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Architecture design E-Portfolio: Assessment System on Project-Based Learning in Science- Based Technology School

Punyapat Chanpet[1+] and Komkrit Chomsuwan[2]

[1]Learning Innovation in Technology, Faculty Industrial Education and Technology, King Mongkut's University of Technology Thonburi, Thailand

[2]Department of Electrical Technology Education, Faculty Industrial Education and Technology, King Mongkut's University of Technology Thonburi, Thailand

Abstract: This study aim to design Electronic Portfolio on Project-Based Learning for appropriate process of assessment into learning's students, in order to help record, display, search and analyze student learning process data. The system has been officially implemented in a course at the school for a semester. The summative evaluation of the system includes user-based and expert-based evaluations in terms of system functions, overall design and interface operation, implementation and uses, and impacts on learning. Expect results of the system evaluation most students consider the system to be helpful with respect to improving learning and accomplishing quality on Project-Based Learning.

Keywords: Project-Based Learning, Electronic Portfolio, Assessment System ,Evaluation , Science – Based, Technology School

1. Introduction

Education of Thailand had special project to develop and produce the inventor of science and technology to enhance and support changes technology in the future. This project have to set up new schools "Science based and Technology school" in 2008. For production thinker , inventor, innovator main purpose is development children who have special knowledge , talent whom expect to be inventor of science and technology. Education accommodate into curriculum management instruction process leading to the inventor's idea expectancy in next generation . Instruction management to practice students approach in project-based learning that is teaching instruction that open the opportunities for student to do the activities that they are interested to find the answer in those topics. There is a systematic planning process with the use of methods or processes. The teacher is only an inspiration and commentator.

Educational science & technology in schools will select students in the Grade 9 and have talent from other schools study the vocational qualifications in Science based and Technology school. Students will learning into process of Project-based learning and basic focus on the the eight groups, include: 1) English 2) Mathematics 3) Science 4) social, religious, cultural, 5) Health - Physical Education, 6), Art 7) Career and 8) foreign language students learn the fundamental of the basic science courses as students in general. Instruction of science and technology continue with the application to practice on project-based learning skills are coupled with the intense action emphasize more than curse of study .

Scholars commonly find many negative impacts of traditional paper-and-pencil assessment methods in research. Examination-oriented instruction and the inability to assess high-order cognitive abilities and affective attributes are some examples [1], [2] . However, the limitations that do not comply with

[+]*E-mail address*: Punyapat.ch@gmail.com.

contemporary learning theories are not only criticized by many scholars, but also provide a theoretical foundation for the improvement of traditional assessment and creation of new assessment methods. From the viewpoint of recently developed constructivist learning theory, knowledge should not be accepted passively, it should be actively constructed by cognition. Therefore, instead of using simple knowledge instruction, an instructor should be a facilitator and adviser of instruction to help learners create a knowledge construction environment. The instructor should give guidance and support, in order to help learners become actively involved in the learning process and construct their own knowledge. Furthermore, situational cognition claims that learning should be applied to real-life situations and should emphasize students' involvement and understanding in the learning process.

Traditional assessments, which are made according to a student's memory of the messages given by instructors, are unable to effectively measure the results of these two learning theories. The changes in the student's cognition and learning process, involvement and interaction have become the new foundation for learning effect assessment. Traditional assessment does not effectively measure a students' ability to organize relevant information or present a coherent argument, and lack sensitivity to the individual growth that teachers desire in students [3]. Therefore, when traditional assessment is unable to effectively reflect a student's learning process, there is a need for new types of assessment. In response to the needs of the new learning theories such as constructivist learning, and to overcome the inadequacy and limitations of traditional assessments, new assessments come out one after another in various forms and names. The most common assessments in the literature include authentic, performance and portfolio assessment that may be appropriate constructivist approaches to assessment [4]. These are approaches to alternative assessment [5] and are designed according to the framework of contemporary teaching theories with emphasis on the co-operation between instruction and assessment, in order to make learning more meaningful and significant. Alternative assessment is absolutely required by constructivist learning environments and can be effectively and efficiently incorporated into these environments established in real world, classroom, or virtual contexts [4]. Allowing students to decide upon the content of a task, a project or an exercise will likely increase their motivation and acceptance of the assessment. Specifically, the ownership of a task or exercise is a major factor in strengthening the authenticity of an assessment [4]. Authentic assessment aims to demonstrate students' authentic learning processes, monitor their growth and reflect observation of their current works.

Among these multidimensional assessments, portfolio assessment [6] has been one of the most often used alternatives. A portfolio is a storage mechanism for a student's work [7], a collection of a learner's work assembled over time (Feuer and Fulton, 1993), and focuses on process as well as product [4], [9] defines portfolios as a systematic and organized collection of evidence to monitor students' knowledge, skills and attitudes. In general, portfolio assessment focuses on the collection of multidimensional data in order to understand the learning and changes in learners, as well as stimulating involvement and self-assessment in learners through the interaction and discussion of the portfolio. Portfolio assessment not only provides true and rich information for reflecting and assessing the true performance and achievement of learners, but it also helps students engage in meaningful learning. Portfolios have attracted much attention as an alternative to traditional assessment [3]. Several counties (e.g. Australia, the UK and USA) have undertaken research and development in establishing portfolio assessment programmes [8] . Many states and school districts in the USA, such as the State of Vermont and the Pittsburgh school district in Pennsylvania, have already made portfolio compilation the alternative assessment. The Association for Supervision and Curriculum Development (ASCD) of the USA has also considered portfolio assessment as one of the curriculum and instruction reforms in the USA [9]. It is understood that portfolio assessment has become the potential development in US educational reform. In Science & Technology School, however, although research in portfolio assessment is limited, the recent increase in the number of studies and research papers shows that portfolio assessment has value in improving the limitations of traditional assessments and is worth further research and discussion. Based on the aforesaid beliefs and importance concerning learning portfolios, this research designed and constructed E- portfolio on the World Wide Web architecture according to the portfolio assessment concept by combining the characteristics and functions of computer

and network technology. Furthermore, this designed portfolio will conduct on a subject at the school to evaluate its functions and effects. The objectives of the research were:

- to design Electronic portfolio (E-Portfolio) that satisfies the needs of students and teacher on Project-based learning in Science & Technology based school;
- to assessment functions and effects of Project-Based Learning into E- portfolio assessment system and its impact on students' learning.

2. Conceptualizing of E-Portfolio

The E-Portfolio is a new concept, with the "E" part of the term suggesting that this is an online environment loaded with electronic tools that can be used to develop and present a portfolio package. Such an environment requires the invention of a new software-management system to offer services for the creation, management, maintenance, and presentation of electronic portfolios. Some developers view the E-Portfolio as a personal, lifelong content-management system for collecting, reflecting on, selecting, and presenting learning outcomes and other professional accomplishments. For educators, the E-Portfolio concept holds several various meanings. Groups such as provosts, career center directors, deans, department chairs, faculty, and students each perceive a different set of functional requirements for the E-Portfolio software environment. Some provosts and academic leaders are excited about the evolution of the E-Portfolio because it promises a new environment with tools to demonstrate and assess student learning and thus to map teaching and learning outcomes in accordance with each institution's established principles of learning. Career center directors think of the E-Portfolio as a valuable mechanism to aid students in career placement. Deans and department chairs view the E-Portfolio as something to use when their programs are due for accreditation and external review. Faculty members see the E-Portfolio as a powerful tool that eases the tenure process and the preparation of promotion dossiers, as well as provides a straightforward method for compiling annual faculty reports. Students, however, seem confused about the usefulness of the concept and apparently do not yet consider the E-Portfolio to be sticky enough for adoption. To reduce this confusion and to clarify the purpose of an E-Portfolio project in an institution, some scholars and developers of E-Portfolios have started to use an identifier to precede the name of their electronic portfolio, for example *student learning portfolio, career portfolio, institutional portfolio, department portfolio, faculty portfolio, student portfolio ,lifelong portfolio,* or *course portfolio.* Certainly, many issues can be addressed to effectively encourage acceptance of the E-Portfolio system so that users truly realize the considerable benefits of its versatility.

2.1. Frame work of E-Portfolio on Project-based learning

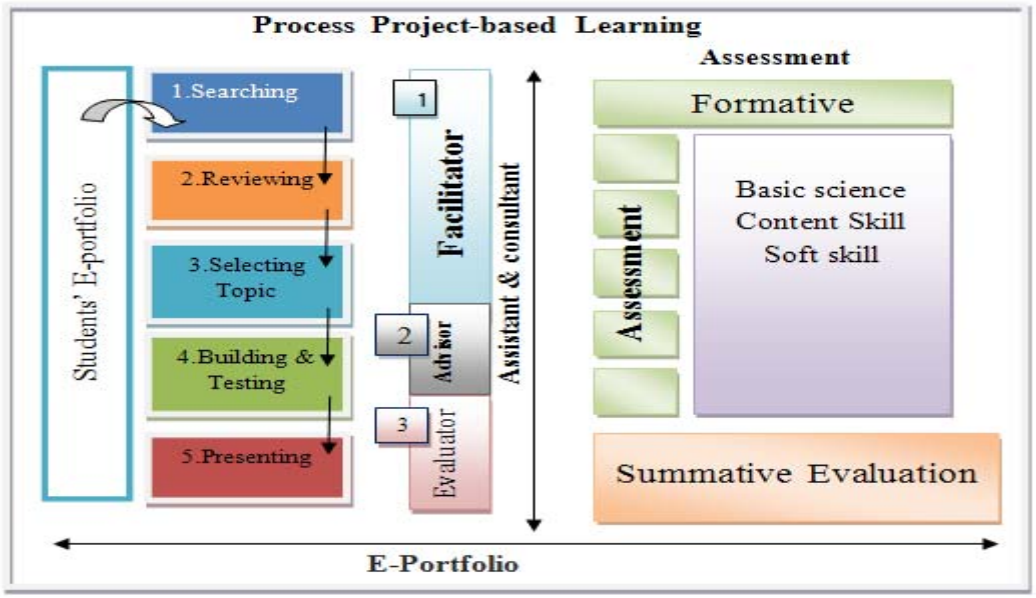

Figure 1: Frame work of E-Portfolio on Project-based learning

2.2. Steps to Develop an E-Portfolio assessment System

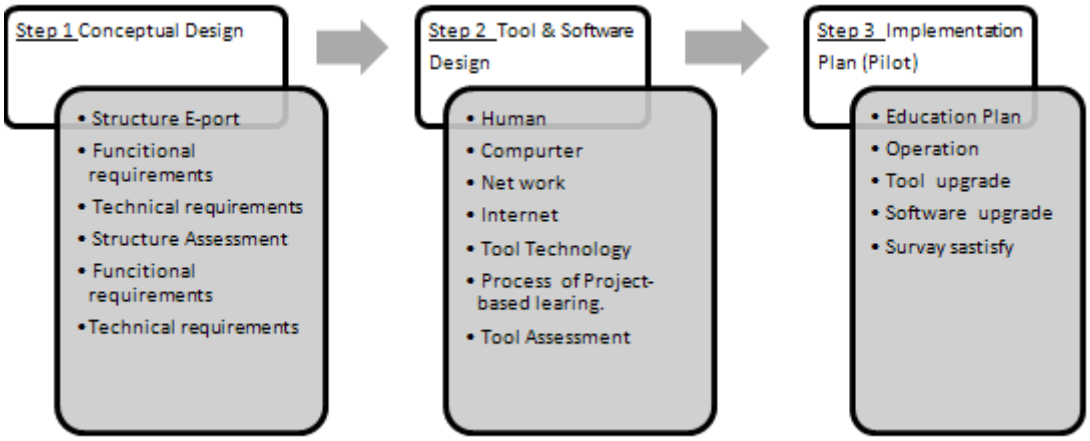

Figure 2: Steps to Develop an E-Portfolio assessment System

The successful development of an E-Portfolio project involves various challenges. First, the conceptual design (step 1) and the software design (step 2) must result in an environment that can both deliver all the E-Portfolio functional and technical requirements and satisfy the expectations of E-Portfolio stakeholders and end users. This challenge must be addressed by the invention of new software tools, since current electronic educational tools (such as the course management system or the campus portal) do not deliver the flexibility demanded by an E-Portfolio system. Designing and developing the E-Portfolio software environment may at first blush appear to be rather simple tasks, but they are intrinsically difficult. The difficulty does not lie in the development of the source code but rather in the requirement for an intelligent design that accommodates the human aspects essential to making the project work (aspects such as the construction of a well-reasoned navigational scheme and logical user interface design), which must then be followed by a smooth integration into the existing educational software environments, principally the course management system, the student information system, and the campus portal.

As Figure 2 illustrates, the software design (step 2) consists of two major components: the human aspects and the computer aspects. The human aspects are more difficult to design, whereas the computer aspects are becoming easier to engineer. In many instances, the failure to understand and harness the human aspects of software design, rather than the failure to machinate the computer aspects, is the major cause for the breakdown of an entire E-Portfolio project. The *computer aspects* of software design mainly concern the mechanical aspects; specifically, this side of software design deals with the building blocks used to create a software environment, such as J2EE vs. ASP.NET for development of the actual software source code or SQL vs. Oracle for creation of the database. Today, with new software-development tools such as Microsoft Visual Studio .NET, development of a new software environment is substantially advanced and thus easy to manipulate. Often an undergraduate student can create a rather sophisticated software environment, one that may have taken numerous experienced or professional programmers considerable time—and also considerable money—to complete just a few short years ago. Furthermore, in terms of educational software development, an increasing number of open source communities are offering free source code for the development of E-Portfolio systems. With the notion of open source communities, software models are offered free of charge for developers to modify and integrate into a customizable E-Portfolio software system.

2.3. Environmental architecture of E-Portfolio

The E-Portfolio system will construct under a Windows environment. Users are divide into students and teachers. A user must be identified before he or she can be admitted to the system. The most important sections are the production and browsing of student E-portfolios. The student's portfolio database is accessed from Tool of an Active Server program through an Open Data Base Connectivity (ODBC) program interface to present and update the contents of E- portfolio. The complete environmental architecture of the E-Portfolio system is shown in Figure 3.

2.4. Evaluation of functions and effects

The system summative evaluation includes user-based and expert-based evaluations in terms of system functions, overall design and interface operation, implementation and uses, and impacts on learning.

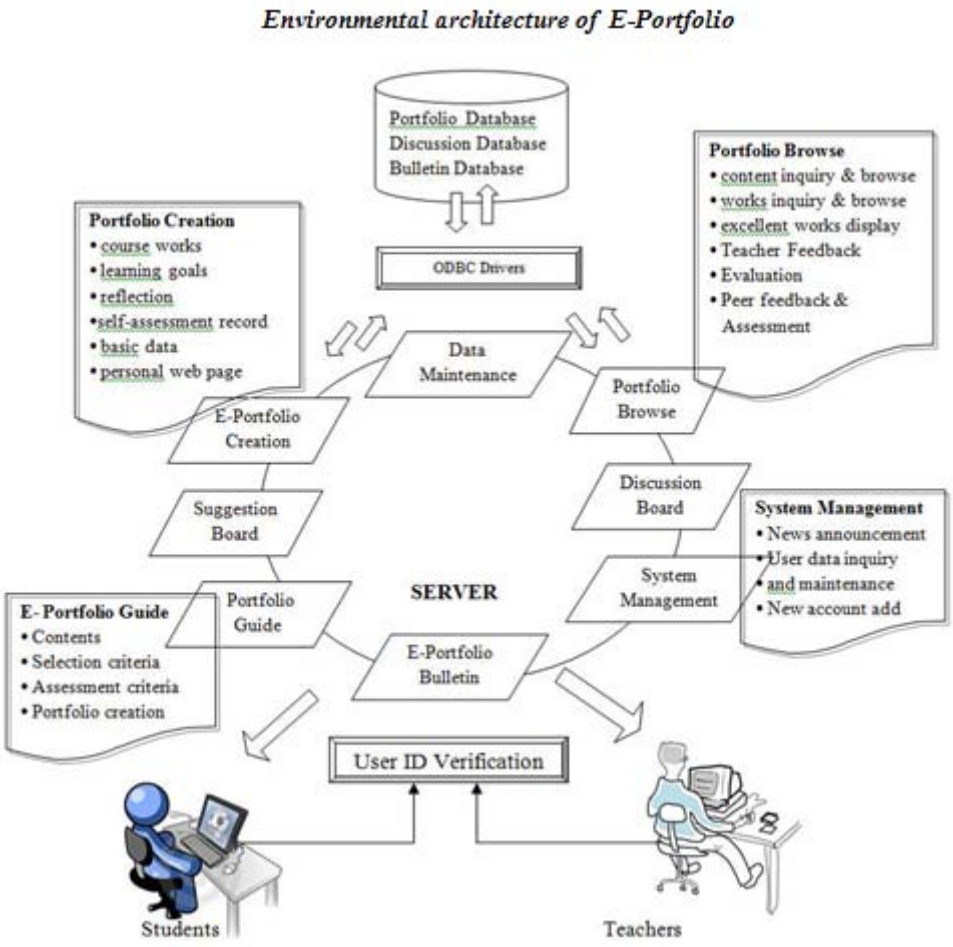

Figure 3: Environmental architecture of E-Portfolio

3. Conclusions

The E- Portfolio: assessment system will implement during the middle of the second term of the school year. The revise and updated prototype system use 35 students taking the Computer and Instruction course on Project-based learning of the Teacher Preparation Programme, until the summative evaluation of the system, for a period of one and a half months. The implementation and operation as the learning portfolio is a new assessment, and through the use and creation of personal learning E-portfolio, a student can personally experience the assessment and process to understand the nature and contents of the method, which is helpful to the future instruction work of pre-service teachers. Moreover, most assignments and works of the course are present in electronic data file, they are very suitable for the creation, management and presentation of E-portfolio. Therefore, the course have select as a subject of the system. As E-portfolio assessment is new to use in new school (Science - Based Technology School) most students do not have the idea or experience of the assessment. In addition, an online help/guide is provided in E-Pportfolio system to help users understand the functions, contents and creation of a learning portfolio. Hope to see after the system implementation, teachers required and encouraged students to use the system according to the course schedule, and subsequently to complete the creation of a personal learning E-portfolio. Moreover, each student is required to write a reflection and self-assessment for each piece of course work, although feedback and assessment on peers' work is not compulsory. At the same time, an online assistant have help teachers to view and numerate the creation of E-portfolios, learning goals, reflections and self-assessment records, peer feedback and assessment, and students projects.

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