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Construction of a Web-based e-Teaching Portfolio for the Efficient Management

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ABSTRACT

This study presents an analysis of the current situation (management, approach, adjustment, transportation, and others) of teaching portfolio by examining the teaching portfolio managers (staffs, researchers, teaching assistants, etc.) of 6 universities in the southeast of Korea. The rationale for the study focus is that the existing teaching portfolio either suffers a problem in the transportation, approach, adjustment and/or management or is likely to raise a problem in the future. In order to solve this problem, this study builds a web-based e-teaching portfolio. According to the analysis results, the engineering education system was established in all 6 universities (Ed- note that '6 universities' has already been specified as the study sample). The teaching portfolio was partially digitalized in this system, despite some problems of converting analog data into digital data, which induced difficulties in constructing the overall e-teaching portfolio. Therefore, this study focused on constructing an e-teaching portfolio without developing any additional system by using the existing system positively, and also on determining the appropriate components among the existing teaching portfolio components. Accordingly, in order to convert the analog data into the digital data required for this study, we used a digital camera as the conversion device and converted the teaching portfolio components into those appropriate for the e-teaching portfolio. Finally, we constructed an existing system appropriate for the e-teaching portfolio by using these devices and components.

Keywords: ABEEK, Engineering Education, Innovation Education

I. Introduction

The teaching portfolio, which documents the teaching activities of instructors and their teaching processes, provides opportunities to improve the course quality and develop specialization among the instructors. Many universities and colleges in the US have adopted diverse portfolios as a tool to record, demonstrate and evaluate the results and processes of specific activities for several purposes.

Kimball (2002) has defined an e-portfolio with the following statement: "e-portfolio is similar to the traditional print media-based portfolio in the content but the media of expressing and constructing it is different. E-portfolio is easy for the approach, transportation, adjustment and management in that it is based on digitalized data and web and is more flexible than the traditional portfolio."

Together with the engineering education certification system, the teaching portfolio in Korea is taken as an important index of evaluating the curriculum operation result and its operation is mandated in the universities for enforcing the certification system. However, most of these are the traditional paper-based teaching portfolios.

Such paper-based teaching portfolios suffer many problems in their management, approach, transportation and adjustment. To solve these problems, this study therefore applies (Ed- by convention, present verb tense is used in the last paragraph of the introduction when the study aim, procedure and methodology are described) the e-teaching portfolio, analyzes the advantages and disadvantages, and reviews its applicability. (Ed- paragraphs combined here) The objective of this paper is to study the effective management of the portfolio. Curriculum management suffers because of too highlighted portfolios. Furthermore, the revision of portfolios is difficult because they are so

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numerous. The objective of this paper, therefore, is to simplify portfolio use by saving the portfolio data on the web.

II. Appearance of e-Teaching Portfolio

1. Domestic Research Trend of e-portfolio

Based on the rapid progress toward the knowledge society, one of the remarkable changes in the recent teaching and learning fields is potential conversion from teacher-oriented teaching to learner-oriented learning. Accordingly, learners need the skills to compose and create knowledge through numerous information and media.

The use of a portfolio is one method to support effective and constructivist learning. Nevertheless, despite the educational potential of portfolio evaluation, portfolio evaluation is barely utilized in actual classrooms because of problems with document-oriented portfolios (Barret, 1994).

The newly developed "e-portfolio" represents a method for solving this problem. Research on "e-portfolio" has progressed actively in Korea and can be summarized in the following five categories:

- Mixed existence and nonexistence of the e-portfolio concept
- Research for applying various targets and curricula
- Research of e-portfolio oriented as an assessment tool
- Diversification of research of e-portfolio according to the implementation method
- Identity of e-portfolio research

2. Overseas Research Trend of e-Portfolio

Unlike in Korea, the portfolio is effectively utilized in overseas education. Especially, students undergo evaluation in most curriculum classes of elementary schools by a portfolio. Teachers make a teaching portfolio and submit it as a part of their expertise assessment.

Table 1 Domestic e-portfolio

Researcher	Study Contents
Hyeok-Il, Kwon (2002)	The Performance for the evaluation of the applicability of e-portfolio
Jeong-Ui, Moon Hae-Ik, Hwang (2003)	The E-Portfolio Assessment of mother and infant development, teacher evaluation agreement and Mother's Influence on Early Childhood Education Participation
Dong-Hun, Kim (2005)	The Learning tasks and learning home for region to develop e-portfolios
Min-Jeong, Kim (2006)	The e-portfolio system for supporting the necessity of artificial interactions

Table 2 Foreign study e-portfolio

Researcher	Study Contents
Barrett (2000)	The e-portfolio includes analog type outputs such as a video tape and possible artifacts, by computer, but all the artifacts in a digital portfolio are transformed as a computer-readable forms.
Barrett (2001)	The difference between an online resume portfolio and digital scrapbooks is in self-reflection based on learners achievement for their learning goals and several criteria to select those learning goals and about the same time.
National Learning Infrastructure Initiative (NLII, 2003)	The e-portfolio can give a big store and a variety of physical evidence resulting from the aggregation for a long time.
e-portfolio Portal (2004)	The e-portfolio is a kind of the web-based information management systems using the electronic media and services.
Ahonen & Murto (2004)	The e-portfolio or digital portfolio is consisted of the letters, pictures, hyperlinks, and include a variety of multimedia elements will consist of students' assignments.
Wade & Abrami (2004)	The portfolio is something gathered of student work in specific areas, progress, and achievement to give talk on the collection of student work will intentionally.
ElfEL (2005)	The e-portfolio is a personal digital collection consisting of the information for individual learning, career, experiences, achievements and skills.
Grant (2005)	The e-portfolio is consisted of constant format of portfolio contents intentionally for the rhetorical purposes with a portfolio of other related topics.

Table 3 The added functionality of e-portfolio

General features of a portfolio	The added functionality of e-portfolio
- Collecting	- Archiving
- Selecting	- Linking/Thinking
- Reflecting	- Storytelling
- Projecting	- Collaboration
- Celebrating	- Publishing

The overseas research trend related to e-portfolio can be summarized in the following six categories.

- Insufficient establishment of e-portfolio concept
- Research for applying various purposes and targets
- E-portfolio for performance assessment
- Research of e-portfolio as a teaching and learning method oriented to learners
- Diversification of e-portfolio utilization domains
- Linkage of e-portfolio to lifelong study

The e-portfolio has the traditional purpose of collecting, selecting, reflection, projecting, celebrating and archiving linking/thinking, storytelling, collaboration, publishing, and adding new features. In this respect, an entirely new form of e-portfolio, rather than a traditional portfolio, can be seen as an extended form.

III. Status of Universities in the Southeast of Korea for Teaching Portfolio

This study has surveyed the teaching portfolio managers (staffs, teaching assistants and researchers) in 6 universities

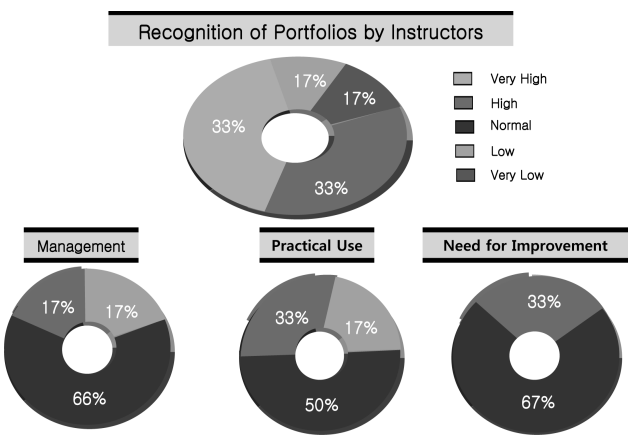


Fig. 1 Status of Universities in the Southeast area for Teaching Portfolio

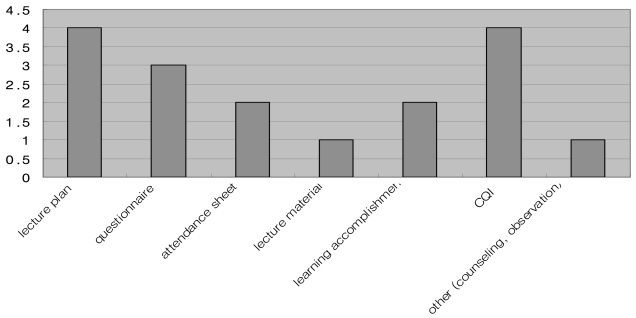


Fig. 2 Degree of Computer Use by the Universities in the Southeast area of Korea

in the southeast of Korea where the engineering education certification system is currently in operation. As shown in Fig. 1, the recognition of instructors was relatively high and they were relatively well managed, but the degree of practical use was low and many improvements are possible.

In order to solve these problems, most universities are using the engineering education system and partially digitalized teaching portfolios. In Fig. 2, universities are using the lecture plan, questionnaire, attendance sheet, lecture material, learning accomplishment, Continuous Quality Improvement (CQI) programs, and other tools by using computer systems with results printed out and managed on paper.

IV. Processing Steps of e-Teaching Portfolio

1. Comparison and Analysis

We have compared and analyzed the existing traditional paper-based teaching portfolio and e-teaching portfolio from various perspectives (approach, transportation, adjustment,

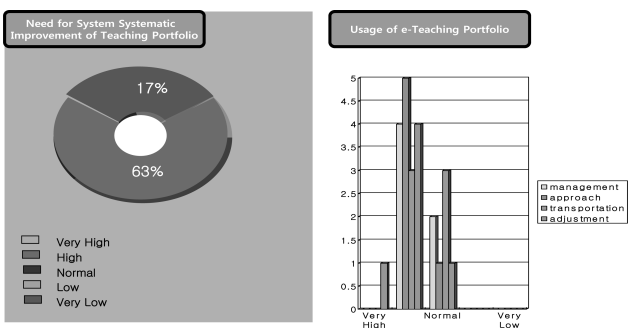


Fig. 3 Analysis of Teaching Portfolio

management). Manage the analyzed data systematically that are the knowledge and information.

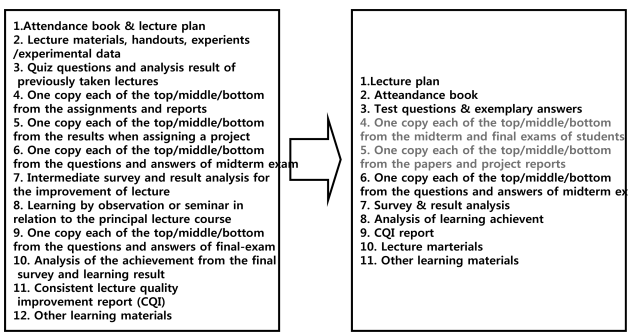
An examination of Fig. 3 reveals the need to improve the current paper-based traditional teaching portfolio. The e-teaching portfolio has a high potential usability in management, approach, transportation, and adjustment. To maximize the advantages of the e-teaching portfolio, the components of the current paper-based traditional teaching portfolio are appropriately converted to the e-portfolio and applied practically in this study.

2. Planning

Establish a trouble-shooting plan based on the analyzed data.

In Fig. 4, we have constructed the components briefly in order to apply the e-teaching portfolio of Fig. 1. Currently, our university is supporting the e-teaching portfolio components 1 and 8 for the engineering education certification system and components 2, 3, 6, 7 and 9 can be easily computerized without using a separate tool. However, most of the data for components 4 and 5 are in an analog form, which necessitated their conversion into a digital form.

Since the devices such as scanner and digital camera play this role, we would like to use one of these two devices according to Table 4 (although other devices may have this function, we have eliminated them because of price and realistic limitations).



〈Teaching Portfolio〉〈e-Teaching Portfolio〉

Fig. 4 Components

Table 4 Comparison between Conversion Devices

Type	Digital Camera (S company)	Scanner (H company)
Resolution	8.1 mega pixels	4800 dpi
Price	200~300 thousand won	200~400 thousand won
Size	Not limited	Limited to A-4 size in general
Capacity (per page)	1-2MB	200-300KB
Processing Speed (relative comparison)	High	Low
Diffusion Rate (relative comparison)	High	Low
Portability (relative comparison)	High	Low
Movie (relative comparison)	Yes	No

3. Tool Selection

An examination of TABLE 4 reveals the superiority of the scanner in terms of capacity, but the digital camera was more advantageous in all other aspects. However, the digitalization of 50 items each requiring 2MB of space thus necessitates about 100MB per course. Based on the assumption of about 50 courses, this totals about 5GB of storage space per semester. The recent server capacity of Korea Maritime University at no less than 150GB indicates the absence of any problem of using a digital camera in selecting the digital conversion tool in terms of capacity. Accordingly, this study applies the advantages of digital camera in building an e-portfolio effectively.

4. Solution

Fig. 5 shows the computer system (example – Korea Maritime University) currently operating in our university and the component table to be added on the computer system for the e-teaching portfolio. Fig. 6 shows the model used to convert the analog data into digital data by using

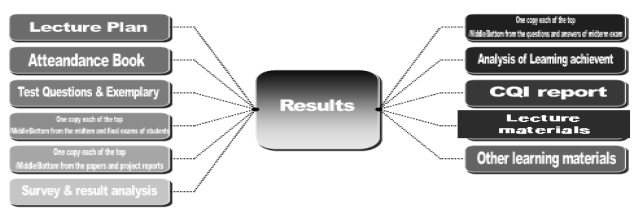
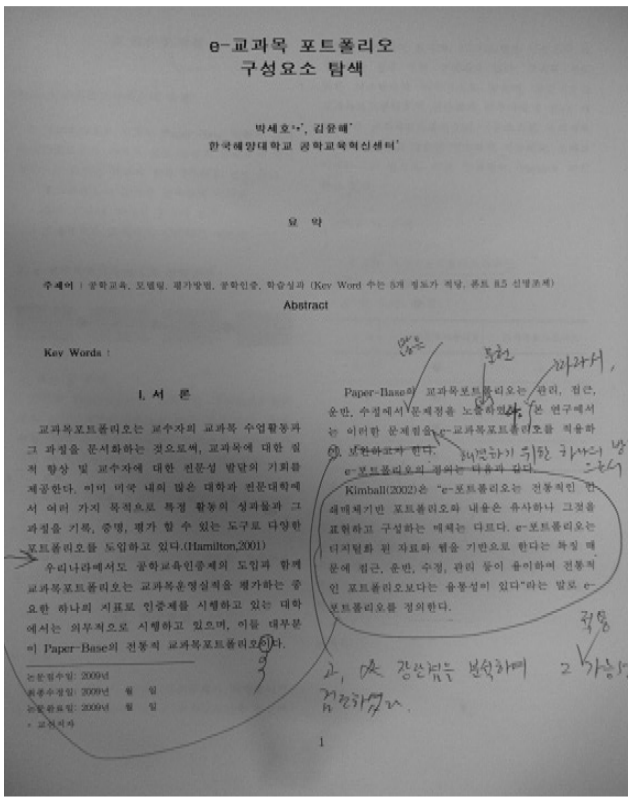


Fig. 5 Computing System of e-Teaching Portfolio



e-교과목 포트폴리오
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요 약

주제어 : 공학교육, 모델링, 평가방법, 공학인증, 학습성과 (Key Word 수는 5개 정도가 적당, 폰트 8.5 신명조체)

Abstract

Key Words :

I. 서 론

교과목포트폴리오는 교수자의 교과목 수업활동과 그 과정을 문서화하는 것으로써, 교과목에 대한 질적 향상 및 교수자에 대한 전문성 발달의 기회를 제공한다. 이미 미국 내의 많은 대학과 전문대학에서 여러 가지 목적으로 특정 활동의 성과물과 그 과정을 기록, 증명, 평가 할 수 있는 도구로 다양한 포트폴리오를 도입하고 있다.(Hamilton,2001)

우리나라에서도 공학교육인증제의 도입과 함께 교과목포트폴리오는 교과목운영실적을 평가하는 중요한 하나의 지표로 인증제를 시행하고 있는 대학에서는 의무적으로 시행하고 있으며, 이들 대부분이 Paper-Base의 전통적 교과목포트폴리오이다.

논문접수일: 2009년
최종수정일: 2009년 월 일
논문완료일: 2009년 월 일
+ 교신저자

Paper-Base의 교과목포트폴리오는 관리, 접근, 운반, 수정에서 문제점을 노출하였다. 본 연구에서는 이러한 문제점을 e-교과목포트폴리오를 적용하여 보완하고자 한다.

e-포트폴리오의 정의는 다음과 같다.

Kimball(2002)은 "e-포트폴리오는 전통적인 인쇄매체기반 포트폴리오와 내용은 유사하나 그것을 표현하고 구성하는 매체는 다르다. e-포트폴리오는 디지털화 된 자료와 웹을 기반으로 한다는 특징 때문에 접근, 운반, 수정, 관리 등이 용이하여 전통적인 포트폴리오보다는 융통성이 있다"라는 말로 e-포트폴리오를 정의한다.

1

Fig. 6 Digitalized Model

a digital conversion device. By using this method, we have constructed an e-teaching portfolio and have saved in the table, as shown in Fig. 5.

The syllabus, quiz, CQI (Ed- this acronym has already been defined above) report and standard are computerized in most universities in the Southeast area of Korea, and only these portions were computerized by the Korea Maritime University. However, the result menu is constructed in a table of a Teaching Portfolio in Fig. 5, and the space capable of storing the detailed material is made in the result menu.

Accordingly, the portion that represented a problem in computerization was converted as material with the digital camera, as shown in Fig. 6, and was stored in the corresponding part of Fig. 5.

The construction of this system enabled this researcher to solve the management, approach, transport and amendment portions that were previously regarded as the problem areas, as well as the spatial constraint on writing a portfolio. (Ed- paragraphs combined here) Also partially solved was the inconvenience of writing a Teaching Portfolio, as this functionality was providing to instructors of Korea Maritime University, thereby enabling those teachers (instructors) with other jobs to submit their portfolio after composition at other locations rather than at school.

V. Conclusion

1. Educational Aspects

The objectiveness and reliability of evaluation can be improved, compared to a traditional portfolio, by the open evaluation of an e-portfolio. The capability of receiving evaluation from teachers, peers and parents, as well as from various evaluators connected through the internet, and of receiving various feedbacks or opinions and ideas from them, promotes critical reflection on a portfolio.

The web also supports the generation and evaluation of a portfolio that is not fixed in time or space, and supports learners in frequently and conveniently amending the content and form of their portfolio.

Accordingly, the e-portfolio enhances the efficiency and effectiveness of evaluation on a development process and the achievements of an educational goal of learners through digitalization of the portfolio, helps to find information for improvement of the teaching-learning process, and supports the self-initiative learning of learners.

2. Managerial Aspects

In managing and operating the teaching portfolio operated by most universities and colleges that are operating or plan to operate the engineering education certification system, the problems of the management, approach, transportation, adjustment, and other are engaged in. The system for the student portfolio remains under development and has been published in scientific journals and papers. However, there is almost no relevant development or study on the e-teaching portfolio. Therefore, in this study, we have focused not only on the implementation of the e-teaching portfolio without developing a separate system, but also on finding the appropriate e-teaching portfolio components from the paper-based, traditional teaching portfolio. We

hope that this study will be helpful in the operation and management of a teaching portfolio in one important component of course operation result.

On the other hand, the preparation of a teaching portfolio requires much effort and time. Considering the advantages of the teaching portfolio that have been demonstrated in many studies, the investment of sufficient amount of time and effort may be worthwhile. Moreover, it is judged that an e-teaching portfolio would be very helpful in raising the efficiency of such a teaching portfolio.

In this pilot research conducted in 2009 at the Korea Maritime University, 50% of the existing portfolio had been submitted. However, a level of 80% is required to ensure effectiveness.

As a digital camera was used as a conversion tool for the user, ease of use was limited by time and place were not.

As a digital camera was used as a conversion tool to ensure ease of use for the user, the time and place were not constraints. And have easily accessible, easily complement the shortcomings of the old portfolio, could, build a portfolio of quality could be improved a lot.

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