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Some issues in the international collaborations for the sharing and re-use of digital learning materials

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Brief description of Lecture(including its purpose: **This paper is on the current international collaborations for the sharing and re-use of digital learning content. The purposes are to share the philosophy and concepts for learning content sharing and to exchange ideas with other cyber learning communities in Korea and APEC countries for the future collaborations.**	
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Abstract

Objectives

In this paper, the current situations in sharing and reuse of digital learning materials in Japan and in the world were reviewed and several issues were shown.

Linkages

The target audiences are professors, teachers, administrators, researchers, learning/teaching support staffs, or other professionals who are interested and/or engaged in the production, development and/or utilization of sharable and reusable learning content.

Methodology

Our lecture is based on our international/domestic surveys on Learning Object repositories and metadata referatories and case studies through our own pilot practices on sharing and reuse of digital learning content.

Result of the research

In FY2004, while NIME launched a new Japanese gateway service for digital learning resources in higher education which is called “NIME-glad (Gateway to Learning for Ability Development), she established a global alliance for the sharing and reuse, which was named with GLOBE (Global Learning Object Brokered Exchange), with other four overseas organizations. In GLOBE, towards the commencement of the official services in 2007, both technical and business issues in the global level are examined. Architecture of federated search services, reusability of learning object (LO), copyright processing, quality assurance, cross-linguistic / cross-cultural issues are of such main issues.

Abstract

In this paper, the current situations in sharing and reuse of digital learning materials in Japan and in the world were reviewed and several issues were shown. In FY2004, while NIME launched a new Japanese gateway service for digital learning resources in higher education, which is called “NIME-glad (Gateway to Learning for Ability Development)”, she established a global alliance for the sharing and reuse, which was named with “GLOBE (Global Learning Object Brokered Exchange),” with other four overseas organizations. In GLOBE, towards the commencement of the official services in 2007, both technical and business issues in the global level are examined. Architecture of federated search services, reusability of learning object (LO), copyright processing, quality assurance, cross-linguistic / cross-cultural issues are of such main issues.

1. Backgrounds

The utilization of high-quality digital learning materials is one of the essential requirements for further progress of educational reform using Information Technology (IT). Under the limitation of human and financial resources, it is a common issue among many countries or institutions how we can maintain the sustainability of their development, accumulation and utilization. Sharing and reuse of digital learning materials is a solution and the concept of “Learning Object (LO)” is an example.

With the progress of internationalization in educational fields, borderless distribution of educational content is increasing. We need to share the minimum understandings and frameworks in order to maintain the quality of education and learning and to facilitate “cross-border” sharing and reuse of the content.

1.1 Learning object

The definition of LO by the Institute of Electrical and Electronic Engineers (IEEE, http://www.ieee.org/) is "any entity, digital or non digital, that can be used for learning, education or training (IEEE, 2002)”. However, many other definitions gave LOs narrower connotations;

(1) LOs are *digital learning materials on the WWW*.

(2) LOs are *sharable and reusable*.

(3) While a courseware is a LO, the *materials/modules/components* of the courseware can be other LOs simultaneously. By preparing adequate and/or multiple levels of *granularity*, LOs can decrease their context-dependency. From the viewpoints of originality and autonomy, many universities and faculties cannot adopt the courseware that others developed. However, they still need the materials (i.e., parts) for their own courses in order to improve their own teaching.

(4) Each LO has *metadata*. By describing in various metadata items, both copyright holders and users can utilize the various information on the content, that is, locations and attributes, quality, the price and other permission conditions, “how to use the content" and so on.

(5) LOs in a small size can be developed *with the small financial resources* or by the limited number of developers. It means even an individual, such as a teacher or a professor, can be a quality content provider on the Internet.

In addition, while the concept of LO is compatible with that of “open-source”, commercial LOs are also possible.

1.2 Technical standards

The development of international standards on LO has been promoted by the some standards organizations, such as IMS Global Learning Consortium (http://www.imsglobal.org/), Advanced Distributed Learning (ADL, http://www.adlnet.org/), IEEE and International Organization for Standardization (ISO). According to a diagram shown by IMS Global Learning Consortium, a standardization process consists of (1) the development of specifications, (2) implementation and reference models and (3) the development of standards. LOM (Learning Object Metadata) ver. 1.0 was developed as standards by IEEE. SCORM (the Sharable Content Object Reference Model) 2004 has been released by ADL and is in the process of the global implementation. One of new standards for the learning content repositories, CORDRA (Content Object Repository Discovery and Registration/Resolution Architecture; http://cordra.lsal.cmu.edu/cordra/; Rehak, Dodds & Lannom, 2005), is also launched by ADL, Corporation for National Research Initiatives (CNRI, http://www.cnri.reston.va.us/) and Learning Systems Architecture Lab (LSAL, http://www.lsal.cmu.edu/).

2. Domestic and international services for sharing and reuse of LOs

After 1990s, in North America, Europe and Oceania, several consortia for co-developing and sharing digital learning materials have been organized among universities and other educational sectors, and they have constructed referatories of metadata and repositories of learning materials on the WWW. In Japan, while NIER (National Institute for Educational Policy Research) has constructed NICER (National Information Center for Educational Resources) mainly for K-12 Education in FY2001, NIME started the Educational Information Portal Services in FY2003.

Besides, some leading consortia for sharing and reuse have recognized the difficulties to reach the “critical mass” of learning materials by themselves. They consider that sharing content and metadata among the consortia is one of the effective strategies to reach the goal.

Table 1 Consortia for sharing and reuse of digital learning resources

Name of the consortium (country or region)	Founded year	Participating organizations	Number of Learning Materials	Special features
ARIADNE (EU)	1996-	51 organizations (announced only)	2,526 Restricted: 1842-	Knowledge Pool System (Repository) GLOBE member
ProLearn (EU)	-	19 universities	-	
EducaNext (EU)	-		700+	managed by UNIVERSAL
MERLOT (International)	1997-	23 university systems / universities / colleges	12,161	Referatory Peer-review system GLOBE member
CLOE (The Co-operative Learning Object Exchange, Canada)	2002-	25 universities / colleges in Ontario and Newfoundland Province	-	Peer-review system
CAREO (Campus Alberta Repository of Educational Objects, Canada)	2000?-	Educational sectors in Alberta Province	4,124 objects	Peer-review system
EduSourceCanada (Canada)	2001-2005	6 primary and 30 secondary partner institutions	-	Project finished GLOBE member
LORNET (Canada)	2005-	6 universities and several business partners	-	Research-oriented
education.au limited – EdNA online (Australia)		digital libraries, cultural image libraries, metadata repositories, learning object repositories in Australia and New Zealand	30,300	K-16 and vocational education Distributed Search Manager (DSM) GLOBE member

NICER (Japan)	2001-	Independent institution	150,000+	for K-12 education
NIME-glad (Japan)	2005- (NIME:1978-)	Independent institution	100,000+	For higher education and life-long learning GLOBE member
TIES (Japan)	1997- (basic system)	Tezukayama University and 12 private universities, 6000+ users	4,500+	Free CMS
Cyber Campus Consortium (CCC, Japan)	2002?-	176 universities and 956 faculties	-	Managed by JUCE (Japan Universities Association for Computer Education)
OCW (USA) and overseas partners	2002	MIT, 3 US universities, JOCW, Universia	900+ courses (MIT)	

Others: LEARNet (Hong Kong),

2.1 Recent trends overseas

In several counties or regions, collaborations between the consortia that manage learning content repositories and/or metadata referatories had been started. For example, eduSourceCanada was a Pan-Canadian umbrella organization for provincial repositories / referatories.

In addition, some new trends for global alliance have become clear. In the September of 2004, NIME established a global alliance (Global Learning Objects Brokered Exchange, GLOBE) with four leading organizations in each region, that is, ARIADNE (EU, Alliance of Remote Instructional Authoring & Distribution Networks for Europe, http://www.ariadne-eu.org/en/, Duval, 2003), education.au limited (Australia, http://www.edna.edu.au/), EduSourceCanada (Canada, http://www.edusource.ca/, McGreal et al., 2004; Carey & MacLeod, 2005), and MERLOT (North America, the Multimedia Educational Resource for Learning and Online Teaching, http://www.merlot.org/, Hanley, 2003) in order to facilitate the international exchange and sharing of LOs (GLOBE, 2004).

In the autumn of 2002, Massachusetts Institute of Technology (MIT) launched a new

innovative project that serves to the global knowledge-based society and to potential learners all over the world (Open Courseware, OCW, http://ocw.mit.edu/index.html). At present, several consortia based on the OCW concept are launching in Japan (JOCW, http://www.jocw.jp/), Latin American countries (http://mit.ocw.universia.net/), China (China Open Resources for Education, CORE, http://www.core.org.cn/en/index.htm), Vietnam (Fulbright Economics Teaching Program OCW、http://ocw.fetp.edu.vn/) and France.

International Organizations, such as the Commonwealth of Learning (http://www.col.org/), also consider sharing and re-use of digital learning materials will be one of powerful solutions for the dissemination of higher education in developing countries (cf. Daniel, 2005).

In other countries, metadata referatories or digital libraries are being developed, such as The Korea Education and Research Information Service (KERIS, http://english.keris.or.kr/) in Korea.

2.2 Recent trends in Japan

Japanese Government strongly pushes the dissemination of Japanese digital content to the world in “e-Japan Strategic Plan II (http://www.kantei.go.jp/foreign/policy/it/0702senryaku_e.pdf). We have still many issues to be solved, such as human resources and capacity building program in this area, infrastructure of content distribution, quality assurance system for the content, and social and legal agreements on content copyright processing.

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) supports the development of quality learning content in higher education and in lifelong learning. While “Modern Good Practice Program” is to assist the improvements of teaching in higher education, ”Grass-roots e-Learning System” is to support new service prototypes for vocational training.

In the March of 2005, NIME launched a new gateway service for higher education which is called “NIME-glad (Gateway to Learning for Ability Development)”. In the September of 2004, NIME established a global alliance (Global Learning Objects Brokered Exchange, GLOBE) in order to support international exchanges of high quality learning materials.

3. The current situation and perspectives at NIME: A Japanese model

NIME is an Independent Administrative Institution, and the mission is to support Japanese and overseas institutions for higher education or life-long learning, in the context of the educational reform using IT. Under the recognition that the accumulation and utilization of high-quality digital learning materials is one of the critical factors for the further progress, NIME planned the grand design of “NIME Digital Learning Content Site”(cf. Yamada, et al., 2005), and has promoted the researches and the implementation of the results. NIME constructed a nationwide infrastructure for sharing and distributing digital learning materials, and gave it various functions as a gateway for domestic and overseas users. In the end of FY 2004, NIME has just launched a new integrated service for learners, called "NIME-glad (Gateway to Learning for Ability Development), and is accumulating metadata and learning content in the repository and referatory (Figure 1).

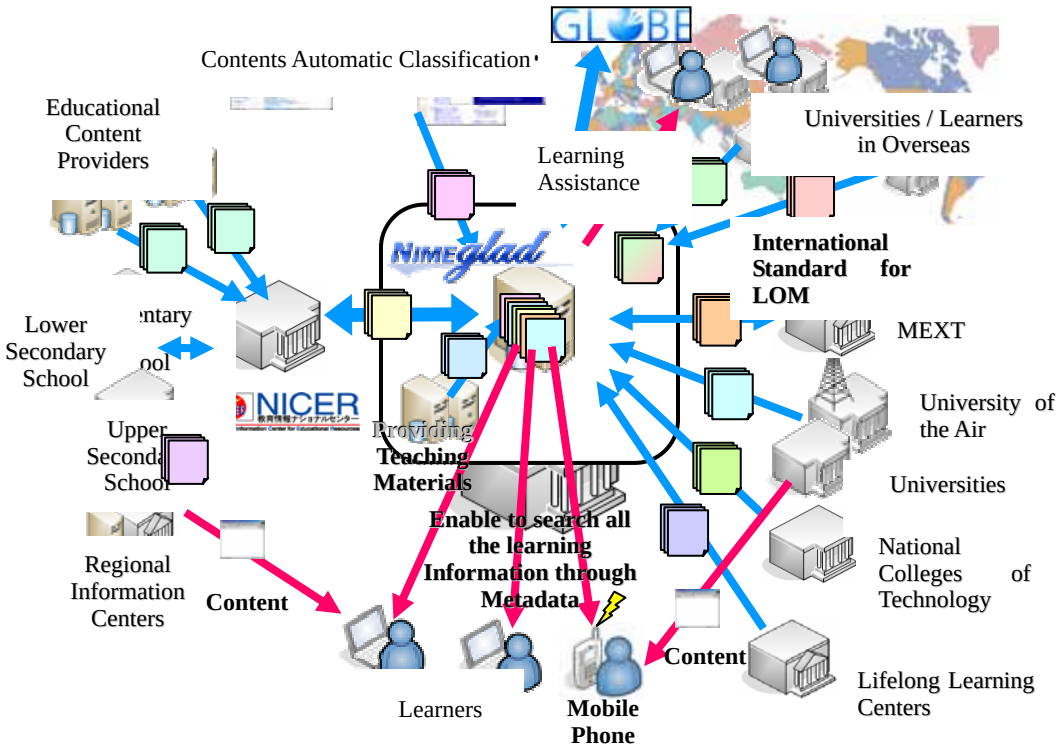

Figure 1 Grand design of “NIME-glad (Gateway to Learning for Ability Development)” (from NIME handbook, by Shimizu, Y.)

3.1 NIME-glad as a nationwide infrastructure (http://nime-glad.nime.ac.jp/)

In the mid-term plan of FY2004-2008, building-up a national infrastructure for the sharing and distribution of digital learning resources is one of NIME’s strategically

important goals. While NIME had already begun several services before, NIME integrated them into the new “NIME-glad” system (Shimizu & Hanley, 2005). In order to cope with various needs and requests from universities and colleges, it has multiple

Figure 2 An English page of “NIME-glad”

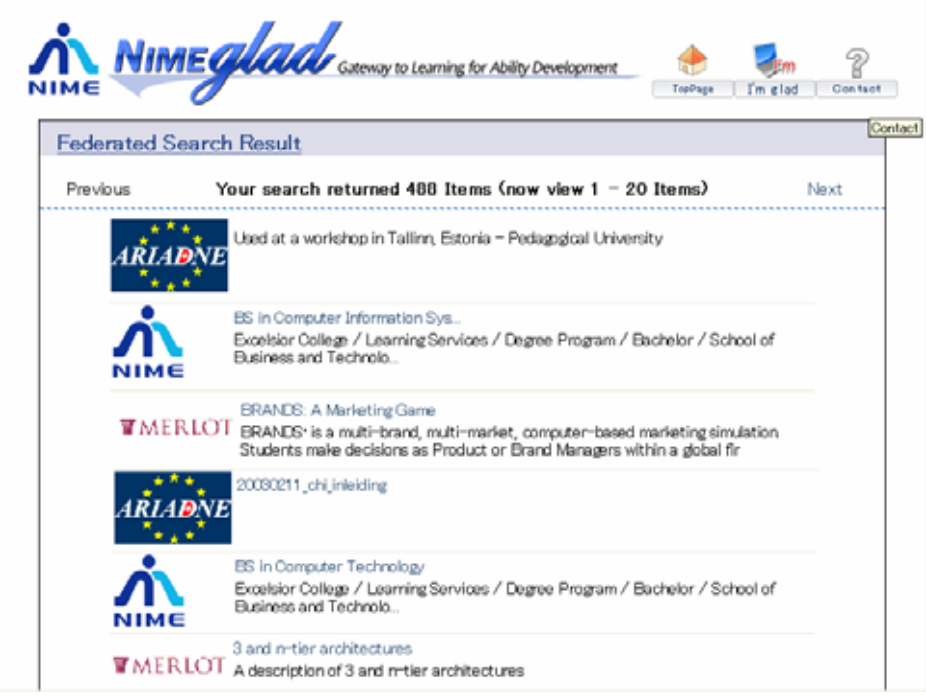

Figure 3 A result of the federated search in GLOBE framework

services, such as metadata referatory, content repository, course management system and so on. The information portal services using mobile phone system is also one of value-added functions.

It contains learning/instructional materials, course-authoring tools, pros and cons of IT-based practices of education, and college syllabi information.

In addition, “NIME-glad” is expected to function as an international gateway to overseas institutions and learners. It has English homepages for delivering Japanese content (Figure 2) and has already started new federated search services under the collaboration with GLOBE members (Figure 3). At the first stage of our federated search service, simple query search is available via ARIADNE search system based on SQI (Simple Query Interface, http://www.ariadne-eu.org/). The search results from each referatory are merged and shown in the fashion that each member decided.

3.2 Collaborations with various repositories in Japanese institutions and consortia

We have a special partnership with NICER (National Information Center for Educational Resources). While NIME aggregates LOM-based metadata mainly for higher education and lifelong learning, NICER accumulates LOM originally for K-12 education. Both institutions exchange each other metadata periodically and keep the set identical.

In FY2002, NIME organized a consortium of consortia, that is, a meta-consortia to find out solutions cooperatively to common issues among member consortia (“the Consortium for Supports to IT education”, the current member consortia are shown in Appendix 1). All of members are focusing on e-learning and/or improvements of higher education by IT use. One of their current issues is how to realize sharing and co-use of learning content. As “the Consortium for Supports to IT education” is based on various academic fields and funding bodies, we expect this consortium will play an important role in the process of shaping agreements for the sharing and reuse of learning materials.

In addition, several other consortia have begun the services for sharing digital learning resources, such as Japanese Open Courseware (JOCW, http://www.jocw.jp/), TIES Consortium (http://www.tiesnet.jp/) and Cyber Campus Consortium (CCC, http://www.juce.jp/katsudou/ccc.htm). NIME examines how we can collaborate and support with such consortia in the development and utilization of learning content.

In some of new government policies, such “Modern Good Practice” program and “Grass-roots e-Learning System” project, MEXT plans to accumulate the outcomes in NIME’s repository in order to disseminate them as prototypic quality learning content.

NIME will support the dissemination processes also.

3.3 Perspectives

Most of Japanese universities and colleges will begin to construct their own content repositories and metadata referatories hereafter. Now, we need some standards and reference models in order to avoid unnecessary complicatedness in inter-institutional distribution system of digital learning content. Under the cooperation of Japanese standardization bodies, such as Japanese e-Learning Consortium (eLC, http://www.elc.or.jp), we plan to examine the possible solutions.

4. The current situation and perspectives in GLOBE: An international model

In GLOBE, our first concern is the construction of federated search system across multiple referatories. The Technology Council started discussion to reach the possible solutions. Other value-added services, such as copyright processing and quality assurance, will be discussed in the future. At NIME, most of our content is in Japanese and we need “localization” processes in several aspects from both technology and business viewpoints.

On the globe, many higher educational institutions have just launched or planned their own learning content repositories. In order to share the content more seamlessly, it is necessary to have both the common framework for exchanging and reusing the content and the reference models of the content repository. NIME and GLOBE have started to examine such possibilities under the collaboration with international standards bodies.

4.1 Organization and basic agreements of GLOBE in Phase I

The initial five members, that is, ARIADNE, education.au limited, eduSourceCanada, MERLOT and NIME, had agreements on the organization and the initial goals. They organized Technology Council, Stewardship/Business Plan Council, Communications Plan Taskforce and GLOBE Website Taskforce. We have just built simple federated search networks (Shimizu & Hanley, 2005) and launched the GLOBE Website (http://globe.edna.edu.au).

4.2 Perspectives

In the initial agreements, GLOBE plans to start official services and to open the organization on 1st January 2007. In the phases of the preparation period, we will

develop guidelines and use cases on technical and business issues. In the process, it is indispensable to have opportunities to hear requests and comments from international or domestic institutions / repositories as potential members in the future, and to have collaboration with international standardization organizations. We have many issues to be discussed, such as interoperability of advanced federated search service, reusability of LO (cf. Robson, 2005, http://www.reusablelearning.org/), copyright processing, quality assurance, cross-linguistic/cross-cultural issues.

5. Prospects: Towards Global Knowledge-based Society

Sharing and reuse of digital learning content should be understood in the more holistic viewpoint of knowledge sharing in knowledge-based society (Yamada, Kogawara & Shimizu, 2004). At present, many LO sharing consortia predict that a broader alliance among them will be effective and efficient to reach "critical mass" for drastic spread of digital leaning content. To reach the goal, we should share some basic concepts and frameworks in technical and business aspects. In technical aspects, we need some agreements on the reference models and standards for federated search and other repository functions, technical innovation in cross-language machine translation and so on. In the business aspects, we need some agreements on copyright issues and cross-cultural issues. One of copyright issues is the agreements on "fair-use" and "exemptions for educational uses" or "open source" (for example, "the Creative Commons", http://creativecommons.org/) . The standardized description of Rights items in metadata is also an important issue (cf. http://www.xrml.org/). In the international collaborations, cultural plurality works both as a merit in some contexts, and as a demerit in other contexts. Especially in the education for the younger generation, we should stand on the mutual understanding and esteems in the multicultural society. In addition, the uneven distribution of digital learning resources should be overcome under the collaboration between developed countries and developing countries. NIME hopes to have some constructive commitments in the international cooperation as a national center and as an international gateway in this field with other Japanese educational institutions.

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Appendix 1. The current member consortia of "the Consortium for Supports to IT Education" (a meta-consortium, as of 1 July 2005). Some of the English names of the consortia are not official.

Member Consortium	The main mission & Levels	Participating Institutions
from FY 2002		
Consortium of Technical Universities for Distance Collaborative Education	Sharing *courses* in master program	12 technical universities
SANGAKU VU Consortium (Consortium for Virtual Universities by Collaboration between universities and industries)	Sharing *courses* sponsored by Japan Inst. for Social and Economic Affairs (Business and Technology)	Waseda Univ, Keio Univ, Doshisha Univ, Kyoto Univ, Tokyo Inst. of Tech., Univ of Tokyo and NIME
Consortium of Veterinary Colleges	Sharing *learning materials* (Animal Pathology)	16 veterinary colleges
Consortium of 4 universities for Collaborative Education	Sharing courses in distance education	Four national universities in Western Tokyo area
from FY2003		
Consortium of Educational Information and Computing Centers in National Universities	Sharing *learning materials* (Information, Information Literacy)	12 national universities (Hokkaido Univ., Muroran Inst. of Tech., Tohoku Univ., Univ. of Tokyo, Nagoya Univ., Nagoya Inst. of Tech., Kyoto Univ., Osaka Univ., Wakayama Univ., Hiroshima Univ., Kyushu Univ., Kyushu Inst. of Tech.)
Consortium of National Seven Universities for Foreign Language Cyber University Project	Sharing *learning materials* and co-developing a *Course Management System*	7 national universities (Hokkaido Univ., Tohoku Univ., Univ. of Tokyo, Nagoya Univ., Kyoto Univ., Osaka Univ., Kyushu Univ.)

Japan Council of Centers for Educational Research and Development at National Universities	Sharing *learning materials* and co-developing *curricula and Faculty Development (FD) Programs*	53 national universities, and NIME
International Network University Consortium	Sharing *courses* and *learning materials*	17 universities in Gifu area and Gifu Prefecture
Association of National Colleges of Technology (ANCT)	Sharing *courses* and *learning materials*	35 national colleges of technology
Project Committee for Space Collaboration System (SCS)	Sharing *Information and know-how* on educational uses of satellite communications systems	123 institutions (universities, technical colleges, governmental research institutes, others
from FY2004		
Bio-digital University Consortium	Sharing *learning materials* (Bio-engineering)	Osaka Univ. and three national universities
from FY2005		
The Consortium for the Research and Development of Educational Materials for Practical Skills of Judicial Professionals	Sharing *learning materials* *(Law, judicial skills)*	Nagoya University and national/private universities