

DEVELOPING ICT-BASED TEACHING MATERIALS OF ENGLISH FOR MATHEMATICS COURSE

PUJI ASTUTI & YUSUF HARTONO

Department of Mathematics Education

Sriwijaya University

Palembang, e-mail: p.astutipuji@gmail.com

Abstract

The information and communication technology (ICT) has been used as a medium of learning. The conventional method is still monotonous and rigid. Therefore, students and lecturer can take advantage of e-learning in the learning process. Hence, this study in the course of English for Mathematics aims to develop teaching materials with an integration of ICT: online discussions, learning videos, access to online materials, and online quiz. The findings show that the instructional videos that were developed by lecturers were easy to deliver to the students by this e-learning process. The students might watch the video before the class then discuss and share the new knowledge in discussion forum. Furthermore, this ICT based learning facilitated the lecturers to assess students' online activities: like forum discussions, exercises, and developed quiz without being limited by space and time.

Key Words: ICT, English for Mathematics

1. Introduction

Students and lecturer will use a lot of English-language references in learning process at university level. Like in mathematics, there are thousands of text book references and mathematics scientific articles in English written by mathematical scientists and are not translated into Indonesian language. Therefore, inevitably, students should be familiar with mathematics books or articles in English to improve their knowledge.

To answer these challenges, students of mathematics education study program need to take course of English for Mathematics.

The course English for Mathematics is one of the compulsory subjects given to the first semester students of mathematics education with 2 credits. This course aims to provide review and exercises to the students in order to understand the math references in English. The lecturing activities, in general, are reading, understanding, and improving mathematics vocabularies from mathematics-related articles, mathematics textbooks, and mathematics instructional videos. Students also need to exercise to reveal back or communicate the content of their reading or mathematical ideas, both written and oral.

Conventional teaching methods are not enough for the learning process for English of Mathematics course. This course requires learning process not just lecturing and question and answer in the classroom, but also requires access to the material of lectures in English language such as textbooks, international journals of mathematics, and instructional videos on math materials.

Information and communication technologies (ICT) can be used as a means of learning process in this course. ICT expands math that can be taught as well as a medium of learning to help students. Various media that can be used in the learning process are including audio, visual media, and multimedia. Correspondingly, it is possible to integrate ICT in teaching and learning English for Mathematics course. With the integration of ICT into teaching and learning, students can access course materials more efficiently and watch videos English-mathematics learning without bounded by distance and time.

Based on what has been described, the researchers are interested in developing teaching materials for the subject English for Mathematics ICT-based. The researchers chose model of E-Learning with type Blended E-Learning, there are lecture in classroom and also online lecture. The researchers used a MoDELss

application (Moodle E-learning for Sriwijaya Student) which is the application program that includes learning in a web for Unsri student.

2. Theoretical Background

As the media in the learning process, ICT offers E-Learning applications or online learning. English for Mathematics course ICT-based applications can use Moodle application which is media distance learning available for students and lecturer at Sriwijaya University. ICT-based learning tools are including the design of syllabus and lesson plan mapped into Mapping Program, teaching materials, instructional videos, and evaluation: quiz.

There are three Internet-based learning systems in E-Learning (Faridi, 2009):

a. Web Course

is the use of Internet for learning where teaching materials, discussions, consultation, assignments, exercises and exams are via the internet or no classroom lecture in the learning proces, like the process of distance learning; virtual university.

b. Web Centric Course

Web Centric Course emphasizes learning in which the teaching materials, discussion, consultation, assignments, and exercise are via the Internet. Exams, and some consultation, discussion and exercises can be done in classroom, like university off campus.

c. Web Enhanced Course

Is the use of the Internet for learning purposes for which the Internet is only to support learning activities. Classroom lecture is still conducted greater than online course.

ICT in education can be used as a medium that helps facilitating the learning, like video conference that can be used for distance learning (Gage, 2005). Video conference gives students the opportunity to learn by participating in two-way communication. Students can explore, communicate, analyze, share information and ideas relating to mathematics in English language. In addition, e-learning can utilize the internet. Internet can be considered as a laboratory and even more from the library because of the availability Math Forum to communicate. (Sinclair, 2005).

The course English for Mathematics is designed with model of Blended E-Learning, which is a blend of classroom lectures and online lectures. The understanding of this course will be easier by using multimedia, including video, audio, power point, and so on. Student activities in the course English for Mathematics are divided into four activities: learning activities in classroom, learning activities in e-learning, video conference, and assignment (individual and group).

3. Method

The subject of this study is the first semester student year 2015/2016 who take the course English for Mathematics, Faculty of Teacher Training and Education (FKIP) Sriwijaya University (unsri).

Based on the aim of this study, the type of the research is developmental research which consists of three phases: preparation phase, development phase, and evaluation phase. This study is Blended E-Learning which consists of classroom activities and online activities. The data were collected through evaluation on online

activities and classroom activities along the learning of English of Mathematics Course.

4. Result and Discussion

In preparation phase, the researcher developed lesson plan and syllabus integrated into Program Mapping (blended e-learning), and learned how to use MoDELss. In development phase, the researchers developed ICT-based teaching materials for English for Mathematics course: content, course materials, online assignment, online test, online discussion, and multimedia. In the evaluation phase, the researchers developed test to assess students learning.

a. Content

Content for the course English for Mathematics ICT-based is embedded into MoDELss as a medium of learning form the website or application program. This website lets students get in the classroom to access digital learning materials. Some of the activities undertaken by Moodle learning in this course include discussion forums, assignments, upload assignments, and quizzes.

To log-in into MoDELss, the lecturers and the students must register to create an account in page <http://elearning.unsri.ac.id/> then from the lists of courses available in the web page, students and lecture can search and enroll the course English for Mathematics. After the students register and get an account, they can log in to access the e-learning courses anytime and anywhere.

**BAHASA INGGRIS UNTUK
MATEMATIKA**
For teacher enrollment: PUJIASELUII.SIPd.,
M.Si

Mata kuliah Bahasa Inggris untuk Matematika bertujuan memberikan latihan agar mahasiswa dapat memahami buku teks referensi, artikel ilmiah, manual, handout, matematika berbahasa Inggris. Mata kuliah ini diharapkan dapat membantu peningkatan kompetensi mahasiswa sebagai guru matematika. Kegiatan pembelajaran berupa latihan memahami dan mengungkapkan pengetahuan, keterampilan dan simbol matematika dalam bahasa Inggris, memahami teks berbahasa Inggris yang berkaitan dengan topik matematika, menonton video pembelajaran matematika berbahasa Inggris, membuat kamus matematika berbahasa Inggris, serta latihan mengungkapkan secara lisan mengenai materi topik matematika dalam bahasa Inggris.

Figure 1. The availability of English for Math course in MoDELss

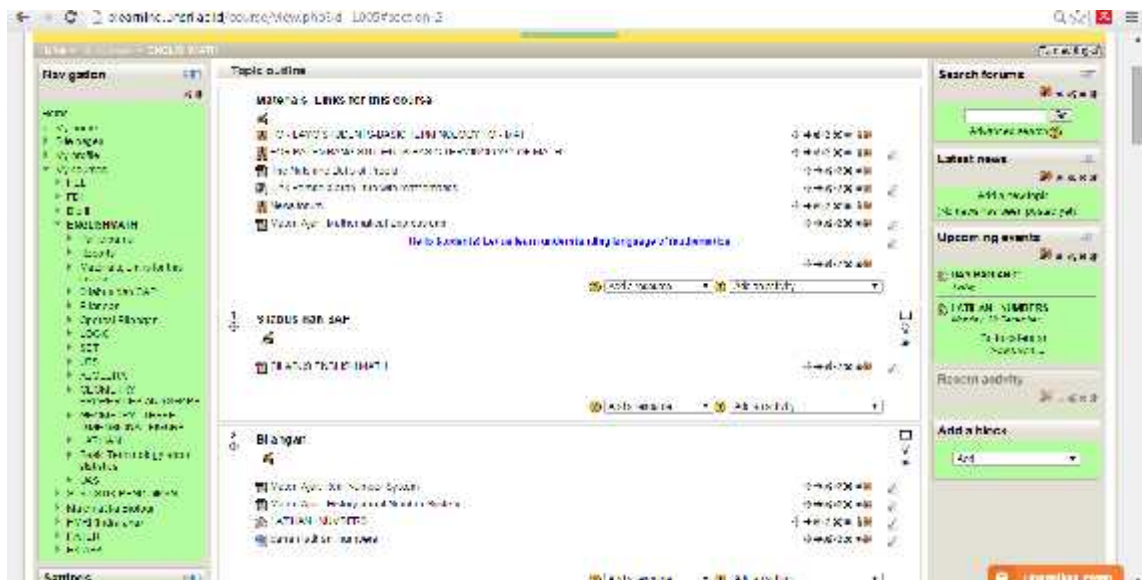


Figure 2. Weekly lecture topics that can be accessed by student

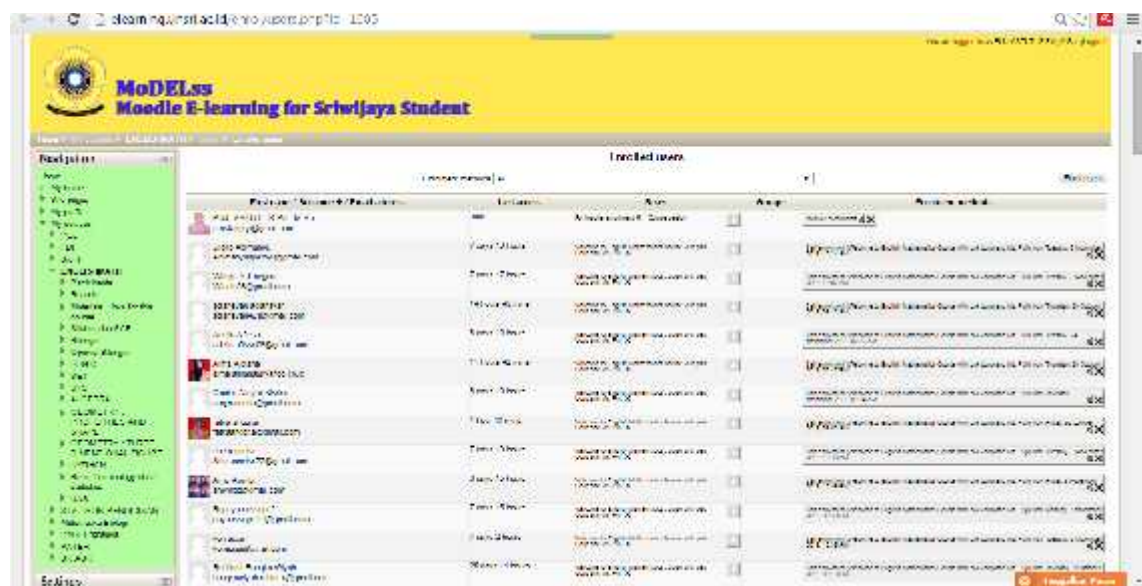


Figure 3. Students enroll in the course

b. Course Materials

Lecture materials designed were for 16 sessions, with 14 lectures, and 2 for online mid test and final test. The teaching materials were uploaded into MoDELss by in the form of word and pdf about mathematics topics in English language. With this e-learning method, the students could easily get into the course by downloading the materials. The students could also be prepared before the lecture in the classroom by reading materials that would be discussed in the class. Meanwhile, for the lecturers themselves, this e-learning activities helped their students better prepared with the materials that will be discussed in class.

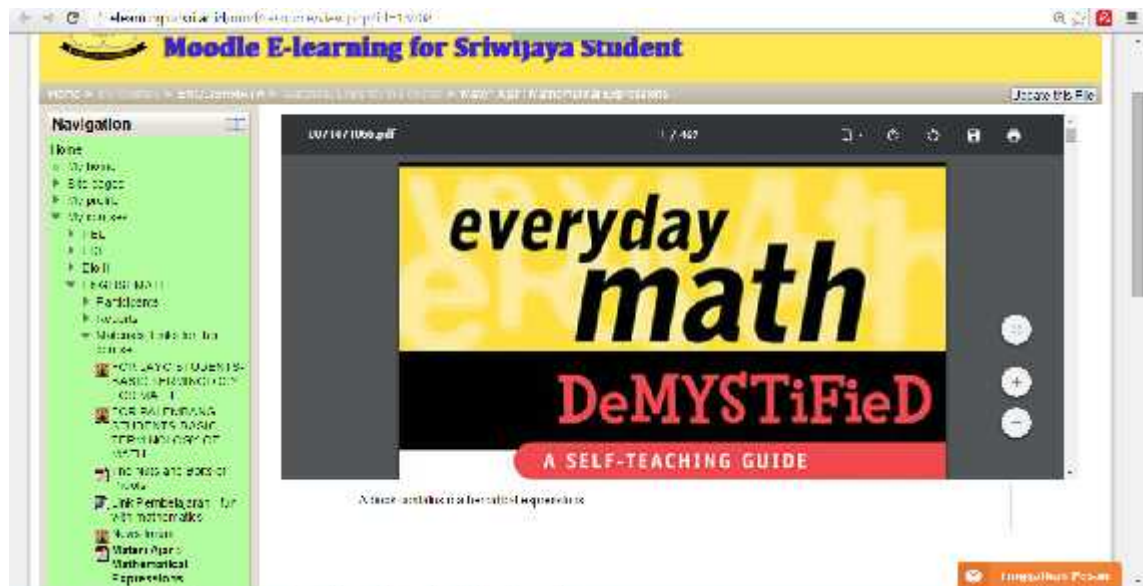


Figure 4. Teaching materials that can be downloaded students



Figure 5. Students could download the materials by clicking on the link provided

c. Online Test

MoDELss also provide facilities for on-line examination. The examination are available online can be multiple choice, essay, short essay, true/false questions, matching questions, etc. In this research, the researchers made the exam for the course English for Mathematics in the form of true / false questions, short essay, and matching questions. In addition, in MoDELss, attempting time for students to finish the test can also be set by the lecturer.



Figure 6. Students can click on a link to follow UAS quiz

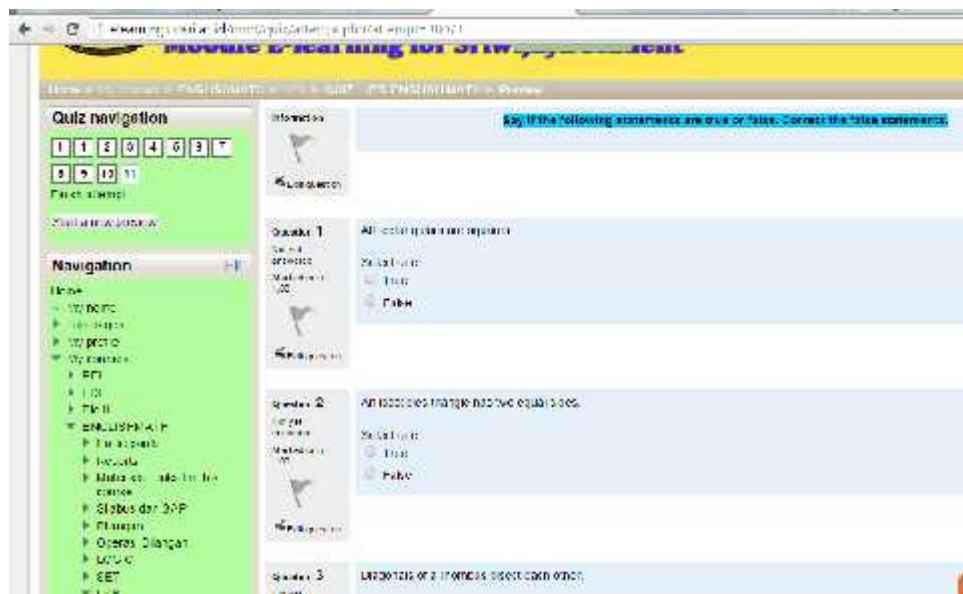


Figure 7. Sample quiz followed by students

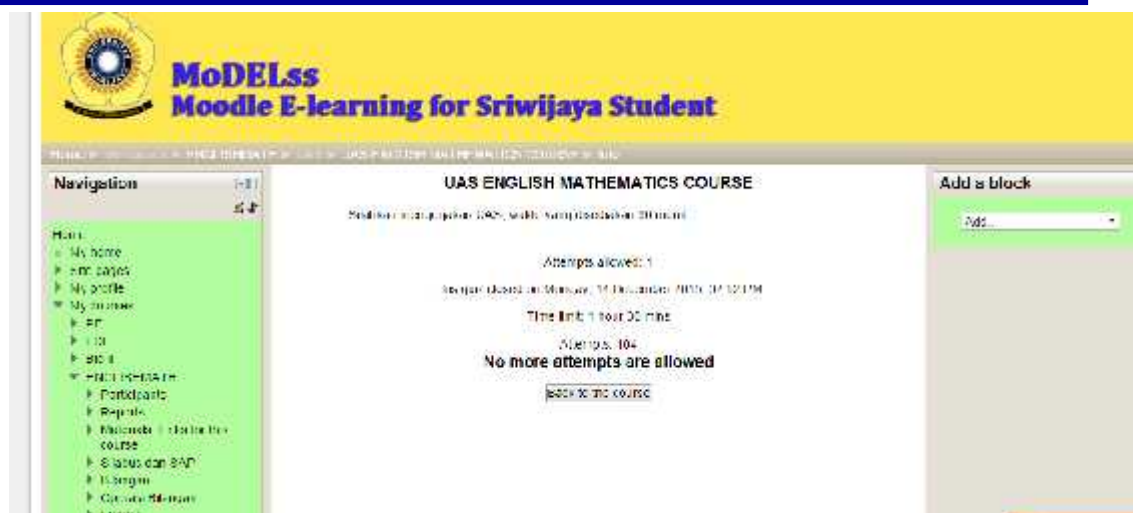


Figure 8. Restricted time to follow the quiz

d. Student Engagement (on-line discussion)

One of the other activities that could support the learning process by MoDELss is an online discussion forum. In this study, researchers made a number of meetings for online discussion forums. The data shows that this online discussion forum could be followed by students and the discussion run well. Students discussed the topic given by the researchers, gave feedback, and asked and answer the questions given by fellow students or the researchers. Here is an example of online discussions undertaken by students on this course.

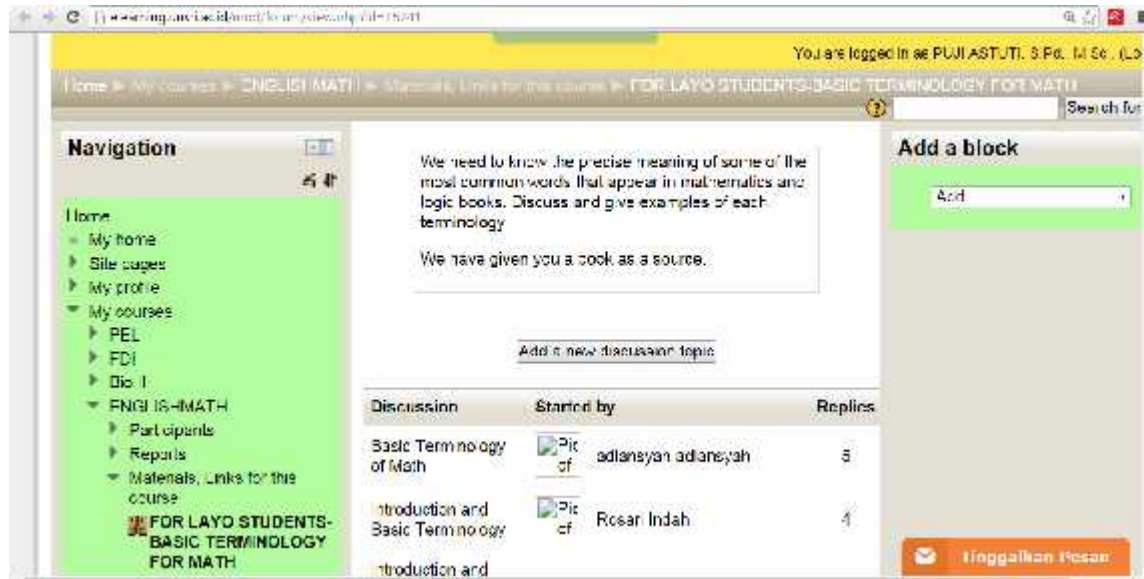


Figure 9. Examples of discussion topics



Figure 10. Forum online discussion by students

e. Online Assignment

MoDELss also provides activities for on-line assignment. In this course, online assignment developed were making summaries from reading mathematics articles or from watching videos, and upload the word or pdf file into MoDELss, making online glossary, and answering the questions and then re-uploading the answer in the form of word. Here are examples of activities on-line assignments in this course.

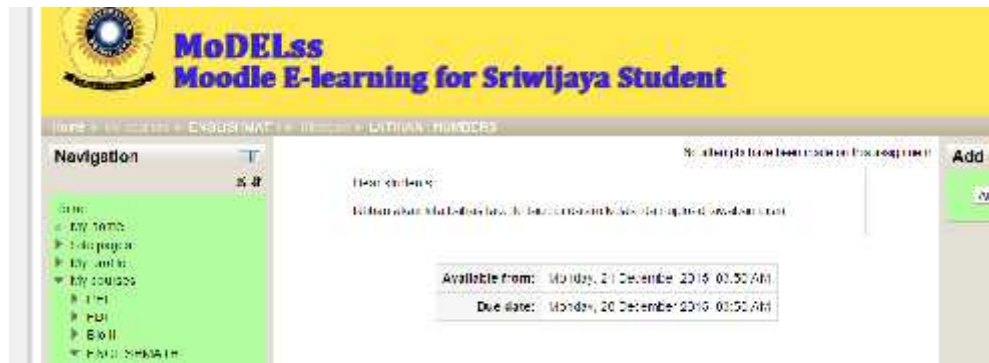


Figure 11. Online assignment

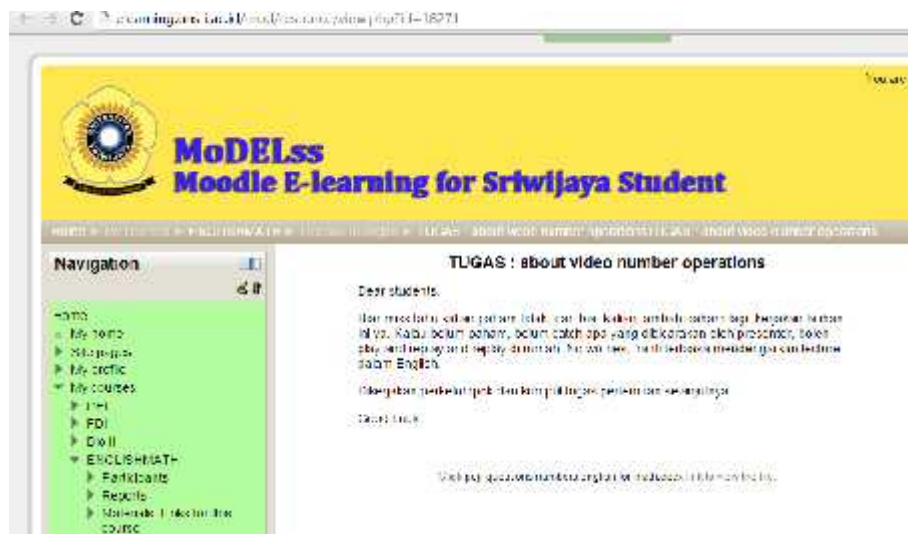


Figure 12. The summary task of learning videos



Figure 13. Students submit assignments online in groups

f. Multimedia

This course aims that students understand how mathematics presentation in English. Thus, in the learning process, students were also given some learning videos of mathematics in English. MoDELss provided a platform where researchers could upload videos with long duration. Thus, prior to the classroom activities, students could first download and watch instructional videos to be discussed in the discussion forum and discussed in classroom. Here is multimedia and video in this study.

Table 1

Multimedia and Video

Kode	Judul dan Isi	Durasi
Multimedia #1	Learning Video : Number Operation	± 15 minutes
Multimedia #2	Video conference : logic, algebra, and geometry.	± 15 minutes
Multimedia #3	Video PPT: statistics	± 15 minutes

g. Result of Final Test

Models provide facilities for lecturers in directly assessing students score in examination. Here is exam performed by students.

The screenshot shows a web-based exam interface. On the left is a navigation menu with categories like 'MATERIA', 'SOAL', 'HASIL', and 'LAPORAN'. The main area displays a table of student results for a 'Pretest of Dynamic full program'. The table includes columns for student name, start and completion times, and scores for seven questions (Q.1 to Q.7). Scores are indicated by green checkmarks for correct answers and red crosses for incorrect ones.

First name Surname	Started on	Completed	Time taken	Q. 1 / 7%	Q. 2 / 7%	Q. 3 / 7%	Q. 4 / 7%	Q. 5 / 7%	Q. 6 / 7%	Q. 7 / 7%
muthalinnoh mumarranoh	December 2010 08:07	December 2010 08:20	13 mins 27 sec	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	0/0 ✗	0/0 ✗	0/0 ✗
mumarranoh mumarranoh	December 2010 08:04	December 2010 08:24	19 mins 79 sec	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓
Anisa Winda Kharonnan	December 2010 08:04	December 2010 08:19	15 mins 17 sec	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓	4/5 ✓
Hur Amalia Susand Rokowidjone	December 2010 08:00	December 2010 08:21	21 mins 44 sec	4/5 ✓	4/5 ✓	4/5 ✓	0/0 ✗	0/0 ✗	0/0 ✗	0/0 ✗
daly diah pratita Rokowidjone	December 2010 08:00	December 2010 08:11	11 mins 16 sec	4/5 ✓	4/5 ✓	4/5 ✓	0/0 ✗	0/0 ✗	0/0 ✗	0/0 ✗
esyana ummaiman Rokowidjone	December 2010 08:00	December 2010 08:18	18 mins 27 sec	4/5 ✓	4/5 ✓	0/0 ✗	0/0 ✗	0/0 ✗	0/0 ✗	0/0 ✗

Figure 14. Scores that can be accessed after students submit exams.

1. Conclusion and Remark

The course ICT-based English for Mathematics can help lecturers to deliver the developed teaching materials quickly and easily accessed by students. The instructional videos that were developed by lecturers were also easy to deliver to the students by this e-learning process. The video might take long duration to be played in the classroom; therefore this ICT method really helped students and lecturers in learning process. The students might watched the video before the class then discuss and share knowledge from what they have watched in the classroom. Furthermore, this ICT based learning facilitated the lecturers to assess students' online activities: like forum discussions, exercises, and developed quiz without being limited by space and time. However, the researchers still have some

problems related online assignment or online examination for pure mathematics topic.

References

- Faridi, A. (2009). Inovasi Pembelajaran Bahasa Inggris Berbasis ICT dalam Rangka Meningkatkan Mutu Pendidikan. *Lembaran Ilmu Kependidikan*.
- Jenny, G. (2005). Video conferencing: case studies in mathematics classroom. In S. Johnstan-Wilder, & D. Pimm, *Teaching Secondary Mathematics with ICT* (pp. 191-202). Berkshire: Open University Press.
- Sinclair, N. (2005). Mathematics on the Internet In S. Johnstan-Wilder, & D. Pimm, *Teaching Secondary Mathematics with ICT* (pp. 203-216). Berkshire: Open University Press.

