Design of E-portfolio System for Supporting PBL Activities

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Abstract

In this paper, we developed "a e-portfolio system for project-based education" for supporting individual students, and applied it to a class. This paper mentions the outline of the developed system and the results of the application to education. This system can be used as a useful reference material for reviewing project activities and explaining the experience of a project to a third party. The purpose of the development of the showcase-type portfolio system was to support students, and the results of the questionnaire survey indicate that this purpose was fulfilled.

1. Introduction

For students in Kanazawa Institute of Technology, the learning portfolio is the valuable record of learning in college and at the time of graduation. Students reflect on the learning activities based on the learning portfolio, to prepare for the next learning activities [1, 2]. For some students, the learning portfolio and their resumes are submitted to the employers of organizations they hope to intern or join. However, it is difficult to explain the abilities of individual students to a third party with reference to the outcomes of the entire team. Students acquire "the ability to set goals" and the "skills to cooperate with others," which are required as the fundamental capabilities of a member of society. In this situation, we developed "a learning portfolio system for project-based education" for supporting individual students, and applied it to a class. This paper mentions the outline of the developed system and the results of the application to education.

2. Flow of students' projects

The student teams work on the following 5 stages as project activities [3]. This is similar to the design process for general production. Each class of Design Project is attended by about 40 students, and each team is composed of 5-7 students.
I. Stage of identifying problems: To find problems worth tackling in project activities
II. Stage of clarifying problems: To see through the problems by surveying needs, etc. and elucidating the needs of those who are related to the problems (users)
III. Stage of creating ideas: To suggest many ideas through such methods as brainstorming
IV. Stage of selecting ideas: To set evaluation criteria for discussing feasibility and select the most feasible idea as a solution based on the consensus of members
V. Stage of cementing ideas: To discuss the feasibility of the solution (crystallize ideas) and describe the results with posters and reports.

3. Learning portfolio system for design projects

We discussed a showcase-type learning portfolio system for describing the progress and history of each project in an understandable manner. The system was developed based on a commercially available printmaking system, so as to output the products stored in the learning portfolio system as booklets. The printmaking system selected for this study was the automatic typesetting system InPeria developed by Kurashiki Printing Co., Ltd. InPeria swiftly typesets the data inputted from a web browser, and enables users to check a PDF sample. We focused on this simplicity, and developed the portfolio system for Design Projects "PBL-InPeria" based on InPeria.

Students follow the instructions on a template in "PBL-InPeria" according to the progress of each project, and input the progress of the project. Figure 1 is the window after login. The template is constituted by the following 6 sheets.
1. On the front cover, a student's photo and brief profile are placed. After the end of a project, the student reflects on his/her learning, and list what he/she has learned.
2. The first page mentions the social background of an issue addressed in the project. It is possible to show the information obtained from the white books with a graph, etc. on the upper part of the page, and report on the survey conducted for finding a problem on the lower part.

3. The second page mentions the results of the discussion on how to survey the needs of assumed users. It is possible to show the results of brainstorming, etc. on the upper part of the page, and report on the survey for seeking latent needs.
4. The third page mentions the contents of idea creation. The upper part of the page describes how ideas for satisfying needs are created through brainstorming, etc. on the lower part of the page, feasible ideas are selected, and the prototyping process is described.
5. The fourth page mentions the examination of prototypes. The verification experiments, etc. are described on the upper part of the page, and the evaluation of prototypes is mentioned on the lower part of the page.
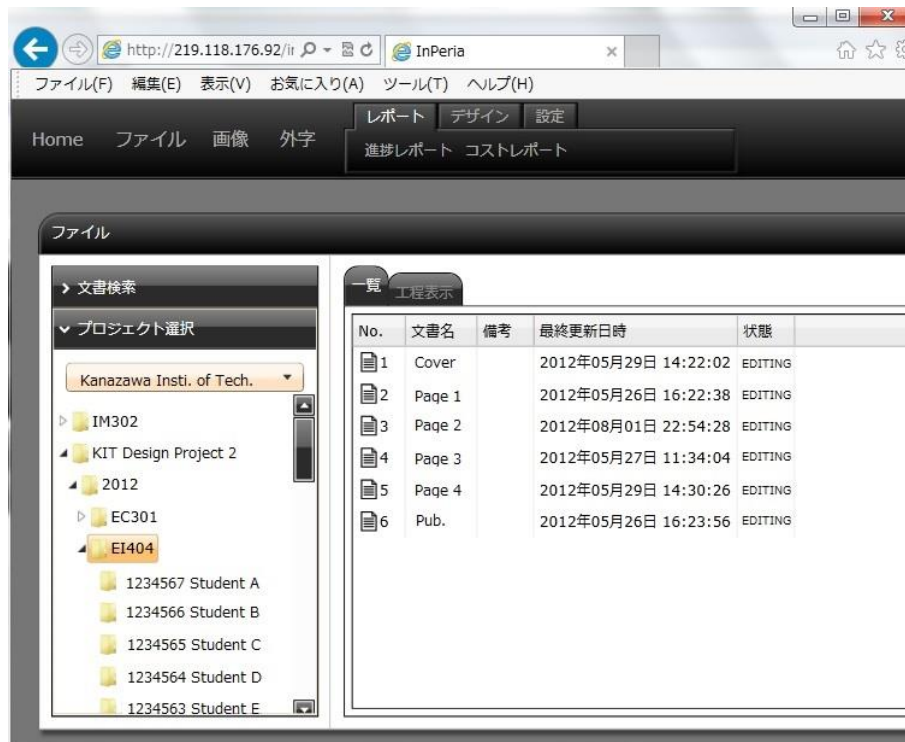6. Copyright pages are shared.

Fig. 1. *Window of "PBL-InPeria" after login*

Figure 2 shows the entry screen on the first page. After inputting text, an image data for the text is specified. Letter size, figure size, and data volume, etc. are adjusted by the automatic typesetting function of the system. After inputting, a PDF file is produced, and the finished one is checked. The produced booklet explains the history of the 15-week project. In Project Design in 2012, we instructed all students to produce booklets by using "PBL-InPeria.".

Fig. 2. *Data inputting screen of "PBL-InPeria"*

4. Valuation of the learning portfolio system

A questionnaire survey was conducted, targeting 36 students using "PBL-InPeria," and its results are shown in Figure 3.

Q1: Do you think you can reflect on your project activities with this booklet?

1. I definitely think so. 2. I'd rather think so. 3. I think I cannot do so. 4. I think I cannot do so at all.

Among 36 students, 6 students answered "I definitely think so," and 26 students answered "I'd rather think so."

Q2: Can you explain the flow of the project for "designing something" to others with this booklet?

1. I definitely can do so. 2. I think I can do so. 3. I don't think I can do so. 4. I cannot do so at all.

Among 36 students, 3 students answered "I definitely can do so," and 27 students answered "I think I can do so."

Q3: Do you think you can explain "your ability to proceed with a project" to others with this booklet?

1. I definitely think so. 2. I'd rather think so. 3. I think I cannot do so. 4. I think I cannot do so at all.

Among 36 students, 1 student answered "I definitely think so," and 25 students answered "I'd rather think so."

Q4: Did you understand the importance of explaining "the ability you acquired" through the production of this booklet to others?

1. I understood it well. 2. I think I understood it. 3. I cannot understand it well. 4. I cannot understand it at all.

Among 36 students, 2 students answered "I understood it well," and 29 students answered "I think I understood it."

Q5: Did the production of this booklet contribute to the "progress of this project (directing the project without leading it wrong)"?

1. It contributed significantly. 2. It'd rather contributed. 3. It didn't contribute well. 4. It didn't contribute at all.

Among 36 students, 1 student answered "It contributed significantly," 17 students answered "It'd rather contributed," 16 students answered "It didn't contribute well," and 2 students answered "It didn't contribute at all."

The number of positive answers is equal to that of negative answers, indicating the dichotomy of opinion. The students who gave negative answers wrote that it is difficult to operate "PBL-InPeria" in the blank for free description.
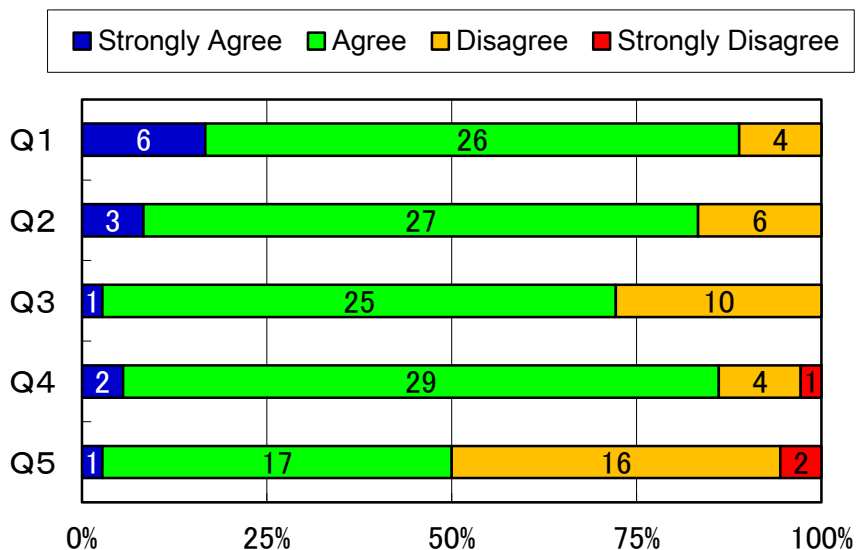
Fig. 3. *Results of the questionnaire survey at the end of the term*

5. Introduction

This paper has mentioned the showcase-type portfolio system "PBL-InPeria" developed by us. This system was applied to our classes. By reading the booklet produced by each student with "PBL-InPeria," it is possible to understand how the student engaged in the project. Namely, it was confirmed that the booklet is useful as the resume of each student project. Booklet production made students become aware of the outcome of each stage of the project, and motivated them to engage in the project. This is a possible reason why the booklets of the students who actively worked on the project are worth reading. It was also found that the students whose booklets were unsubstantial did not engage in the project actively. Anyway, this booklet can be used as a useful reference material for reviewing project activities and explaining the experience of a project to a third party. The purpose of the development of the showcase-type portfolio system was to support students, and the results of the questionnaire survey indicate that this purpose was fulfilled.

References

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