

***MOBILE AND UBIQUITOUS NETWORKING
FOR GENES SOCIETY***

**UBIQUITOUS-NETWORKING AND DIGITAL
ARCHIVES FOR EDUCATION
WITH SIGNIFICANT USE OF
CULTURAL HERITAGE CONTENTS**

Susumu Sawai,	Toshiko Wakaki,	Tomio Saku,	Junnichi Yamanisi
Manager,	Professor,	Secretary,	Professor,
Gakujoken	Shibaura	Internet	Toyama
(Information	Institute	Community	University
Research Center	of Technology	School	
for Education)		in Toyama	

Abstract

Ubiquitous-networking is an active e-learning environment using the information communication technology (ICT) like cellular phones, personal computers, PDA and so on, where a learner can learn anytime, anywhere and any style. In this paper, authors emphasize that learners, especially children should be able to use every digital Cultural Heritage for education, as a digital Cultural Genes. In order to backup "e-Japan strategy", authors propose new creation tool.

Keywords

digital archives, Cultural Heritage, ubiquitous-networking, digital Cultural Genes, learning object metadata, the extensible Markup Language (XML)

1. Introduction

The IT strategy headquarters of Japanese government planed that Japan should be the latest IT country in the world within five years, as "e-Japan strategy" in Jan. 2001. In

this "e-Japan strategy", the promotion of education, e-learning and training of talented people are the one of the five most important fields.

Ubiquitous-networking is an active e-learning environment using the information communication technology (ICT) like cellular phones, personal computers, PDA and so on, where a learner can learn anytime, anywhere and any style.

The Ministry of Education, Science, Sports and Culture (MEXT) founded National Information Center for Educational Resources (NICER) in August 2002. NICER has the roles to arrange and manage all the information about education and learning in Japan on the Internet. In this paper, authors

propose new creation tool in order to backup e-Japan strategy.

In this decade, authors have been coordinator of several Japanese Government ICT projects for policy preparation under the Minister of Economy, Trade and Industry (METI) responsibility: Multimedia, Digital Archives, Applications of ICT in Education.

GENES Project was launched in August 2001, in cooperation with Fujitsu and Ministry of Education. GENES stands for Gakujoken network studying group. Gakujoken is the public organization managed by MEXT. The roles of Gakujoken is to collect and to offer the educational contents to learner.

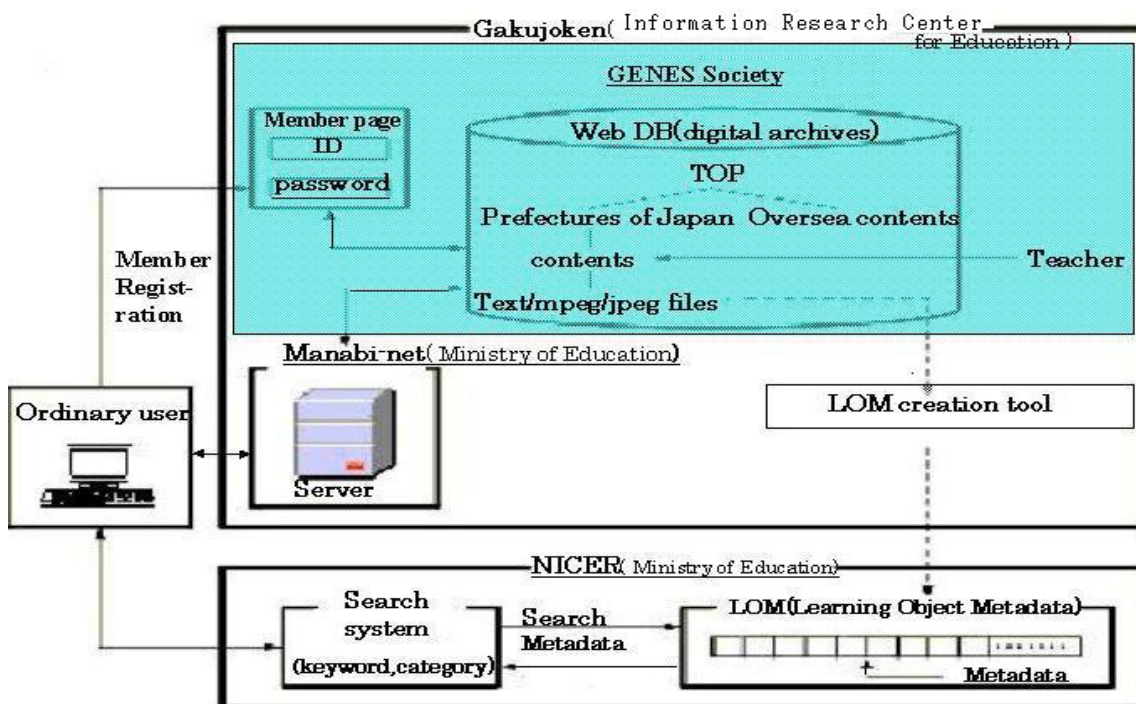


Fig. 1: The relation between GENES and NICER.

Fig. 1 shows the relation between GENES (Gakujoken Network Studying group) and NICER.

2. Objective of GENES 1),2)

The objective of GENES is to create the society where Cultural Heritage contents are created by teachers, as the knowledge base of Digital Archives for Education. The roles and aims of GENES are to realize the e-bok like electric book that learners, especially children should be able to use every digital Cultural Heritage for education, as a digital Cultural Genes.

Today the profile of the project to realize GENES society is as follows:

- MEXT finances some of the project cost, related to e-Japan projects and the MEXT portal for lifelong learning named "Manabi-Net" .

-GENES concept is indirectly based on "Internet Community school", and "E-square project" financed by METI and managed by MEXT and

METI. The Internet Community school is an ubiquitous solution for those who cannot attend the extension courses nor seminars as follows.(Fig.2)

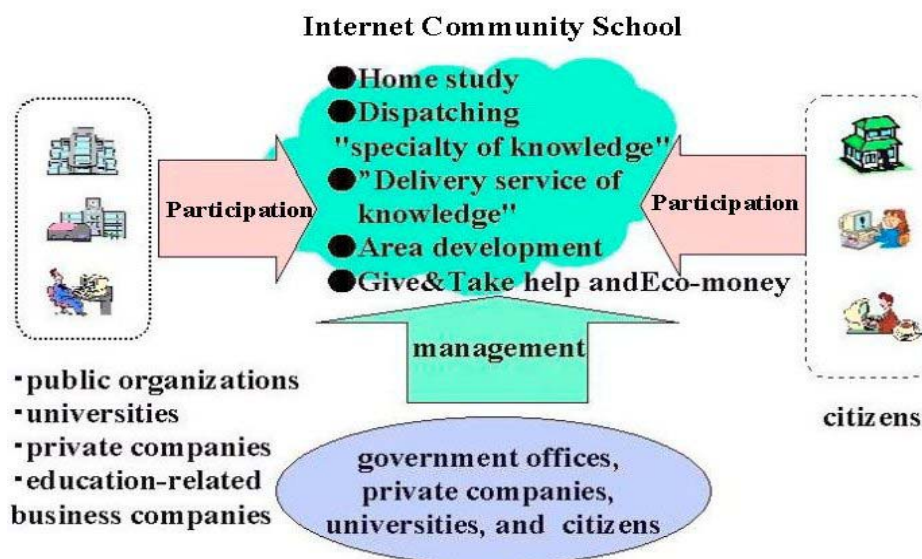


Fig.2 Conceptual Diagram of Internet Community school

-Cooperation with more than 1200 school teachers.

-Nine CD-ROM titles,

-Two DVD-Video titles,

-More than 200 WEB sites for educational contents.

-The use of contents is limited to education.

-Cultural Heritage represents about 30% of the contents.

-Teachers , members of GENES society, organize the cooperation cooperate with

local museums.

-National museums developed their own web based educational contents, and Gakujoken's GENES has access to these contents via the MOE portal for Lifelong Learning.

-More than 30,000 educational contents (video, photos and texts) are combined in this digital archives, as illustrated bellow. (Fig.3)

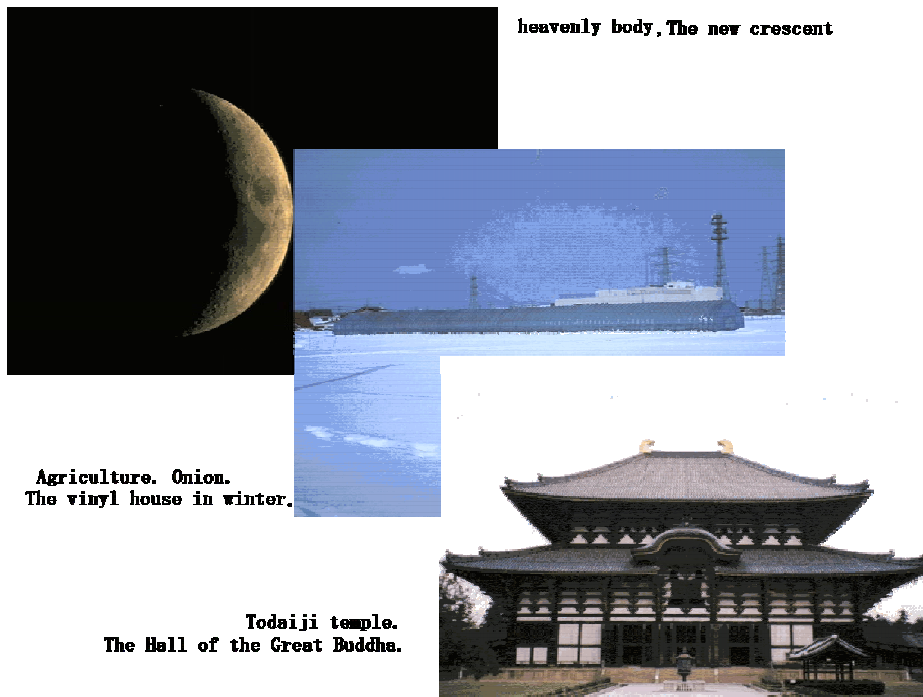


Fig.3 Sample illustration of educational contents

-These educational contents contain the following specifications: a school grade, a subject and a unit, a coverage person, a coverage date, a coverage place, copyright, etc.

-Some schools have already DHTV equipment. In the future, it is expected that all schools will have DHTV systems.

3. Learning object meta-data (LOM)

The metadata is the meaning of "the data for data". A learning object metadata(LOM) is used for explaining the information about various resources on the Internet. Now, the data model standard of LOM is authorized as a IEEE-SA standard (P1484.12) on June 12th, 2002.

Fig. 4 shows a LOM database. A LOM database must be a relational database and form must be Excel data. Now, a LOM database has 96 data Items like ID number of data items, title, abstract , thumbnail and so on.

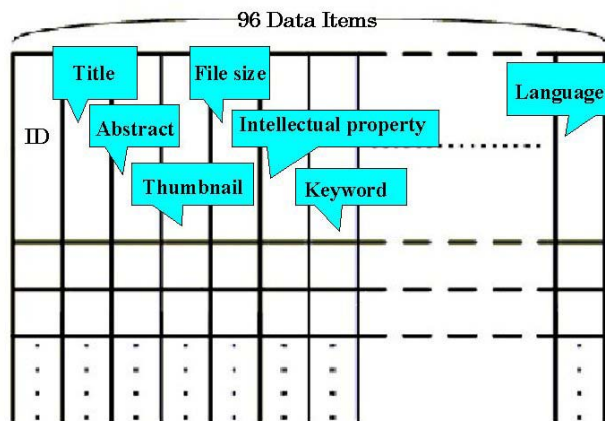


Fig. 4 Outline of a LOM database (IEEE-SA standard)

4. The bulletin board for ubiquitous-networking corresponding multi-career

The description method of the contents on the Mobile computing varies from 3 types of cellular phones, i-mode, EZWeb and J-SKY in Japan.

As seen from a multi-career correspondence view, there are the following problems:

- Inefficiency of the individual contents creation for 3 types of cellular phones
- The extendibility to a new standard is low.
- URLs accessed by 3 types of cellular phones are different.

The anywhere anytime paradigm are realized by the extensible Markup Language (XML). First of all, all of the data written in the bulletin board and the data which can be displayed are saved in XML form. Then the screen data of the bulletin board created by XML are transformed automatically, using XSLT.

Fig. 5 shows the description method of contents, CHTML, HDML, MML, respectively.

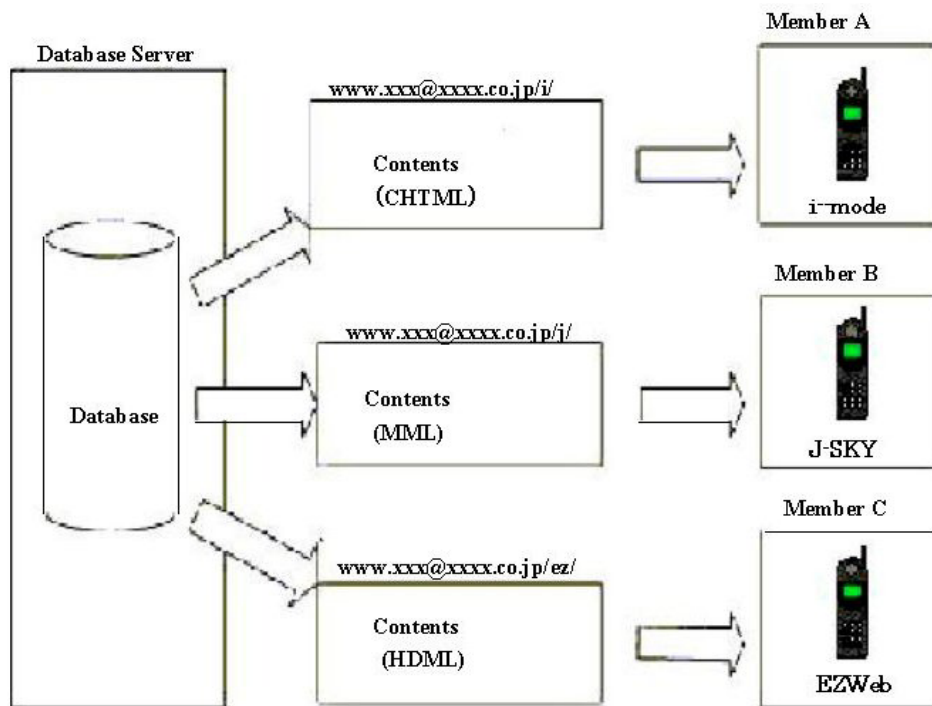


Fig. 5 the description method of contents

Fig.6 shows the automatic content transformation flows, corresponding to each cellular phone.

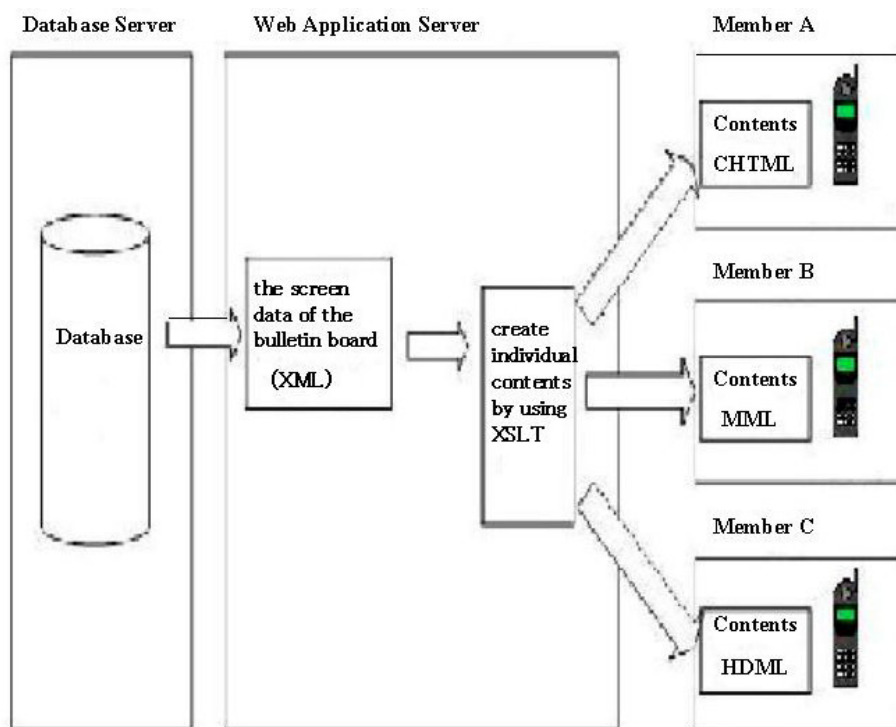


Fig. 6 Automatic content transformation flows

An administrator does not need to create individual contents for each cellular phones, and creation and management of contents become easy, as the Mobile computing of one-source multi-use styles.

Moreover, by adding XSLT, a correspondence new model can be easily added. It is easily extensible. Any user can access the same URL from any types of cellular phones, i-mode, J-SKY, or EZWeb.

5. LOM creation tool and Digital-archives reference support system

The search engine of the digital archives refers to the keyword contained in LOM by NICER, as shown in Fig.1. So all the contents in the digital archives should form the LOM database and this LOM database should provide NICER. Therefore, as shown in Fig.6, each file of digital archives is change into the items of the LOM database by hand, one by one. In order to reduce the man-power and cost, LOM creation tool has been developed by using the visual BASIC (VBA). Fig. 7 shows the flow of a tool.

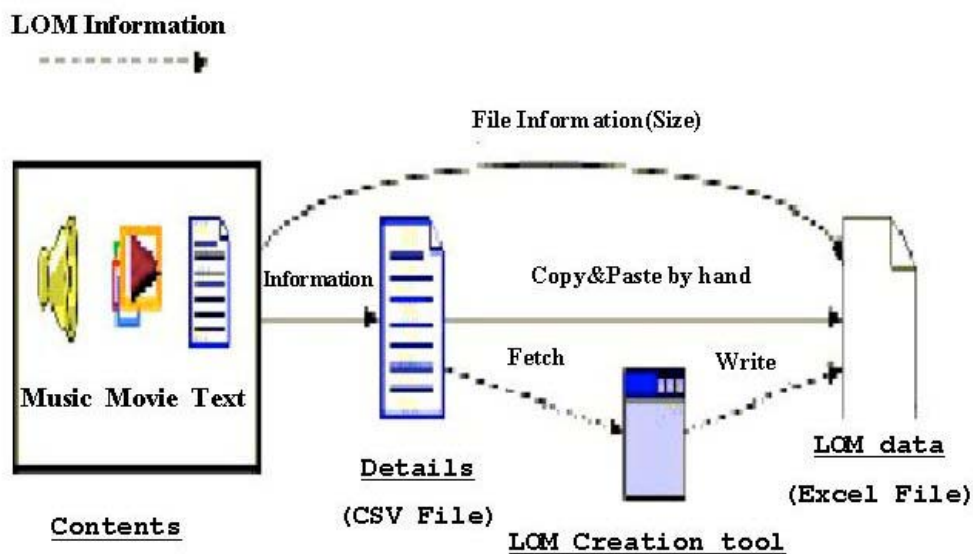


Fig. 6 Flow of LOM creation tool

7. Conclusion

Authors emphasize that learners, especially children should be able to use every digital Cultural Heritage for education, as a digital Cultural Genes. In this paper, authors propose new creation tool in order to backup e-Japan strategy.

Anywhere anytime paradigm of Mobile and Ubiquitous-networking becomes more popular for learners to utilize the knowledge-base made by GENES society.

References

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