研究論文

鳴門教育大学国際教育協力研究　第１号，63－69，2006

A Perspective of IT-Related Human Resource Development in International Educational Cooperation: Focus on the Lesson Archives

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要　約：本論文の目的は，開発途上国における IT 教育の基本的な問題点を指摘した上で，e-learning，特に授業アーカイブスのあり方に関する若干の考察を行い，その基本的な問題点を明らかにすることである．レクチャ，エキスパート，トレイニーの３つのカテゴリー別でアーカイブスの役割を述べた上で，その問題点を技術面（ファイルサイズと配信方式，データ収録・編集技法），運用面（研修員の IT 能力拡充，省力化，キラーコンテンツ確保），法規面（著作権，肖像権，個人情報保護），利用面（メンタリング，情報モラル）から整理した．

Key words：Lesson archives, IT education, teacher training, mentoring

1. Locus of the problem

Held through a vote of the United Nations General Assembly, the World Summit on the Information Society (WSIS: Geneva 2003, Tunis 2005) confirmed the importance of IT in supporting both the content and methodology of basic education in developing countries. Considering that progress is being made in preparation of infrastructure and communication system improvements in developing countries, and in international cooperation toward elimination of the digital divide, it may be said to be necessary to reinforce practical methodologies for supporting and promoting IT education and the fruits thereof among teachers in developing countries. In particular, in connection with fostering of IT human resources –a difficult area in which to achieve sufficient results in a short time– in response to the needs of parties involved in international cooperation to somehow maintain the IT skills that were improved through training, this paper focuses on archives that effectively sustain and disseminate the training results. After pointing out the basic problems in IT education in developing countries, this paper makes a few observations concerning the state of affairs surrounding lesson archives and clarifies their basic problems.

2. Basic problems in IT education cooperation toward developing countries

2.1 Overview of support for IT education

IT education cooperation includes the instruction of IT skills as an independent field (IT Education) as well as the use of IT to facilitate education (IT for Education). These two aspects are not easily separated; however, they each have a different main focus. The former needs to be considered at the level of basic IT skills education (word processing, spreadsheet software, etc.) and at the level of IT engineer education within higher education (network administration, content development, etc.). In the case of the latter, knowledge management (CD-ROM conversion and distribution of content, database utilization and information sharing) and online exchanges and remote learning (e-mail, BBS, E-learning) are the core, and IT support is necessary not only for improving literacy but in almost all existing areas.

2.2 Problems in support for IT education

(1) Implementation of support based on a long-term vision

Compared with other fields, the pace of advances in knowledge and skills in IT is rapid. If a bottom-up approach involving local surveys to research the IT conditions of the country in question, by the time the donor country accepting the request actually conducts support, the technology may already be obsolete. It is necessary to have ongoing, periodic renewals of both hardware and software.

(2) Securing of native language content

The problem of hardware, such as infrastructure improvements and procuring of computers, is the assumption of IT education support. Equally important are the imparting of a vision for what can be done with IT, and the improvement of content. Not only is it important to provide attractive content in the developing country's native language(s), without support for fostering of development capabilities, the securing of ongoing IT skills cannot be expected.

(3) Development of IT education models

Training of IT human resources is essential to the promotion of ongoing computerization in developing countries, and it is important to make many education support models using IT. It is necessary to develop models for ideal IT education, including online teacher training, improved follow-up to training in Japan, and on-demand support for the developed IT human resources.

(4) Appropriate IT/non-IT balance

IT enables both synchronous and asynchronous exchanges of opinions and information, as well as time and labor savings through concentration of knowledge and information. However, it is by no means an "all purpose" tool. In particular, in the area of IT for education, it is important to recognize the extent of what can be covered by IT, and what are its limits. For example, even though e-learning is generally effective in the transmission of knowledge, it is not well suited to technology transfers, at least not unless augmented by workshops, online meetings, etc.

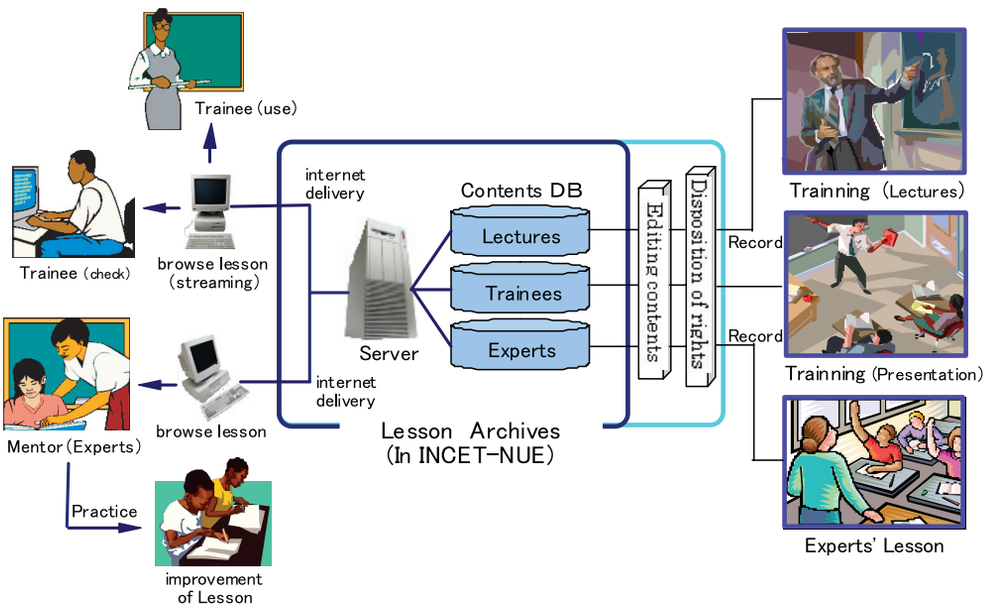
(5) Cultural impact considerations

Because the Internet environment resulting from open access policies has a huge cultural impact on developing countries, there are some countries which restrict web page browsing through the use of proxy servers. This is a political matter, and cannot be decided by donor country. It is necessary to provide support with an awareness of the cultural impact in many dimensions of IT-enabled information access.

As mentioned above, in developing countries as well, the improvement of currently active teachers' IT skills and improvement of lessons are important issues, and there are demand for deliberation of IT education with the aim of improving the quality of education. At the same time, many international cooperation projects implementing teacher training are finding it difficult to sustain the leadership abilities that were improved through training in Japan. Toward comprehensive accommodation of these IT education and IT-assisted education aspects, this paper focuses on archives.

3. Systematic sharing of information through archives, and problems encountered in use

It is not easy to obtain sufficient results in human resource development over a short period, and greater attention is being paid to sustaining and reinforcement of education results through remote lessons and video distribution, web conferencing and other forms of communication. Taking as given the diversification of curricula and variances in individual rates of progress, in order to assure that each individual will be able to enjoy fruitful study, an environment that assures online access to web databases, specialists and other intellectual resources is indispensable. And it is thought to be effective to use archives to conduct information maintenance and provide study opportunities in the context of augmenting widespread online sharing and use of developed training content, enhancing specialist efficiency and improving follow-up. With regard to configuration and administration of these archives, many international organizations are already involved with consolidation and use of intellectual assets that tend to be dispersed. Greater attention is being placed on new modes of learning through remote lessons, video distribution, online conferencing and other forms of communication. Progress is being made in archiving lessons toward management and effect utilization of intellectual content. Archives are situated as one part of an asynchronous learning/education support system that removes the time and spaces constraints on viewing of lessons, and through terminals connect to the internet, an environment is provided whereby the accumulated and publicly released videos can be viewed at any time. The conceptions that support these involvements are also applicable to human resource development in international education cooperative projects. Previously, in keeping with the status of developing countries' infrastructures, they were not pushed into the foreground. However, as improvements have been gradually realized in the developing countries' communication systems, reflecting the current trend moving in the direction of elimination of the digital divide problem, it is thought to be necessary to organize the underlying issues in discussing



the modes of developing country teacher training used in online distribution, etc. IT research section of International Cooperation Center for Teacher Education and Training, Naruto University of Education, is promoting the securing of content in the following three categories at its website.

4. The three lesson archive categories

4.1 Lecture data

Training contents are digitized according to the three aspects of (a) lecture content, (b) utilized information/ materials, and (c) student evaluation; the digitized contents are compiled into an archival database that can be referenced at any time after returning home to the developing country. This becomes a resource for local specialists, and the trainees whose interest has been stimulated can repeatedly review the lecture material after returning home. Because training in Japan is done in English, in some cases it is possible that the participating currently active teachers may not have sufficient English ability to comprehend the lecture content. Accordingly, through effective linkage of the training in Japan and the follow-up after return to the trainees' home countries, it can be expected that improved comprehension of the training content and longer-term sustenance of the training effects will be facilitated. The main problem in configuring this database is arriving at a common understanding among the lecturers concerning the collection of content. Even if selective and limited, since making public the lecture contents ties into appraisals of the lecture by the outside world, it is necessary to seek the understanding of lecturers, stressing the need for accountability, concerning public disclosure of the training content.

4.2. Expert data

Normally, the training in Japan of currently active teachers from developing countries places importance on observation of excellent class exercises by expert teachers in Japanese elementary and junior high schools, as well as on participation in local class workshops. However, the understanding that these Japanese expert teachers manifest toward their students and the practical aspects of their student-centered instruction methods, as well as the lesson study culture, etc., are not sufficiently apprehensible through just a brief training period's observation opportunities. It is thought that many things can only be understood in retrospect, upon implementing on one's own the lessons and lesson studies after returning home. Accordingly, it is desirable to archive the lesson practices of experienced teachers so they can be referred to after trainees return to their home countries. The practices of experienced teachers and the analyses thereof shall be organized and accumulated as expert data. The main subjects referencing this data shall be returnees; however, if teachers planning to visit Japan for training were given opportunities to view this material prior to their arrival, it can also be expected to be of some value in helping to maximize the results of their training. The main problems in configuring this database will be the selection of experts and the securing of lesson content. In any case, these problems would seem to be solvable only with the cooperation of teachers in the various affiliated schools and teachers in leadership positions

at regional workshops, etc.

4.3. Trainee data

With training in Japan, in order to demonstrate the training results, it is common to have trainees execute lessons or give presentations periodically. This archived data of trainees in action is accumulated as trainee data. This serves to facilitate monitoring of the state of progress of teacher training, and the trainees themselves can look back over this material as a record of their studies, thus obtaining a more objective perspective on their lessons. This environment has the potential to facilitate improvement of lessons. Also, it would be possible to set up a BBS in parallel with this database to encourage communication among past and present trainees and teachers. This would support discussions among trainees concerning areas to improve in each other's lessons.

It is though that the main problem in configuration of this database would be the need for protection of trainees' personal information (discussed below) on the one hand and the need for open discussion concerning the training process on the other. Since this database serves primarily as a digital portfolio pertaining to the trainees, after discussing the scope of public disclosure, it will be necessary to restrict access through the use of a password confirmation system.

4.4. Common problems

Let's consider, from technical, operational, legal and utilitarian perspectives, the common problems pertaining to promoting and firmly establishing the use of these lesson archives.

(a) Technical

<File size and distribution method>

In order to simplify securing of video data in the narrow transmission bandwidth environments of developing countries, it is necessary to minimize as much as possible the file size through compression and reduction of the color palette; however, as image quality worsens it becomes more difficult to comprehend the expressions on children's and students' faces, as well as what is written on the blackboard, etc. Accordingly, it may be necessary to edit lessons to make them more compact, or split lessons up into shorter parts that can be more easily distributed in narrow-bandwidth environments. However, in the event such approaches are employed, it will be necessary to split up each lesson –which is an extended narrative– into meaningful parts according to the content. Also, from the perspective of copyright issues (discussed below), it is thought that distribution perhaps should not be in the form of downloads, but rather should take the form of streaming video. In that case it will be necessary to ameliorate user stress when buffering.

<Data recording and editing techniques>

Normally, archiving of lectures at a university will use an automated video recording system to promote labor savings. This is often a multi-angle, fixed-camera approach. However, when archiving workshops, presentations, and other participation-type lesson content, methods of recording and editing that provide content with a high level of ambience will be necessary.

(b) Operational

<Improvement of trainee IT performance>

In expanding archive access opportunities and utilizing the content therein, it will be necessary to include some practical IT skill training among the content of training to be conducted in Japan. Since developing country trainees' IT skill level varies according to person even more greatly than in Japan, several courses should be designed according to initial skill level so that during short-term training even beginner level classes will be able to extract information as needed from the archives and be able to view lesson videos.

<Mentoring>

Particularly for teachers who still have insufficient IT knowledge to experience obtaining and using online materials, no amount of verbal instruction will impart a realistic sense for the practical potential of the archives. Accordingly, it is necessary to engage in mentoring activities whereby trainees are helped through usage examples to visualize the abundant potential for IT utilization. Since the lesson archives are primarily aimed at use in developing countries, the collaboration of local specialists as mentors will be indispensable

<Labor savings>

Raw data cannot serve as teaching material. The purpose of archiving is not simply to store lessons, but rather to reinforce and support the results of training. Accordingly, it is necessary to promote viewer comprehension through appropriate language capture and insertion of expert commentary. Furthermore, additional labor will be involved if metadata to facilitate searching is to be specified.

<Securing of "killer content" >

To play the devil's advocate for a moment, it should be pointed out that there are no guarantees the trainees will use the lesson archives for study after they return home. Even if great effort is expended in configuring the archives, if they do not contain appealing material, there is no reason to expect that anyone will want to access it. This point refers more to the

content of the training itself, but it will be necessary to come up with so-called "killer content" that powerfully attracts trainees and makes them want to view the material repeatedly –such as ways of developing inexpensive collections of teaching materials, successful administration methods for lesson studies, etc.

(c) Legal

Whenever intellectual information is converted to an open source format, there are always concerns about copyright, image right, security of personal information, and other rights-related issues. Concerning these legal aspects, there is no alternative but to obtain advance consent from all parties, through agreement forms on paper, concerning the purposes and uses of the video data that will be collected, including either a transfer of copyright or an agreement concerning online distribution. Particularly in the case of training records, since there is potential for problems of diplomacy to arise, it will be necessary to hold colloquy as much as possible with JICA and other organizations that promote training. Among the extremely sensitive issues are whether free access should be given or password restrictions imposed. It is important to ensure there is sufficiently high awareness of the content's usage and rights issues among all the parties.

(d) Utilitarian

Archives are an excellent resource, providing on-demand access to diverse public disclosure data; however, the archives themselves are not what support learning. Just as libraries need librarians to function, archives and studies based thereon require the existence of mentors who provide emotional support to their mentees, indicate successful models to them, encourage them to remain eager, promote written and video communication, and contribute to effective problem solving.

<Role of the mentor>

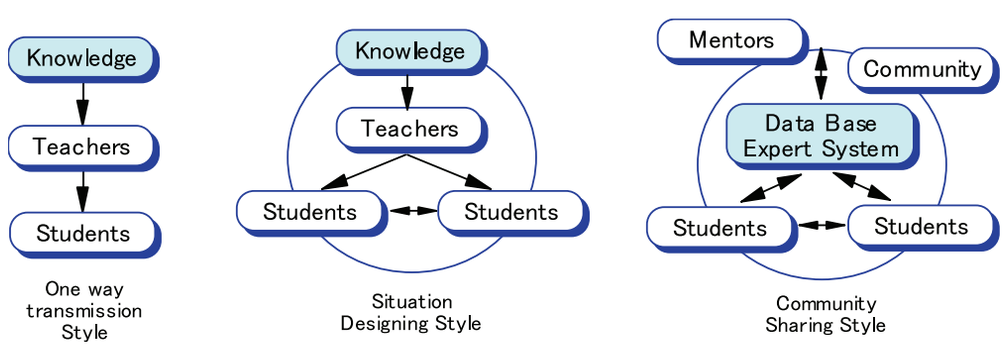
The basis of the mentor's activities is, based on acceptance and sympathetic understanding of the mentee, to use non-instructional advice to indicate a model accompanying success experiences. One problem observed in IT education is a tendency toward polarization among mentees in correspondence to their aggressiveness and eagerness –a variant of the digital divide problem. By this promotion of contact with success models, in can be expected that mentee proactivity and initiative will be drawn out and motivation to continue reinforced.

A mentor is neither to point out problems nor a transmitter of information, and neither does he have a monopoly on standards of correctness. At the very least, he does not authoritatively dominate learning. He must never go beyond offering advice and support at each stage. He is to give appropriate expression to his mentee's ideas and to coordinate the mentee's collaborative learning. He is to stimulate self-awareness of the mentee's status of comprehension, and, from a long-term perspective, to elicit the relationship between the mentee and society. The following shows three basic models for the modes of learning.

These three types are chosen depending on one's purpose. In the nature of the case, it is not possible to be dogmatic about which one is "best." However, in promoting IT education, the "coordination-mediation" approach is the most practical. Learning through the use of IT goes beyond mere self-instruction to involve the formation of new communities. Accordingly, the mentee must be supported to grow through collaboration with others and thereby maximize his individual potential.

<Information ethics in connection with archive utilization>

There is a responsibility to ensure the mentee's thorough legal compliance and performance of moral responsibility regarding handling of the data readily accessible through the archives. We are confronted by a mountain of issues in the raising of network citizens who use IT in a wholesome manner with an awareness of public decency. One problem that could be mentioned in the fostering of information ethics is the doctrinaire attitude in our teaching about the rules



that "copyrights must be respected," "personal information must be protected," etc. Even if we give explanations of reasons why, along with examples, we cannot expect effective nurturing of such mores through that alone. What is easily omitted in our fostering of information ethics is the broader perspective of how ethics are fostered in the first place. As a result there is not enough consideration paid to nurturing in stages. In order that our efforts do not simply begin and end in platitudes without any connection to what people really feel in their heart of hearts, it is necessary for the mentor to know the mentee's internal condition with regard to information ethics. At the very least, it is very important to keep in mind that ① ethics is not the passive internalization of norms, and ② problems of information ethics are not brought to a conclusion either by one's feeling sympathy for a person who has suffered harm as a result of some ethical hazard, or by feeling pangs of conscience or guilt over our actions. It is conceivable that we might have to face a somewhat "complex" ethical decision-making situation when we consider, for example, "should I make a copy of software for a friend who can't afford to buy it outright?" Through striving to balance his own information ethics dilemmas, the mentee can be expected to get beyond the stage of superficial obedience to rules, and, based on a correct understanding of the value of information, develop ways of thinking and behaving that are conducive to appropriate behavior in the international information society. In order that nobody become either a victim nor a victimizer in connection with use of the archives, while demonstrating to the mentee his own attitude as a participant in information society, the mentor should lead toward the adoption of an ever higher standard of information ethics.

5. Conclusion

After pointing out the basic problems in IT education in developing countries and discussing the state of affairs surrounding e-learning (particularly lesson archives) with regard to lecture, expert, and trainee databases, this paper organized the problem points from the perspectives of technology, operation, legislation, and utility.

Support for improvement of conditions for education utilizing IT, and provision of programs and the materials thereof to developing countries is also proposed by the Committee for International Cooperation in Education (2000). Rather than simply using websites for international educational cooperation projects, etc. for public relations purposes, it would be better to incorporate archives and use them to achieve more effective functioning of the projects themselves. For example, Naruto University of Education has experience providing technical support for multimedia utilization in cooperation with the Thai government executing "Project of the Capacity Building on the Development of Information Technology for Education." That experience shall be drawn on in cooperation with Oceania teacher training utilizing IT, which shall be implemented from this year. A major issue shall be empirical analysis of the effects of incorporating lesson archives into systems seeking the prolonged expression and spread of training results from international educational cooperation projects. For some time now, much excellent discourse has taken place concerning technical methodologies for learning the utilization of IT proper; however, discussion toward the steady advancement of international cooperation in the field of IT education is still in its nascent stage. In the future, still more in-depth, essential discussion shall be necessary, such as a reappraisal of IT utilization that centers on communication with mentees and other necessary conditions for the development of more desirable online communities, as well as the role of IT in human character formation, etc.

Notes:

1) IT support being developed by Japan consists mainly of the following four areas.
   ① Intellectual contribution to awareness building on IT's potential and strategy/system formulation;
   ② Personnel development (training, human resource development);
   ③ Improvement of information communications infrastructure and support for networking;
   ④ Promotion of IT utilization through aid.
2) In the broad sense, cellular phones and other devices can also be viewed as IT.
3) For example, JICA's "JICA-Net" (http://www.jica-net.com/) etc. is an operation that involves remote technical cooperation. It can also be expected that the World Bank's "GDLN (Global Development Learning Network)" will also use remote learning
4) However, there are many practical examples of remote lectures and conferencing using SCS communications satellites.
5) In view of the burden on networks, about 5-10Mb would seem to be about the limit.

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