	<p style="text-align: right;">Date : 29/06/2007</p> <p>Developing IT-based teaching materials to enhance information skills and knowledge awareness among students</p> <p>Ida Fajar Priyanto Priyanto.ida@ugm.ac.id idafp@lycos.com</p>
<p>Meeting:</p>	<p>133 Academic and Research Libraries with Information Literacy (2)</p>
<p>Simultaneous Interpretation:</p>	<p>No</p>
<p style="text-align: center;">WORLD LIBRARY AND INFORMATION CONGRESS: 73RD IFLA GENERAL CONFERENCE AND COUNCIL 19-23 August 2007, Durban, South Africa http://www.ifla.org/iv/ifla73/index.htm</p>	

Abstract

Changing the teaching media from chalkboard to computer-based does not only develop IT-awareness among teaching staff but also enhance their readiness to teach and quality of teaching. As a result, the students pay more attention to the lectures and in the long run students get better knowledge and understanding about the course.

In the developing countries reading habit is still a practice done by quite a few people. The changing of teaching media as well as the shift from teacher-centered learning to student-centered learning has changed the way students acquire knowledge and make use of the library and multimedia facilities.

Gadjah Mada University has been working hard to change the method of teaching by helping the teaching staff develop IT-based teaching materials and put them on the intranet; making teaching material databases available through the digital library; and providing easier access to the library users. In addition, IM text messaging, blogs and mailinglist have been the media to discuss and share ideas and knowledge among lecturers and students too.

Keyword: *information technology, teaching method, library*

Introduction

In the developing countries, reading is not a habit done by many people. Recent development shows this habit is also counteracted with media for listening and watching

information which then results in the decreasing number of readers. Another problem faced by the developing countries is the teaching method which emphasizes more on writing instead of reading. Students at schools get more writing assignment instead of reading assignment. In the classrooms, teachers are the center and dominate the class activities. Some schools even provide materials for students in a form of a package of books for one semester before the semester begins. As a result, parents have an idea that the materials will be sufficient for their children to study within one semester without any additional reading. To make the matter worse, the teachers also make use of the resources as the only reading materials, while chalkboard is the only media to describe the lessons.

Higher education, however, has better scene. Although some higher education institutions still have poor facilities, i.e. poor classroom facilities and library, but more institutions improve their facilities. The classrooms are equipped with sufficient facilities, namely, overhead projectors where a lecturer may use transparencies prepared before their teaching. In this way, a lecturer must prepare materials before the classes begin and have to replace the transparencies when new ideas or development come. Recent development, however, shows that more and more higher education institutions provide classroom technologies, i.e. an projector and a desktop with online network to access materials from the library and internet. In this way, a lecturer does not need to replace previous materials when new knowledge or ideas come, instead, they can just modify the materials. In addition, Reinking (2002), states that technologically mediated texts "expand the boundaries of freedom and control in accessing textual information....and change the pragmatics of written communication" (p. 449).

Gadjah Mada University has seen the information and communication technologies as prospective to enhance the academic atmosphere of teaching and learning. Therefore, the university designed a strategy to establish an IT-based education including teaching materials, library resources, interaction among teaching staff, communication between teaching staff and students, and the interaction among students themselves.

Brief Overview of Gadjah Mada University

Gadjah Mada University is the oldest university in Indonesia. It was located in Yogyakarta, Central Java, and was established in 1949 to support the development after the struggle of independence. Currently GMU has 18 faculties, namely Biology, Cultural Studies, Economics, Forestry, Philosophy, Pharmacy, Law, Social and Political Sciences, Medical Science, Psychology, Mathematics and Natural Sciences, Geography, Veterinary Science, Dentistry, Animal Science, Agriculture, Agricultural Technology, and Engineering. Within those 18 faculties there are 73 courses taught in the undergraduate level and more courses taught in the graduate level. Currently there are about 55,000 students taking both graduate and undergraduate courses.

Prior to 2002, this continuously increasing number of students attended the courses that were provided in the classrooms and they should find resources for their study either through faculty and department libraries or through the university library. Most references and reading materials were available in the printed form without any network among the libraries at the university. These resources were found very inefficient and time-consuming to get. Thus, in 2002, there was an initiative to provide information technology in all aspects of the university—the classrooms, libraries and other academic facilities.

Gadjah Mada University's IT project

Considering the weaknesses and slow access to printed materials throughout the campus, the university management initiated the university-wide Information Technology project in order to enhance the education system. This project is aimed at speeding up the progress of education process at Gadjah Mada University and making all information available within clicks. Information and communication technologies are used to enrich and support the education process.

The stages of the project may be viewed as follows:

1. fiber optic network and integration of websites
2. library network and digital library

3. discussion groups, mailinglists, IM text messaging and personal emails
4. student-centered learning and multimodal materials production
5. digital video conference and distance lectures

In the last 5 years Gadjah Mada University has developed various aspects of teaching and learning as well as the administrative infrastructures. To support the information exchange and dissemination, the university first developed a network using fiber optics to connect all faculties, university, and other supporting facilities such as the computer center and libraries. This fiber optic is designed to manage the flow of financial reports, academic administration as well as library network and access within the university. Currently there are 64 libraries (university library, faculty and department libraries and research school libraries). Besides this fiber optic connection, the university also established wifi (wireless) connection so that students and academicians may connect to the internet with their laptops. Students and lecturers are also encouraged to own laptops to support their academic lives. Increasing internet bandwidth is also the continuing project of the university.

The digital library initiative actually dated back to 1996, when the medical library was of the opinion to set up electronic resources available in the networked computers and made all CD-ROM collections accessible in all computers. It was also followed by university library that designed a union catalog accessible via internet. In addition, to support the library network within the university, library management software was also made. Now all libraries use the same software for their services making the library materials accessible in all departments.

In addition, the digital library initiative was begun in 2003 when the university started to subscribe databases and to digitize research papers, theses and dissertations. As most departments also publish their journals, the library also initiated to digitize the articles published by all departments. Indeed this is the most exhaustive but successful project. This initiative was done first by holding training among librarians on various topics such

as web management, digitization, and database searching. Later, those librarians trained other librarians, lecturers and students.

Subscribing to databases was also a trial which was hard to do in the beginning, especially in convincing the financial department. The main problem was that when the financial department provided budget, the stuff should be tangible. Therefore, the first thing to do was changing the mindset of the financial department which was such a hard thing to do and took time. However, the next subscription to other databases is not a problem any longer. By having trials and find the most accessible trial databases, the library will then subscribe to the databases. Those databases on trial but with the least or few users to access will not be subscribed. The benefit of having trials and finding the high access of databases is that more and more academicians and students log on to the library's website and therefore, the database access is also increasing. The information about databases as well as databases on trial is available through the lecturers' as well as students' mailinglists. IM text messaging is also used to promote the access to databases. Ebsco has announced that Gadjah Mada University has the highest access to its' subscribed databases among Indonesian universities.

The webometrics method to rank universities worldwide also affects the lecturers' awareness to put their papers on the library's website as well as on their weblogs. However, it was only recently that many lecturers designed their weblogs and put their course materials available for students.

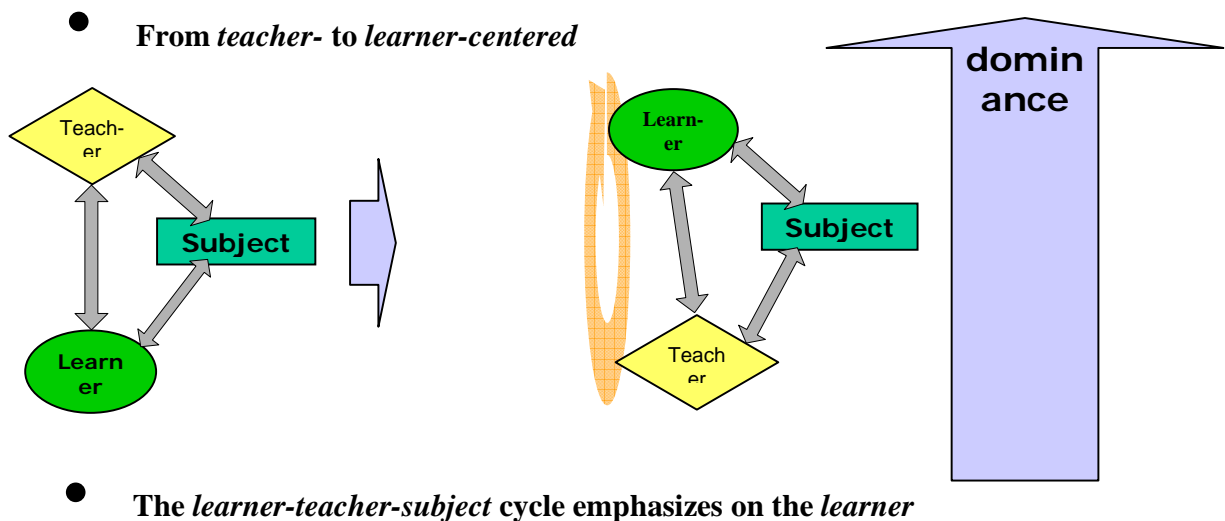
The biggest and widely used mailinglist is the university's mailinglist. The members are lecturers, university management, and some librarians. This mailinglist is aimed at sharing information and discussing all university matters. It is through this mailinglist that the library announces the new databases, databases on trial, and library activities.

Emails are provided for all academicians, students, librarians and other administrative staff. However, as it is now the transition time, printed invitations are the ones considered as formal or official, while invitations through mailinglist, email or text messaging are still considered as informal. It is also interesting to note that lecturers, librarians, other

administrative staff and students contact one another via IM text messaging. The communication among them is fine and only in the early stages of use that some senior staff find IM text messaging awkward. In fact, dealing with new technology is always more problematic for older people than to young people; therefore, teaching or showing the older people how to use new technology is important.

Another initiative of the university is the implementation of student-centered learning. This idea was begun with the trial of problem-based learning implemented in the Faculty of Medicine, Gadjah Mada University. The implementation of problem-based learning affected the learning atmosphere. Based on this successful implementation, the university then also began to develop IT-based teaching materials in order to enhance the information skills and knowledge awareness among lecturers and students.

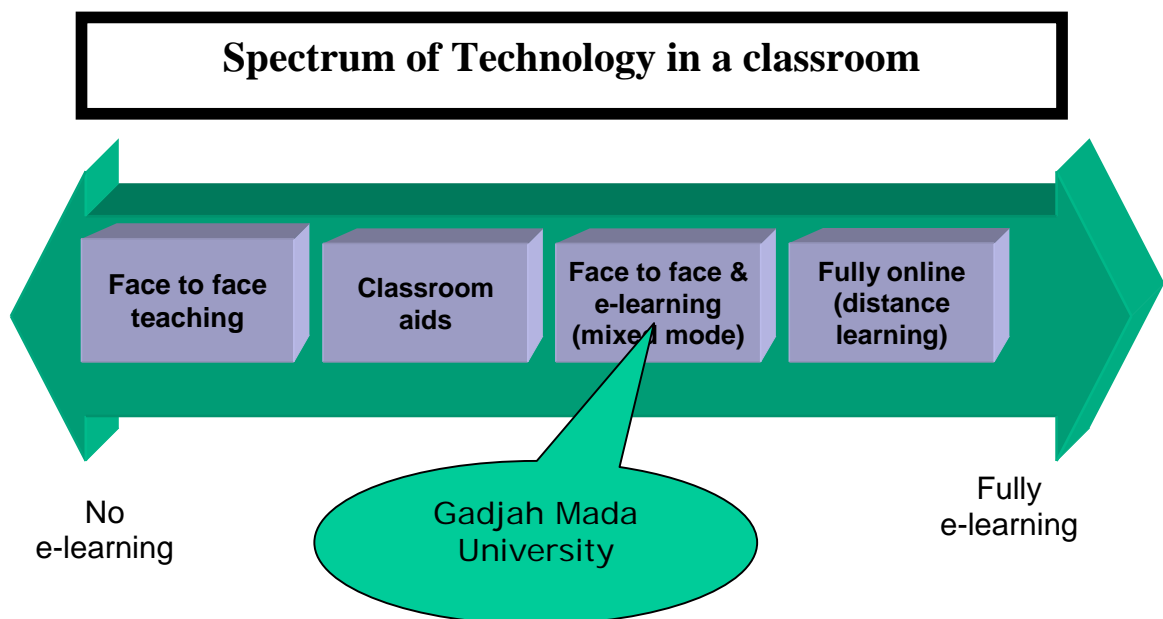
The paradigm shift from teacher-centered to student-centered



Enhancing Education through Multimodal Materials Production

There are four types of teaching methods, namely face-to-face, classroom aids, face-to-face and e-learning, and fully online. The face-to-face teaching method requires only oral

presentation of the lecturer and responses from students. The classroom aids requires lecturers to prepare materials using classroom aids such as chalkboard used at the time of teaching or transparencies prepared before the course while overhead projector is prepared in the classroom. Meanwhile in the face-to-face and e-learning the lecturer prepares materials before the course and stores the material in the server and retrieves it when he or she teaches. The classroom should have a projector and computer network. However, in the lower level of e-learning, the lecturer may prepare material in the flashdisk or CD. The other method is the fully online teaching in which there is no need for a lecturer to be present in the classroom; neither do the students, as materials are already available online and students may access at any convenient time.



Considering the weak reading habit and availability of printed materials, the university developed IT-based teaching materials to enhance the information skills and knowledge awareness among students. This IT-based teaching materials support the face-to-face classroom activity and students may learn the materials in the library or access the materials through their laptops. It is believed that human-computer interaction

strengthens the way one acquires knowledge. In his study, Purves (1998) sees that the range of textual choices offered by technology is unlimited by modality--the audio, visual and textual modalities. They can combine in any iteration to produce documents. He is also of the opinion that the subject matter of the text is virtually unlimited, which is in contrast to the printed materials. An internet-connected classroom, he says, can introduce topics that are without any of the traditional boundaries placed upon appropriate classroom material.

The education system in the university is semester credits. One credit means 50 minutes classroom activity, 50 minutes structured assignment, including practical and home assignment, and another 50 minutes of individual study. Information technology is considered to be able to enrich course materials as all teaching materials are available electronically and accessible through the library and wireless connection. In this way, students may be able to get resources directly from the library. Bruce (2004) even points out that the established classroom practices can no longer adequately account for a world “defined by video, the World Wide Web, cell phones, wearable computers and instant messaging.”

In the first stage of development, experts in education and related teaching staff discussed the teaching materials. This was then continued by designing the course materials and choosing the most appropriate technology. The project itself is called *eLisa* (e-Learning System for Academic Communities). *eLisa* is based on the academic community and contents.

The collaboration among different groups of experts seems to be the strength of the project. Experts of multimedia, computer experts, experts of education, as well as lecturers and assistants to lecturers work together to design the contents of *eLisa*. Meanwhile librarians store and disseminate the resources and make it available in the library and classrooms via fiber optic network. Young lecturers find this project so beneficial and they design the course materials enthusiastically; while senior lecturers with little computer capability need time to learn it. However, according to Lewis and

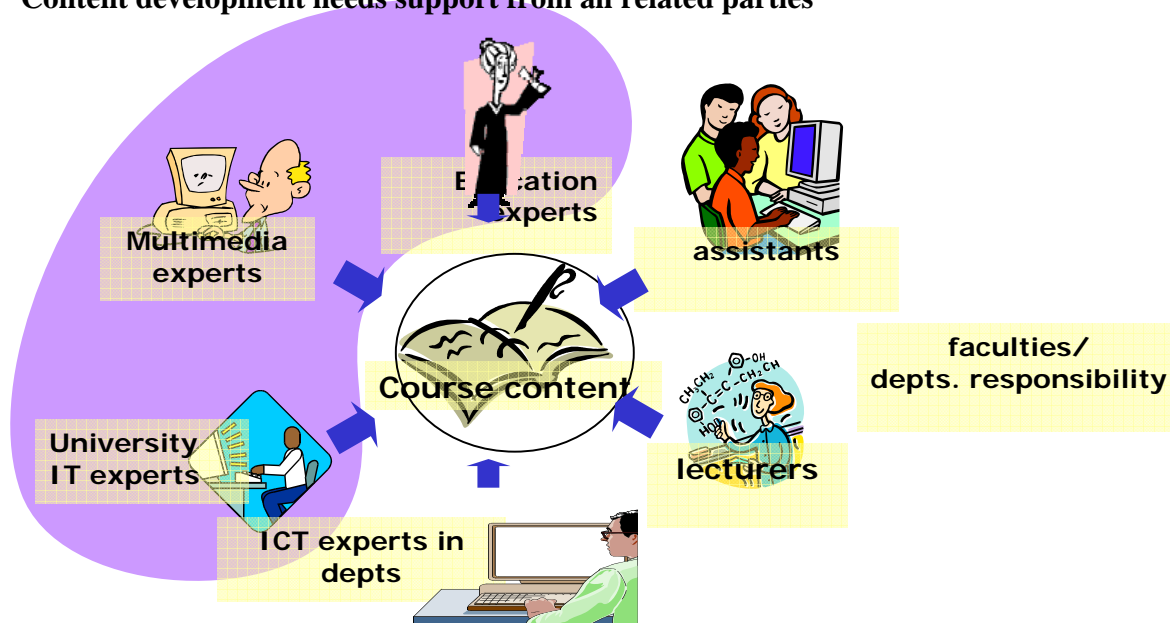
Finders (2004) actually there is no difficulty in negotiating their position within this richly intertextual and multimodal world. The multimodality of classroom teaching does not threaten the senior lecturers. Instead, it reinforces the existing power dynamics. Lecturers do not have to shift their pedagogical paradigm to account for practices that have traditionally taken place.

In addition, a study by Hagood et al. (2004) shows that students today do not have the same fear of technology as their lecturers, because such technology has been part of their lives: "Television, music videos, movies, the Internet, email, instant messaging, online chats, streaming video, and computer-generated games, for example, entail literacies that permeate the lives of today's Millennial youth, affecting the information they encounter and the texts they read" (p. 70). Therefore, senior lecturers must be introduced to technology both for their classroom activities and out-of-classroom lives.

The contents of the course are fully designed by the lecturers, while the multimedia experts learn the contents and design the pictures and multimedia with suggestions from the education experts.

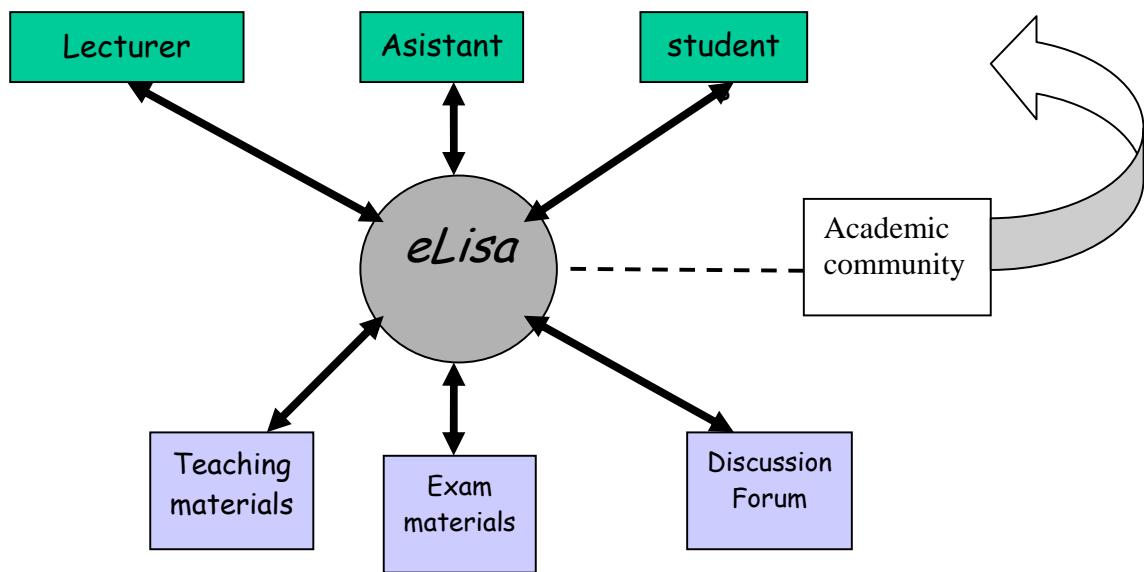
“content” Development

- Content development needs support from all related parties



The materials that lecturers design are varied. However, the animation and 3D pictures prepared by the multimedia experts are consulted to the lecturers before they are put into the server. For some theoretical materials and some mathematical models the multimedia are just simple, while for materials related to cycles, construction and flow, for example, more complicated multimedia are added.

eLisa Software Concept based on academic community



The multimodal that the lecturers develop does affect the way lecturers prepare their materials and students make use of materials more enthusiastically. What is also interesting to note is that, with the implementation of ICT facilities for teaching and learning, the course materials are well-prepared by the lecturers and thus, the learning process goes better. In addition, the number of lecturers and students who are IT-literate increases.

The use of computers in the library also increases along with the implementation of multimodal facilities. This is due to the need of students to learn the course materials available in the library and accessible via computer networks. Another point to note is the

students' willingness to read materials using current technology that they are now familiar with. Previously a student would read the printed course materials when they were about to have exams.

Conclusion

Developing IT-based teaching materials is really time-consuming to develop. Some points to consider include infrastructure, willingness to change, and IT strategic planning. While young lecturers welcome multimodal, there is no need for older generations of lecturers to be reluctant to the ICT; instead, they may learn from the young people.

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