

# Statistical Analysis of eLearning Usage in an University

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## Abstract

*eLearning opens the new era of the distance learning. Especially in Thailand, several eLearning courses are initiated in many universities. However, there is no practical information of students' behavior to use the eLearning contents. In this paper, we analyze the statistic data from the School of Information Technology (SIT), KMUTT, which gathers over 170,000 hits of the eLearning contents access in several provided media types of the SIT's eLearning. The available media include high-resolution video, low-resolution video, sound, and synchronized video with slide handout from the classroom. The eLearning system is use in every curriculums of the SIT. All data were collected from the real courses starting from the 1st semester of year 2002. The statistic data are classified in several dimensions, which can show the students' behavior. The analysis also produces interesting results such as the most used media, relation between courses and media usage and etc. This information is very useful for designing the eLearning course and system.*

**Keywords:** eLearning, curriculum design, statistical analysis.

## 1. Introduction

eLearning system [1] is going to be the norm in every education level. C. Sherweed has presented in his work about the

importance of eLearning in a learning organization [2] or in the constructionism[1]. Especially in the university the new law [3] that support the university student who graduated from eLearning curriculum has all authority and acceptability same as other normal curriculums. Consequently, the eLearning bring Thailand high-level education to the new era. There are several new eLearning curriculums going to open in the near future. However, we have no information about the effectiveness of the eLearning system for Thai universities' students. How the students respond to the eLearning that lecturers, contents, and assignment are on the web. The media that we use in the system is also effect design of the eLearning system. In this paper, we propose some interesting results from eLearning system's access log analysis. The data are collected form eLearning system of the School of Information Technology (SIT) –King Mongkut's University of Technology Thonburi (KMUTT) – since the 1st semester of year 2002. There are more than 170,000 hits. The SIT's eLearning system is described in section2.

## 2. SIT's eLearning system

SIT's eLearning use ATutor [4] as Learning Management System (LMS) and Microsoft Server 2003 for streaming server. SIT's eLearning system is designed to record more than 90% of lectures from classrooms in digital video format and transfer through Gigabit campus network. All of the digital

videos are stored into a 2 TB network disk. The draft network diagram as illustrated in Figure 1. All videos are processed and convert into several forms of medias by Learning Facilitators (LF). There 4 types of media provide in the SIT's eLearning system:

- **Hi Video** is the high-resolution video, which contents high quality video and sound in streaming format [5][6][7]. The audience is able to watch the video without download the whole file. Data rate of the Hi Video is 150 Kbps.
- **Lo Video** is the low-resolution streaming video, which content low quality version of the Hi Video format. Data rate of this type of data is 33.6 Kbps and 56 Kbps
- **Sound** is the streaming sound file that extracts from the digital video that record from the classroom. Data rate of the streaming sound is 20 Kbps
- **Slides and video** is Hi resolution video file (Hi video) that is synchronized with the slides of the lecturer that is used in the classroom. The student is able to select slide, which has his desired content. The video clip will automatically jump to the part that the lecturer teaching about the selected slide. Sample screen shot is shown in Figure 2.

SIT's student can access the eLearning medias via SIT's website anywhere anytime. They can choose media according to their connection speed which varies from Dial-up modem (56Kbps) to ADSL [5] or Local Campus network.

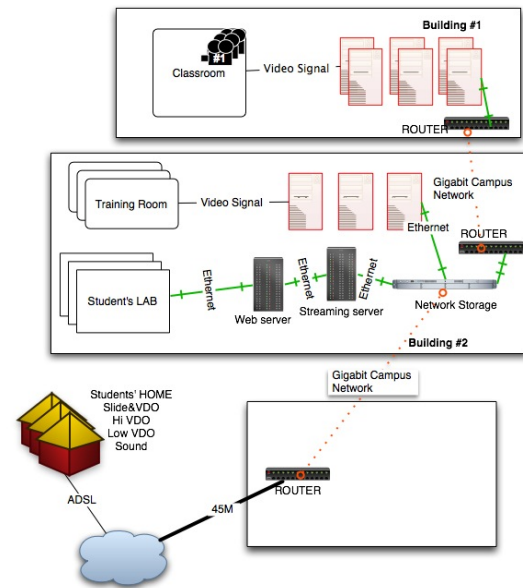


Figure 1: Network infrastructure of SIT's eLearning

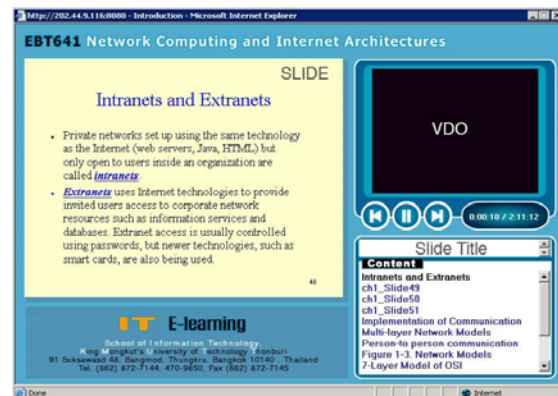


Figure 2: Webpage SIT's eLearning – Slide and VDO

### 3. Collecting the Data

Student's attention in class is recorded as a part of student's evaluation. The eLearning system is provided for class reviewing not to replace the class. There for, the main objective of the eLearning system is increase performance of the student in their classes. The hit rate shows that many students interest and use the system. Since the 1<sup>st</sup> semester of year 2002 we have more than 170,000 hits, which is count from individual media accesses (not from the webpage hit).

Data is collected from the eLearning web log. Data include number of media's

accesses, classes' semester, subject and curriculum. The data is collected only when the student open the media file. The data is analyzed in several dimensions as describe in section 4

#### 4. Data Analysis

In this paper, we use not only data from the eLearning system log but also use student's registration data. The analysis results are discussed as follows.

##### 4.1 Media usage data analysis

Figure 3 shows access's quantity of eLearning medias that classify by semester. The data shows the media usage increasing dramatically in the 2<sup>nd</sup> semester of year 2004. In the 2<sup>nd</sup> semester of 2004, broadband Internet (ADSL)[5] is available in Bangkok with affordable price. Many students can access the media from their place via high speed Internet, which make the number of access increase noticeably in the period.

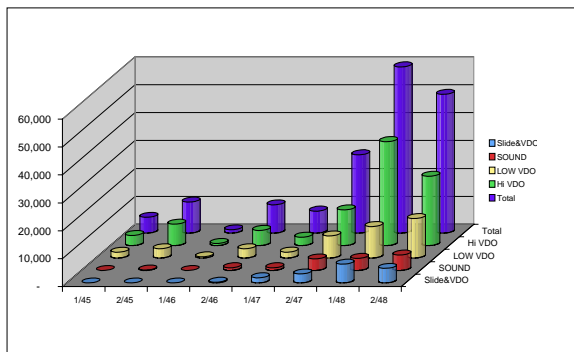


Figure 3: Graph shows eLearning's medias usage classify by semester and year

Furthermore, the graph in Figure 3 shows the obvious pattern, which relate to the graph in Figure 4. The graph shows the largest number of access come from Hi Video media. The Low Video, Slide&Video, and Sound have smaller amount or access respectively.

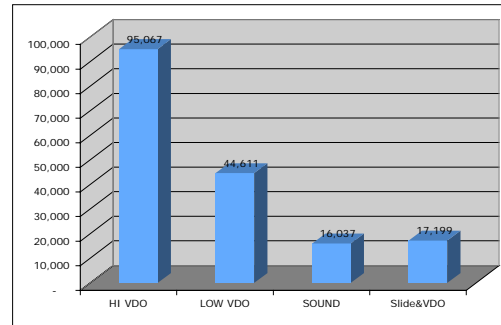


Figure 4: Graph shows number access of each media

The Hi Video media requires bandwidth 150Kbps, which is identical to the Slide&Video media. However, the observers have to wait for a few minutes to initial (download) the slide from the server when they start the Slide&Video media. In addition, all class materials are available on the classes' webpage. Consequently, most of the student just wants to see what the teacher does in the class and read content from their own slide handout. Moreover, some students may record or download the whole streaming Hi Video and use them offline on their personal computer.

##### 4.2 Analyze the eLearning usage data according to the audience type

In this subsection, the medias usage data is analyzed together with the student's registration data. The student's registration data is the number of student who registers in each course in the eLearning system. With the registration data, we can find the relation between hit rate and the course curriculum.

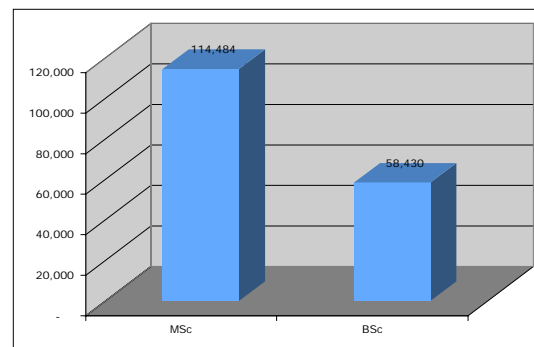


Figure 5: Graph shows media access of MSc. and BSc.

As shown in Figure 5 and Figure 6, graphs show the total and individual number of media access in Bachelor degree (BSc) program and Master degree (MSc.) program. The graph clearly presents that number of MSc. student's access is 48% more than BSc. student's access.

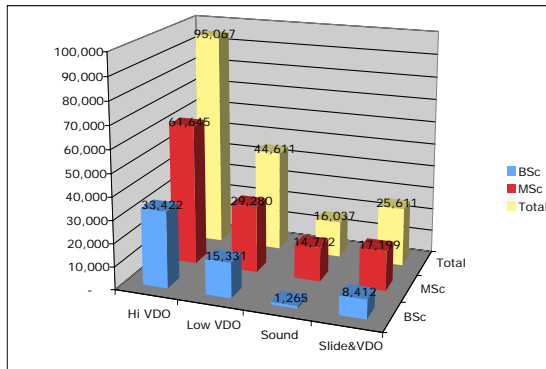


Figure 6: Graph shows access number of each media of MSc. and BSc.

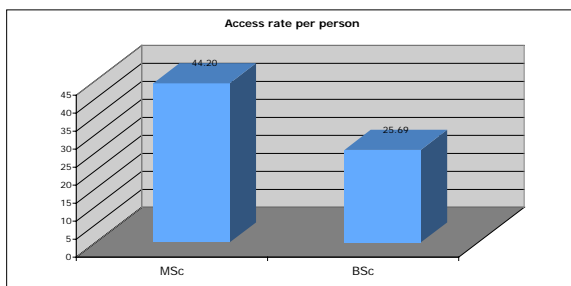


Figure 7: Graph shows access rate per student of MSc. and BSc. students.

In the Figure 7, graph shows the media's access rate per student in the MSc. and BSc. programs. We conclude that MSc. degree students have more interest in the eLearning system than BSc. degree students.

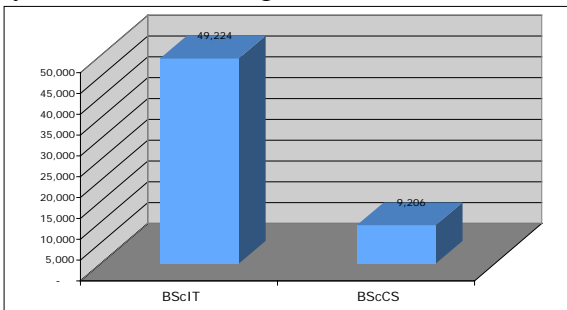


Figure 8: Graph shows quantity of media of BSc. IT and BSc. CS program.

The language that is used in the lecture also relates to the quality of the class and eLearning system. Number of access that is shown in the Figure 8 presents media usage of BSc. IT (Thai language) program and BSc. CS (English language) program respectively. The number of access of Thai program is about 82% greater than the English program. However, the Figure 9 shows the number of access per student of BSc. IT (Thai language) and BSc. (English language) which almost identical number (2.8% difference). In the next section the analyzed information will be discuss and detail analyze.

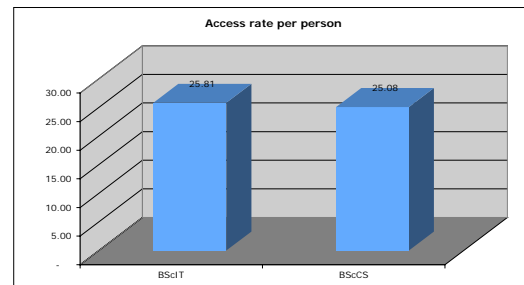


Figure 9: Graph shows eLearning's media usage per student of English and Thai language program

## 5. Conclusion

In this section, we conclude the analyzed results in section 4 into 3 topics as follows:

### 5.1 Internet speed and eLearning system efficiency

From the information in subsection 4.1 show the quantity of eLearning usage obviously increase when hi-speed Internet (such as ADSL, Satellite) available in Bangkok and Thailand. That means the hi-speed Internet is one of the key success factor for the eLearning system. The eLearning curriculum should consider the student's Internet speed as an important factor for the program.

## 5.2 The media type and eLearning

Media type is another chief factor of the eLearning system. It also relates to the Internet speed access. The higher quality of media requires the higher Internet access speed. The Figure 3 and Figure 4 and the results from the subsection 4.1 show that students do not request for complex media. The student needs speed of media access however they want the best quality for their Internet speed. Therefore student is able to download the whole file to store in the their computer using streaming video recorder [7][8]. However, the low bandwidth medias are required for every eLearning system. There are many students still need low quality media (included sound) because they have only 56k dial-up connection to access the eLearning system.

## 5.3 Program curriculum and the eLearning system

From the registration information of every program in the SIT, we are able to analyze the access rate of each course. As shown in subsection 4.2, the eLearning system is more effective for the MSc. program than the BSc. program. The main reason should be maturity of the students.

For the English language and Thai language program, the result (in subsection 4.2) shows almost similar number of access per student. So we may conclude that language is not effect the eLearning system success.

## 6. References

- [1] Terence Cannings, (2003) "Online Constructionism and the Future of Teacher Education", the *IFIP Working Groups 3.1 and 3.3 Working Conference: ICT and the Teacher of the Future*, The University of Melbourne, Australia, 27th–31st January, 2003.
- [2] C. Sherwood (2001), "Knowledge Management For eLearning", *International Conference on Engineering Education*, Oslo, Norway, August 2001.
- [3] ประกาศกระทรวงศึกษาธิการเรื่องหลักเกณฑ์การขอเปิดและดำเนินการหลักสูตรระดับปริญญาในระบบการศึกษาทางไกล, 2548, รก.๒๕๔๘/พ๑๒๐ง/๘/๒๖ ตุลาคม ๒๕๔๘.
- [4] <http://www.atutor.ca/atutor/docs/index.php>
- [5] BehrouzA. Forouzan (2003), *Data Communications and Networking*, 2003
- [6] <http://www.afterdawn.com/glossary/terms/wmv.cfm>
- [7] <http://all-streaming-media.com/record-video-stream/record-streaming-video-windows-media.htm>
- [8] <http://www.wmrecorder.com/>