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Contact Address
Informatics Department, Faculty of Information Technology,
Sepuluh Nopember Institute of Technology Surabaya
Gedung Teknik Informatika ITS,
Jl. Raya ITS Keputih Sukolilo Surabaya Indonesia
Tel. + 62-31-5939214
Fax. +62-31-5913804
Homepage: http://icts.if.its.ac.id
e-mail: icts@if.its.ac.id
PREFACE

This proceeding contains sorted papers from Information and Communication Technology Seminar (ICTS) 2007. ICTS 2007 is the second annual international event organized by Informatics Department, Faculty of Information Technology, ITS Surabaya Indonesia. This event is forum for computer science, information and communication technology community for discussing and exchanging the information and knowledge in their areas of interest. It aims to promote activities in research, development and application on computer science, information and communication technology.

We would like to express our gratitude to all technical committee members who have given their efforts to support this seminar. We also would like to express our sincere gratitude to our sponsors: Faculty of Engineering Kumamoto University Japan, IEEE Section Indonesia, PHK-A3 and Computer Society for great support and contribution to this event.

Finally, we also would like to thank all of keynote speakers, the authors, the participants and all parties for the success of ICTS 2007.

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COLLABORATIVE LEARNING MODELS FOR IMPROVING COURSE CONTENT QUALITY IN EASTERN PART OF INDONESIA UNIVERSITIES

Achmad Affandi
Laboratory for Telecommunication Networks, Center for Information and Communication Technology, Institut Teknologi Sepuluh Nopember, ITS Campus, Surabaya 60111, email: affandi@elekt-eng.its.ac.id

ABSTRACT

Important growth of higher education development in Indonesia mostly focused in Java Island, hence significant gap has been realized between graduates of most universities in Java and those of universities in eastern part of Indonesia. Development of inter-university backbone networks (INHERENT - Indonesian Higher Education Networks), has been carried out in order to minimize such an important gap. Some important notes are delivered taken from lesson learned from previous projects in order to improve future works on ICT learning models. Three collaborative learning models proposed are organizing courses through e-lecture, organizing joint courses and implementation of e-learning platform using Learning Management System and Content Management System.

Important challenges of model proposed are commitment of institution toward Information and Communication Technology (ICT) based learning development and providing proactive human resources and unit in implementation.

Keywords: virtual university, e-learning, virtual laboratory, collaborative learning

1 INTRODUCTION

Organizing higher education courses in eastern part universities is challenging works. In order to achieve successful class, lectures should be highly motivated within limited environments, including facilities, capacity of human resources and availability of good course contents and materials.

Since development of Indonesian Higher Education Networks (INHERENT) in 2006, it should become a huge communication bridges for universities to improve the learning process, especially in eastern part of Indonesia. Previous works and studies [1,2,3,4] have proven that ICT may offer large number advantages of learning methods and approaches including e-books, e-library, e-learning, e-lectures, virtual class, virtual university etc. Those methods end to offer learning material availability, possible alternative learning approaches and finally may improve quality of learning process.

However, availability of huge communication bridge apparently is not enough to improve quality of learning process. From our experience in one year PREDICT ITS (2006-2007) activities over INHERENT, among challenging environments, most helpful condition is when interpersonal and inter institution communications are built. Lectures from eastern part of Indonesia universities could meet their appropriate colleagues from other resource university (i.e. ITS), to be peer partnership for developing course contents for their classes. Such an activity is one example of introducing quality improvement in learning process.

Main objective of this study is to provide suitable and implementable collaborative learning models supported by ICT infrastructures and facilities for eastern part of Indonesia universities as the cases. Proposed models may be considered as optional reference of ICT based learning models. Their functions may reflect necessary requirements to be prepared by universities in order to improve their learning activities.

2 ICT BASED LEARNING MODELS

Information and communication technology progress allows us to access, to share any information to enhance our capacity. Some learning approaches using ICT may be introduced as the form of [1]:

1. CBT (Computer Based Training)

In principle, this expression describes any form of computer-supported training. However, the term is increasingly applied only to packages which are supplied for use on individual computers or...
within an internal network, and which are available in the form of a CD-ROM or DVD.

This model is a suitable option for learning environment that has limited communication access. Hence, using digital learning material packages, one may perform as student centered learning, or as reference in a certain training programs delivered by certified/professional trainers.

2. WBT (Web Based Training)

This model refers to the adaptation of CBT for use on the Internet. Such applications run on standard browsers, in contrast to classic CBT, WBT makes it possible to incorporate all forms of computer-based communication such as e-mail, chat rooms and news forums. On the other hand, because of the relatively narrow bandwidth currently available for many Internet connections, the use of elaborate animations and videos is still restricted when compared to CBT solutions. However, there is a great deal of interest in these technologies. Using common search engines, e-books, lectures, electronic learning and electronic learning conferences gave millions of hits.

3. Multi-media teaching/learning

This term can be used to describe any form of computer-assisted instruction which involves the use of various media (text, image, sound, video). Both CBT and WBT normally qualify as multimedia learning. Using nowadays multimedia development tools easily allow us to prepare comprehensive learning materials. However familiarisation of the tools need more efforts for most lecturers. Some usable tools are microsoft power point, macromedia flash, microsoft producer, etc.

4. Video-conferencing

This is an Internet-based training situation in which the participants can be in specially equipped rooms at different locations and can communicate with one another using a remote video system. Video-conferencing can include tele-lecturing and tele-discussions as methods of instruction. Previously usage of ISDN protocols were common, however IP based protocols using H.32x are most common used nowadays. Apart of hardware videoconference equipments, there are some software based videoconference available on the nets, such as Netmeeting and Skype.

5. Virtual Co-operation

This refers to an Internet-based form of instruction in which the participants work together using various computer-supported communications and co-operation tools. Other terms used for this are CSCL (computer-supported co-operative learning) or CSCW (computer-supported co-operative work).

It is not simple work to implement virtual cooperation activities among institutions. One of successful activities are described in the Finnish Virtual University [5]. Similar concept to the FVU which is on progress, is the implementation of PULSE (Public University Link System of East Java) [6].

2.1 e-learning Challenges

Introduction many electronic/digital learning tools and approaches to lecturers has been carried out. However, many educators are disappointed that electronic learning technologies have been accepted much more slowly than expected - the same problem as occurred when the Gutenberg Press revolutionized communication. [1] There are several common arguments. Many instructors have feared that widespread adoption of these technologies would lead to a loss of jobs. They are worried that Universities will offer courses online rather than hiring local people to teach. Institutions have found that producing online courses is costly and that few staff members have the expertise or the time to devote to these technologies. However, most instructors use some innovative technology - such as web pages and e-mail - as part of their teaching programs.

In term of learning process, we may distinct two approaches either from teacher centered and student centered learning models. ICT uses in both learning approach could be included as a tool, as learning resources development, as access to resources (as communication channels) and as collaborative system providers. For both approaches of learning, there is different weight of challenge in ICT functions and supports. Such a relation may be figured in the figure 1. [7]
2.2. e-learning Approaches

Use of ICT in learning process is not merely the use of technology. Peltonen [7] prompted us that clear pedagogical idea and simplicity are still keys to success. In addition activating students to work together with a topic promotes good and deep learning. Novel e-learning is a tool for learning and students, it is not a toy for "polished products" or "show off". Hence appropriate approaches in information, communication and technology should be researched in order to develop individual learning culture. This approach is presented in Figure 2.

There are three main aspect in use of ICT in learning: person/human/individual, learning and culture. The use of ICT in learning environment should consider characteristics of individual, as well as culture of learning process, and its culture. Those are related to development of learning environment using ICT supports. In order to achieve successful implementation of ICT in learning process, bringing individual characteristics in learning process, it should be prepared pedagogical approaches of learning process using ICT environment. Suitable pedagogical approaches of learning will be accepted by people to perform their ICT learning activities. With the same way of approaches for appropriate technology in developing learning culture. Or, transforming existing culture to new learning culture using appropriate technology should be significant exploration steps. The third works are proposed to elaborate and to develop learning organization in order to introduce and to build new culture of learning. This is more mass communication activities, including socialization or familiarization of ICT tools and learning models to certain groups of people or institutions. Hence, building e-learning system is not an instantaneous works, but it needs coordination, synchroni-ation and more socio-organization among communities.

2.3 INHERENT

Thanks to the existence of the INHERENT, it becomes a significant basic infrastructure for developing learning networks in Indonesia. The Indonesian Higher Education Networks (INHERENT) which has introduced since the end of 2006, links about 33 local access points distributed in public universities [8]. Twelve of them are concerned with eastern part of Indonesia, outside Java island. From each local access point, it is possible to deploy other new networks including surrounding universities. Development of the networks should be a basic fulfillment of an important requirement, i.e. a communication channel, for development student centered learning models. Such networks should be a huge bridge of diversity among universities within Indonesia.

Availability of networks allows user to surve in order to search interesting material or information, as well as a great chance for user/institution to use the networks for organizing collaborative activities. Initiative of collaboration has been introduced by Directorate General of Higher Education (DGHE) in order to socialize their programs, i.e. competitive grants of institution, or coffee morning with DGHE (www.dikti.org).

3 COLLABORATIVE MODELS

This paper introduces possible collaborative learning models could be proposed in order to improve course content quality. Such models have been taken from experiences and activities within PULSE (Public University Link System of East Java) in 2003-now, FIND (Finland INDonesia) in 2005-2006, PREDICT ITS (Project for Research and Education Development on ICT in ITS) 2006-2007 and INHERENT in ITS projects in 2006.

3.1 Assumption

Effectiveness learning process depends on several factors, including availability of good learning materials in the context of contents quality.
and pedagogical aspects. Such a requirement related to the presence of good learning materials and expert lecturers. From the view of learners, capacity of learners, their habit or culture may affect successfulness of learning process. But in the point of view of developed region in Indonesia, human resources, either learner and lecturer become.

Suppose ICT may supply the first requirements in the point of view of available good learning materials, in addition the existence of INHERENT may become learning channel for student centered learning model, then culture of learners-lecturers (human resources) should be considered as a main entry point in order to introduce successful ICT based learning models. Such an assumption is used to deliver suitable learning models.

3.2 Key Points from Experiences

In order to take some important lesson learned from projects activities related to ICT based learning that invited ITS lecturers and other universities, we first introduce global description of projects activities as follows:

- **PULSE**
  a. Introducing collaborative activities including developing common course material for eight public universities, i.e. Kewiraan, Pancasila.
  b. Providing learning materials in digital archive.
  c. Initiating to develop web based learning materials.
  d. Steering committee meeting and coordination: possible operation to allow students take courses in other partner university.

- **FIND**
  a. Introducing e-learning platform: LMS
  b. Introducing digital content development: workshop on light content production
  c. Introducing Virtual University: existing Finnish Virtual University and possible concept for Indonesia
  d. Student and staff exchange activities

- **INHERENT K: ITS**
  a. Development and implementation of LMS including CMS
  b. Development of e-lecture/video conference systems

- **PREDICT-ITS**
  a. Promote ICT based learning, including practical use of LMS, organizing e-lectures and scientific meetings.
  b. Joint research activities among Japanese laboratory, ITS and eastern part of Indonesia universities
  c. Collaborative activities, including joint organization of international seminars in Manado, developing curriculum for informatics study program in University of Sam Ratulangi, other development programs.

Those projects has supported one another, especially the INHERENT K: ITS accelerates the latest projects, because within this project has linked main public universities in Indonesia.

Some important notes may be delivered taken from implementation of the projects are as follows:

- **CAPACITY BUILDING**: For some universities ICT based learning are still unfamiliar, socialization and introduction of digital learning materials development, light content production, learning management system and content management system should be organized more intense.

- **MOTIVATION & COMMUNICATIONS**: Small leading lecturers should be maintained their motivation to spread their knowledge, skill as well as the advantages of using e-learning system. Providing technical assistance for technical consultation is very helpful for keeping their motivation. Such a center of e-learning may be developed/established in the Institution, in regional or national wide. Existence of the center will reduce technical aversions and challenges for the individual.

- **MANAGEMENT SUPPORT**: commitment of institution management may become principal drive in Indonesia. When the leader of education institution may represent as Chief Information Officer (CIO), he will consistently commit to support growing environment for ICT uses in learning, through the institution policies and rules. Almost implemented experiences especially inter-university activities, formal support from management is necessary.

- **PROMOTION**: Government (MONE) commitment to develop ICT based learning has increased by year. However, such a promotion should not only be carried out by competitive grant for universities' institutions [10], but also for common activities inter-universities in developing good course materials or any collaborative development programs. Hence, such an incentive will motivate them to uses the backbones (increasing traffic) at the same time to develop their competences.

Such notes correspond to '5 Cs' from Pannen [9] in developing e-learning system, including Context, Contiguity, Champions, Capacity Building and Change.
3.3 Proposed Implemented Learning Models

Starting with the condition exist in most universities in eastern part of Indonesia, we first introduce inter-university communications as starting point. Then one of three possible collaborative models drawn below could be carried out.

1. Organizing e-lecture: lecture through video conference may be introduced as entry point of inter-university communications and collaborations. Before INHERENT established, Indonesian universities almost lack of communications, especially among lecturers. Any topic may be offered, either presented by lectures resource universities or foreign experts. Notes from ten of experiences; big gap concerning human resources capacity; hence effectiveness of such a lectures are doubt. In addition, lack of responsiveness of participants has also noted. Providing copy of lecture materials before, it is not enough. It should be stimulated by appointing one most competence lecturer in each site to be assistance. He will guide and motivate participants to enter to the presented topic. He should introduce and resume what participants comprehended and stimulate smart questions to presenter. Those are related issue of culture triangle, then it should be any treatment in social organization/communications.

2. Organizing joint courses or other collaborative activities. This is an advanced activities of improving initiative to organize self evaluation concerning learning process in certain classes. Implementation of Joint lecture is not a simple organization. Such a joint course should be recognized formally by both institutions. Hence, some necessary stages should be established before organizing joint course are describe in the figure 4. Based on formal contract, this activity may be carried out later.

3. Implementation of e-learning platform: use of learning management system (LMS) and content management system (CMS) [11] is more comprehensive and organize e-learning implementation. The implementation of e-learning platform requires readiness of triangle components in the institution. Availability of access should be guaranteed, because learners and lectures will use web based platforms in organizing learning process. Stakeholders should be familiar with the LMS and CMS, hence capacity building activities should be carried out, maintained and implemented. At the same time, in order to implement such a system, change in management (policies and rules) to promote use of e-learning platform should be introduced. Our experiences said that introduction and TOT workshop on LMS (Moodle) in several events are not guarantee the implementation of e-learning platform in an institution. In addition to change management, championship of special unit to support hardware, software and brainware of implemented e-learning platform is necessary. Initiative to develop such a platform to be integrated in whole information system is also important.
4 CONCLUSION

Background and condition of implementation of ICT based learning in eastern part of Indonesia has been introduced. This paper has explored challenges and possible solutions in developing and enhancing learning process through collaborative learning models. Important goal of collaborative learning models is developing peer learning process and communications among lecturers and learners. Through intensive contacts that should be promoted by the institution and government, improvement of education quality will be recognized in the near future. In addition, necessary works in exploration of formal learning process is interesting to be discovered in the future.

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Achmad Affandi, born in Tulungagung on October 1965. After finishing his Sarjana in 1989, he joins with Department of Electrical Engineering at the Institut Teknologi Sepuluh Nopember (ITS) Surabaya. He was assigned in some consulting service activities with JICA Consulting Team for Study Telecommunication Networks in GERBANGKERTASUSILA (1990), KDD Consulting team for Surabaya-Banjarmasin Optical Fiber Submarine Cable (1991-1992) and CANAC-Microtel: Development of Telecommunication Networks in Sumatra financed by ADB (1993-1994). In 1995-2000, he was registered as DEA and Doctor candidates in Mobile Radio Communications in Institut National des Sciences Appliquées (INSA) de Rennes. Back to the ITS, he was active in some development and cooperation projects in Higher Education: TPSPDP financed by ADB (2003-2007), FIND (2005-2006), INHERENT (2006) and PREDICT-ITS (2006-now). His research interests are protocol engineering (including system integration), radio and next generation networks in his Laboratory for Telecommunications Networks at ITS. He is appointed also as Director of ICT Center in ITS (2003-now), and active in national forum (ICT Center of Ministry of National Education, Directorate General Post and Telecommunications)