

Design and Implementation of a Lifelong Learning Support System

- Promoting Digital Contents through the Internet -

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Abstract: The purpose of this research is to support learners or communities and lifelong learning environments with e-learning or ICT and thus provide an environment for distributing digital contents, especially to existing distant locations. In the field of lifelong learning, new learning activities have begun to appear through the practice of e-learning as an application of ICT on a network. In more recent developments, NICER (which is part of MEXT, Japan) will be supporting lifelong learning resources by gathering the data of digital contents starting in April 2006. This system will be inputted in an existing learning plan (Lifelong Learning Passport, or e-portfolio). The idea is to help an instructor or a learner to make an automatic learning plan or to support creation of semi-automatic learning plans with digital contents in NICER. The Social Education Director joined the evaluation, and the system is suited to supporting learners or learning groups.

Introduction

The aims of this research are to support lifelong learners or communities with e-learning or ICT and to provide an environment for distributing digital contents, especially to distant locations.

In recent years, with the rapid development of information and communication technology, many learning practices that utilize various ICT environments have been implemented in educational fields such as school education, social education, and home education. One remarkable example is how computers and Internet connections have now spread to include almost every school in Japan, providing children with the opportunity to learn with ICT.

It was immediately incorporated into the scattered learning resources, and it is now possible through support with ICT to send learning results from a school to the world at large without limiting the subject matter to learning for lessons (Central Education Council Subcommittee of Lifelong Learning, 2004). Given the present conditions in Japan, however, these materials are not offered as social resources to learners searching for it, although there is a large quantity of learning information gathered together on a network. A base system is therefore required, and it is also important to create an environment for distributing digital contents, especially to existing distant locations. Another important matter is how to offer these learning resources while combining and inflecting them. In supporting a learning community consisting of an individual and a learning group, lifelong learning is necessary.

In addition, in the field of lifelong learning, new learning activities have begun to appear through the practice of e-learning as an application of ICT on a network. By means of this learning activity, even while a member of society works, he/she can begin to form a learning community in fields not limited to one's own study. The following case study serves as an example. In the "Toyama Internet Shimin Juku" (Toyama Netizen Supplementary School), a citizen can recruit a lecture via the Internet from homes and can also create a private school or a circle with friends. For the voluntary lectures planned and carried out by citizen-lecturers, ?passive

learning? changes completely the concept of "teaching as the best learning method." These communities will be growing in the future. In order to support these persons or the communities, as of 2005 there were about 23,000 persons certified as Lifelong Learning Instructors in Japan (National Association of Distance Education). These persons attend the courses of NADE and receive certification. Likewise, there is at least one Social Education Director in almost every municipal social education institution. These persons are generally civil servants, and number about 30,000 persons in Japan (Lifelong Learning Policy Bureau MEXT, 2004).

Incidentally, The National Information Center for Educational Resources (NICER) plays a role on a national level in the networking of information related to education and learning in Japan. The primary objective of the NICER is to support the promotion of digitized education in schools, higher education, and lifelong learning. The NICER collects various resources on Japanese education and learning from the Internet and organizes them systematically. Large volumes of learning resources on the Internet have been organized to help users find exactly what they are looking for. In a recent development, lifelong learning resources have also been provided as of April 2006. There are 120,000 items altogether. This system was created by gathering the data of digital contents provided by prefectural lifelong learning promotion centers and converting them into metadata formatted with LOM (Learning Object Metadata).

The aims of this research are supporting these persons or the community and lifelong learning environments with e-learning and ICT, and providing an environment for distribution of digital contents, especially to existing distant locations. I will therefore create a Web application system to support learning plans in lifelong learning by using digital contents in the NICER. The system is inputted in an existing learning plan to help an instructor or a learner to create an automatic learning plan or to support them in creating semi-automatic learning plans with digital contents.

The Contents of the System

System Architecture

This section explains the system in detail. It consists of two parts: Collecting System and Planning System.

The Collecting System is as follows: The Collecting System traces each of the prefectural lifelong learning promotion centers to collect html contents and URIs (See Figure 1): These include teaching materials, information about certification, and learning opportunities. Each center has its own retrieval website and maintains data with almost the same format (the Ministry of Education, 1989), although the retrieval methods differ. A trace program is prepared for each center. The Collecting System creates LOM data from html contents and identifies each URI regularly so that it can discover when a link has run out. Up to now, 120,000 URI and LOM have been collected.

The Planning System is as follows. On the client (user side), the system shows a web page created dynamically with PHP. On the server, the web-server is Apache, the database system is PostgreSQL, and the operating system is either Linux or Windows (multi-platform). The system consists of four parts: input/output module, text convert module, teaching plan analysis module and content search module. (See Figure 2) This planning system operates as follows. (User interface of this system will be covered in the next section). First, a user inputs his/her own existing learning plan into the system. If the learning plan is a Word or PDF data, the text conversion module transforms it into plain text. Secondly, in the learning plan analysis module, the learning plan is transformed into text and split into words with appropriate weight by natural language processing. Third, the content search module searches for a learning plan and the learning materials in NICER, which are accompanied by LOM. Finally, the system shows the searched learning teaching plan in NICER or learning materials with digital contents in NICER.

The problems that were encountered are listed below.

Copyright: Some of the contents in NICER are copyrighted. In case of such contents the system shows a copyright message. LOM parameters used in NICER have a copyright field. In order to respect the copyright, a message is shown at the top of the page indicating that the user should handle the contents as copyrights of each site linked by NICER.. The users can choose only copyright-free contents.

Word Importance Weighting: The level of importance depends on the item. In Japanese “Kujira” may indicate both an interest area item (a whale) and a personal address item (in Kawagoe-city JAPAN). The former is generally more frequent than the latter. At the present time, the system carries out classification according to the structure of the lifelong learning passport. In the future the system will classify by means of algorithms (Sugaura, 2004)

Learning Preparation Plan: Now comes the question of what kind of plan the user inputs and how a plan should be made. It is possible to utilize the Lifelong Learning Passport, in which learning logs are stored, or the e-portfolio, in which works or lectures are stored. Each local government encourages practical use of the lifelong learning passport (MEXT, 2004). And the lifelong learning instructor makes learning plans for learners in cooperation with them. He/she talks with them regarding the long-term learning schedule and prepares them for the program. In one e-portfolio example, DePaul University supports lifelong learning for school students or graduates (Yamamoto, 2002).

Estimation of Learner's Interest: The system must estimate the learner's interest inputted to the Lifelong Learning Passport or the e-portfolio. The system then searches by words from these by means of natural language processing and the thesaurus in the EDR (produced by NICT, Japan) electronic dictionary. In the future other algorithms will be included.

Contents Collecting Intervals: An important question is how long the intervals are in which the system collects. The system must provide the latest collections, but it will affect network traffic or system load if the interval is shortened to every day or week. For the time being, the system collects every month. In the future, if a center changes contents, it will send a message to the system or RSS delivery.

User Interface

In the file open dialogue, the user specifies Lifelong Learning Passport or e-portfolio, formatted WORD, PDF, or text.. The system then starts text conversion, natural language processing and content search. The results page is shown in Figure 3. The link to the most adapted contents in NICER is shown at the top. Likewise, the messages that the user should deal with such as the copyrights of each site linked by NICER are shown at the top of the page. On the right side of each content is a radio button. If the user chooses one of the contents and pushes the retrieve button, the system searches other contents so that the user can obtain contents that are slightly different.

Evaluation

The above-mentioned system was evaluated by evaluators by means of an inquiry. This system is, however, a prototype, and not complete at the present time (i.e., under construction). Most of the parts of the system can be used but cannot be tuned regarding the aspect of importance weighting.

Five people, all of whom are social-lecturers at a netizen supplementary school, joined the evaluation. They are both lecturers and learners. These persons first prepared the learning passport themselves. Second, they inputted their learning plans into the system separately. Third, the system showed search results for these persons, who then checked each other's results.. Finally, we made an inquiry with the ten evaluators about the operation and the design of the system..

The following are the results of the evaluation. Favorable comments included: “convenient not to have to search by words, possibility of choosing by learning history, actual feeling of working with with digital contents, new findings, readily understandable?, easy to understand with pictures or movies, and highly motivating”. Unfavorable comments included: “hard to understand due to small characters, would prefer printed matter in detail”. In addition to discussing the system itself, the evaluators pointed out that this system lacked the ability to search for another person who wants to learn the same materials they want to, or the ability to search the community for members who are learning about the same subject. Incorporation with SNS is necessary, so that sharing learning contents will not only be possible between the national and local levels

(vertical) but also between regions or learners (horizontal). Also necessary is the ability to search for a community nearby.. At present, the system does not collect such information. In the future it needs to be able to collect information of a community or a tutor.

Conclusions

This paper discussed a Web application system to support a learning plan in lifelong learning that uses digital contents. The system is inputted into an existing learning plan to help an instructor or a learner to make automatic learning plans or to support creation of semi-automatic learning plans with digital contents. This system is designed to support learners or communities and lifelong learning environments with e-learning and ICT and to provide an environment for distributing digital contents, especially to existing distant locations.

Questions that remain to be addressed in this research are as follows: The system is not completely tuned in terms of importance weighting. As the system's ability improves, learners, communities and social education directors will eventually be able to make more efficient and frequent use of it. In addition, collection of contents will be carried out sequentially.

It is our hope that, in the future, lifelong learning with concise plans will be much easier to realize for everyone.

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