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Augmented Library

- toward Fusion of Analog and Digital Libraries -

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목차

1. Introduction

In recent libraries, the services they provides are dynamically changing by so called "Learning Commons". In that, library is not only a place of storing books, but also a concentrated functionality for learning, and provides creative environments. That is, the libraries' resource is changing to be identified from only a 'books' to also 'people' and 'environment'.

On the other hand, the digital library service are also changing the similar directions. SNS(Social Networking Service) and forksonomy system means that they tends to introduce and utilize the user-oriented and user-perticipated services.

Moreover, seamless cooperation with analog(real) and digital library is happening. Some RFID library as in Kyushu University begins to develop a web bookshelf system connected to RFID bookshelf system, e-paper devices are about to be deployed such as Kindle by Amazon. Furthermore, development toolkit for augmented reality, which is a technology to place a virtual object in the real world, is developed such as ARToolkit.

From these trends, we have to expect the library services must be evolved seamlessly and cooperatively between analog and digital services. It is not the matter whether it is analog or digital. What is the service is the most important. For achieving them, the excuse that a service is not realized because of the digital divide of the library staff will not be accepted. Thus, we call the library which provides services of analog and digital in a seamless and equal manner the augmented library.

An institutional repository is also one of the web services emerging in Japan as a new feature of augmented libraries. In the institution, they are required not only the introduction to the members, but also the operation of the system, and extension of functionalities. The repository system has been supported by National Institute of Informatics(NII) Japan, but one problem is that the institution has to keep the operation even after the support is finished. Moreover, the repository system is a new concept, and it needs evolution required by users. Especially, web 2.0 era makes an standard older soon, and the system and staff must follow the changing requirement and changing environments.

For this, we planned an experience for developing skills for system designing and project management in Kyushu University. The experience managed 10 hours in 2 days

at once, and held 3 times so far. The contents are html language, PHP language, SQL language, CakePHP framework, their web application, and project management with system proposal skills. This is actually very condensed, but we introduced many ideas to help understanding with web and remote developing environment, homework, and pair programming.

These contents have not been provided to librarians sufficiently so far, as opposed to the needs is increasing. The most cause of this might have been no one acknowledged the needs itself. If we handle information systems as a black box, we do not recognize the changes inside. Since information technology evolves every day, it is possible that a revolution no one has been expected can easily happens, such as the big increasing of Google inc in US. The contents has been wished as a must for librarians to understand information systems for the purpose of making a decision which is optimal according to the requirement of society and history.

In this paper, we describe the ongoing work and result of the experience for system designing skill and project management skill held in 2008. In the following sections, we introduce curriculum, formation of staff, participants, computer environment, programming language, and project management web tool. We describe the contents of the experience in Section 3, and show the outcome in Section 4. Section 5 is the conclusion.

2. Skill Development for Augmented Libraries

For preparing for coming augmented libraries, we explored the methodology to develop skills through developing curriculum, staff formations, system environment, and letting participants experience and deploying.

In this section, we describe the ongoing work for the methodology in two aspects: system designing skill and project management skill.

2.1 System Designing Skill

The experience is performed supported by a project for next-generation scientific contents development through 2008 to 2010, National Institute of Information(NII). It is

positioned as a research for sustainability and increasing the value of institutional repositories. The requirement institutional repositories are facing is quite similar to that of this paper, and the future direction of augmented library is the same. Five universities, that is, Saga University, Nagasaki University, Kumamoto University, Miyazaki University, and Beppu University, made the joint proposal together.

This experience is described as in NII webpage[1] as "The purpose of this experience is to, while the repository operating person in charge of each institution masters the fundamental knowledge about development of a web system through a short course. A participant is collected from not only a cooperative organization but widely in other organizations." Holding the experience targeting on the system design is new in the entire project.

2.1.1 Curriculum

In the curriculum, the attendance candidate was set to beginners who are going to master a development of a web system from the foundation. We planned to hold a 2 days(about 10 hours) x4 time experience in two years, and also imposed homework between them, so that the acquired knowledge may not be dropped.

2.1.2 Formation

The author, who has an expertise on computer science in Kyushu University Library performed the main instructor, and other professional programmers did alternative instructors. Besides, several staff resided as supporting staff, and prepared in order that a participant's question can be answered and advised immediately. The supporting staff are joined by 2 members from the library, and other 2 members from information systems division in the university. They discussed the planning of the curriculum prior to the experience, and participated as a participant to the experience.

Moreover, we established a web site, described in Section 2.1.6, as supporting environment of the curriculum to response for the questions and comments from the participants in another time than the face-to-face experience.

2.1.3 Participants

The participant of the experience did not only include the cooperating 5 universities,

but also widely called to the National University Library Association, the Kyushu Area University Library Congress, the Digital Repository Federation[4], and so on. As a result, the participants became 27 people(7 from Kyushu University) at first time, 22 people(5 from Kyushu University).

Since the technique of pair programming(mentioned in Section 2.1.5) was adopted at the experience, where 2 members proceeds the programming with a discussion, we required to the participants a preliminary questionnaire at the time of the application, so that the skill level among pairs may not vary extremely. It asked "the experience of institutional repository operation", "the experience of information systems management", "the interest in information technology and programming", and "the experience of programming", etc. After that, we classified the participant into four categories by the combination of the experience of institutional repositories and information systems.

Moreover, we balanced pairs as to a participant who is not high as for the concern about programming will be paired with a participant who is experienced in operating and concern will be high.

2.1.4 Environment

The computer environment of the experience was a UNIX server. The participants logged into the server by the account and password with the terminal software which is installed in a USB memory which was distributed to the participants. All materials resides on the website, so it can be review and challenged repeatedly by a participant(or not even the participants) even if the experience is completed, since development environment can be accessed at any time if it is on a website and they have a USB memory. Details are given in Section 2.1.6.

2.1.5 The Programming Language and Pair Programming

The programming language used as the material is PHP(PHP:Hypertext Preprocessor) [5]. PHP is widely spread as a language of an open source, and supports various web servers and various database management systems. The fact that it is intelligible and easy to introduce for beginners is the reason chosen as a target.

Moreover, we studied a web application development framework called CakePHP, written in PHP from the 2nd time of the experience. It is a the programming framework

which adopted the latest idea such as Model, View, and Controller(MVC). It is expected that development of web application becomes efficient if the framework is used. Another reason that we chose CakePHP and PHP language is that, compared with other competitive development frameworks, they can be roughly learned even if the participants does not know the concept of object oriented method.

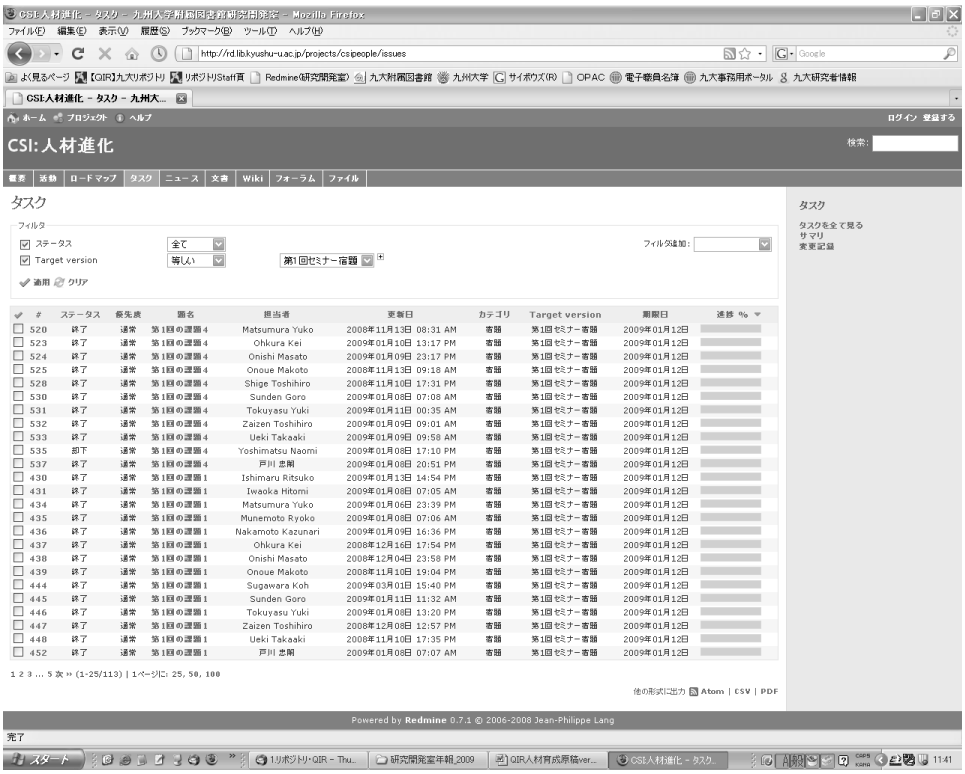
Furthermore, the technique of pair programming tried this time provides a chance for participants to cooperate and suggest each other in a way that one computer are shared by 2 persons.

2.1.6 Project Management web Tool

Redmine [6] is as support environment of this experience which is the project management system of open source, developed by Ruby on Rails[7]. The work item called a "ticket", was used for recording and managing the work. used "wiki" and "forum", and the staff provided the "ticket", "document", and "files". Moreover, each participant's homework was assigned as a "ticket", and the progress of the ticket became obvious. It served also as the website of the project[8]. Table 1shows the feature list, and Figure 1 shows the screen of Redmine.

〈Table 1〉 Features of Redmine

Menu	Usage
Outline	The contents of activity, and a member task outline
Activity	Activity logs on the system
Roadmap	Progress situation of tickets
Ticket	To Do list
News	What's new
Document	Experience report
Wiki	Teaching materials, a program.
File	Files for download
Forum	Information exchange among participants



〈Figure 1〉 The Screenshot of Redmine

2.2 Project Management Skill

Apart from the system designing skill, an experience which studies project management and system proposal was held. An experience of 2 days(10 hours) was added. This experience was attended by 18 participants(13 from Kyushu University).

Although it was distinguished from the flow of the experience, it is also important in fact. Every staff will require installation, operate, and improve an information systems required for each business. In many cases, it is a fact to outsource them rather than carrying out by ourselves nowadays. The exact directions and effective negotiation by the request side, which needs the knowledge of a certain amount of systems development in order to explain clearly, is really required.

The experience constructed 4-5 persons' team, drew up and released the plan proposal document of the system.

3. Contents

The details of the experience is in Table.

Reports, such as a questionnaire after the experience, are opened in general on "Wiki" of Redmine.

〈Table 2〉 Contents of the Experience

The 1st time: November 6(Thurs.), Heisei 20 to 7(Fri.)

〈〈 Thurs., November 6 〉〉
13:00-13:30 Opening ceremony
13:40-17:00 Short course (Orientation) 1. How to use tool 2. Concept of web 3. HTML 4. CSS 5. HTML exercise 6. PHP language 7. Object-orientation 8. PHP exercise 9. Web application
〈〈 Fri., November 7 〉〉
9:00-16:00 Short course 1. Web application exercise + mini announcement 2. Concept of database 3. SQL language in one table 4. SQL exercise 5. Web database 6. Web database exercise + mini announcement 7. SQL language in two or more tables 8. Web security 9. Introduction of CakePHP
16:00-16:30 Closing

The 2nd time: January 13(Tue.), Heisei 21 to 14(Wed.)

〈〈 Tue., January 13 〉〉
13:00-13:30 Opening ceremony
13:40-17:00 An announcement, a short course, and exercise (Orientation - environmental preparation -) 1. Announcement of 1st homework 2. CakePHP 3. Blog creation experience in CakePHP using Bake

〈〈 Wed., January 14 〉〉
9:00-16:30 A short course and exercise 1. Concept of MVC 2. Blog tutorial 3. Creation of Web application
16:30-17:00 Closing

Special editing: December 8(Mon.), Heisei 20 to 9(Tue.)

〈〈 Mon., December 8 〉〉
13:00-13:30 Opening ceremony
13:30-17:00 A lecture and exercise 1. How to advance short course exercise 2. Creation method of plan proposal document 3. Consider the subject and solution of a system proposal place.
〈〈 Tue., December 9 〉〉
9:00-16:30 A lecture and exercise 1. Project management 2. Creation of PowerPoint 3. Review of created PowerPoint 4. Announcement of each team
16:30-17:00 Closing

As the contents of the 1st and the 2nd days, the participants touched HTML and CSS first on the 1st time. After that, they experienced PHP language and programming in a command line. Moreover, they did web application creation by PHP language. Then, they stepped forward to two or more table handling on the next day after one table handling of the relational database which uses the SQL language, and the web application handling a database is studied by calling SQL on a PHP program.

They experienced making a blog system after a data definition on the 1st day of the 2nd time using a simple application creation command called Bake in CakePHP, and learned with training on the 2nd day about the concept of MVC as the background, and its practical use.

As you can see, the contents have so many things to learn in a short period of time. Not many courses in general are considered to be such condensed. However, it is insufficient for the purpose of this project of management of an institutional repository if we concentrate on only a basic part. Conversely, there will not be appropriate participants if we concentrate on only an high-level part. It resulted vividly in that the gap of the skill needed and the real situation. It is considered that varieties of tricks or methods

shown above can be a help for understanding for participants. Nonetheless, there might be the side-effects effect that the participants recognize such a gap.

First of all, it seems that a library personnel had the opportunity to study the skill of system management, such as server management and a database management, so far. However, experience of web system development itself was quite rare. Staff who corresponds flexibly can develop such a a system according to the request of a user are quire required now, when web system serves as main service media.

4. Outcome

In this section, we describe the outcome obtained by the experience so far.

First, by a total of 67 persons, participants experienced the fundamental knowledge about development of the web system, which was a main purpose. It did not remain in the universities in Kyushu area, but had participation from many places in Japan.

Next, exchange of each university was performed in uprising and a social gathering in the orientation of the experience with a circle in all participants -- formation of this human network is also one of the results.

Third, if a participant's skill development is considered as a main purpose, the deployment of the knowledge by the participant is the side purpose. The homework for the participants was included such as "tell someone about these contents". The participants have reported having striven for the share and the spread of results within each organization on Redmine.

As an example, the following reports are received from the cooperation university or the participant of the support team.

[Nagasaki University]

- Web application, a PHP language short course(2008. 12.5)
- Cooperation and an SQL language with a database(2009. 2.26)

[Saga University]

- The 1st experience study meeting(2008. 12.25)

[Miyazaki University]
- PHP programming study meeting(2009. 1.5)

[The Information Systems Division, Kyushu University,]
- Information system study(2009. 2.18)
- Information system study(2009. 2.23)

In such an deployment, the participants have enacted the role of a lecturer. This is the result of the efforts of a participant and the height of consciousness not only participation.

Moreover, they are starting to produce a real web system which is useful for themselves or the users. This will be accelerated in this final year of the project.

5. Conclusion

Although it is the experience began from the basics of web application development, since it has deep contents that repeat an exercise, it might be a tough work depending on a participant's skill. Although existence of the support staff is important also from that point, finding such staff is becoming difficult as the contents step forward. For continuation of the experience, it is necessary to strengthen and consider between universities.

This experience is a ongoing work which lasts till 2009. At the time of next experience, we will pile up discussions and carry out for a better experience which is scheduled twice in 2009.

Acknowledgement

We would appreciate Masaki Takemori in Kyushu Institute of Technology and Ken'ichiro Oyama of Fusic co. ltd. who did an instructor in system designing experience, and Prof. Shoichi Komaya in Tsukuba University who did the project management experience. We also appreciate staff in Kyushu University and other libraries to support this activity, including visiting researcher Dr. Kim Eunja.

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