The Development and Transition From Portfolios to E-Portfolio Within Educational Context

1.1 INTRODUCTION .............................................................................................................. 3
1.2 USES OF PORTFOLIOS ................................................................................................. 4
1.3 BENEFITS OF PORTFOLIOS ....................................................................................... 5
1.4 SUCCESS CRITERIA ..................................................................................................... 6
1.5 PORTFOLIOS IN DIFFERENT DISCIPLINES ............................................................. 7
2.1 ELECTRONIC PORTFOLIOS ....................................................................................... 9
2.2 USES OF E-PORTFOLIOS ........................................................................................ 10
2.3 BENEFITS OF E-PORTFOLIOS ................................................................................ 12
2.4 THE USE OF E-PORTFOLIO IN TEACHER EFFECTIVENESS ............................... 15
2.5 THE IMPORTANCE OF E-PORTFOLIOS IN EVALUATING PRE-SERVICE TEACHERS ............................................................................................................. 18
2.6 SCHOOL IMPROVEMENT THROUGH E-PORTFOLIOS ........................................... 22
2.7 POINTS OF DIFFERENCE FROM TRADITIONAL PORTFOLIOS ............................. 24
2.8 ELECTRONIC PORTFOLIO ADOPTION AND IMPLEMENTATION .......................... 25
2.9 BARRIERS TO IMPLEMENTATION ............................................................................. 27
2.10 E-PORTFOLIOS - EDUCATIONAL AND PEDAGOGICAL CONSIDERATIONS.. 27
2.11 E-PORTFOLIO SUPPORT AND TECHNICAL CONSIDERATIONS ....................... 29
3.1 E-PORTFOLIOS QUALITY STANDARD ...................................................................... 31
3.2 E-PORTFOLIOS DESIGN AND DEVELOPMENT STANDARD ............................... 33
3.3 HELEN C.BARETT APPROACH ................................................................................. 33
3.4 KADRIYE O. LEWIS, RAYMOND C. BAKER APPROACH ....................................... 37
EXECUTIVE SUMMARY

This chapter discusses the importance of portfolios’ and the use of e-portfolio within educational context. The uses of portfolios have been incorporated in different educational context, and they proved their educational value for both teachers and students. The current advances in the field of Information and Communication Technologies (ICT) have created a new method for using and incorporating different electronic tools in the educational field. These tools and associated files have been gathered and classified using different ways, and they have been used for showing their competence in the educational field. The previous process have been called electronic portfolio or as abbreviated by e-portfolio. The uses of e-portfolio is not monopolized by the educational field, rather it is used with different disciplines for showing knowledge, achievements and competency. This chapter will present the latest advancement in this field, and will provide the current methods and standards for creating and using e-portfolios. Moreover, it will bring the reader to fully understand the value and use of this tool and how to make the best use of this electronic technology.

**KEYWORDS:** Barriers, Criteria, Development Standards, education, Educational technologies, e-portfolio, Improvement, learning objects, Pedagogies
1.1. INTRODUCTION

It is important to bring some introduction to the portfolio concept before introducing the uses of e-portfolio, as the e-portfolio is looked at as natural extension for portfolios that came as a result to the current advancement in ICT. Moreover, e-portfolios inherit all the benefits of portfolios, and it adds to them the new benefits that are found by the ICT.

Portfolios are generally defined as a collection of facts and proofs that shows a persons journey through learning and teaching over time and they are used to demonstrate their ability and competences. The use of portfolios can be restricted to specific discipline or they can be used to define a broader concept that wrap a person’s lifelong learning. A wide range of different evidences can be included within portfolio such as:

- Writing Samples
- Photographs
- Videos
- Research projects
- Observations and evaluations of supervisors, mentors and peers
- Teaching and learning artifacts
- Reflection of previous evidence.

The most important aspect of portfolios is reflection, as it shows what the portfolio owner has learned, by justifying the reason for the included items within the portfolio (Abrami and Barrett, 2005; Klenowski et al., 2006). According to Kimball (2005), he argues that:

...neither collection nor selections [of pieces to be incorporated into a portfolio] are worthwhile learning tasks without a basis in reflection. Thus it is seen that reflection is the entire pedagogy of portfolios.

Having the previous argument, it is evident that teachers are learning from the reflection that is associated with the process of creating portfolios, through introducing them to different tools and techniques that are
used in pedagogical context, and how to use these tools towards teaching, guiding and mentoring students. It is also believed that portfolios have another two important key elements that are:

Measuring learning and development over time (Challis, 2005)

The process of constructing a portfolio is where the learning takes place, rather than the end product (Smith and Tillema, 2003).

1.2. USES OF PORTFOLIOS

Portfolios are looked at as a main source for providing evidence and they can be employed for different purposes such as:

Learning
Professional development
Assessment
Job applications
Promotions.

Moreover, they have been used with different audiences such as: lecturers, mentors, employers and for self-use; in addition portfolios provide an alternative form of assessment (Chang, 2001; Smith and Tillema, 2003; Smits et al., 2005; Wade et al., 2005) that can be used with students or teachers in different forms as summative or formative assessment tool (Abrami and Barrett, 2005; Kimball, 2005; Loughran and Corrigan, 1995; Ma and Rada, 2005).

According to the literature, portfolios come in different types and all are based on the use and the audience for the portfolio. According to Zeichner and Wray (2001) portfolios can be of the following types:

Learning Portfolio: document students learning over time.

Credential Portfolio: used for registration or certification purposes.

Showcase Portfolio: used for applying for employment positions.
Abrami and Barrett (2005), define three different types of portfolio:

- **Process portfolio**: they represent learning over time.
- **Showcase portfolio**: they represent achievement in the study or workplace.
- **Assessment portfolio**: they are used for evaluation purposes.

Another variation is presented by Smith and Tillema (2003) with the setting of their use in four different types:

- **Dossier Portfolio**: used for job selection and promotion purposes.
- **Training Portfolio**: used for learning and development.
- **Reflective Portfolio**: self-directed portfolio that can be used for many purposes.
- **Personal Development Portfolio**: self-directed portfolios that reflect learning and development.

From the different variations of portfolios it is obvious that each portfolio has a major aim, so that portfolio developed to show change and progress in learning will not be appropriate for use when applying for a job, just as a portfolio displaying only ideal pieces of work will not be useful for evaluating reflective learning. The option of using portfolios in this study and within Saudi schools is intended to be reflective portfolios, as these types of portfolios are considered more flexible to work with and use. The reflective portfolios can be used with summative and formative assessment procedures and will enable teachers to create many portfolios that are directed to the intended assessment objectives.

**1.3. BENEFITS OF PORTFOLIOS**

The use of a portfolio has different benefits for its owner, as it helps to focus thinking on a specific issue or matter (Wade and Yarbrough, 1996). Also, a portfolio provides a way to translate theory into practice (Hauge, 2006) and the main benefit is that they document a learner’s progress over time (Abrami and Barrett, 2005; Challis, 2005; Smith and Tillema, 2003). In terms of using portfolios with students, a major benefit that has been recorded is students’ communication and organisational skills and that they present a way of classifying and recognizing prior learning and also they can lead to new learning outcomes (Brown, 2002). The process of portfolio construction has enabled different students to sense and visualize what they are learning (Young, 2002). Having awareness of their accomplishment creates a better
understanding of how their learning takes place (Brown, 2002). So, for students or learners it is a creation process, while evaluators see portfolios as the end product (Darling, 2001).

If portfolios are to be considered in different context, Zeicher and Wray (2001) have posited several important questions for portfolio implementation in educational settings:

- What is the purpose of the portfolio? Is it learning, assessment, professional development or for employment reasons?
- Who decides what should be included in a portfolio? Should it be the student/learner or evaluators?
- How prescriptive should guidelines for creating a portfolio be?
- How should the pieces of evidence in the portfolio be organized? Should they be based on themes chosen by the student/learner or based on programme goals or based on achievement standards?
- What kinds of artifacts are acceptable as pieces of evidence? What should be included or excluded
- What kind of input should tutors, lecturers and peers have throughout the process of constructing the portfolio?
- How frequently should students/learners be expecting feedback on their progress?
- How should the portfolio be assessed? Should it be by using specific evaluation criteria and grading rubrics or a simple pass-fail system?
- What should happen to the portfolio after it is finished? Should it be publically acknowledgement or a presentation of work?

The previous questions all indicate that there are some problems related to the use of portfolios as an assessment exercises in academic settings. Some of these issues are related to the current shift towards involving electronic environments in educational settings, while others are related to lack of defined guidelines and clear structure towards portfolio construction and use (Smith and Tillema, 2003).

1.4. SUCCESS CRITERIA
Based on the previous considerations of the problems and questions posted, a number of criteria have been set for successful use of portfolios (Loughran and Corrigan, 1995; Smith and Tillema, 2003; Wade and Yarbrough, 1996). The following are a summary of the success criteria:

- Having familiarity with the portfolio concept and understanding the processes and the product of portfolio construction.
- Having clear a framework and guidelines for constructing and using a portfolio.
- Having the portfolio structure tempered with enabling freedom for creativity.
- Providing or gaining feedback during the evidence collection process.
- Have a clear understanding of the value of reflection.
- Understanding the importance and value of portfolios for future use, such as for employment.
- Being motivated (or motivating) to learn and achieve good results.
- Enforcing the concept of portfolio ownership.
- The target audience should be considered.
- Creating a sense of achievement for teachers at overcoming struggles to understand the portfolio concept.

1.5. PORTFOLIOS IN DIFFERENT DISCIPLINES

Portfolios have proved to be beneficial even if employed in different educational disciplines such as teacher education, medical education, nursing, and other disciplines. This field of medical education is shifting towards having assessment based on achievements and maintenance of competencies. In order to have a competency-based evaluation, there should be a way of determining progress against a threshold rather than against other people, thus portfolio assessment shows the greatest promise for meeting these demands (Carraccio and Englander, 2004; Jarvis et al., 2004).

It is acknowledged in medical education that portfolios are tools that can be used to assess performance in authentic contexts (Driessen et al., 2005a), or they can be looked at as collections of evidences that demonstrate education and practice achievements (Davies et al., 2005). Davies et al., (2005), they agree
that portfolios compiled by healthcare professionals have the potential to assess outcomes, including attitudes and professionalism, which are both understood as difficult to assess using traditional instruments. Based on different research studies (Davies et al., 2005; Pearson and Heywood, 2004; Duque, 2003; Lynch et al., 2004), there are different benefits of portfolio use within education in medical context such as:

Reflection on practice and learning from experience which results in improvements towards patient care.

The support towards personal and professional development helps clarifying learning goals and monitor progress of medical students.

Encouraging self-directed learning.

Progress over time.

Teach lifelong learning skills.

The previous points are another example of the effective use of portfolios in the context of other professions that seek development of practices and enhancement of educational performance through reflection, support of professional development, measuring progress and lifelong learning skills. To guarantee that portfolios are successfully implemented and used in the medical setting, the following strategies should be addressed:

Student should be involved in the decision-making process (Driessen et al., 2005b).

Students should have good supervision (Pearson and Heywood, 2004; Pinsky and Fryer-Edwards, 2004).

Students should have supportive educational climate where they feel comfortable revealing their weaknesses or mistakes (Pinsky and Fryer-Edwards, 2004).

These benefits of portfolios and successful implementation are not just relevant in the medical education field; they are just as applicable to other fields including education.
2.1. ELECTRONIC PORTFOLIOS

An e-portfolio is simply an electronic version of the paper-based portfolio that is created using computers and it incorporates: graphics, audio, video and interactive elements. Another definition is given by Abrami and Barrett (2005, online) as:

a digital container that is capable of storing different elements such as visual and auditory content including text, images, video and sound, that are specifically designed to support a variety of pedagogical processes and assessment purposes.

Moreover, Challis (2005) provides a more in-depth definition by describing e-portfolio:

as selective and structured collections of information that are gathered for precise reasons of showing or evidencing one’s accomplishments and growth by storing the evidences digitally and managing them using appropriate software that operates within a web environment and they can be retrieved from a website or delivered by CD-ROM or DVD.

In terms of data generated and used by portfolios, they can be stored in completely different system as it is shown in the Figure 2.1.

![Figure 2.1: Different systems used for e-portfolio data management (Source: Himpsl and Baumgartner, 2009)]
The e-portfolio system can be categorized as three different software systems that are used through the Web or a network. The systems are:

1. E-portfolio Management System: used e-portfolio systems such as Mahara, Epsilen, PebblePad and Taskstream.
2. Learning Management System (LMS)/ Learning Content and Management system (LCMS) with integrated e-portfolio functions such as Exabis, Fronter and Sakai.
3. Integrated systems with possible portfolio functions such as Drupal ED, Elgg, Joomla, and Wordpress.

All of these systems can be used as e-portfolio systems, and preferring one to another is based on the context and the intended use of the e-portfolio system.

2.2. USES OF E-PORTFOLIOS

E-portfolio uses are classified into three main categories, according to Lorenzo and Ittleson (2005).

Students while studying: portfolio use allows students to demonstrate their competences, develop, demonstrate and reflect on pedagogical practices with enabling them of showing their attitudes, knowledge and skills. Such portfolios are used in educational institutions and colleges (Milman and Kilbane, 2005; Sherry and Bartlett, 2005; Smits et al., 2005; Lorenzo and Ittleson, 2005)

Graduates while moving into or through the workforce: portfolio use in such a context enables the users to apply for licensure, qualification and competencies in job interviews; they can also be used for appraisal, promotion and for critical reflection and learning purposes (Milman and Kilbane, 2005; Pecheone et al., 2005)

Institutions for programme assessment or accreditation purposes: portfolio use in this context is looked as a medium for institution reflection, learning and improvement to express institutional accountability, to make accreditation processes more evident (Lorenzo and Ittleson, 2005).

As an alternative Adamy and Millman (2009) cite two types of e-portfolio:
Accountability portfolios: which involve licensure requirements and evidence of teachers’ knowledge of standards.

Formative portfolios: which focus on teachers’ acquisition of reflective skills. Figure 14 shows the documentation of achievement and documentation of learning using e-portfolio.

The documentation for learning and the documentation of achievements are two widely used methods in e-portfolios. The assessment types used with the previous methods are formative and summative assessments that have been discussed previously in this chapter. From Figure 14 it is noticed that the Documentation of Achievement mainly focuses on evaluation towards showcasing or accountability (summative assessment), and it presents the learning objects in thematic organization that consist of predefined, directed, rational pages and screens with a retrospective reflection towards the learned material. On the other hand, the Documentation of Learning focuses on providing feedback towards learning and reflection by having formative assessment. Moreover, the presentation of learning is
presented in chronological order that consists of reflective journals, blog entries and discussions that are provided mainly by social networks. The previous two approaches have common shared points which are:

Collection of artifacts: each of the previous approaches has artifacts.

Direction: each of the previous approaches has some form of direction towards the learning objective.

Presentation: each of the previous approaches has the data presented through an electronic medium.

Collection: each of the previous approaches is working towards collecting the needed materials with respect to the used method either as predefined or reflective.

2.3. BENEFITS OF E-PORTFOLIOS

The use and benefits of e-portfolios are many; the following points address the benefits that have been identified in the literature:

a. E-portfolios enhance skills development: users of e-portfolios are introduced to different skills that include: general literacy, communication and problem solving skills, multimedia and technological skills (Abrami and Barrett, 2005; Barrett, 2000; Heath, 2002, 2005; Wade et al., 2005; Wall et al., 2006).

b. E-portfolios serve as evidence of learning, as they serve as general, flexible and distributed evidence of learning which include different times and places (Love and Cooper, 2004; Wade et al., 2005), also they provide a rich picture of learning showing the past and current learning gains (MacDonald et al., 2004; Wade et al., 2005).

c. E-portfolios show learners competencies and enable them to make connections between their course project and non-academic projects which facilitates authentic learning (Love and Cooper, 2004). Moreover, e-portfolios help users to manage their professional development which reflects positively to lifelong learning contribution (Barrett, 2000; Love and Cooper, 2004; Wall et al., 2006)
and they provide a significant pedagogical benefits, thought-provoking class discussions and provide student-centered learning (Canada, 2002).

d. E-portfolios provide feedback: the use and construction of e-portfolios has been found to assist in exchanging ideas and providing feedback (Lorenzo and Ittleson, 2005). Users of e-portfolios can have feedback on their work quickly using an electronic media channel which serves in many occasions as a ‘feedback loop’, which is an integral process to formative assessment (Cambridge, 2001).

e. E-portfolios provide reflection: the context of using portfolios, either as paper-based or electronic, is to provide the user continuous reflection and justify reasons for choosing certain pieces to be included in their portfolio (Ahn, 2004). It has been found that reflection integrates their learning experience through making meaning out of diverse and unconnected pieces of information (Cambridge, 2001).

f. E-portfolios promote continuous assessment: as users are constructing their portfolios they are constantly revisiting and refining their work and learning resource which provides a better understanding of the assessment criteria and processes they are undertaking which reflects positively on the learning process (Wade et al., 2005, Cambridge, 2001).

Figure 2.3. : A model of e-portfolio-based learning, adapted from Kolb (1984)

Figure 15 is based on Kolb’s experiential learning cycle that demonstrate the continuous process of learning based around dialogue and collaborative activity with others. E-portfolio use can produce
different skills that learners need to effectively navigate their way through the complex demands of an information age. Through e-portfolio development, skills of collaboration and selection are acquired. Moreover the most important skills promoted by the use of e-portfolio are those related to reflecting and forward planning in response to an experience or occurrence of learning. These are skills that have relevance across the sectors and in all subject disciplines.

g. E-portfolio use of artifacts: different kinds of artifacts can be used and integrated with e-portfolios such as text, pictures, graphics, audio and video (Abrami and Barrett, 2005; Canada, 2002; Heath, 2005; Love and Cooper, 2004; Milman and Kilbane, 2005; Wade et al., 2005). Moreover, they take advantage of the flexibility that is provided by electronic technology in incorporating different work that is already in an electronic format (Heath, 2002, 2005).

h. E-portfolio maintenance: maintaining and enhancing e-portfolios is considered easy through processing different direct commands such as edit and update which promotes constant revision towards portfolios (Canada, 2002; Heath, 2002, 2005).

i. E-portfolio portability and sharing: e-portfolios are considered portable and easy to share as they provide different ways of sharing either by using CD-ROM, DVD, storage disks or the Web. Also they are easily transferred to another system or working environment (Abrami and Barrett, 2005; Strudler and Wetzel, 2005; Wade et al., 2005).

j. E-portfolio access: e-portfolios are highly accessible if they are used through the Web as they provide the ability for users to work on their portfolios either as students by updating, editing or adding resources, or as evaluators in an any time anywhere purpose (Ahn, 2004; Canada, 2002; Heath, 2005; Wade et al., 2005).

k. E-portfolio audience: as portfolio is based on electronic technologies, it has inherited the high accessibility features that are provide by those technologies, and they can be accessible and viewable by a larger audience which includes students' peers, supervisors, assessors, parents, employers (Ahn, 2004; Strudler and Wetzel, 2005, Wade et al., 2005).
1. E-portfolio organization: the process of organizing e-portfolios is relatively easy due to the inherited nature of electronic resources (Ahn, 2004; Wade et al., 2005; Young, 2002). This enables organizing resources and learning evidences and artifacts in a complex way and presents them in with navigational links that connects ideas with artifacts and resources (Canada, 2002; Heath, 2002, 2005).

m. E-portfolio storage: as portfolios do not rely on large binders full of paper, e-portfolios are easy and efficient to store (Ahn, 2004; Canada, 2002).

n. E-portfolio cost: the use of e-portfolios is inexpensive as they are easy to reproduce. However, there is initial set-up cost for having the software and the equipment that may be quite high (Heath, 2005).

o. E-portfolio standardization: e-portfolios have the flexibility and the ability to be standardized across different regions and countries, if a universal specification can be agreed upon (Abrami and Barrett, 2005).

p. E-portfolio privacy: the use of e-portfolios can include having privacy features in order to provide the needed protection for student work. In many e-portfolio products and tools access policies can be set to those that the students wish to view his/her work.
It is well accepted that using e-portfolios demonstrates what is important about individuals at particular points in time, their achievements, reflection on learning and potentially provides a rich and rounded picture of their abilities, aspirations and ambitions.

2.4. THE USE OF E-PORTFOLIO IN TEACHER EFFECTIVENESS

In their work about e-portfolios, as the pedagogy behind the technology used in Science projects, Chua and Chua (2007) state that e-portfolios can serve as a tool to be utilized in integrating technology to capture the learning process and reflection of individuals. They point out that the pedagogy behind the technology serves as the key to success in using any teaching and learning technology. It is likewise
emphasized that in ensuring success in the use of e-portfolios, e-portfolios must be used with consideration towards the use of ICT and teachers ICT competencies Huang (2006).

According to Jafari and Kaufman (2006), there is much promise offered by e-portfolios in the improvement of learning and assessment in teacher education. In order to realize this promise there is:

- A need for new technology to address the need for efficient and effective teacher education. Technology must be considered in the background, and not the focus of this improvement;
- A need for reflection and sharing will be facilitated by this technology, moving teacher education towards a more ideal teaching portfolio that is created across diverse contexts over time, enriched through collaboration, and designed by reflection;
- An ultimate goal being the advancement of student learning through raising teacher effectiveness in interacting with ICT and having appropriate ICT competencies (Jafari and Kaufman, 2006).

By enabling technology to be placed in the background, emphasis would be placed back on theory, reflection, and collaboration. Jafari and Kaufman (2006) encourage teacher educators to use e-portfolios for their advantage that other means cannot achieve by the same totality. The presented ideas by Jafari and Kaufman (2006) are relevant to this research since they provide an insight about the usability of e-portfolios for teachers and ultimately, to the students, for their ultimate learning.

Bartlett (2009) provides an elaboration of a five-step model designed to enhance electronic teaching portfolios, whose conceptualization starts with dissatisfaction with traditional measures of student learning. This dissatisfaction has led to the implementation of performance-based assessment such as portfolios, with an aim to measure teaching effectiveness. Performance assessment, in contrast to standardized tests, deals with collaborative and active learning aiming to ensuring success on tasks that are termed 'real world’.. Although being relatively new, there is popular growth in teaching portfolios
alongside increased demand by accreditation bodies for tangible evidence of teachers’ competencies. In his study Bartlett (2009) implemented e-portfolios with two groups of pre-service teachers. The participants in the programs started with limited technology backgrounds as they created their portfolios. Within the two-year program, the group consisting of graduate students learned how to make web pages, use of PowerPoint, how to create digital movies and how to do internet research whilst presenting ideas to the class. In addition to leaning technology, the students spent 42 hours creating e-portfolios. Some components comprising portfolios included: welcome page, teaching philosophy, career goals, self-evaluation, and resume. The presentation of teaching development included: used documents, video clips, digital photographs, and scanned work samples of students.

An evaluation model for electronic teaching portfolios includes five steps, which are:

1. A rubric for assessing individual portfolios,
2. Qualitative data on students’ assignment perceptions,
3. Qualitative data on e-portfolios advantages and disadvantages,
4. Quantitative data on changes in knowledge and attitudes about technology,
5. Qualitative data on the use of technology by students as beginning teachers.

The model aims to monitor the effectiveness of the e-portfolio process (Bartlett, 2009). According to Bartlett (2009), rubrics enable students to be informed effectively of what to be expected. The author finds rubrics to lead to better final projects and enable easy grading. A useful framework for assessing e-portfolios is provided by the five-star model. Moreover, Wilson et al. (2003) examined how e-portfolios are implemented in pre-service teacher education programmes, taking into account a three-fold purpose of the process of e-portfolios. These included integrating technology into instruction, reflecting on the uses of technology during instruction and enabling teachers to create a picture of themselves as educators using electronic portfolio.
Two contexts given for the use of portfolios have been identified in the portfolio assessment process these are: student-focused portfolio assessment and teacher-focused portfolio assessment. Using the context of portfolio assessment involving students, the focus is collaboration between a teacher and a student. In terms of portfolio assessment involving teachers, the emphasis is placed on the portfolio being represented as knowledge and competence (Wilson et al., 2003). The work of Wilson and colleagues is relevant to this study although it investigates the implementation of e-portfolio in a pre-service teacher education programme. Furthermore, Huang (2006) focused on investigating the impact of the development of portfolios on self-directed learning (SDL) of pre-service teachers alongside computer technology skills. The study involves three student teachers and two internship students using qualitative methods and some descriptive quantitative analyses. It is found out that SDL is guided by a natural setting in which problem solving is employed. With SDL the participants are able to be in charge of their own learning, as they create their e-portfolios and determine the purposes and audiences. The study revealed that the e-portfolios used by participants enabled computer technology proficiency and self-directed learning readiness and helped pre-service teachers to become motivated to accomplish the tasks by telling them that their e-portfolio can be used as useful tools for getting a job within their profession. This can however undermine the usefulness of e-portfolios as a means to obtain computer technology literacy and as a self-directed learning tool. It is emphasized that teachers’ knowledge can be communicated by e-portfolios in two ways: providing the capacity to integrate various forms of media in one document and communicating ideas across various audiences through the internet. A study involving electronic teaching portfolios also demonstrated teachers acquired literacy with multimedia technology hence producing rich representations of tasks and knowledge in the classroom (Huang, 2006).

2.5. THE IMPORTANCE OF E-PORTFOLIOS IN EVALUATING PRE-SERVICE TEACHERS

The phases involved in the process of assessment are planning, consensus building, measuring, reflection, analyzing, and improving certain actions based on what is presented in the data about a learning objective or a set of learning objectives. A range of activities is likewise involved in assessment, which includes
testing, performances, observations, and project ratings (Orlich et al., 2004, cited in Buzzetto-More and Alade, 2006).

An efficient and viable means of assessing teaching effectiveness can be provided by the use of information technologies (i.e. e-portfolios) as these support traditional and authentic assessment protocol. The measures offered by technology are those that can yield rich sources of data in which educators can understand teaching effectiveness and learning mastery. Those that include the use of information technologies and e-learning, which transform the assessment process are: diagnostic analysis, pre/post testing, the use of rubrics, artifact collection, and data aggregation and analysis, to name a few (Buzzetto-More and Alade, 2006). This article provides a significant contribution to this study in understanding the use of information technologies, particularly e-portfolios, in assessing teacher evaluation.

In order to satisfy the requirements posed by the National Council for Accreditation of Teacher Education (NCATE) standards, e-portfolios have been successfully incorporated into the teachers’ curricula by several teacher education programmes (Buzzetto-More and Alade, 2006). The article of Stansberry and Kymes (2007) is relevant to the topic being tackled since it is focused on the design and format of electronic portfolios, specifically on what happens to teachers when they engage in the creation of professional portfolios. It involves the notion of whether teachers are able to transform this experience into a more authentic one in the teaching-learning process. Stansberry and Kymes’ work investigates whether teachers find an alteration to their own core beliefs related to these tools apart from acquiring proficiency in the use of portfolio development tools. The study involved 78 teachers who created e-portfolios as they participated in an education course at graduate level. This scenario might well establish the potential capabilities of e-portfolios in evaluating pre-service teachers and developing school improvement, which is the focus of this study. The study used Mezirow’s transformational learning theory to explain data which were gathered quantitatively and qualitatively and concluded that albeit not all teachers showed readiness in replicating the process of developing e-portfolios with their students, they were however transformed by the process of e-portfolio creation. Moreover, transformative learning
is facilitated by the content that this particular portfolio addresses, alongside the course format that includes collaboration, supportive discussion, and critical reflection, all of which influences this study.

Huang (2006) points out that the multimedia capabilities of web technology may pave the way for the development of a new language of practice in the teaching profession. The study’s overall finding indicated:

An improvement in some participants’ self-directed learning readiness as well as their computer technology skills, whilst only little improvement was seen in others, as they developed their e-portfolios.

That developing an e-portfolio can be effective for improving the computer technology skills of learners, highlighting the importance of initiative that an individual should take for his or her own learning (Huang, 2006).

This work by Huang (2006) contributes to the development of this study since it points out the benefits that can be gained from utilizing e-portfolios amongst pre-service teachers. Moreover, Huang’s work is consistent with the findings made by Bartlett (2002) on the latter’s study about the use of e-portfolios in teacher education. Bartlett evaluates the survey responses of pre-service teachers in the creation of instruction units taught to primary pupils through the use of software and multimedia materials. The teacher-respondents rated the assignments positively, indicating opportunities that need to be learned about e-portfolios and educational technology. Time and equipment problems are however two complaints presented in this use of educational technology (Bartlett, 2002).

The above works are also congruent to the efforts made by Kay (2006), which provides a discussion of pre-service education and technology based on 68 refereed journal articles. The review conducted involved ten key strategies, including: the delivery of a single technology course, mini-workshops, integration of technology in courses, the means through which technology may be used (i.e. multimedia, collaboration amongst pre-service teachers and mentor teachers) and access improvement to software, hardware, and/or support. The basis of evaluating these strategies is their effect on computer attitude, use,
and ability. Accordingly, most studies tend to emphasize programmes that integrate only one to three strategies. Another is that the use of computers is more pervasive when four or more strategies are utilized. A more important concern is that several students demonstrated severe limitations in methods: small samples, poor data collection tools, unclear sample and programme descriptions, and lack of or absence of statistical analysis. It indicates a need for more rigorous and comprehensive research in order to evaluate the impact of key technology strategies in the education of pre-service teachers.

Kay’s work (2006) is relevant to this research as it deals with the strategies based on their effects on computer attitude and use, leading to the effectiveness or otherwise of the use of e-portfolios in evaluating pre-service teacher education. It can thus help in enabling inferences and analyses on the use of e-portfolios in pre-service teacher evaluation in Saudi Arabia. Figure 17 shows how e-portfolios work towards achieving quality standards:
Some of the performance indicators posed by e-portfolios include promotion, support, innovativeness, and capacity to engage students in solving authentic problems with the use of electronic tools and resources. Some of the artifacts demonstrating this standard include career objective, inventory of learning styles, and teaching philosophy. In their pursuit to maximize context learning, teachers engage themselves in designing, developing, and evaluating authentic learning experiences and assessment integrating modern tools and resources. Performance indicators leading to this are directed towards designing relevant learning experiences incorporating electronic tools and resources in the promotion of student learning and creativity. Also, developing technology-specific learning environments allowing learners to become active participants in establishing their own academic goals, managing their own
learning, and evaluating their own progress. Artifacts in which this standard is demonstrated include: a lesson plan, Web Quest, and software evaluation (Nolan et al., 2011).

It must be emphasized that in the current age of digital learning, teachers represent themselves as innovative professionals in a global and technological society as they demonstrate knowledge, skills, and work processes. This is exhibited by performance indicators, including the demonstration of fluency in technology systems and transfer of current knowledge to new technologies, as well as collaboration with stakeholders with the use of digital tools and resources in an aim to support learner innovation (Nolan et al., 2011). This work is relevant to the topic being investigated as it highlights specific tasks being undertaken in the adoption of digitization in education (i.e. using e-portfolios to enhance planning and learning skills).

Vannatta et al. (2001) emphasize the occurrence of changes in how pre-service teachers think about technology and their corresponding use of technology infusion alongside the role of technology in learning. Findings from an evaluation study involving pre-service teachers are reported, embodying collaboration between teams of teachers and K-12 teachers. Technology is infused in the respective teaching contexts of these teachers whilst creating links between these contexts. Each team in the study pursued constructivist teaching through hands-on experiences with computer technology, two-way interactive videoconference activities, and field experiences in classrooms with technological tools. The findings of the study indicate that a change of view is exhibited by pre-service teachers, from thinking about teaching and learning technology, to thinking about using technology to support students’ learning (Vannatta et al., 2001). This study is helpful to the research being undertaken as it highlights the benefits that can be enjoyed by teachers in their use of e-portfolios.

According to Barrett (2007), a culture of evidence must be organized by a learning organization in its pursuit to effectively use portfolios for assessment. The artifacts placed by a learner in an e-portfolio is not the only means that measures evidence in such portfolios, but also the accompanying rationale
provided by the individual - such as the notion as to why these artifacts constitute evidence of achievement of specific goals, standards, or outcomes. Moreover, a claim is not substantiated by merely having a learner state that their artifacts are evidence of achievement. The evidence is sometimes validated by some trained reviewers, wherein a well-developed rubric is used alongside identifiable criteria. A simple formula representing this process is stated as: Evidence = Artifacts + Reflection, (Barrett, 2007). Barrett provides a fruitful discussion that is useful for this study, since he has highlighted the process in which e-portfolios may be utilized in the learning community.

2.6. SCHOOL IMPROVEMENT THROUGH E-PORTFOLIOS

Related to the discussion of school improvement through e-portfolios is the work of Ring and Foti (2003) in which the authors’ assertions are that a problem existing in the educational system is the lack of responsibility on the part of teachers to provide students with a range of communication skills that today’s standardized tests have not tested. This is in addition to attending to reading, writing, and other skills that the current standardized tests measure. These communication skills include:

- Communicating effectively with new technologies
- Understanding necessary methodologies to respond to ill-instructed and complex problems.
- Developing awareness where analyses are required, overlapping cultural, parochial, and disciplinary boundaries.
- Establishing a professional philosophy with a well-thought out rationale.

The rationale behind focusing on these skills is that students will one day compete for jobs and school placements with several students that are adept at modern communication skills and strategies, and it is the teacher’s duty to ensure that they compete effectively. In this regard, the development of e-portfolios can potentially bridge the gap between teacher-directed learning and student-centered learning. Moreover, the e-portfolio approach is said to prepare pre-service teachers to utilize technology in order that they may be able to communicate their proficiency in their teacher education programmes (Ring and Foti, 2003).
The work of Wilhelm et al. (2006) indicates the use of e-portfolios in teacher education programmes as a means to provide evidence of the growth and development of pre-service teachers. This electronic version of portfolios is implemented on a widespread basis as programmes are better able to integrate technology into the teacher education curriculum. The authors describe the process of implementing e-portfolios in three different universities in the United States, describing findings from the first three years of implementation. E-portfolios are considered a natural fit with the reform in teacher education, which is described as standards-based. As schools and implementing bodies define and refine these standards, growth became more appealing with the use of electronics in preparing portfolios (Wilhelm, et al., 2006).

Collaboration with other teachers, students, administrators, and parents is required in a teaching career. In a survey conducted by Jafari and Kaufman (2006), it is pointed out that students were slightly positive about whether the process of portfolio creation is collaborative, and slightly negative about the sufficiency of their opportunities in viewing peers’ portfolios. These findings suggest that more peer and faculty reviews would be beneficial to students, with the goal of creating a ‘portfolio culture’ through the development of a kind of learning environment that promotes care, richness, and intense expectations. In relation to school improvement, it is expected that students would picture themselves as advocates of e-portfolios when they became teachers. In actuality, only few plan to advocate for e-portfolios for student or teacher assessment (Jafari and Kaufman, 2006). Moreover, Jafari and Kaufman (2006) conclude that e-portfolios bear much promise in the improvement of learning and assessment in teacher education. In order to realize this promise, there is a need for new technology that is both simpler and less cumbersome. Technology in this sense must rest in the background and must never be the focus of improving learning and assessment in teacher education.

It is indicated in the study by Maruszczak (2008) that there is a generally favorable perception amongst teachers with regard to the role of school-wide learning expectations and rubrics, as instruction and curriculum are shaped. The school-wide rubrics are used by the teachers in the study as a tool in their classroom assessments. It is likewise emphasized that teachers must be clear about their curriculum and
provides an alignment of their curriculum to assist students in mastering essential learning. It is also pointed out that the design and implementation of portfolio tasks have impacted teachers’ practice, whereby they are now creating tasks specifically for the purposes of portfolios. It is indicated that teachers use common assessments frequently, but they do not look at students’ work frequently to calibrate the school-wide rubrics or utilize the common assessment results to facilitate systematic information of the learning of an individual or group. Moreover, teachers in the study were not utilizing common assessment results in order to help improve the curriculum strategies of the school in a collaborative manner (Maruszczak, 2008). It must be noted that student reflection plays an instrumental role in changing some teachers’ practices, as suggested in the study. Student reflection regularly occurs in classrooms by conducting formative reflections for each portfolio. The quality of reflections has improved over time for these students since specific rubrics are provided by the schools on their customized portfolio system (Maruszczak, 2008). This study by Maruszczak is relevant to this research as it highlights how e-portfolios may be used to improve student learning, teacher performance, and the school curriculum in general.

2.7. POINTS OF DIFFERENCE FROM TRADITIONAL PORTFOLIOS

E-portfolios have brought a new concept to the use of portfolios by taking advantage of technological change, and sharing the same conceptual context with traditional portfolios (Barrett and Knezek, 2003; Strudler and Wetzel, 2005). However, they still differ in some major point and characteristics that have been identified through the literature (Challis, 2005; Abrami and Barrett, 2005; Strudler and Wetzel, 2005), the differences are:

Managing e-portfolios are easier than traditional portfolios through performing tasks such as: search, retrieval, manipulation, refining and reorganizing.

Using e-portfolios reduces effort and time in comparison with traditional ones.

E-portfolios are considered more comprehensive and rigorous.
E-portfolios are able of using more extensive materials due to the electronic features and their advantages.

E-portfolios can include pictures, sound, animation, graphic design and video.

E-portfolios are cost effective to distribute and allow fast feedback.

E-portfolios are directly accessible and easy to share with peers, supervisors, parents, employers and others.

E-portfolios are capable of having different organisational structures that are not linear or hierarchical.

**2.8. ELECTRONIC PORTFOLIO ADOPTION AND IMPLEMENTATION**

In order to successfully implement e-portfolios, different factors should be present. Students need to be clearly introduced to the concept of e-portfolios and their purpose and the concept should be linked to the curriculum and programme goals, thus they should be motivated towards using and constructing their own e-portfolios (Chang, 2001; Klenowski et al., 2006; Wetzel and Strudler, 2005). Students need to have clear understanding before and during the use of e-portfolios of what type of evidences are needed and how many pieces they should include, what are the requirements for reflection and self-assessment and how is the portfolio going to be assessed and what mark is going to be addressed to it (Canada, 2002; Chang, 2001; Carliner, 2005). To have a successful implementation, students should be motivated when constructing their own portfolios by enabling student decision-making, also students’ need to be assured that they have ownership of their portfolios (Al Kahtani, 1999; Chang, 2001; Tosh et al., 2005). Moreover, they need to have public access to and recognition of their work over the Web. To facilitate this process for students, they can be introduced to past examples of e-portfolios that have been made by their peers and to reveal their efficiency in making learning gains (Abrami and Barrett, 2005). Also, students must be educated in searching, using and exploiting the electronic resources found on the Web or other resources to complete their portfolios (Wetzel and Strudler, 2005).

If the view is to be directed towards portfolio systems, they need to have different criteria to be considered successful (Ahn, 2004; Wetzel and Strudler, 2005; Kimball, 2005) including:
The need to be flexible towards students’ needs.
They should protect the privacy of those working with portfolios.
A system needs to ‘stand-alone’, without constant interference from academic staff.
Finally, educational institutions using e-portfolios need to be aware that implementing e-portfolio systems
is a long-term effort that can present successful outcomes if time is spent in the initial stages before it
becomes an available programme or institutionalized (Wetzel and Strudler, 2005; Ahn, 2004).
In order for any institution to have a successful design and creation of e-portfolio systems, they should
adopt the following factors according to Yancey (2001) introduced in a series of questions:

What is/are the purpose/s of having e-portfolios?
How familiar is the portfolio concept? Is the familiarity considered a plus or a minus?
Who are the persons that want to create an electronic portfolio, and why?
Who are the persons that want to read an electronic portfolio, and why?
Why electronic? And is sufficient infrastructure (resources, knowledge, and commitment) available
for the electronic portfolio?
What processes are needed: What resources are presumed?
What component does the model assume or include towards faculty development?
What are the required skills that students need to develop?
What curricula enhancement does the model assume or include?
How will the portfolio be introduced?
How will the portfolio be reviewed?

2.9. BARRIERS TO IMPLEMENTATION
There exist a number of barriers to e-portfolio implementation that have been identified through the
literature, the following list summarizes these points (Canada, 2002; Lorenzo and Ittleson, 2005; Sherry
and Bartlett, 2005; Tosh et al., 2005; Wetzel and Strudler, 2005).
E-portfolio systems require the presence of adequate hardware and software.
Using e-portfolios requires a specific level of computer and technological skills amongst students and staff.

Technical problems either as hardware or software that are related to e-portfolios.
The need for technical support when problems are encountered.
Hardware maintenance.
Adequate storage space and server reliability.
Using e-portfolios have demands on staff time.
Using students’ time efficiently.
Overcoming issues of ownership and intellectual property.
Problems that are related to security and privacy of data.
Lack of features or of control over those features.
Access and permission controls.
Absence of common standards between different electronic portfolio systems.

2.10. E-PORTFOLIOS - EDUCATIONAL AND PEDAGOGICAL CONSIDERATIONS

The concept of portfolios is based on constructivist philosophy which is useful for those thinking of implementing portfolio assessment (Abrami and Barrett, 2005; Chang, 2001; Klenowski et al., 2006; Meeus et al., 2006; Strudler and Wetzel, 2005).

According to (Klenowski et al., 2006) constructivism is:

“The knowledge that is constructed through activities such as participatory learning, open-ended questioning, discussion and investigation. Facilitation helps learners construct their own schema for internalizing information and organizing it so that it becomes their own”.

Portfolio pedagogy, circles the point of having evidences, reflection that makes learning experiences and making connections between different ideas and actions. Thus it is evident that portfolios seek to encourage and involve students in becoming dynamic participants in their own learning through being the users and the authors of their own portfolios (Kimball, 2005). The technological skills necessary for students to interact with e-portfolios should not be seen as a separate set of skills, but rather as a way of
enhancing learning and teaching, also the focus should be made on learning not on the used technology to facilitate learning. Working and interacting with e-portfolios will only be worthwhile if and when they are used to advance important activities in academic life such as reflections by academic staff towards students' e-portfolio construction (Ehrmann, 2006). It has been found that students are capable of making connections between different aspects of their lives that have helped them to form their social identities within their discipline of study through the use of e-portfolios. The use of e-portfolio systems should include consideration of assessment, and purposes of assessment as e-portfolios can be used for formative purposes that help facilitate students’ learning and for summative purposes to assess how much a student has learnt over a course of study (Beck et al., 2005; Klenowski et al., 2006).

The following table is structured according to Barrett (2004) and it summarizes the differences between using e-portfolios for summative (of learning) and formative (for learning) assessment.

Table 2.1: E-portfolios for Summative/Formative Assessment

<table>
<thead>
<tr>
<th>Summative Assessment</th>
<th>Formative Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The reasons for having portfolios are prescribed by the institution.</td>
<td>The reason for having portfolios is agreed upon with learner.</td>
</tr>
<tr>
<td>Artifacts and activities are overviewed by the institution to determine results of education.</td>
<td>Artifacts are selected by learners in order to tell the story of their learning.</td>
</tr>
<tr>
<td>Portfolios are time limited as they are developed at the end of a class, term or programme.</td>
<td>Portfolios are time flexible and they are maintained on an on-going basis throughout the class, term or programme.</td>
</tr>
<tr>
<td>Portfolios are scored based on specific and predefined procedures and rules and quantitative data is collected for external audiences.</td>
<td>Portfolios are reviewed with learners and used to provide feedback and reflection to improve learning.</td>
</tr>
<tr>
<td>Portfolio structure is based around a set of</td>
<td>Portfolio organization is determined by learners</td>
</tr>
</tbody>
</table>
outcomes, goals or standards. or discussed with teachers.

In some cases used for making high stakes decisions. Rarely used for high stakes decisions.

It includes what has been learned from past to present. It includes the needs for present to future learning.

It requires external motivation. It fosters external motivation-engages the learner.

The audiences are external and the learner cannot choose his/her audience. The audiences could include peers, family, friends; the learner can choose his/her audience.

### 2.11. E-PORTFOLIO SUPPORT AND TECHNICAL CONSIDERATIONS

In order to have successful implementation of e-portfolio systems, it is important to have a proper plan and pay special consideration to the following points (Barrett, 2000; Heath, 2002; Lorenzo and Ittleson, 2005; McNair and Galanouli, 2002):

- Is the e-portfolio system going to be chosen or designed?
- Is there a clear justification for the chosen technical solution?
- How will the system users be identified?
- How will the e-portfolio audiences be identified?
- What technology skills will be required by the staff and students who will use and interact with the system?
- How will the available financial, hardware and software resources be defined?

When choosing to adopt e-portfolio systems, there are four different options that developers should consider: (Lorenzo and Ittleson, 2005; Strudler and Wetzel, 2005)

1. Adopting in-house designed e-portfolio system, in order to meet the institutions’ specific requirements.
2. Adopting open source systems that meet requirements or can be customized to meet more requirements.

3. Commercial systems that the institutions are willing to purchase.

4. Using common tools such as Microsoft Office applications, Internet browsers and so on, to design a portfolio that can then be uploaded to the Web or saved to CD-ROM, DVD, or distributed on memory flash disks.

Different research studies agree that regardless of the chosen e-portfolio system, there should exist some practical and technical requirements that need to be met in order to ensure technical success and minimize any fatigue, contaminants and challenges that might face the users while working and interacting with their chosen solution of e-portfolio system (Abrami and Barrett, 2005; Barrett, 2000; Barrett and Knezek, 2003; Challis, 2005; Lorenzo and Ittleson, 2005; Questier and Derks, 2006; Siegle, 2002; Tosh et al., 2005). The requirements agreed upon are:

To provide a structure towards organizing content.

To be capable of tracking student progress.

To provide a way of archiving and storing large amounts of data.

To provide a way of retrieving data.

To provide a way of linking artifacts to reflective pieces.

To provide a way of showing assessment results incorporation into the e-portfolio.

To provide different ways of publishing the portfolio, so it can be produced for different audiences.

Providing flexibility towards organizing and structuring data in e-portfolios.

To ensure the availability of technical standards necessary so the system can communicate reliably with other systems.

To enable the system to support and recognize a wide range of file formats used by users.

To be capable of providing security and access permission for users with respect for their roles.

The system should be scalable and ensure that a large volume of users can access the system.
The system should ensure maximum accessibility and usability for users of all levels of skill.
To define what kinds of technical support are or will be available for users.
To ensure the protection of privacy and intellectual property of users.
To specify the time that e-portfolios will exist in the system.
To ensure portability, so that students can take their e-portfolio to another institution or choose to maintain it on their own.

Having the e-portfolio system bought, developed or customized will definitely affect the educational process and activities in the institution by providing a new pedagogical approach towards educational processes. However, if the previous points and concerns are addressed within e-portfolios systems, they will surely meet the needs of a larger number of students and staff in any institution, which will ensure better adoption and educational results of the educational processes and activities (MacDonald et al., 2004).

3.1. E-PORTFOLIOS QUALITY STANDARD

Back in the year 1997, the Canadian Labour Force Development Board (CLFDB) initiated a research study on the use of “electronic learning record”. This study resulted in raising a major concern and setting a defined demand towards e-portfolio standards and quality. The study stated that in order for an e-Portfolio to make a contribution to increasing the effectiveness, efficiency and equitability of a labor force development system, it must consider including an instrument (format, content), and a process (access, development, maintenance) and a utility for all the labor market partners that meet minimum standards for effectiveness, efficiency and equity. This concern was addressed by a specialized educational company under the name of FuturEd Inc that worked with CLFDB, and created a recommendation for e-portfolio standards to address Human Resources Development policy goals.

The recommendation points for quality standards are:
1. The e-Portfolio should list and describe skills and knowledge in a way that is recognized and respected by all the labor market partners.

2. The e-Portfolio should have the capacity to be a complete inventory of skills and knowledge acquired by the individual regardless of where they were acquired.

3. An individual should develop and own his/her e-Portfolio. Some people may require informed assistance to achieve this. The use of the e-Portfolio and any changes to it should be completely controlled by the individual.

4. The content of the e-Portfolio should be current, accurate and verifiable.

5. The e-Portfolio should allow flexibility to accommodate unique or industry-specific skills.

6. The e-Portfolio should follow a standardized format.

7. The e-Portfolio content and format should link to existing and developing labor market exchange systems.

8. The e-Portfolio and its development process should be relatively simple and straightforward.

9. The development and use of the e-Portfolio for any and all users should be barrier-free; that is to say, social identity, disability and geography should not be barriers to individuals.

10. The development and content of an e-Portfolio should be bias-free.

11. An e-Portfolio should not create barriers; for example, a person who does not have an e-Portfolio is not discriminated against for the lack of one, or for the skills revealed.

3.2. E-PORTFOLIOS DESIGN AND DEVELOPMENT STANDARD

Designing and developing standards towards what to include and how to format the e-portfolio depends heavily on the intended purpose of use and technology. Different studies have defined models and included detailed steps on how to design and develop e-portfolios. However, it is important to consider that an e-portfolio development merges two different processes of Multimedia development and portfolios. Thus when developing an e-portfolio it should be understood that an equal attention should be
paid to these complimentary processes as they are both considered essential for effective e-portfolio development. The two most renowned approaches defined by the literature are:

Helen C. Barett Approach (Barrett, Helen, 2000)


3.3. HELEN C. BARETT APPROACH

This approach was designed by Helen C. Barett and it depended on the framework designed by (Danielson and Abrutyn, 1997). The enhanced framework by Helen C. Barett relied on producing two different processes for portfolio and multimedia development. In previous studies related to traditional portfolio, Robin Fogarty, Kay Burke, and Susan Belgrad (1994, 1996) have identified ten options for portfolio development, further defining the stages and increasing the quality of the portfolio process, the points are:

Portfolio Development Processes

1. PROJECT purposes and uses
2. COLLECT and organize
3. SELECT valued artifacts
4. INTERJECT personality
5. REFLECT metacognitively
6. INSPECT and self-assess goals
7. PERFECT, evaluate, and grade (if you must)
8. CONNECT and conference
9. INJECT AND EJECT to update
10. RESPECT accomplishments and show pride

In terms of e-portfolio development Helen C. Barett identifies that the first part of e-portfolio development should include the following processes:
1. Collection: The portfolio’s purpose, audience and future use of artifacts will determine what artifacts to collect.

2. Selection: Selection criteria form materials to include should reflect the learning objectives established for the portfolio. These should follow from national, state or local standards and their associated evaluation rubrics or performance indicators.

3. Reflection: Include reflections on every piece in your portfolio and an overall reflection.


5. Connection: In this phase the creation and publication of e-portfolio hypertext links in order to enable the feedback from others. (This process according to Helen C. Barett, can occur before or after the projection/direction stage)

In terms of multimedia development, the framework suggests the following steps:

1. Assess/Decide: In the first stage there should be focus on needs assessment of the audience, adding presentation goals and defining appropriate tools for e-portfolio presentation. This stage is subdivided into further details as defined by (Helen C. Barett, 2000) that are:

   a. Technology Skill Levels

      1. Limited experience with desktop computers but able to use mouse and menus and run simple programs

      2. Level 1 + proficient with a word processor, basic email and internet browsing, can enter data into a predesigned database

      3. Level 2 + able to build a simple hypertext (nonlinear) document with links using a hypermedia program.

      4. Level 3 + able to record sounds, scan images, output computer screens to a VCR and design an original database
5. Level 4 + multimedia programming or HTML authoring, can also create QuickTime movies live or from tape, able to program a relational database

b. Technology Available

1. No Computer

2. Single computer with 16 MB RAM, 500 MB HD, no AV input/output

3. One or two computers with 32 MB RAM, 1+ GB HD, simple AV input (Such as QuickCam)

4. Three or four computer, one of which has 64 + MB RAM, 2+GB HD, AV input and output, Scanner, VCR, Video camera, high-density floppy (Such as Zip Drive)

5. Level 4 + CD-ROM recorder, at least two computer with 128+ MB RAM; digital video editing hardware and software > Extra GB+ storage (Such as Jaz drive)

The technological specification table is considered old with the current technological advancement, thus the levels should be edited to match the current advancement, and the level’s can be defined based on the criteria defined by the institution willing to use e-portfolios.

2. Design/Plan: This next stage should focus on the design and organization of the presentation that can include the following important considerations

   Determining the appropriate content

   Determining Software

   Determining Storage medium

   Determining Presentation sequence

   Constructing flow charts and writing storyboards
3. Develop: This stage includes gathering materials that are going to be included into the presentation, next should be organizing them into sequences using hyperlinks that are produced using appropriate multimedia authoring software.

4. Implement: In this stage the author (teacher/developer) presents the e-portfolio to the intended audience.

5. Evaluate: This is considered the final stage as the focus should be on evaluating the presentation’s effectiveness in light of its purpose and the assessment context.

Based on the merge between Multimedia Development Process and the Portfolio Development Process, the following five stages of e-portfolio Development emerge. The following table shows the issues that are going to be addressed at each stage of this process.

Table 2.2. Stages of E-portfolio development, source (Barrett, Helen, 2000)

<table>
<thead>
<tr>
<th>Electronic Portfolio Development Stages</th>
<th>Portfolio Development</th>
<th>Electronic Portfolio Development</th>
<th>Multimedia Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose &amp; Audience</strong></td>
<td>1. Defining the Portfolio Context &amp; Goals</td>
<td>Decide</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assess</td>
<td></td>
</tr>
<tr>
<td><strong>Collect</strong></td>
<td>2. The Working Portfolio</td>
<td>Design</td>
<td></td>
</tr>
<tr>
<td><strong>Interject</strong></td>
<td></td>
<td>Plan</td>
<td></td>
</tr>
<tr>
<td><strong>Select</strong></td>
<td>3. The Reflective Portfolio</td>
<td>Develop</td>
<td></td>
</tr>
<tr>
<td><strong>Reflect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Direct</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inspect</strong></td>
<td>4. The Connected Portfolio</td>
<td>Implement</td>
<td></td>
</tr>
<tr>
<td><strong>Perfect</strong></td>
<td></td>
<td>Evaluate</td>
<td></td>
</tr>
<tr>
<td><strong>Connect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4. KADRIYE O. LEWIS, RAYMOND C. BAKER APPROACH

This approach presents a new framework for developing e-portfolios, it has some common similarities with (Helen C. Barett ,2000) approach, and it differs in some major points due to the technological advancement that affected the use and concept of e-portfolios. The current framework consists of the following steps:

1. Define and clarify the scope and purpose of the e-portfolio: In order to achieve this step the framework suggested the following Table 2.3. shows the questions to be answered as they are going to drive the process of creating e-portfolios

Table 2.3. Questions drive the process of creating e-portfolios, (Helen, C. Barett, 2000)

<table>
<thead>
<tr>
<th>N.O.</th>
<th>Topic</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Purpose</td>
<td>What is the purpose(s) of the portfolio?</td>
</tr>
<tr>
<td>2</td>
<td>Audience</td>
<td>Who are the target audiences?</td>
</tr>
<tr>
<td>3</td>
<td>Content</td>
<td>What work samples or artifacts will be included?</td>
</tr>
<tr>
<td>4</td>
<td>Design</td>
<td>What design processes will be used during the development of the portfolio?</td>
</tr>
<tr>
<td>5</td>
<td>Management</td>
<td>How will time and materials be managed in the development of the portfolio?</td>
</tr>
<tr>
<td>6</td>
<td>Communication</td>
<td>How and when will the portfolio be shared with pertinent audiences?</td>
</tr>
<tr>
<td>7</td>
<td>Evaluation</td>
<td>When and how should the portfolio be evaluated and by whom?</td>
</tr>
<tr>
<td>8</td>
<td>Technology</td>
<td>What is the best technology available for this purpose?</td>
</tr>
</tbody>
</table>
2. Creating a flowchart that will give a visual representation and illustration of different e-portfolio aspects such as (sequence, organization, and navigation) of the content of the e-portfolio. This step is considered an important task to be finished as the framework design relates on using flow charts. By creating a flowchart it helps the author to visualize and think ahead about what the e-portfolio will look like when it is completed. Using this step it has been found that flowchart helps the authors create the direction, structure, and sequence for the portfolio content and define how the different parts of the e-portfolio will relate to each other.

3. This step is concerned with creating or selecting representative artifacts for each item or category defined in the flowchart. In the current context different variety of media types, including text, images, and audio, video, animation, and Internet technologies are available for this step. The proposed framework suggests that the nature of the artifact usually implies the appropriate media type to be used. The following Table 2.4., indicates some examples of content and the appropriate media type to best demonstrate it.

Table 2.4. Media Types artifacts

<table>
<thead>
<tr>
<th>N.O.</th>
<th>Content</th>
<th>Media Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teaching Philosophy / Syllabus</td>
<td>Text</td>
</tr>
<tr>
<td>2</td>
<td>Didactic Lecture</td>
<td>PowerPoint Presentation with voiceover, Streaming video</td>
</tr>
<tr>
<td>3</td>
<td>Evaluation Forms, Certificates of recognition</td>
<td>Scanned documents (e.g., pdf format or images)</td>
</tr>
<tr>
<td>4</td>
<td>Images, Photographs, Graphics</td>
<td>Image files (e.g., Jpeg, gif, png)</td>
</tr>
</tbody>
</table>
4. In this step users need to position their artifacts and learning objects onto the e-portfolio system. Currently with the wide spread use of internet applications and services most software are considered easy to use as they also have tutorial in order to show how the system and its functionalities are used. The time and effort spent on learning the effective use of e-portfolios and they way to develop them depends on the previous experience of users with working with similar services found on the internet.

5. This step is considered the final step as the e-portfolio is published to an appropriate medium that allows viewing. In most e-portfolio systems it is possible for e-portfolios to be published to several different formats as this choice is mainly dependant on the viewing audience as (promotion and tenure committee, instructor, or employer).

The same approach of (Kadriye O. Lewis, Raymond C. Baker) has adopted an evaluation methodology for evaluating e-portfolios rubrics by setting the following standards that has been used by their research studies. The following table shows and defines each criterion:

**Table 2.5. : Criteria to Evaluate the E-Portfolio Rubrics, source (Kadriye O. Lewis, Raymond C. Baker, 2007)**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Definition/Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Well organized; unique/imaginative approach to design; highly visual; excellent use of design, audio, and text elements.</td>
</tr>
<tr>
<td>Navigation</td>
<td>All of the portfolio navigation links and all sections (standards, artifacts, and reflections) connect back to the main table of contents. All external links to all connecting websites connect.</td>
</tr>
<tr>
<td>Technical</td>
<td>Links work; content includes audio/video, digital images, slide show, or PDF docs; documents are error free; portfolio has been converted to CD</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Layout and Text Elements</td>
<td>The e-portfolio is easy to read with visual organization of information using fonts, point size, bullets, italics, bold, and indentations for headings and subheadings. The layout uses horizontal and vertical white space appropriately. The background and colors enhance the readability of text.</td>
</tr>
<tr>
<td>Artifacts</td>
<td>Artifacts are related to reflections; categories are complete; good variety of artifacts included; excellent quality digital or video images and sound.</td>
</tr>
<tr>
<td>Caption</td>
<td>Each artifact is accompanied by a caption that clearly and accurately explains the importance of that particular work including title, author, date, standard addressed, and description of the importance of the artifact.</td>
</tr>
<tr>
<td>Reflection</td>
<td>Reflections are clearly related to artifacts, demonstrate growth over time, are well written, and reveal depth and breadth of experiences.</td>
</tr>
<tr>
<td>Multimedia</td>
<td>All audio and video files effectively enhance reflective statements, create interest, and are appropriate examples for one or more standards. Background audio does not overpower the primary audio. Creativities and original ideas enhance the content of the e-portfolio.</td>
</tr>
<tr>
<td>Writing Mechanics</td>
<td>The text has no errors in grammar, capitalization, punctuation, and spelling.</td>
</tr>
</tbody>
</table>
The previously discussed methods and evaluation standards are widely used in creating e-portfolios for different purposes. The choice and justification for choosing one of these methods is all dependent on the nature, context and use of e-portfolio.

Many other standards are available too, and many will be defined in the future as the information and communication tools are in continuous development and use. But it is important to drive the use of these tools by educational standards and theories and not to be driven by the technological features only.

4.1. CONCLUSION

This chapter presented portfolio’s and discussed some important issues related to their use and benefits. Later the chapter presented the use of e-portfolios, In addition the benefits and uses have been outlined with different implementation of e-portfolio in educational context. The use of e-portfolios in teacher effectiveness and the evaluation of pre-service teachers have been presented and outlined. The presented information on e-portfolio, presented the effect of e-portfolio on raising the quality of teachers performance and the improvements it has on schools. The chapter presented e-portfolio’s adoption and implementation and the expected barriers of implementation. Moreover, e-portfolios educational and pedagogical considerations have been presented too. E-portfolio’s support and technical considerations have been outlined and the used quality standards have been defined. In terms of standards for quality, two popular standards that are (Hellen C.Barett, and Kadriye O.lewis, C. Baker) have been presented and briefly discussed as they are used for constructing e-portfolios.

5. 1. REFERENCES


Burke, Kay; Fogarty, Robin; Belgrad, Susan (1994). The Mindful School: The Portfolio Connection. Palatine: IRI/Skylight Training & Publishing


**CONTACT**

Dr. Nasim Matar,

Email: Nasim_matar@yahoo.com
Mobil: 00962-799113593

Nasim Matar has finished his PhD degree in Computer Science from Anglia Ruskin University, UK; his research focused on designing a unified flexible e-learning structure for universities in the Middle East focusing on reusing learning objects from the educational repository. Currently he is working at Petra University – E-Business Department Amman- Jordan. Dr. Matar published many Journals and books in his field of work, and contributed in many other. He is also lecturing in different Jordanian universities and giving different workshops and seminars with different international and local agencies. He worked as head of e-learning center in Zarqa University for the period of 2 years. His research interest and work are all subjected to the e-technologies and services.

Ebtisam AlHarithi

Email: bhalfahad@gmail.com

Ebtisam Alharthi worked as education Supervisor with responsibility for 30 schools (15 secondary schools with pupils aged 12 to 15 years and 15 high schools with pupils aged 16 to 19 years). Her specialism is science education she got her master’s degree in 2007 in the field of educational measurement. She also worked with teachers in training and entering the profession. She also contributed in different workshops in measurement and evaluation for principals and teachers. Moreover, she worked as educational consultant in (ARC) for 3 years. Currently she is doing her PhD at Southampton University, UK in the field of E-learning (measurement and evaluation); her research interest is related to the use of portfolios to better provide evidence for teachers' attainments and progress.