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Research paper

Evaluation of Blended Learning Implementation which is Conditioned to Optimize the Mastery of Student Knowledge and Skills

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Abstract

Learning process is part of the E-Procurement courses curriculum in Information Systems Study Program at Widyatama University. All this time, in the face-to-face method of learning process, students have not been able to optimize the mastery of knowledge and skills as expected. One of the things that the Information Systems Study Program did to optimize said mastery is applying the blended learning program in e-Procurement courses. This study uses mixed method evaluation approach in evaluating various stages of the process to implement a blended learning program. Meanwhile, the evaluation method used consists of 2 parts of the model namely 1) CIPP, an evaluation carried out on context, input, process, and product, 2) The Flashlight Triad, an evaluation of activities that utilize information technology online. As the final result of evaluating the implementation of blended learning based on observations and research that has been done, there is an optimization of the increase in mastery of students' knowledge and skills, after conducting various activities that are conditioned on face-to-face activities combined with online ones. The results of this evaluation mean that a well-conditioned blended learning program can influence students in terms of motivation, therefore mastering the knowledge and skills of a course can be optimized through the student learning experience.

Keywords: *Evaluation of mastery; knowledge; skills; conditioned; learning process; blended learning.*

1. Introduction

The involvement of information and communication technology (ICT) in the field of education is no longer considered as an option, but has changed to the needs owned and used by lecturers and students with the ease of accessing and distributing information. One of ICT products that is currently developing in a number of universities in Indonesia namely an electronic-based learning process, as well as those studied by [1].

The problem of the community in the learning process requires a good management because it can be observed that the need for information is not just an effort to search; get; and display / present information. However, a good governance is needed for every lecturer and student involved to interact with each other, especially students in obtaining information about knowledge and aptitude in its application.

A number of universities in Indonesia through previous research have tried to implement this distance learning, based on the way of understanding and interpreting in each university, according to the regulations of the Ministry of Research and Technology of Indonesian Higher Education (Kemenristekdikti). However, nothing can be used as a standard reference for the use of the learning process application in distance education (online). The Information System Study Program at Widyatama University is currently carrying out the online learning process using multiple mode, in which this mode is one form of distance education according to Kemeristekdikti. In this case, the dual mode method will place the server and the learning system on campus in serving online interactions for students and lecturers, while the object of research will be students who followed the learning process in E-Procurement courses. Furthermore, it will be evaluated whether the dual mode that is applied to the course can optimize the ability to master student knowledge and skills.

Optimization of the mastery of knowledge in question is the standard ability according to the syllabus, which drives students to have the ability to develop or expand the understanding of a knowledge and its application based on the syllabus according to the learning outcomes that have been set. Similarly, the understanding of mastery of skills in this study is intended as a mastery of students to complete various case studies according to the syllabus.

Motivation and creativity appear to have not developed in the students themselves, even though the lecturer has directed and instructed students to try to find various case study literature and how to solve them through various available resources. Like looking for source books in the library or search engine usage about e-Procurement material in journals on the website. In fact, there are still a lot of students who have not been motivated to do the instructional instruction because the lecturers' instructions did not provide encouragement to look for various learning resources outside the lecture time in class. On the other hand, students also assume that lecturers are the only source of learning that can provide examples of case studies and the best solutions.

The limited direction of learning resources and learning experiences gained by students also have an impact on their knowledge and skills. Knowledge acquisition is limited, triggering students' low ability of knowledge and skills to be able to use the understanding of concepts and application in a case well and quickly. This also triggers a decrease in students' motivation by not com-

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pleting the assignment given by the lecturer or unable to exercise independently.

2. Methodology

In developing this research refers to mixed methods research approach namely the simultaneously approach carried out quantitatively and qualitatively as stated by [2]. Research will be conducted using mixed methods to evaluate learning programs using blended learning. As we known that blended learning is a learning process that is carried out face-to-face directly in class and online interaction meetings.

Based on the results of previous research, it produced a number of findings that mention the role of blended learning which provides great benefits for students in the learning process. There are also those who do their research by combining the learning process face-to-face and meeting online (synchronous or asynchronous interactions) with various ways of implementing that are conditioned in combining the learning process by utilizing existing information technology such as web conference, Skype, chat, and forum [3].

The method of face-to-face learning in class can be assisted by the implementation of blended learning, so that students' insight in understanding various information including knowledge is growing [4].

Based on the various results of the research, the researcher saw the importance of a research method in evaluating a blended learning process. This is related to how to evaluate various changes in learning conditions that arise starting from the preparation of infrastructure, learning design, delivery of lecture materials, and the process of interaction during the course of the blended learning program. Of course, evaluation also observes student behavior which has an impact on increasing the mastery of knowledge and skills.

The method in this evaluation study uses the CIPP model and the Flashlight Triad model. This CIPP model evaluation research evaluates a program from the point of view of four components namely the context, input, process, and product in a program that runs. The goal is that each component can be used as an action in the implementation of blended learning programs in E-Procurement courses [5].

Meanwhile, the Flashlight Triad model is an evaluation of lecturers and students who use information technology in conducting learning interactions, so that the learning outcomes of the subjects concerned for students can be obtained optimally. As stated by [6] that, "The Triad refers to the combination of a technology, a learning activity, and an educational outcome."

In this study, a number of resources involved underlie a problem and become the basis for researchers to develop their research. The human resources involved in this study include: rector; chair of the study program, lecturers, students, and e-Learning system development team. Meanwhile, physical resources that are conditioned in blended learning program activities include technology infrastructure, servers, web system administration, learning instructions, modules, training, and rules for implementing blended learning. Whereas, the implementation of blended learning involves learning activities of a lecturer and 40 students participating in e-Procurement courses that are being monitored every week for four months. Therefore, it needs to be operationally defined regarding the definition and methodology of evaluation that is tailored to the research needs namely:

1. Blended learning
   Blended learning in the researcher's perspective is a mixed learning process conducted in two ways; face-to-face and online/offline (e-Learning). In face-to-face implementation in this study, none of the activities have changed and are still in accordance with the general rules that apply with a student centered learning approach. Whereas, for eLearning, the various activities in the web-based system are conditioned, this is intended to improve the optimization process of mastering the knowledge and skills for students.
   The opportunity to combine the learning process between face-to-face in class (traditional) and eLearning with the help of synchronous or asynchronous use of technology will provide a different learning experience for students.
   As stated by [7], "It represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning."

2. CIPP evaluation
   Evaluation in the context of this study is to assess the extent to which the blended learning program can solve problems in mastering knowledge and skills for each student. This is the reason for the need for assessment of the learning process. As stated by [8] that there must be an explanation of the learning outcomes obtained by students and the "black box" model is unable to provide this explanation. Because blended learning is part of the curriculum evaluation which is part of an education, so a focus needs to be developed on the process to be able to explain "the why of outcomes". This is in line with what was conveyed by [9] that, "Education policy in Europe is always centered on the evaluation process." Evaluation of the blended learning process uses the CIPP Model [10-11] which will be referred to in the decision making for the Information Systems Study Program. As stated by [12] that, "The most important contribution to a decision management oriented approach to educational evaluation."

3. The Flashlight Triad evaluation
   This evaluation refers to how to evaluate the learning process that uses technology media, especially web-based ones. The activities carried out will be evaluated according to the stages in implementing the planned information technology development, so that it can provide the role of lecturers and students optimally when using technology and it can implement a learning process as expected. As stated by [13], the Flashlight Triad evaluates the learning process in helping educational institutions and improving the quality of education using technology. Same as the research results of [14] about evaluation of learning with virtual learning technologies.
   The steps of the activities that must be carried out are: overview and confronting the blob, from the blob to issue, from issue to triad, from triad to data, from data to next steps. According to the researchers, the evaluation of the extent to which the minimum specification of existing technological infrastructure needs to be done and has met the required standard criteria. This consists of: software; hardware; brainware; procedure and users.

Operational boundaries for the CIPP evaluation and the Flashlight Triad related to blended learning, including assessment of the learning process on online meetings and face-to-face (traditional) meetings. Online meetings include the planning stage; development stage; application stage; and implementation stage, while face-to-face meetings use the student centered learning (SCL) approach in discussing topics and comprehensively evaluating various important topics that are not resolved online (eLearning system).

From the results of the CIPP and the Flashlight Triad evaluation, the mapping of the two evaluation models will be carried out by creating an activity connectivity matrix as a parameter related to the evaluation of the CIPP model and evaluation of the Flashlight Triad. Then, to facilitate the integration of evaluations from the results of the matrix mapping in question, a synthesis matrix is created between the CIPP model and the Flashlight Triad as in Table 1.

Table 1: Mapping Result Matrix of Two Evaluation Models

	FT1	FT2	From issue to triad			FT6	FT7
	(Overview and Confronting the Blob)	(From the blob to issue)	FT3 (Technology)	FT4 (Activity)	FT5 (Outcome)	(From triad to data)	(From data to next steps)
C (Context)	Interest blended learning program formulated by the management C-FT1	Various barriers can be minimized by blended learning program C-FT2	Analyzing the needs of the use of technology C-FT3	Planning the different rules in the blended learning program C-FT4	Assessing the readiness of lecturers and students related to the use of blended learning C-FT5	To socialize about blended learning program for faculty and students C-FT6	Evaluation purposes are conducted regularly C-FT7
I (Input)	Input is provided in accordance with the objectives of the program I-FT1	Efforts to overcome the limitations associated resources blended learning program successful I-FT2	Determination of technological resources in a blended learning I-FT3	Creating the conditions and rules in implementing blended learning I-FT4	Blended learning program to encourage faculty and students to meet the human resource needs I-FT5	Providing infrastructure requirements for faculty and students I-FT6	Conducted an evaluation of the resources available input I-FT7
P (Process)	The process that will be used towards achieving program objectives P-FT1	Blended learning program is able to overcome the obstacles that occur P-FT2	Provision of technological resources related to blended learning program P-FT3	All the activities will be provided to faculty and students P-FT4	Feedback and support the implementation of the rules for faculty and students are responsible P-FT5	The importance of blended learning program socialized intensively P-FT6	Evaluation during the process of implementation of blended learning programs implemented P-FT7
P (Product)	Products resulting activity in accordance with the purpose of blended learning program O-FT1	Product programs can be achieved by eliminating the various barriers O-FT2	Technology products can meet the needs of blended learning program OFT3	Products impact of activities undertaken for faculty and students involved O-FT4	Lecturers and students are able to adjust to the needs of blended learning program O-FT5	Product blended learning program can be met because of insufficient resources O-FT6	Product program achieved due to continuous evaluation for program improvement O-FT7

There are a number of reasons as to why this descriptive qualitative research approach is carried out. First, this study wants to see the extent to which mixed learning activities (blended learning) can provide optimal mastery of knowledge and skills conducted by students in the current era of engineering. As stated by [15] that, "In our current educational practices, are we developing students with the necessary intelligences and capabilities for the 21st century? What are the challenges facing your current education system?" Therefore, it is time for students and lecturers to carry out an innovation in the learning process in the 21st century and interact with the online learning process. Further explanation was also given about the need to develop a learning environment beyond the limits of a class namely: "Educators today are not just disseminators of information or even facilitators, Learning has to extend beyond the physical boundary of the classroom and educators need to become designers of the learning environment".

The steps that will be used as a qualitative research approach according to [16] which became the reference in this study, concerning: data collection; data reduction; display data; conclusions and verification.

3. Analysis

Data analysis is the process of organizing and sorting data into patterns, categories and units of basic descriptions, so that the themes and formulations of the working hypothesis can be found. Based on the formulation above, an outline can be made, that data analysis aims to organize data. In Figure 1, we can see the flow of evaluation of the blended learning program that has been carried out. There appears to be a relationship between the groups of subprocesses involved that the process group in the evaluation scope that uses two previous evaluation models can be implemented if the online / offline system support group and face-to-face system give the results first.

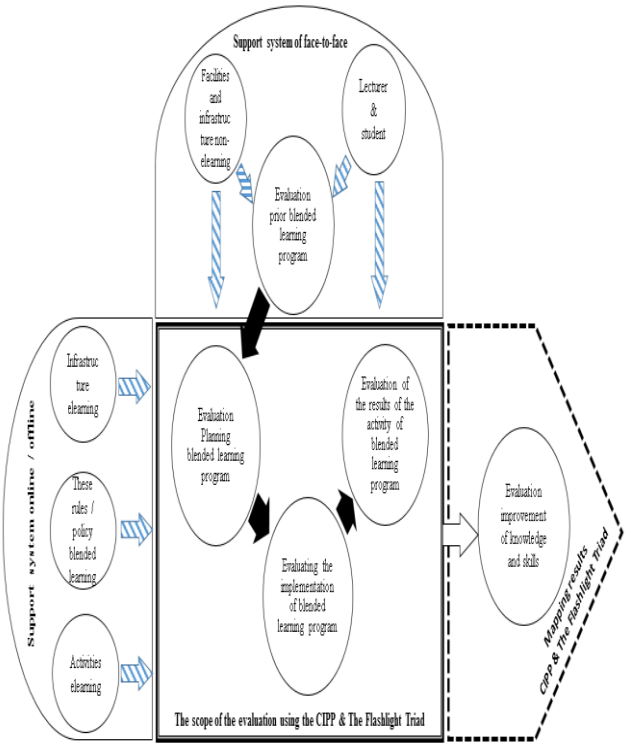

Fig. 1: Interaction of various sub-processes in evaluating the implementation of blended learning applications

Description of the arrows' direction:

The direction of the object involved

Mapped evaluation results

The process of the stages carried out

It appears in Figure 1, that there are two groups that provide data support namely:

1) The online / offline system support group is the first part that needs to get an initiative to plan the implementation of blended learning. In this case, it includes the activities of the subgroup of processes related to the rules of the blended learning policy. At this stage, the head of universities need to support by issuing policies on the importance of implementing blended learning along with various implementing rules, including the obligation for lecturers and students to participate. Furthermore, in the sub-group of processes related to e-Learning infrastructure that are absolutely prepared by the head of the university, namely various forms of ability to provide facilities and infrastructure according to the needs of the e-Learning system. As well as how to prepare and distribute instructional materials along with forms of interaction that must be done by lecturers and students, so that it becomes a guideline for lecturers and students in interacting online and, or offline.

2) The face-to-face system support group is a series of traditional learning processes that are routinely and optimally carried out before blended learning is implemented. In this case consists of sub-groups of conditions of facilities and infrastructure that have been carried out in class related to facilities in interacting between lecturers and students in the classroom. The two subgroups were evaluated for their relevance as input for the implementation of the evaluation using the two evaluation method models described earlier.
3) The group evaluation stages of the CIPP model and the Flashlight Triad model are based on input from the two previous groups. Based on the two evaluation methods, it is necessary to map in the form of a matrix to evaluate each interrelated relationship. The final result after various evaluations is done is obtaining various activities that need to be done in the implementation of blended learning.

This research was conducted in a particular class group and course. In this case, environmental objects that include e-Learning system facilities and infrastructure; college student; lecturer; teaching material; distribution of learning instructions; up to class administration tools in class; and prepared guidelines and rules for implementation. Furthermore, it will be evaluated to what extent the blended learning process can provide optimal mastery of knowledge and skills in the learning process.
This type of research is evaluative research using the CIPP model and the Flashlight Triad as a reference in evaluating the implementation of blended learning. The core of the model put forward by [10] evaluates four components of the type of evaluation; context, input, process, and output (CIPP), while the Flaslight Triad evaluates online / offline learning methods.
The use of blended learning does not yet have standard provisions (technical instructions) and general policies that are used in implementing it in universities in Indonesia. In this case, the researcher considers that there is a need for some meaning and description of the extent to which optimization can be done in the implementation of blended learning in a university. This is because research only focuses on a class of students and lecturers as well as certain courses, causing the results to be generalized because they only apply to certain conditions.

4. Results

The description of the research's results that has been carried out includes:

- Since the introduction of blended learning, students have turned out not only engaging in learning interactions, but essentially changing the mindset of learning and motivate students to actively search for information that is spread widely on the internet in an easy and convenient way to obtain it.
- Student confidence increases rapidly in understanding and applying a knowledge to solve problems because students can understand the various knowledge acquired on the internet according to the needs with the understanding ability of each student who can be different.
- Lecturers provide wider space and opportunities for students to seek learning resources (experience learning) which results can be shared with other students, so as to increase confidence in acquiring knowledge and skills.
- Knowledge and skills gained from learning resources can help and guide students to be able to solve various problems optimally, so that the mastery of knowledge and skills keeps on increasing.
- Limitations of time in the traditional learning process and students' dependence on material that is only given by lecturers can be overcome by conditioning in blended learning.
- A number of e-learning exercises and testing conducted every week can be measured well based on the results of various learning activities, resulting in a significant increase in the mastery of knowledge and skills as expected.

Meanwhile, the results from the evaluation from planning to the application of blended learning that has been mapped in the matrix in Table 1 can be explained as follows:

1. Scope of planning: The process that will be used leads to the achievement of program objectives that provide understanding, meaning, and technical skills carried out in blended learning (target activities, namely socialization).
2. Scope of planning: Blended learning programs are able to overcome obstacles that occur and cannot be resolved during traditional learning (activity targets are the obligation to use various activities).
3. Scope of planning: Provision of technology resources related to blended learning programs (activity targets are server procurement and installation of e-Learning systems and tool settings in e-Learning systems).
4. Scope of planning: All activity processes will be applied to lecturers and students (activity targets are the stages of the learning process in blended learning).
5. Scope of planning: Feedback and support for the implementation of rules for lecturers and students in a responsible manner (the target activity is the interaction of the learning process).
6. Scope of planning: The importance of a blended learning program is intensively and specifically socialized (activity target is monitoring).
7. Scope of planning: Conduct an evaluation during the implementation of the blended learning process (target activity is to conduct a comprehensive evaluation on a weekly basis).

5. Discussion

Various findings that have been made regarding blended learning have had a significant impact on the mastery of knowledge and skills through conditioning of various aspects related to the implementation of blended learning.

Table 2: The survey students in the implementation of E-Learning

Activities	Do Not Agree	Disagree	Agree	Strongly Agree
The study material presented in e-Learning is very easy to use and accessible at any time according to the wishes of students	2.5%	7.5%	82.5%	7.5%
When the discussion forum takes place, developing responses / comments can greatly help students' understanding of the teaching materials that have been obtained previously	2.5%	7.5%	87.5%	2.5%
Responses from various references that appear and are expressed in the discussion forum can provide a new understanding of the meaning of a terminology that fits the weekly topic	2.5%	5%	90%	2.5%
In the discussion forum makes students have their own perspective in accordance with the referrals I get, to participate in responding to problems in the discussion forum	2.5%	10%	87.5%	-

Students tend to have other perspectives by analyzing or combining various responses / comments of students and lecturers at the forum	2.44%	9.76%	82.93%	4.88%
Activity on the forum discussion is very effective in understanding the weekly topics	2.5%	7.5%	85%	5%
Students easily repeat the learning experience by retracing various recorded learning resources	-	7.5%	82.50%	10%
Knowledge from various sources at the site address can be found easily following examples of weekly topics	5%	7.5%	82.5%	5%
Different ways of evaluation (test) was done, giving the mastery of knowledge and skills as well as the results of assessments of students earn	2.5%	5%	82.5%	10%
The use of the e-Learning system can improve the mastery of students' knowledge and skills in carrying out the learning process	-	7.5%	85%	7.5%
Students feel comfortable working on all activities in the learning process	-	10%	80%	10%
Overall students are satisfied with the use of the e-Learning system in e-Procurement courses	2.5%	5%	82.5%	10%
This e-Learning learning process will improve your motivation for self-reliance on student learning in mastering knowledge and skills	-	7.5%	80%	12.5%

In general, it appears that the results of the blended learning program are able to provide increased mastery of understanding a weekly material for students as a survey conducted by students participating in e-Procurement courses

Table 3: Comparison of Student Experience when face to face (Traditional) with E-Learning

Activities	Do Not Agree	Disagree	Agree	Strongly Agree
Students are easy to develop understanding of the material delivered by the lecturer when face to face compared to the e-Learning system	12.5%	57.5%	25%	5%
Students can express their responses freely on the topic of problems from the lecturers while in the e-Learning forum compared to face-to-face	10%	15%	62.5%	12.5%
Students easily exchange information well in e-Learning forums compared to face to face	-	17.5%	67.5%	15%
Students easily develop study materials from their lecturers in the classroom than in e-Learning	5%	22.5%	67.5%	5%
Students easily complete various assignments that are delivered when face to face compared to e-Learning	2.5%	17.5%	72.5%	7.5%
Students prefer to study material from lecturer sources rather than exchange information in e-Learning discussion forums	10%	72.5%	17.5%	-
Students are able to express different opinions about a particular topic when face to face compared to e-Learning	10%	62.5%	25%	2.5%
Students more often have detailed records on the topics explained by the lecturer when face to face compared to e-Leaning	12.5%	57.5%	25%	5%
Students know more about teaching material / insight than lecturers when face to face compared to e-Learning	10%	65%	25%	-
Students are not motivated by conditioning that is included in e-Learning compared to face to face	15%	72.5%	12.5%	-

The survey table above shows the e-Learning activity provides a learning experience for students, which results can optimize the mastery of knowledge and skills each week.

Table 4: Average Time in the Log System Needed by Students in conducting E-Learning Activities

	<15’	15’ – 30’	30’ – 1 Hour	1 – 2 Hour	>2 Hour
The time needed to study and understand the material from the lecturer and various references on the website related to weekly	10%	17.5%	45%	20%	7.5%

topics					
Time to work on assignments	-	20%	20%	42.5%	17.5%
Doing a pretest	7.5%	42.5%	35%	15%	
Doing a posttest	10%	32.5%	37.5%	15%	5%

Based on the table above, it can be concluded that the ability of student activities in reading, understanding the reference material to working on an average task takes 1-2 hours. That is if the learning experience is given to students to manage it and the lecturer as a facilitator, it will result in an optimization of the mastery of students' knowledge and skills.

Table 5: Log System Time Implementation of Student E-Learning activities

	Morning	Noon	Night	Not Sure
The habit of reading material on weekly topics	5%	5%	55%	35%
Doing a pretest	7.5%	15%	52.5%	25%
Doing a posttest	10%	7.5%	52.5%	30%

Based on the log system table data above, that students have different ways and times in completing the understanding of the material and the execution of tests and assignments. Of course, the more variety of learning resources available and the trust given to access various sources of learning can increase the mastery of students' knowledge and skills.

6. Conclusion

The implementation of blended learning conducted by students provides comfortable activities in the learning process and learning experiences that are fun to share with fellow students. As a result, it has the effect of optimizing the mastery of knowledge and skills for these students.

This success can occur through various aspects that contribute to the implementation of blended learning. The aspect referred to begins with the policies and rules made by the head of university regarding the importance of blended learning applied, so that the culture of delivery, monitoring, elaboration, and evaluation of learning that has occurred so far can be changed to the interaction form of blended learning.

The next aspect through the development of e-Learning system infrastructure and continuous socialization (including workshops) can provide comfort for lecturers and students to contribute to learning interactions.

The last aspect is through encouragement and direction for students to be given the confidence to seek various knowledge and skills regarding topics and problems every week, through an understanding that has been reviewed by each student, which is then discussed in a discussion forum and can be elaborated again in face-to-face meetings in the classroom.

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