

u-Learning UCC Contents Authoring Systems based on Learning Activities

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ABSTRACT

With the development of information communication and network technologies, ubiquitous era that supports various services regardless of places and time has been advancing. The development of such technologies has a great influence on educational environments. As a result, e-learning concepts that learners use learning contents in anywhere and anytime have been proposed. The various learning contents authoring systems that consider the e-learning environments have also been developed. However, since most of the existing authoring systems support only PC environments, they are not suitable for various ubiquitous mobile devices. In this paper, we design and implement a contents authoring system based on learning activities for u-learning environments. Our authoring system significantly improves the efficiency for authoring contents and supports various ubiquitous devices as well as PCs.

Keywords: u-Learning, Learning Activity, LMS, Contents authoring System

1. INTRODUCTION

Over the last few decades, information and communication technologies have been improved greatly and computers have become more widespread. In particular, ubiquitous computing is a new trend of information and communication technologies, in which we embed a huge number of tiny computers into an invisible part of the fabric of everyday life. Ubiquitous computing provides computing for all: access to anything, by anyone, at anytime and anywhere. As a result, education has undergone major changes in recent years[1],[2]. E-learning is the concept including all system of educations that are provided by using the electronically simulated environment including the web. E-learning is done at a computer that is usually connected to a network and gives us the opportunity to learn almost anytime, anywhere as an alternative to a traditional classroom education. E-learning takes place in an electronically simulated environment. E-learning falls into two categories. Such as: Asynchronous training and Synchronous training. With asynchronous training, students can interact with other students

or instructors through e-mail, online discussion groups and online bulletin boards. Synchronous training is a real-time method of e-learning with live interaction between the instructors and students. It is called so because students have to log in at a specified time and the classes will be held for a specified period of time. With e-learning, students don't have to physically attend classes, seminars or training programs. E-learning is web-based so participants don't have to spend a lot of time away from their work. E-learning also allows for more participants than traditional learning methods since the number of participants is not considered by venue limitations[9].

Now, the assimilation of ubiquitous computing in education marks another great step forward, with the advances of ubiquitous learning through the concept of ubiquitous computing[3],[4]. This is called as u-learning, the concept of the next generation of the e-learning concept. The u-learning is a compound word of the ubiquitous and learning[5]. U-learning is an online learning system which can after the education with low cost at anytime and anywhere. That is, the e-learning service can be received in a home, the school, and an office and in transit through the various digital media and devices with an embedded training as well as the web based learning, and etc. The ubiquitous environment was gradually developed so that the education can become possible without the limit of the time

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Contents Viewer with purpose.

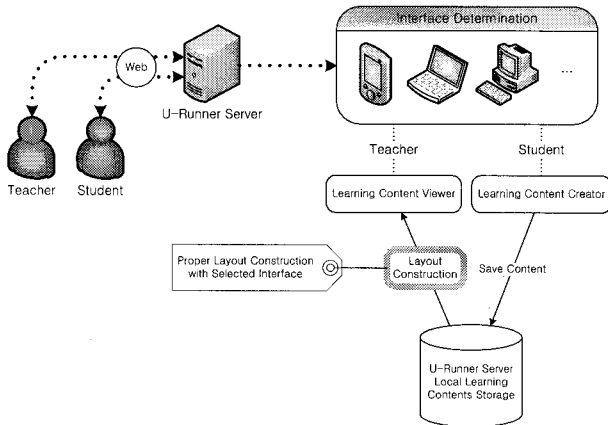


Fig. 2. Operation of the proposed system

In our system, user can access as professor for create learning content. A professor designs learning sequence based on learning activities and describes content of each activity using Learning Contents Creator. Figure 3 shows XML data of learning content using our system that include learning sequence and content information. Sequence of each the learning activities is represented by arranges of XML elements and content of each learning activities is represented by attribute values of XML elements.

Students use the created learning contents by Learning Contents Creator with Learning Contents Viewer. Learning Contents Viewer can attend specified learning contents in database. Layout Construction functions of Page Builder in Learning Contents Viewer make user interface page based on XML data of learning content. This processing method can reduces redundancy of learning content and manufacturing load of producer because making interface of many devices is unnecessary.

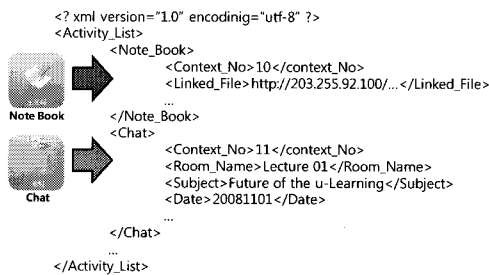


Fig. 3. XML based learning content structure

3.2. Multimedia Editing Tools

Our system includes a multimedia editing tool that improves the utilization of multimedia contents over the existing systems. Figure 4 shows operation of multimedia editing tools in our systems. At first, User upload original multimedia source on temporary directory of server. At next, User edit original source on temporary directory using editing module in tools and update. Finally, these multimedia data is serviced to users.

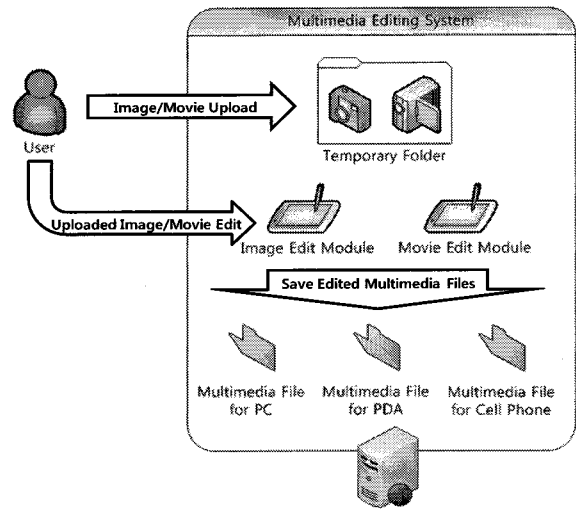
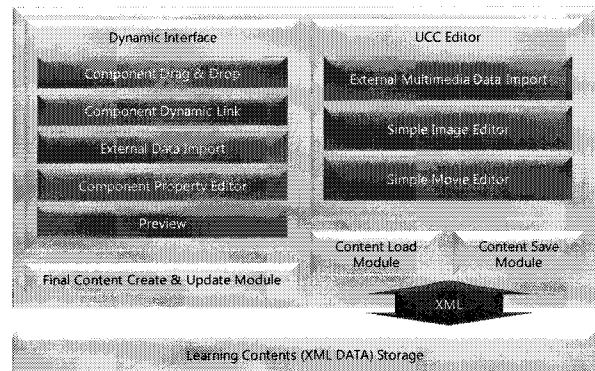
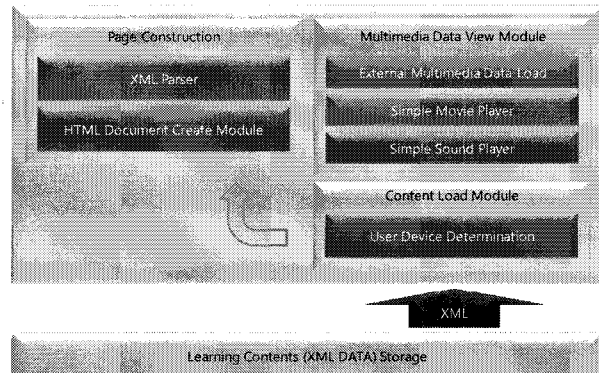


Fig. 4. Operation of Multimedia Editing Tools

3.3. Learning Contents Creator & Viewer



(a) Learning Content Creator



(b) Learning Content Viewer

Fig. 5. Learning Content Creator & Viewer

Our system is composed of two sub systems, such as Learning Contents Creator and Learning Contents Viewer. Users make learning contents using the creator and view learning contents using the viewer.

Figure 5 (a) shows composition of detail modules in Learning Contents Creator. Modules consist of 3 large parts such as Dynamic Interface part, UCC Editor part and Contents I/O part. Dynamic Interface part provide intuitive and interactive design environment. This part supports useful

functions, learning activity arrangement using drag & drop, content registration easily and import external multimedia data. UCC Editor part provide using Multimedia Editing Tools. Contents I/O part provide access to the Learning Contents Database and convert designed buffered data to XML data or XML data to buffered data.

Figure 5 (b) shows composition of detail modules in Learning Contents Viewer. Modules also consist of 3 large parts, such as Page Construction part, Multimedia Data View part and Contents Load part. Page Construction part makes layout and content of webpage using Learning XML data in database. Each device of users has different screen resolution and CPU performance. Therefore, Page Construction part provide different construction of page with different device. Multimedia Data View part is in charge of loading Movies or Images on service webpage. Content Load part get Learning Content in Database.

4. SYSTEM IMPLEMENTATION

4.1 Implementation Environment

U-learning contents authoring system based on learning activity was built on Microsoft Windows Server 2000. We ran a MS-SQL 2003 for a database system. To build U-learning hub site, we use ASP.NET at work. And u-learning contents creator and viewer for professors and students was built by using Flex2 that based on flash, and runs within the ubiquitous flash9 player. We implement multimedia editing tools using JAVA net beans ver5. Table 1 shows the running environment.

Table 1. Running Environment

Item	Value
Operating System	Windows XP
CPU	Intel Core2 Duo 2.4Ghz
RAM	2Gbyte
HDD	300Gbyte
Web Browser	MS Explorer 7.0

4.2. Result

In this section, to demonstrate the relative usability of our system, we build sample pages of proposed system and compare our proposed system with existing system. Figure 6 illustrates the Learning Contents Creator provided by hub site. The Learning Contents Creator provides producing and comprising function for a lecture. Instead of complicated structure of preexistent LAMS, our system provides instinctive and convenient environment. The activity required for a lecture is added by drag and drop to learning area. After including Activity in the learning area, the formation of an activity is completed by setting up detail attributes of the corresponding Activity. By using the connection tool, the composed Activities decide an order, efficient attending of students can be induced.

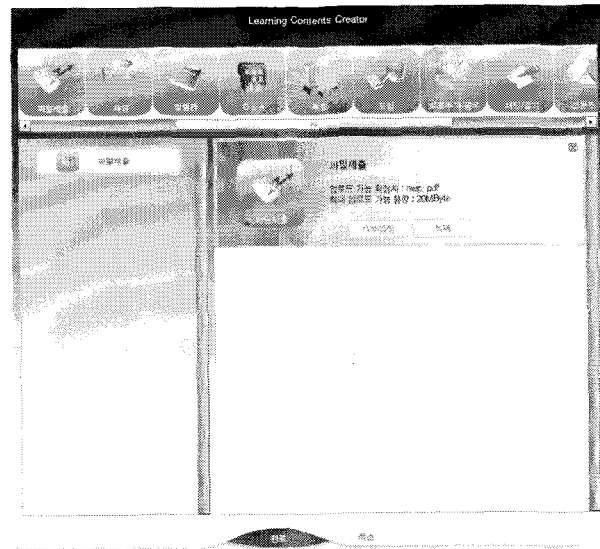


Fig. 6. Learning Contents Creator and Arrangement of the Activity

The main screen of Learning Content Viewer to perform learning activities has been shown in Figure 7. Learning Content Viewer loads XML documents corresponding to the lecture in which a teacher opens, serves learning contents converted for the connection device of students. Learning Content Viewer helps students to perform activities that a teacher makes up.

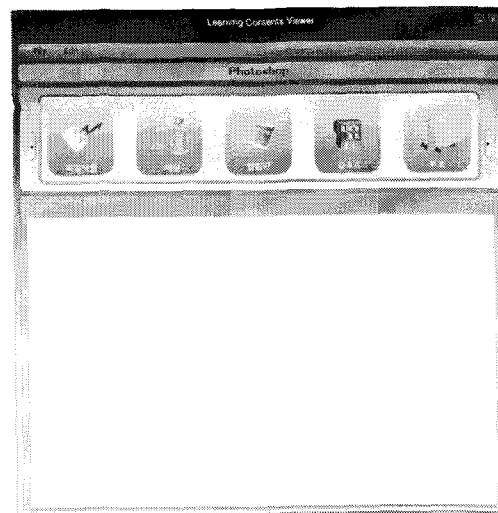


Fig. 7. Learning Contents Viewer

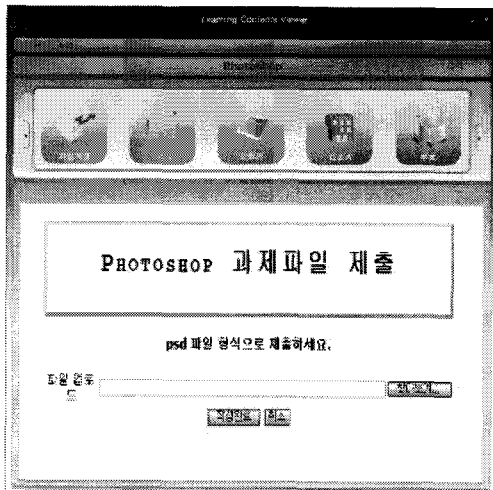


Fig. 8. Result of Learning Content

(a) Image Editor (b) Movie Editor
Fig. 9. Multimedia Editing Tools

Figure 8 displays students carry out activities in Learning Content Viewer. Activities are performed by the order that a teacher determines. The Activity list in which a teacher comprises is seen on the top of the Learning Contents Viewer. In the learning activities area, the learning content of the Activity required for a lecture is indicated. Those contents are studied by students.

Figure 9 shows interface of inner multimedia editing tools. Author can uses these tools for include multimedia data on learning content. Figure 9 (a) shows interface of image editor. This tool provides various functions (crop, resize, effect, picture frame and so on). Figure 9 (b) shows interface of movie editor. This tool also provides various functions (range selection, sampling thumbnails and so on).

5. CONCLUSION

In this paper, we designed and implemented Learning Contents Authoring System. We have developed RIA system that provide easy, efficient and intuitive user environment using Flex2. We remove unnecessary functions of existing system and solve problems of LAMS. We also improve multimedia function using multimedia editing tools within our system. We proposed XML based Learning Contents data structure. This structure can make various layout of webpage with different device immediately. Therefore, our system completely removes data duplication and reduces contents creation time.

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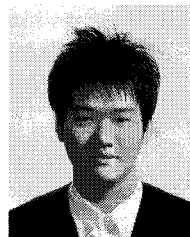
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