artifacts in the first day of my practice teaching; I see the mistakes I made and I did not do the same mistakes in my final portfolio.” She had an opportunity to go back in her portfolio to see where she is at the moment, and be aware of what she was doing in her practice teaching.

These student teachers revealed an enthusiasm about portfolios: the portfolio is personal, and representative of the person who prepared it, and it is the collection of “best work.” The notion of best work is valued by other researchers including Calkins (1994), and Graves (1992).

Furthermore, they expressed a sense of pride in their finished product. For example, Didem said, “at first I thought I don’t want to do this portfolio, with all these practice teaching requirements, but once you finished it and see the results you are proud of yourself that you can do it.” Burcu, for example, was very proud of her portfolio. She concluded that:

I want you to know that although at one point, I thought I made a mistake by signing up for this electronic portfolio project. But now I am lucky to participate it. But it was well worth it, especially when I look back at it months later and I was proud of my work.

The student teachers accepted the responsibility that this portfolio was reflection of themselves and that the artifacts reflected their skills as teachers. Arter and Spandel (1992) said that ownership implies control over what goes into the portfolio and that ownership is a big responsibility for the portfolio constructors. These student teachers said from the very beginning of this study that the portfolios “are my best work that represents me as a person,” or “a unique way to show my accomplishments.” The use of “me” in these quotations actually shows the sense of ownership felt by the student teachers. This finding is consistent with the findings of other studies that having a portfolio (traditional or electronic) allowed student teachers to feel a sense of accomplishment in the finished product, and a means to keep and organize most of the important and best works from courses and practice teaching (Dutt-Dover & Gilman, 1998; Johnson, 1999; McKinney, 1998, Wetzel and Strudler, 2006).

Opportunity for ongoing learning

Learning was evident throughout the portfolio preparation process. However, what was becoming more evident to these student teachers by constructing a portfolio was the “ongoing” process of learning (Wolf, 1996). Each student teacher developing portfolio seemed to sense professionalism as the semester progressed. However, they did not understand the process they were undergoing at the very beginning of this project. It was not until

they started to prepare their artifacts that they understood what was expected from them. They recognized exactly what was happening in terms of professional development when the portfolios were completed. Ayşe's view of the portfolio also changed as she talked about why it was prepared:

I prepared items for the course first and put them in the portfolio. But then I realized what I have done is something valuable, I learned from it (portfolio) and it will affect my teaching in the future because I see my growth in it.

Esra also was not sure about the purpose of preparing a portfolio at first, and said she believed it (portfolio preparation) was a time consuming process. But then she realized that the purpose of the portfolio preparation was “to increase our awareness of what we learned in schools and to show them what we observed and which aspects of this observation is beneficial for us.”

All of the participants saw their portfolios as a good resource for displaying their learning and professional development. In addition, specifically, portfolios contain the teacher narrative section that is specifically related to professional development. This section makes powerful statements about the student teacher. It states what an individual believes, and the remainder of the portfolio shows how that student teacher relates his or her practice to their philosophy. Student teachers stated that the portfolio helped them reveal their professional beliefs about education in general, and about foreign language education, in particular. Didem said in her post-interview, “my beliefs of education are important. It is a combination of who I am and what I have learned. And I believe that culture must be taught within foreign language courses. You must include culture to your activities.” And, in one of her lesson plans, she used examples from English speaking countries. She not only stated what her beliefs were, but also backed up those statements with her practices.

These student teachers developed their portfolios over one year, and especially over the course of their practice teaching, and their portfolios emerged from this process of collecting evidence that represented their growth. This process does not end with the graduation; as the student teachers mentioned they also plan to add items to their portfolios that show their new experiences and new knowledge. Therefore, the portfolios will continue to grow and change with their new experiences, and it gives them an opportunity for an ongoing learning and professional development.

The Development of technological skills

Through the development and maintenance of an electronic portfolio, student teachers used technology throughout the second semester. Preparing an electronic portfolio enhanced student teachers' professional development in terms of increased technology knowledge and use. The participants seemed more proud of their electronic portfolios than their paper portfolios. Even though at the beginning they seemed to be overwhelmed by the idea of preparing an electronic portfolio, at the end they mentioned that preparing it helped them develop their technical skills. For instance, as Burcu said “I was really scared at the beginning. But now, in terms of technology, I feel more confident, and I can now say that I can use a computer.” All student teachers in this study agreed that they had learned new computer skills in the process of preparing their electronic portfolio. They reported learning how to import and download internet files, how to use a scanner or how to create hyperlinks between the portfolio items. When talking about her experience with the scanner, Didem stated, “I learned how to scan. I had never used a scanner before. Now I feel comfortable using a scanner. That is definitely a skill I learned by preparing this portfolio.”

Esra described what she had learned about technology, especially videotaping, and how she felt it was going to help her in her future teaching. She said:

For my electronic portfolio, I decided to videotape the lessons I taught in practice teaching. So, I learned how to set up the video cameras. Learning how to do these things helped me to understand more about how technology can be integrated into language teaching. After I graduate and when I have my own classroom, this knowledge will help me to videotape my classes so that I can watch myself. This will help me understand what skills I still need to develop.

Burcu was very proud of the PowerPoint presentation that she created for her electronic portfolio. She described what she learned about PowerPoint from doing this presentation:

I saw that PowerPoint slides are more useful than the traditional OHP. This program provides color and action to any lesson. Using sounds, pictures and even video clips

add excitement and interest to a lesson. This will help students motivate and participate more.

The student teachers all reported that preparing paper and electronic portfolios were worth doing. They felt a sense of accomplishment in technology skills as a result of participating in the electronic portfolio project. This finding is consistent with the findings of McKinney (1998), Richards (1998), Wetzel and Strudler, 2006 and Piper (1999), which suggested that student teachers indicated a positive attitude toward the use of electronic portfolios in their teaching, and that they learned new technological skills as they developed their electronic portfolios.

Reflective thinking

Reflective thinking facilitates improvement in professional practice by helping student teachers examine what they are actually doing in the classroom, such as how they teach, or how they assess students' understanding or how they plan lessons. Reflection in the portfolio helps them to see themselves better. Data from the interviews revealed that the student teachers, however, did not consider developing an electronic portfolio as a reflective activity. They believed that electronic portfolio preparation actually hindered their reflectivity because they were very much concerned with the technicality of the electronic portfolios so that they might have given importance to the outlook of their electronic portfolios rather than the content (Kocoglu, Akyel and Erceetin, 2008). Like the teachers in Orland-Barak's study (2005), the student teachers in the present study depicted the experience of having an electronic portfolio as "favorable image" (p. 36) of their teaching, therefore they focused on presenting a favorable image through their portfolios as a neat and professional collection of their teaching practice. Burcu said, for instance, "My reflections are there, but I don't think they are critical reflections. I thought mostly about the appearance." Ayşe said that "to reflect on yourself as a teacher, you need to think about your beliefs that you were taught in your teacher training. But what I did was to organize the screen." The findings of the present study did not confirm the findings that the process of developing portfolios (paper) help student teachers better understand the complexities of teaching and become reflective practitioners (Loughran and Corrigan, 1995; Winsor and Ellefson, 1995). A number of other studies also suggested that portfolio development was also a useful tool for supporting reflection (Dana and Tippins, 1998; McKinney, 1998; Zembal-Saul, 2001, Wade and Yarbrough, 1996). This study, however, found out that in terms of the student teachers' perspectives, developing an electronic portfolio did not enhance their reflective thinking.

CONCLUSIONS

This study reported the perspectives of student teachers on portfolio preparation. Results of data analysis identified several themes, indicating how the student teachers perceived the role of portfolio before and after the portfolio construction. In pre-portfolio construction phase, student teachers saw the portfolio as a tool that serves them in the job search process. The portfolio audience took an important role in the process. The student teachers said in their pre-interviews that they were producing evidence with the notion that someone with the power to provide them with a job would be reading and viewing their portfolios.

Initial interviews revealed expectations about portfolios, but also it created a sense of being "tired" by it. They believed that portfolio preparation was a tiresome and time-consuming process, which needed support from faculty and classmates. When asked about the purpose of the portfolio in pre-interviews, the student teachers said it was to get a good course grade and meet graduation requirements.

In post-portfolio construction phase, they believed their portfolios were collections of materials that showed their personal and professional development. The student teachers cited difficulties with the portfolio preparation and sought support from their course instructors and their classmates. However, they did not work alone; they collaborated with each other. They discussed with each other the ideas they had and offered advice to one another. Collaboration was an important practice during the portfolio preparation process, and this finding coincides with the findings of others who have viewed collaboration as a productive practice (Kieffer, Faust, Morrison & Hilderbrand, 1996; Graves, 1994; Routman, 1994).

In their post-interviews, student teachers also reflected upon their portfolios. They looked closely at their strengths and weaknesses. They were actually proud of their portfolios and what they had achieved, especially when they finished their electronic portfolio. They also indicated that portfolio preparation process was an ongoing developmental process. In the end, they admitted that the portfolio preparation process did not actually finish. As Burcu said, "it will never be over. There will be more to add and more to change as time goes on." For these student teachers, the portfolio preparation process provided them with the opportunity to monitor their professional growth. In addition, as discussed by Wright, Stallworth and Ray, electronic portfolios also required

time, commitment, planning and evaluation (p.60). The student teachers indicated positive attitudes about the use of technology in developing their electronic portfolios.

First of all, the findings of this study show that electronic portfolios are an important element for the professional development of a student teacher, helping them keep current with innovations in the modern digital world. However, the student teachers in this study did not believe that electronic portfolios can be an important tool to develop reflective thinking. Therefore, further research is needed to investigate whether electronic portfolios are as effective as paper portfolios in enhancing reflective thinking in terms of reflective narratives/portfolio artifacts written by the student teachers.

Second, the findings of this study imply that if a teacher education program plans to implement electronic portfolios as an effective tool for reflective activities, the student teachers need to be first trained sufficiently in technology use to be able to create such a technological tool. In other words, teacher education programs need to provide adequate facilities with the appropriate hardware and software as well as lab hours for student teachers to work on their electronic portfolios.

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