A design proposal of competency-based ePortfolio system utilizing Sakai OSP

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Abstract: We have developed a Web-based portfolio system on Sakai CLE for supporting the students in the graduate school of instructional systems of Kumamoto University. The system is currently under operation mainly for the fresh students in the graduate school. It is constructed of several default tools of Sakai CLE to accumulate learning outcomes for the students. In this report, we propose a competency-based ePortfolio system utilizing the Sakai OSP. This system manages evidences to link learning outcomes with competency.

INDRODUCTION

Recently, online learning or blended learning has gradually become more popular for higher education since high speed and wide band network is available to use. A majority of higher education institutions are conducting classes by e-Learning (NIME, 2007). And quality assurance of higher education is now becoming very important.

In Kumamoto University, Student Information System (SIS) and Learning Management System called WebCT are connected so that all the courses in the university are automatically prepared in WebCT with the data from SIS (Nakano, et.al., 2004). It is readily possible to conduct classes in all the departments by e-Learning. Actually, "Basic Course of Information Technologies A / B", are required courses for all fresh students in Kumamoto University and have been conducted in a blended (both e-Learning and face-to-face) learning style since 2002 (Kita, et.al., 2003). Based on the experience of these e-Learning enhancing activities, Graduate School of the Instructional Systems (GSIS), was established as Japan's first 100% on-line program for fostering e-Learning specialists in corporate and higher education in April 2006 at Kumamoto University. As a leading institute for education improvement, GSIS is seeking for various effective ways to promote Instructional Design-based paradigm and infrastructure. One good example is realizing an e-Learning system to show learning process information or attainment of student's goal, to support communication between teachers and students or among students. To realize these features, we have developed "GSIS Portal (Nakano, et.al., 2006)" and "Learning Portfolio". "Learning Portfolio(Miyazaki, et.al., 2008)" has been developed from an educational standpoint utilizing Sakai Collaboration and Learning Environment (CLE).

In the present paper, we make a brief description of both Open Source Portfolio (OSP) and ePortfolio tools of Sakai CLE, and then show how we redesigned "Learning Portfolio" as the competency-based ePortfolio system using the Sakai OSP tools.

DESIGN OF LEARNING PORTFOLIO

We have developed a Web-based portfolio system on Sakai CLE for supporting the students in the graduate school of instructional systems of Kumamoto University. The system is currently under operation mainly for the fresh students in the graduate school. It is constructed of several default tools of Sakai CLE to accumulate learning outcomes for the students. "Learning Portfolio" system is shown in Fig 1. Students are able to publish their reflection paper and goal statement, so that we expect educational effects. Additionally, it is useful for students to communicate each other because they publish self-introduction web pages on the system. Design of Learning Portfolio with Sakai Basic Tools is shown in Fig 2.
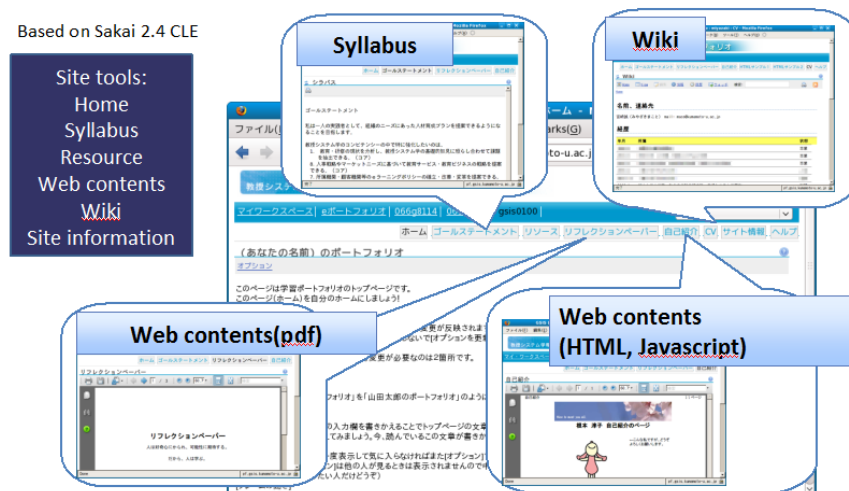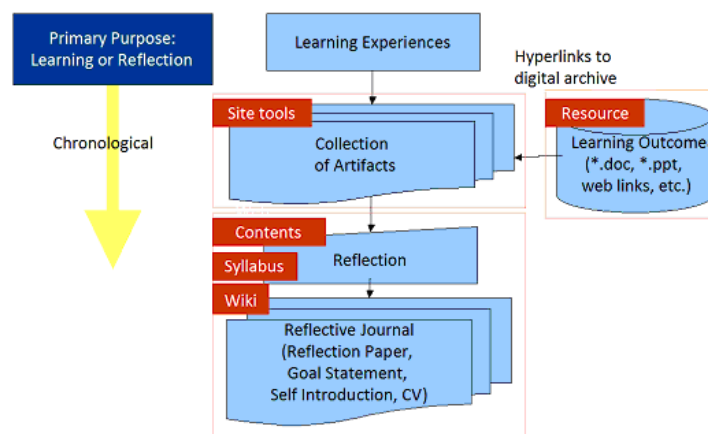
Fig 1. Learning Portfolio

Fig 2. Design of Learning Portfolio with Sakai Basic Tools

Competency List of Graduate School of Instructional Systems (GSIS)

All the courses in GSIS of Kumamoto University are designed based on the GSIS competency list (GSIS, 2009) that had been determined when the Graduate School was established.

Each competency in the list is related to assignments of the courses and defines what abilities should be learned as the result of learning in the Graduate School(Kitamura, et.al., 2008). Our ePortfolio system is also designed based on the competency list and the students using the ePortfolio are supposed to be always aware of the competency list.

Open Source Portfolio (OSP)

The Open Source Portfolio is implemented tool sets of Sakai CLE. It is possible for users to edit, share, evaluation. According to Cambridge (et.al., 2008), at least 50 colleges and universities from around the world currently use the OSP tools, and the Sakai CLE, which includes OSP, has been implemented by a minimum of 200 institutions in at least 28 countries.

The development of the Open Source Portfolio (OSP) began in 2003 as the Open Source Portfolio Initiative (OSPI). The first version OSP was based on source code of the University of Minnesota. OSPI received grant from

The Andrew W. Mellon Foundation to develop version 2.0, and published in 2004. OSPI joined the Sakai Project in 2005.   In 2007, OSP tools incorporate into the core tools of Sakai CLE 2.4 in 2008.

    We surveyed the Sakai OSP tools (Table 1) (Sakai Project, 2009). A part of OSP tools could not work as individual tool (e.g. Wizards, Matrices, Portfolios, etc.). These tools require form based XML format with a Forms tool.

Table 1. The OSP Tool's Names and Functions

Tool Name	Function
Forms	Manages forms defined based on XML format. It is available for Matrices, Wizards, Portfolio Templates and Resources
Wizard	Create and use a structured, guided ePortfolios wizard
Matrices	Create and use a structured, guided ePortfolio matrix
Glossary	Create a glossary of terms referenced in Matrix row and/or column names
Portfolios	Create personal ePortfolios using existing templates, layouts, or free-form design
Portfolio Templates	Add XSL design templates for portfolios that incorporate form data (or for 'forms-based portfolios')
Portfolio Layouts	Add XHTML page layout templates for free-form ('design your own') portfolios
Styles	Add Cascading Style Sheets (CSS) for controlling the appearance of wizards, matrices, and portfolios
Evaluations	View outstanding evaluations from student's ePortfolio matrices and wizards
Reports	Generate analysis reports using sakai and eportfolio data

Problems in current system

    Our system is useful to introduce myself with html contents and pdf files, because they usually study by online. But we did not implement peer-assessment function. So it is not enough to reflect learning activities effectively in a current system.

REDESIGN OF LEARNING PORTFOLIO

    The OSP supports portfolio-based activities by providing an environment in which a matrix owner can exhibit their work. We consider that one of solutions is redesigning the learning portfolio using the OSP Matrices tool.

    Matrices tool is one of OSP tools. Matrices tool is used in Indiana University Purdue University Indianapolis (IUPUI) , Weber State University (WSU), and etc.
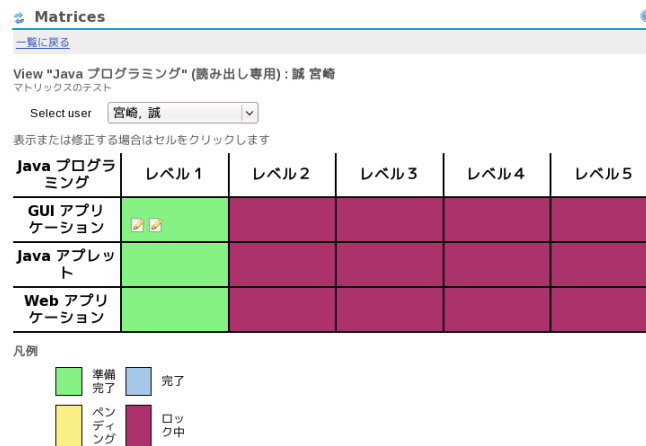
Fig 1. Sample of Matrix

A sample of Matrix is shown in Fig 3.
Matrices tool Features are as follows;

- management of the learning process (e.g. Rubric),
- registering items as evidence of learning in each cell,
- Item file formats (Word, Excel, Power Point, PDF), multimedia file types, URL links, defined form, etc.,
- reflection comments for own items,
- feedback comments for other student's item
- submit cell to evaluator and to receive evaluation comments for items,
- Integrate assignment into items of the matrix.

We designed "Learning Portfolio" using the OSP matrices tool to show a correlation between learning outcomes and the competencies of the graduate school more clearly. We set row labels as GSIS Competencies and column labels as four semesters. The column labels are also set cells for activities in both before admission and outside curriculum. The students can register items satisfied competency, reflection comments for their own items, and also a feedback comment for other student's items. These processes may be self-assessment activities and peer-assessment activities. Design of Learning Portfolio with OSP is shown in Fig 4. Competency Matrix is shown in Fig 5. It is considered that current ePortfolio would substitute for the Profile Matrix shown in Fig 6.

Problems in Matrices tool

Even if someone registers an item, I don't know someone's matrix is updated. Matrices tool has functions to add reflection comments and feedback comments to items. But I need to open each cell of matrix to find comments. We consider notification function is very important to use matrices tool more effectively.
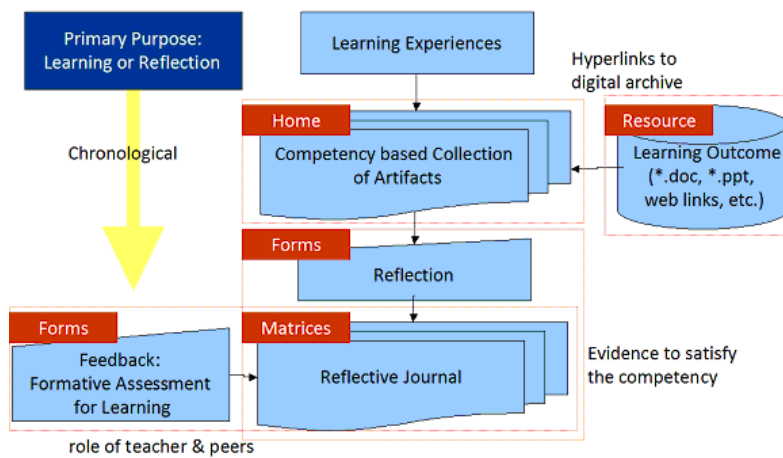
Fig 2. Design of Learning Portfolio with OSP

Fig 5. Competency Matrix

Fig 6. Profile Matrix

Future Plan for this Study

Table 2 shows our future plan for operation. After implementing the several functions that mentioned above, we fix all materials provided to our students, such as a help manual embedded in the ePortfolio, conceptual introduction of ePortfolio, and worked examples: novice level and advanced level. Not only providing normal operational manual, but providing concept of our ePortfolio is our policy of this project. We assume our ePortfolio is ready when all supplemental materials are set. And then, we are going to conduct a formative evaluation at real operational environment.

Table 2. Steps for implementation

1. Add and implement uncompleted functions
2. Prepare all supplemental materials   (e.g., help manual, conceptual interlocution, worked examples)
3. Conduct a formative evaluation
4. Release the new ePortfolio to the target students

CONCLUDING REMARK

For enhancing the currently running simple ePortfolio system in our graduate school, we have designed and prototyped a competency-based ePortfolio system utilizing Sakai Open Source Portfolio (OSP) Tools. We redesigned the "Learning Portfolio" for the graduate school with Matrices Tool is a part of OSP Tools and equipped with basic and effective features like self-assessment or peer-assessment on Sakai CLE. It is readily possible with Matrices Tool for each learner to create his/her own matrix for putting materials as learning results in order to show the list of competencies (the goals our graduate students should reach at the graduation) satisfied until now. Using the Competency Matrix is one of the practical and comprehensive approaches for quality assurance of higher education. Matrices Tool is handy and effective, but several points seem somewhat weak for peer-assessment activities. That should be resolved by a compensating subsystem or a restructured system created with more generic features of OSP Tools.

ACKNOWLEDGEMENT

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