The 1st International Seminar on Science and Technology
August 5th 2015, Postgraduate Program Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

D310-89

The Design of E-Learning (share.its.ac.id) Course "Sistem Pengendalian Otomatis" to Support Effective Learning Outcomes

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Abstract - Open and integrated online learning is learning that promotes the use of learning content from colleges that have more resources for other universities in Indonesia. Subjects – "Sistem Pengendalian Otomatis" (SPO) 4 credits, one of subject in Engineering Physics Department, has been tested for blended learning with partner universities, between ITS with ITN Malang, ITT Bandung. Currently e-learning use by Sriwijaya University, UNSRAT-Menado and MUSAMUS-Merauke. Learning object designed in 8 Sub Achievement Learning - SCP, in cognitive, psychomotor and affective, in the activities: independent study, groups study in guided by lecturer, synchronous and asynchronous learning. Affective abilities measured by activity chats, forums, management capabilities to upload time of task, and the ability of communicate in writing. Psychomotor ability is measured by skill in the design of control in the mini plant or object and skill in programming. The skill have recorded by video camera and uploaded in the share.its.ac.id. Student followers of SPO course showed cognitive abilities, and 92% of them have met the achievement standards that have been set.

Index Terms- SPO, e-learning, share.its.ac.id, learning outcome.

INTRODUCTION

Prerequisite college curriculum is based on Permendikbud No. 73 of 2013 concerning KKNI (Indonesian National Qualifications Framework). Each study program required to prepare a description of the learning outcomes. Learning outcomes is an ability acquired through the internalization of knowledge, attitudes, skills, competencies, and the accumulation of work experience [1]. Curriculum model implemented in Indonesia, following the Europe model, known as the curriculum to increase efficiency and effectiveness in college. 29 European countries have declared in June 1999 [2]. The curriculum is known as curriculum based Learning Outcomes.

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Learning use a digital technology that is known m-learning will impact more efficient, effective, and intensive on learners (students). This media helps students to learn longer, deeper and more productive, if lecturers are able to provide learning content, technology, feedback, and generate self-management for learners [3]. The technology that supports the m-learning for interactive learning using a computer or other digital technologies, such as: IPAD, IPOD, Mobile phone, pocket PC, PDA [4], [5].

There are 12 characteristics of digital learning has been investigated by several previous researchers, that is; zero tolerance for delay, the computer is part of life, it is easy to access information, available tools, adept at multi-tasking, emphasizing the planning and management of time, globally connected, self-actualization, actively practicing, collaboration practicing in groups [6].

Learning Automatic Control Systems (ACS) courses TF091332 - 4 credits, has been done in blended learning, mobile learning on Face Book and share.its.ac.id since 2012 until currently. The module is placed on ITS server's. ACS was followed by students from the department of Engineering Physics ITS, and ITT Bandung; Electrical Engineering ITS and ITN Malang, Computer Systems UNSRI Palembang. Currently this course is run with students in Computer Systems UNSRI, Electrical Engineering UNSRAT and Electrical Engineering MUSAMUS.

METHODE

Description of Learning Outcomes expressed in the form of activities to be conducted, and the knowledge will be obtained by the students [7]. LO on each subject formulated compatible with the levels of Bloom's taxonomy in the cognitive domains (C), psychomotor (P) and affective (A) [2]. There are 8 topics corresponding to 8 LO, that is (1) Students are able to explain the function of Components in Automatic Control System (C2, A3), (2) Students are able to create a dynamic model system (C3, P3, A3), (3) Students are able to compare a Response of system dynamic models (C4, P3, A3), (4) Students are able to create a root locus charts (C4, P3, A3), (5) Students are able to compare a Frequency Response of system (C4, P3, A3), (6) Students are able to

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compare characteristics of P, I, D Controller and combinations of it (C4, P3, A3), (7) Students are able to distinguish a designing of P, I, D control systems and its combination, and Ziegler Nichols methods (C4, P3, A3), (8) Students are able to elaborate the characteristics Systems based on state space equation (C5, P3, A3). Notation C, P, A at each LO is the level of capability in the areas of Cognitive, Psychomotor and Affective. Identification capability at the final the course has been set as LO course, and have analyzed the suitability of LO with any Topic on subjects SPO [8].

Implementation of lectures conducted by ITS students, UNSRI, UNSRAT and MUSAMUS. Participants registered at ITS P3AI unit (Center for Development and Learning and Instructional Activities). This unit has the authority to control all activities of the students participating in m-learning. Table 1 shows the number of learning resources and activities are provided in the m-learning (share.its.ac.id). LO learning resources adapted to each subject. Activities designed to achieve LO, as well as the assessment conducted through assignments, quizzes online - multiple choice, exam - essay and activity in chats and forums.

RESULT AND ANALYSIS

The implementation of online courses SPO at 4 universities, i.e: ITS, UNSRI, UNSRAT and MUSAMUS, for synchronous and asynchronous activities are shown in Table 2. The percentage of students who upload tasks on the e-learning (share.its.ac.id) is very good, with an average of over 89%. This suggests that the role of the students is very high. Synchronous activity requires the initiation of the lecturer to give reward as an assessment of student activities. Asynchronous activity unsuccessful to invite all students to participate. This is indicated only 15% of the total number of active participants in the discussion. Learning resources can be used to achieve LO on any subject. The average value of an online quiz show abilities above 70% achievement of LO.

CONCLUSION

From the results and discussion that has been described in Chapter 3, it can be concluded that:
1. Activities students in e-learning on course SPO has been designed to support the achievement of LO
2. Learning resources provided had to support the achievement of LO
3. e-Learning (share.its.ac.id) can increase student competence in accordance with the achievements of the learning course
4. E-learning (share.its.ac.id) supports the achievement of LO

TABLE 1. DESIGN ACTIVITY AND RESOURCES IN E-LEARNING (SHARE.ITS.AC.ID) THE COURSE OF SPO.

	2012	2013	2014
Number of modules (text)	16	54	54
Number of modules (video)	0	3	3
Number of modules (simulator)	0	0	3
Number of activity (forum)	4	8	9
Number of activity (chatting)	0	0	18
Number of activity (Upload Tasks)	4	9	10
Number of activity (Quiz online)	1	7	8
Number of activity (Survey)	0	2	2

TABLE 2. PERCENTAGE OF ACTIVITY STUDENTS IN SYNCHRONOUS AND ASYNCHRONOUS.

	2012	2013	2014
Percentage of active students in forum (asynchronous)	74%	95.12%	66.73%
Percentage of active students in forum (synchronous)	-	-	18.92%

TABLE 3. PERCENTAGE OF NUMBER STUDENT IN UPLOAD TASKS.

	2012	2013	2014
Percentage of student uploaded task	89.5	100	94.5

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