IMPROVING STUDENTS' PERFORMANCE IN ONLINE TUTORIAL: UTILIZING GISMO SOFTWARE

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Abstract

The advancement of information and communication technology in various fields leads to its wider application in education, especially in higher education. Universities worldwide increasingly adopt the online learning system as a learning practice. Besides its ability to provide education without any geographical limitations, online learning also provides flexible learning activities. However, relative to the class-based learning process, online learning has several disadvantages, especially in term of students' activities. In the meantime, students' ability to understand learning materials is the primary priority in a learning process. This study aims to analyze students' activities in the online tutorials. This research analyzes students' activities in reading materials, responding to discussions, and submitting the assignments in 13 online tutorial classes. UT use the GISMO software that enables us to analyze the students' activities in the online tutorials. GISMO monitors interactive graphics and visualize students' activities. By using GISMO, tutors can monitor various students' aspects from a distance, such as being present in the courses, reading the materials, handing in the assignments, etc. The results show that students still exhibit relatively low activities. More specifically, students are relatively active in the first few weeks, but the activity levels start to decline in the following weeks. Regarding the submission of the assignments, only about 26.7% of students in a class submit their assignments. This figure indicates the important role of tutors in motivating students.

Keywords: online tutorial, student participation, GISMO

1. INTRODUCTION

The development of information and technology (ICT) has created new opportunities in education, especially in higher education. The advancement of ICT-related knowledge, methods, and techniques significantly changes the development of learning methods. The development of various applications opens wider access to education without being constrained by distance and time through online learning. The development of ICT has established online learning as the modern education paradigm. Learning can take place anywhere anytime, even if there is the geographical distance between students and teachers or between students. The development of technology facilitates the long-distance education and encourages more people, especially adults, to involve themselves in the learning process.

However, although various theories or facts suggest the success of online learning in education, the ability of students in the online learning remains the primary priority. Students' interests to learn through online learning depends heavily on various factors, such as technological readiness, learning design, learning environment, and students' and teachers' attitudes and responses (Sun *et al.,* 2008). Liaw (2008) suggests that in the online learning environment, students emphasize the system quality in the interactivity, implying that students expect a more interactive and communicative learning environment in the online learning.

In recent years, a new approach in the automatic analysis to improve learning experience has emerged. This new approach, commonly known as learning analytics, is a new approach to research and education that will likely become a trend in the future learning (Johnson *et al.,* 2011). Learning analytics is not a new research approach because studies in various fields (academic analysis, action research, educational data extraction, recommendation system, and adaptive personal learning) have applied this approach (Chatti *et al.,* 2012). Learning analytics offers several advantages. For example, this approach is based on the learning theory and focuses on the relevant learning components in an online-based learning environment (Ferguson and Buckingham Shum, 2012).

Universitas Terbuka (UT) is a higher education institution that applies the long-distance learning system. This application implies that UT is responsible for providing various learning supports that enable students to study independently. Online tutorial is a learning support system offered by UT. Student achievement in the online tutorial is based on their activities in the discussion and completing the assignments. More specifically, the marking process is based on the students' answers in the online tutorial activities. Thus, to understand the use of online tutorial for students, it is necessary to evaluate the implementation of online tutorial and to analyze the factors affecting students' activities in online tutorial and obstacles they experience.

Students still exhibit relatively low activities in online tutorial. In a similar vein, the percentage of students who have completed all online tutorial activities and received grades is still relatively low. Table 1 below shows students' activities in UT's online tutorial.

Table 1. The Rate of Students' Participation in Online Tutorial

Faculty	No. of Classes	Number of Students Activities	Number of Students Completing the Process	Percentage
FE	968	136.523	84.512	61.90%
FMIPA	318	14.643	9.067	61.92%
FHISIP	1.912	200.979	111.502	55.48%
FKIP	639	50.421	30.736	60.6%

Source: Rector's Report 2016

The increasing use of online learning in the learning process is very important in answering questions related to students' participation and their online interaction that facilitate students' success in participating in online learning.

2. LITERATURE REVIEW

2.1 Online Learning in the Long-Distance Education

The long-distance educational system is an educational system that exhibits the geographical distance between students and teachers. This system is a solution to everyone who wishes to study but is subject to the distance and time constraints. However, the long-distance educational system exhibits several disadvantages relative to the class-based learning system, such as lack of community sense and opportunities among students (Sadera *et al.*, 2009).

The use of technology in learning, especially the web-based application has started to emerge since the 2000s and has become the standard platform in the long-distance education and learning management system (Parsad and Lewis, 2008). The long-distance learning system is currently intertwined with the online learning method, implying that various educational levels, especially higher education, increasingly apply online learning. The use of online learning has been increasingly intensive in higher education for various reasons, such as the potentials of online learning to offer the access flexibility to contents and instructional materials anytime, anywhere and with effective costs (Castle and McGuire, 2010). Online learning potentially improves the learning experience of anyone who cannot attend the face-to-face learning environment and enables higher education institution to distribute learning contents cheaper and to maintain the quality of students' outcomes in the long-distance education.

The ability of students in participating online learning largely depends on various factors, such as activities in online learning (LaPadula, 2003; McLouglin, 2002). Higher education institution currently face various challenges in designing effective and sustainable online learning (Rodrigues *et al.,* 2009). Several studies have identified the key components of the success of the instructional design to improve the outcomes of online learning (e.g., Gunawardena *et al.,* 2000; Kreijns *et al.,* 2003; and Mallen *et al.,* 2003). Students' satisfaction in online learning largely depends on various concepts, such as the interaction between students and teachers, the interaction between students, course structure, students' interaction with the content, supporting administration services, facilitators, technical support, and delivery methods (Roberts *et al.,* 2005). Students' success also largely depends on students' interests in online learning system as indicated by their learning activities (Chen *et al.,* 2010). Students' interest to online learning process requires learning comfort in using computer and web technology (Lee & Witta, 2001). To be able to fully participate in online activities, students should have skills to use software applications. Lack of this skill likely reduces students' interests to be active in the learning process and even becomes obstacles to learning (Cheurprakobkit *et al.,* 2002).

2.2 Learning Analytics

Learning analytics can be defined as the use of data and model to predict the progress and performance of learners and their ability to act based on the information (Educause, 2016). As suggested by Figure 1 (Chatti, 2012), learning analytics contains a cycle that consists of three stages, namely (1) data collection and pre-preprocessing, (2) analytics and action, and (3) post-processing.
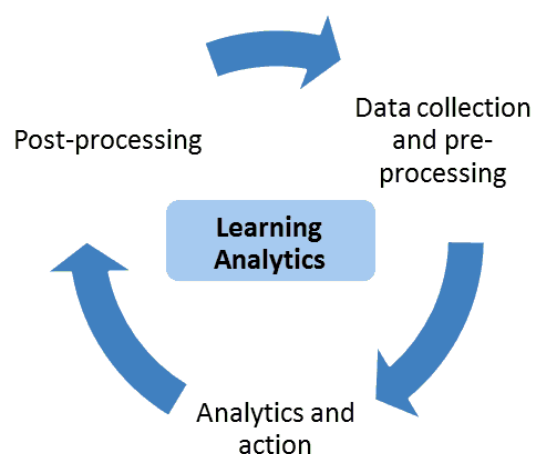

Figure 1. The Learning Analytics Process

Learning analytics can be used as an approach to increase students' success (Arnold and Pistilli, 2012). Learning analytics is an effective approach to support students' learning process and is increasingly applied recently. Some factors facilitate the development of learning analytics, namely (1) big data, (2) online learning, and (3) political concern (Ferguson, 2012). Learning analytics can be used as the tool, technology, and platform to motivate teachers to inspire students to succeed in their learning process. Furthermore, learning analytics also helps students and teachers in detecting students' progress in learning.

3. RESEARCH METHOD

3.1 Research Design and Sample Selection

This study is designed to analyze students' activities in online learning by using the learning analytics method. We identify students' activities in online learning from their activities in reading the initiation materials, proposing ideas in the discussion, and doing the assignments. This study uses the explanatory design that explains current and future events or condition. We generate the research data through the survey on the sample subjects. This study selects the online tutorials in the Study Program of Management, Faculty of Economics, Universitas Terbuka as the research object. Therefore, the population of this study is all online tutorial courses in this study program. We randomly select the sample classes that represent the core and non-core courses in the Study Program of Management.

3.2 Data Collection and Analysis Methods

We generate data by studying the students' activities in online tutorials that consist of reading the initiation materials, proposing ideas in the discussion forum, and doing the assignments. Accordingly, we use the GISMO software that enables us to analyze the students' activities in online tutorials. More specifically, GISMO monitors interactive graphics and visualize students' activities. Therefore, GISMO helps tutors in online tutorial classes. By using GISMO, tutors can monitor various students' aspects from a distance, such as being present in the courses, reading the materials, handing in the assignments, etc. Users of the Moodle learning management system can utilize GISMO for their teaching activities online. Thus, GISMO is very appropriate for the UT's online tutorials that use the Moodle platform. Moodle has provided several standard reports that enable tutors to monitor whether students have individually have

learned certain resources or participated in certain activities on certain days. Moreover, GISMO can complement the Moodle's reports by offering the comprehensive visualization that provides the general description of the overall classes and not only certain students or certain resources. Furthermore, GISMO enables tutors to analyze the overall classes and to have a clear description of current or previous class activities.

GISMO offers the following graphic visualizations:
1. Accesses overview

   This graphics reports students' access to the courses.
2. Accesses to the course

   This feature is the graphic report of the access for each student in a certain period.
3. Accesses overview of resources

   This graphics reports the number of students' accesses to the available resources in the courses.
4. Assignments overview

   This graphics reports students' assignment handing in.
5. Quizzes overview

   This graphics reports students' quiz handing in.
6. Resources access overview

   This feature is the graphic report of the summary of the number of access to the resources available in the courses.
7. Resources accessed by a particular student

   This feature is the graphic report of the summary of a certain student's access to the available resources in a certain course during a certain period.
8. Students' accesses to resources

   This graphics reports the number of accesses to the available resources in the courses for each student.

3.3 Data Collection

We generate our research data by collecting the secondary data from the GISMO software that are installed in several online tutorial classes to monitor students' activities in online tutorials. We randomly select our sample online tutorial classes that

represent the core and non-core courses in Study Program of Management. Table 2 displays the 13 online tutorial classes used as the research sample.

Table 2. List of Courses

No.	Course Name	Class
1.	Business Law	12
2.	Financial Management	31
3.	Performance Management	03
4.	Change Management	07
5.	Strategic Management	02
6.	Marketing Management	08
7.	Supply Chain Management	08
8.	Introduction to Business	11
9.	Strategic Marketing	10
10.	Budgeting	05
11.	Introductory Accounting	26
12.	Organizational Behavior	10
13.	Operation Research	04

3.1.1 The Students' Activities in Reading the Initiation materials

Table 3 shows the students' activities in reading the initiation materials.

Table 3.

The Number of the Students' Accesses to the Initiation Materials

Course Name	Number of Accesses (frequency)								
	Initiation I	Intiation II	Initiation III	Initiation IV	Initiation V	Initiation VI	Initiation VII	Initiation VIII	Independent Exercises
Business Law 12	89	66	47	43	63	39	34	29	44
Financial Management 31	55	43	44	44	53	23	43	36	112
Financial Management 03	85	67	56	67	61	36	32	30	-
Change Management 07	107	72	64	45	46	46	42	37	-
Strategic Management 02	95	82	76	69	73	47	53	33	-
Marketing Management 08	129	100	47	66	78	22	26	40	25
Supply Chain Management 08	74	58	55	44	36	25	40	27	30
Introduction to Business 11	521	359	293	165	140	85	55	68	62
Strategic Management 10	94	81	45	43	43	42	26	17	35
Budgeting 05	130	91	96	142	54	107	137	132	-
Introductory Accounting 26	515	178	127	103	79	76	96	58	-

Organizational Behavior 10	127	77	74	62	67	53	47	60	-
Operation Research 04	48	38	66	36	59	16	38	20	15

The data suggests that the students' access the initiation materials between 17 and 515 times. As indicated by Figure 2, on average students read the materials more actively in the first weeks of tutorials, but the frequency of this activity declines in the following weeks.
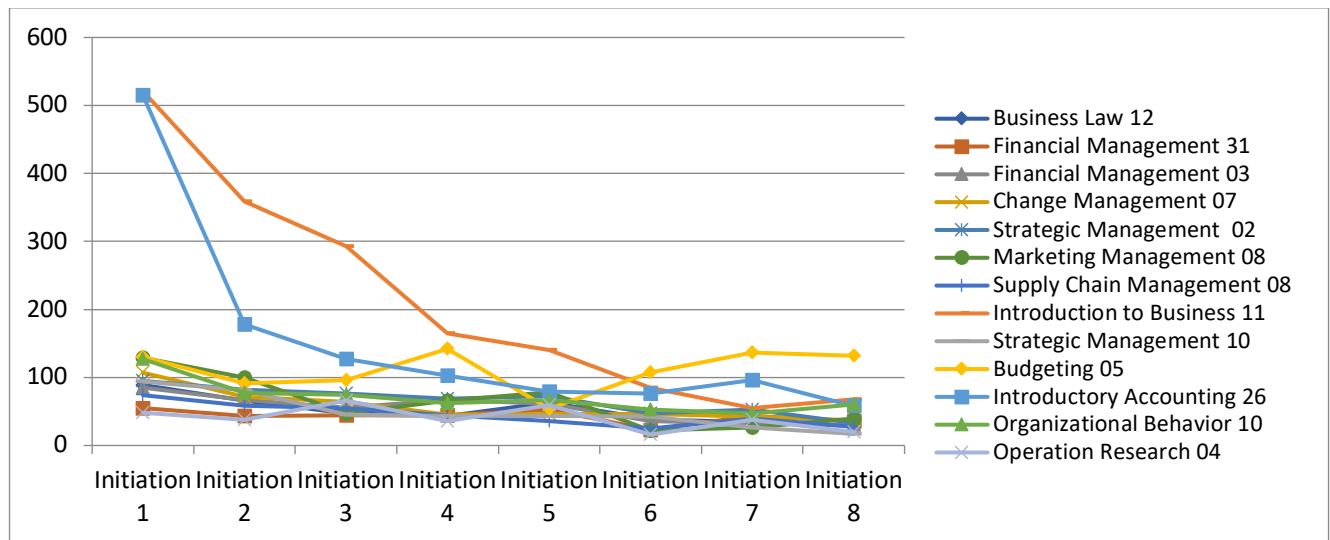

Figure 2. The Students' Activities in Reading the Initiation Materials

The students' activities in reading the initiation materials decline after the first week. One of the main factors is that students exhibit declining motivation to study independently in online media. This factor highlights the tutors' important role in motivating students to read the initiation materials actively.

3.1.2 The Students' Activities in the Discussion

Table 4 demonstrates the students' activities in responding the discussion.

Table 4.
The Number of the Students' Accesses to the Discussion

Course Name	Number of Accesses (frequency)							
	Initiation I	Intiation II	Initiation III	Initiation IV	Initiation V	Initiation VI	Initiation VII	Initiation VIII
Business Law 12	831	486	386	298	263	220	235	183
Financial Management 31	1.232	704	700	533	493	366	288	204
Financial Management 03	338	722	308	330	322	222	204	146
Change Management 07	303	277	172	211	176	156	123	108
Strategic Management 02	294	261	212	233	145	205	134	131

Marketing Management 08	693	518	339	410	327	333	229	251
Supply Chain Management 08	294	206	154	157	156	142	132	120
Introduction to Business 11	1.050	848	531	508	375	388	309	263
Strategic Management 10	740	563	308	236	219	197	174	167
Budgeting 05	224	166	187	148	125	133	146	116
Introductory Accounting 26	1.166	551	382	413	330	300	260	256
Organizational Behavior 10	435	306	252	236	177	157	161	153
Operation Research 04	372	313	290	157	189	127	174	95

The number of the students' accesses in a class ranges from 95 to 1,232 times per week. Figure 3 suggests that similar to the previous activity (reading the initiation materials), the students participate in the discussion more actively in the first weeks of tutorials, but the participation declines in the following weeks.
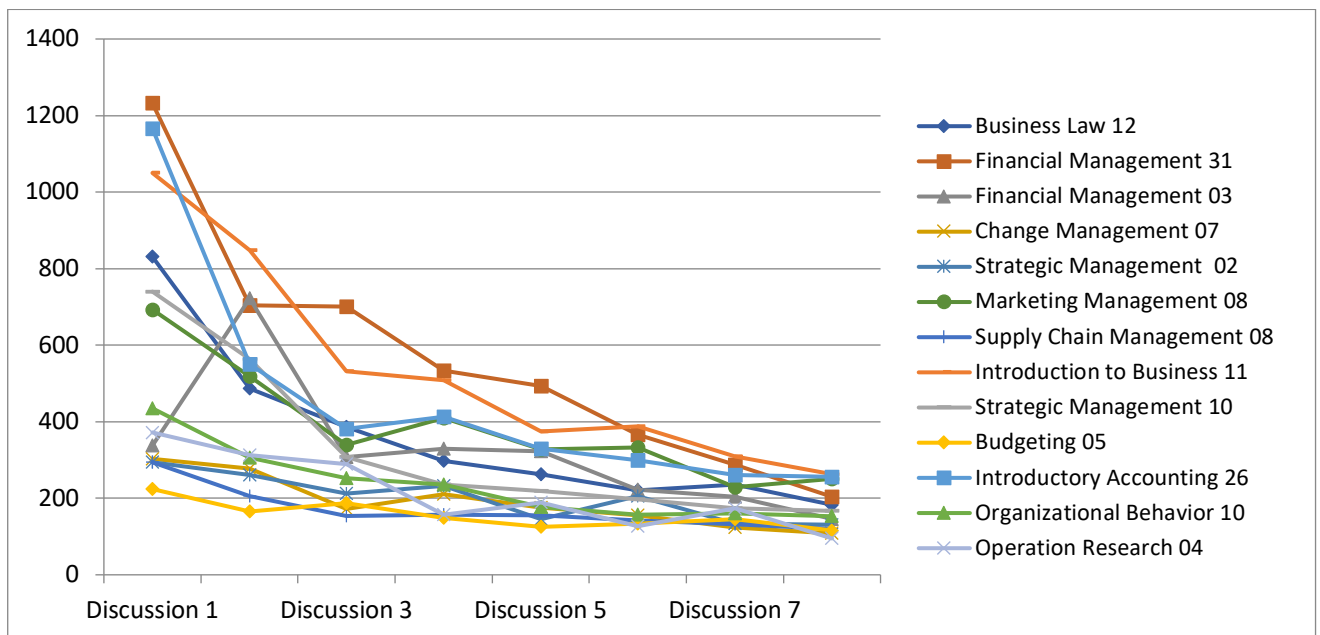

Figure 3. The Students' Activities in the Discussion

Similar to the previous activity, students answer the discussion actively in the first weeks of the tutorials and their participation declines in the following weeks.

3.1.3 The Students' Activities in Doing the Assignments

An assignment contributes to 50% of the students' total mark. Each online tutorial gives three assignments to the students. Table 5 demonstrates the students' activities in handing in the assignments.

Table 5.

The Students' Activities in Doing the Assignments

Course Name	Number of Students Doing the Assignment		
	Assignment I	Assignment II	Assignment III
Business Law 12	42	40	40
Financial Management 31	53	41	43
Financial Management 03	45	40	45
Change Management 07	49	37	36
Strategic Management 02	46	41	37
Marketing Management 08	44	44	32
Supply Chain Management 08	39	37	40
Introduction to Business 11	86	77	65
Strategic Management 10	44	33	21
Budgeting 05	40	31	34
Introductory Accounting 26	54	55	32
Organizational Behavior 10	40	40	44
Operation Research 04	22	27	24

The data suggest that on average only less than 40 students hand in the assignments or about 26.7% of the total students in a class that consists of 150 students. This figure is relatively low because it is less than 50%.

4. CONCLUSION AND SUGGESTION

This research aims to analyze students' activities in online tutorial that can be classified into three main students' activity groups, namely reading the initiation materials, participating in the discussion, and doing assignments. In general, students still exhibit a low level of activities and even the activities decline in last weeks of online tutorial. The online tutorial is a learning support facility of UT to its students. The online tutorial contributes about 30% of the students' total mark. Participating in online tutorial actively (studying the initiation materials, responding the discussion, and doing the assignments) helps students improve their marks. Thus, it is important

that tutors motivate students to participate the online tutorial actively from the beginning to the end of the process.

The study does not explore the reasons why students are less active in online tutorials. We suggest that future studies can explore the factors affecting students' activities in online learning.

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