

Flipped Classroom Application and Improvement of Motivation and Creativity of Participants in the Educational Technology Research and Development Study

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Abstract—The development of instructional model in the subject of research and development of educational technology requires the process of improvement and development, in order to nurture the students so that they can devote the ideas and creativity reflected in the lecturing activities of the project's final project. This research uses design and development method. Starting with identifying potential and problem identification, data collection, model design, expert validation, revision, model development, revision, model implementation and final evaluation. This research is expected to produce a guide of learning model implementation which creatively utilize information and communication technology (ICT) with new learning scheme that is by using Flipped Classroom model and optimizing potency from Google Apps Technology which have been owned by every UPI student through upi.edu email account and also SPOT, the Learning Management System software developed by ICT Directorate of UPI.

Keywords—*blended learning; flipped classroom; creativity; innovation motivation; educational technology*

I. INTRODUCTION

Educational Technology Research and Development is one of the subjects at the final level in educational technology study programs. This course intention is to allow students not only to have a better understanding of the basic concepts, scope, and methodology used in the research and development of educational technology. However, they can propose further design, implement and evaluate programs and products resulting from the development of educational technology.

Assignments and homework are one way to motivate students to repeat the lessons that have been delivered. For some intelligent students who have sufficient learning resources, these activities are quite effective and can motivate and challenge them to re-learn and even explore the material that has been given. However, this is not the case for students who are slow and have limited access to learning resources. This activity can make those who do not really understand the lesson, will be more confused, even stressed, when they

encounter difficulties in carrying out tasks without the guidance of others.

The abundance of learning resources available on the internet can be one of the advantages that can be done to facilitate students' lack of access to learning resources. Flipped classroom is an instructional model in which the lecturer assigns tasks to students to actively learn the given material that will be delivered through digital media in the form of videos or e-books or other forms of learning resources as pre-material and preparation for classroom activities (face to face). Whereas in the face-to-face process more optimizing practicum, learning workshop activities, or task execution.

The development of a flipped classroom model based on Google Apps technology in Educational Technology Research and Development course is expected to be an alternative learning solution. Increased motivation and creativity to innovate students in carrying out lectures on Educational Technology Development and Research into other impacts that are expected to emerge.

The main objective of this study was to design and develop instruction in the Educational Technology Development and Research subject using a flipped classroom model based on Google apps technology. Besides that, to find out the improvement of student motivation and creativity in innovating in the field of educational technology.

II. LITERATURE REVIEW

Blended learning emerged as a response to inevitable technological developments. With the development of technology, Smaldino et al. define blended learning as a combination of e-learning and direct face-to-face learning [1]. Instead of using the term e-learning, these research tend to use the term online learning because it literally has a firmness in the use of electronic devices as a prerequisite of e-learning.

Smaldino et al. also stated that online learning is not only about accessing information, but also about achieving specific learning outcomes [1]. This opinion also confirms that online

learning is not only about getting information through devices connected to the internet. But also related to the learning objectives and the measurement of the learning outcomes. Including interactions that rely on the teacher as the main learning resources are transformed into other types of learning resources. Therefore, the availability of various types of learning resources is an integral part of supporting online learning.

The essence of learning with a flipped classroom model is not only on changing learning patterns from traditional (teacher-centered) to student-centered learning, but also on the changing role of educators and students in the learning and teaching process as concluded from Educause, Center for Digital Education, Hamdan et al., and Flipped Learning Network [2-5]. Educators shift roles by acting as facilitators whose main task is to manage classes and learning processes that occur in the classroom so that students achieve the desired learning goals, while students will play a more active role in the learning process (self-learning - personal learning).

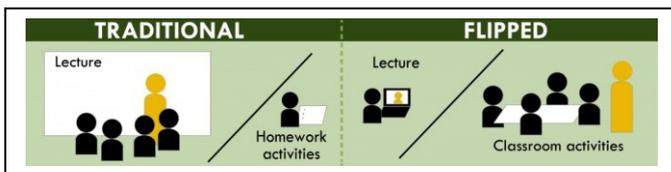


Fig. 1. Difference between traditional and flipped classroom models.

McCarthy found that changes in learning patterns can lead to increased intensity in access to teaching materials, thus opening up better opportunities for knowledge formation of students [6]. This finding is strengthened by the results of a study by Nwosisi et al. which states that using flipped classrooms is generally able to improve learning outcomes [7]. In fact, Danker also emphasized that flipped classrooms can accommodate deep learning in large classes [8].

In the 21st century learning concept according to Partnership 21 or P21, there are skills that must be possessed by students to be able to compete and survive in an era of global competition and knowledge-based economy, among these skills is the ability to work together, communicate effectively, then critical thinking, problem solving, self-direction and media and technology literacy [9]. The student-centered learning process, one of which is the flipped classroom model, is expected to be able to encourage the formation of these skills systematically.

In other words, the needs, desires, interests, and desires that move someone to do something Motivation by Weiten is defined as needs, wants, interest, and desire that propels us in certain direction or lead to a goal can be called motivation [10]. The urgency of the study of motivation will never be used as long as humans live and develop. So motivation will continue to evolve with the changing needs, desires, interests, and desires of humans.

Meece and McColskey set six behavioral indicators of highly motivated students which are attendance and discipline, participation and completion of work, task persistence and

acceptance of errors, quality of task involvement, independent learning, and interest and liking [11].

A. Attendance and Discipline

This indicator can be seen even at the most basic level, students who are motivated should attend class, pay attention, and are not disruptive. More motivated them, the more their attendance and discipline level.

B. Participation and Completion of Work

It can be seen that students who are motivated, may begin any assignments with little prompting, do tasks completion on time, follow directions, and actively participate in discussions.

C. Task Persistence and Acceptance of Errors

This persistence is an important indicator of motivation, which can be seen from how long a student stays with a task, the easy task or especially a difficult one. Highly motivated students stay persist and try many different solutions before trying to seeking help when they meet the difficulty when finishing a task.

D. Quality of Task Involvement

Sometime in specific condition, students have options to choose between invest effort in learning or find some shortcuts to get the task done faster and easier without expending a massive deal of effort. The effort's amount and quality, which students expend on learning tasks is another indicator of motivation. The higher motivated students are willing to invest more effort and to use their own acquired skills.

E. Independent Learning

Students who have indication of willingness to learn more than is required are rarely to stop working on a task, even when it is time to move on to something new. They also may bring in materials from outside school, complete work that is not primary or given, or ask questions to learn and discuss more about a topic.

F. Interest and Liking

If students always enjoy learning, showing enthusiasm, and take pride in their work. It indicate that student is highly motivated. The more this attribute showed, the more they motivated.

Similar opinion applies to creativity. Weiten also considers creativity to be essential for human life because it can help solve various human problems [10]. Long et al. based on various expert opinions defines creativity as the ability to find a variety of useful ideas and solutions [12].

Creativity is widely known as a skill that must be possessed in the 21st century. Creative thinking skills fall into one of the skills to support learning and innovation skills (www.P21.org/Framework).

Brookhart said that creativity basically can be seen in a person, if the person shows openness in receiving various experiences, confidence in his creativity, has good knowledge

and expertise, motivation, sensitivity against risk and willing to deal with it, and withstand the various criticisms it faces [13].

The creativity can be measured by clarifying the criteria and show the extent of one's appearance in their creativity, whether their creativity is high or low. Although the content and systematics of creativity measurement may vary, the testing response categorization tends to be the same. By testing aspects of creativity, such as fluency, flexibility, originality, and elaboration. The creativity measurement model which developed by Brookhart measure four levels of creativity, namely very creative, creative, ordinary / routine, and imitative in four different areas, namely variations in conveying ideas, variations in finding resources what is needed, novelty in combining ideas, and novelty in carrying out the communication process [13]. The measurement of four level creativity in the scale of four ranging from 0-1.75 (imitative), 1.75-2.75 (ordinary/routine), 2.75-3.5 (creative), 3.5-4.0 (very creative).

Another creativity measurement model developed by Guilford can also be used to measure a person's divergent production. This measurement focuses on the creativity produced by the person in the context of "speed" in completing the task given within two minutes and can produce how many responses. To measure the fluency can be seen as much as the response given by students. To measure flexibility what type of response is given. To measure originality can be seen from unusual responses from students. Whereas to measure elaboration, it can be seen from how detailed the response given by students.

The urgency presented by these two components is an addition to the need for innovation as one of the attributes of 21st century students. So it makes this research more necessary to be implemented.

III. METHODS

This study uses the design and development method. Richey and Klein define this research method as a systematic study in designing, developing and evaluating with the aim of presenting an empirical basis in producing products and tools for both learning and non-learning or giving birth to new models or enrichments that govern changes [14].

The subjects of this study were students of educational technology study programs who took courses in Educational Technology Research and Development, the 2015 class of educational technology study programs as many as 50 people.

The design prepared to carry out this research according to the method is to use the ADDIE Design Model which stands for Analysis, Design, Development, Implementation, and Evaluation. The design of this model refers to the formulation developed by Branch which is adapted into a chart as follows [15].

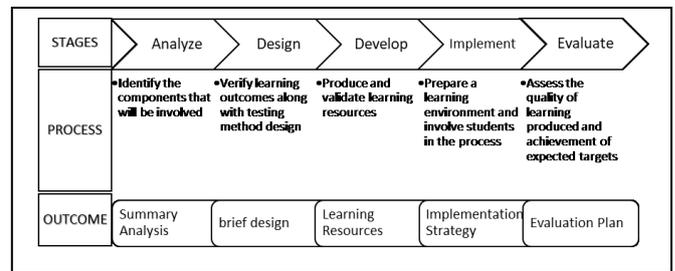


Fig. 2. Research design chart.

To measure the motivation and creativity uses specific different instruments. A questionnaire is used to measure the motivation level. While a combination of Guilford and Brookhart instrument of creativity formed a rubric to assess student's creativity.

This measurement activity involving Educational Technology Research and Development Class. Which is have total 48 students of 19 male and 29 female. It has been held in the first semester of 2018-2019 academic year.

IV. RESULTS AND DISCUSSION

The main result of this research is a design model for establishing a blended learning environment with flipped classroom scenario. This model is intended to become an alternative for lecturer, which is transforming their classroom activity into blended learning or developing online instruction course for distance learning and massive open online course (MOOC).

The design model resulted from this research is called GALE model, an acronym which stand for four main step to develop a blended learning. 1st step is Goal Analysis. 2nd step is doing an Activity Plan. 3rd step is Learning Resources Development. And the 4th plan is Evaluate and Reflection.



Fig. 3. Design model steps.

This model implementation tryout on this research is by using Google Apps Technology, which is adopted by Indonesia University of Education as one of its integrated services for both student and staff.

First step of this GALE model is doing Goal Analysis. This step objective is to elaborate the instructional goals. Specifying

it into more applicable statement and measurable indicators. And then the subject or sub topic can be formulated. Generally in the first step of Gale model there are three sub step as follow.

TABLE I. 1ST STEP – GOAL ANALYSIS

1 st Step	Goal Analysis
1	Unpacking Goals
2	Constructing measurable indicators
3	Formulating Subject/Sub Topic

This model core step probably is in the 2nd step, which is try to focus on the learning activity setting and design. The combination of online and offline activity is the main concern. But, the variation of the activity is also an important consideration. Both online and offline learning formed with some developmental rules to distinct each activity objectives. Online activities should be directed to give basic information of instruction, so it can be labeled as a basic knowledge delivery. This can be delivered with expository, directed and teacher centered approach. Therefore, offline activity try to deliver experience that actualize the basic knowledge. These activities consist more student centered learning such as workshop, simulation, guided discussion, and other practice based activity. Last action in this step is constructing evaluation form. This plan of evaluation is intended to measure student’s achievement from both online and offline instructional activities.

TABLE II. 2ND STEP – ACTIVITY PLAN

2 st Step	Activity Plan
1	Online Activity/Basic Knowledge Delivery Design
2	Offline Activity/Actualization Experience Design
3	Construct Instruction Evaluation Form

3rd step is could be considered as the key in the implementing learning activity. This step is consisting with three main components, utilizing available resources, developing some new one, and then forming its implementation strategy. No like others sub steps before, Learning Resources Development’s sub steps is not a sequence. Both sub steps can be can be implemented simultaneously. A simple note on this step is the choosing of variety type of resources might be critical for whole design.

In educational technology field as Seels & Richey and Januszewsky said, the form of learning resources are identified as messages, people, materials, devices, techniques, and settings [16,17]. The choice of which learning resources forms will be used in the activity can be crucial. It might be a result of student characteristic analysis, relevant with learning objective and its availability, familiarity (ease of use), and its capability to store and deliver instructional knowledge and learning experiences.

After resources has been developed, the next step is form the implementation strategy. The common strategy for blended learning with flipped classroom is that online activity delivered first, the offline activity will follow.

TABLE III. 3RD STEP – LEARNING RESOURCES DEVELOPMENT

3 rd Step	Learning Resources Development
a	Utilization of available resources
b	Development new original resources
c	Forming Implementation Strategy

Then, the last step is Evaluate and Reflection. The different between this step and the evaluation in the second step is that in the second step was intended to measure student’s achievement. And the evaluation process is considered as a part of learning activity. However in this 4th step, evaluation is intended to assessing whole implementation process.

Evaluation and reflection step is consisting with three sub step. Student learning outcome achievement analysis would be the first sub step. It is very important to gain every information reflected from student’s learning achievement results. It might be picture which aspects that students achieve more from one to other.

The second sub step is the reflection process. Start with the questioning of the teacher satisfaction with the students achievement. Teacher’s satisfaction can be rely on the assessment orientation used by teacher. Whether criterion-referenced assessment (CRA) or norm-referenced assessment (NRA) can be used as a reference to answer the question of satisfaction. After the question has been answered, then it should be analyzed to get information regarding all aspects that construct the student achievement successfully satisfied or unsatisfied.

TABLE IV. 4TH STEP – EVALUATION AND REFLECTION

4 th Step	Evaluation and Reflection
1	learning outcome achievement analysis
2	Reflection process
3	Follow up decision

Final step is to decide what to do to make the next implementation a better instruction process. This decision formed in a series of list and notes will be used as recommendation and consideration for developing a new steps of instruction with blended learning model. The completion of this step is a mark for an end. It is mean all the blended learning instruction process has been ended.

Besides making design model for developing blended learning, this research is also measuring student’s level of motivation and creativity to innovate in the Educational Technology Research and Development Study.

Student’s motivation level in the beginning of instruction is at early medium level. Its mean as a plenty room for improvement. Students were asked to respond several statements that described their motivation level to innovate. And then increasing after some instructions. The early achievement of student’s motivation might be caused by the lack of information received by students about the instruction and the project in the Educational Technology Research and Development Subject Matter.

After several instruction can be measured that student motivation are growing. From six indicators observed and measured directly and through questionnaire that is 1) Attendance and Discipline, 2) Participation and completion of work, 3) Task persistence and acceptance of errors, 4) Quality of task involvement, 5) Independent learning, 6) Interest and liking.

Increasing motivation of student to innovate most likely seen in the independent learning aspect. Despite overall increasing in other aspect, massive increasing in independent learning may be caused by the addition of online activity. In the online learning, independence and autonomy or self-regulated learning play a huge role for it successful. Or like Sutisna founded that self-regulated learning related with the increasing of student learning result [18].

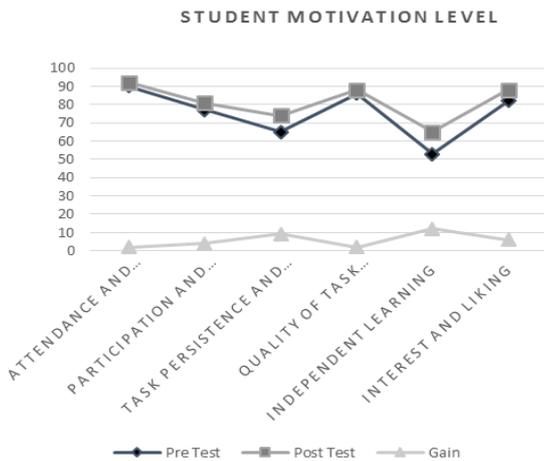


Fig. 4. Student motivation level chart.

Measurement on student’s creativity using a combination of Brookhart and Guilford instrument are as follow.

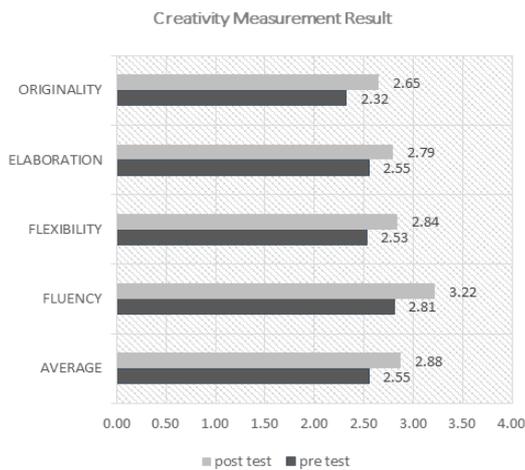


Fig. 5. Student creativity level chart.

It can be seen from the figure above that there are increasing in all aspects of creativity. And the amount of its increasing tend to be equal. Based on scale of four, the average

of the student creativity slightly changing from imitative to creative category. It reflect in almost all aspect, except the originally aspect which is not change in imitative level despite it increasing amount of achievement.

Despite of the positive results, the process of implementation seems to be more complex than the traditional one. Flipping classroom probably giving some obstacle to teachers in the preparation process. Collaboration with other teacher or faculty staff might ease the process for a little. That also, why Nwosisi et.al said instructors/teachers should start small and keep it simple [7]. And then considering to develop a flipped instruction as a collegial process.

This results of research also strengthen what Lalima and Dangwal said that blended learning is probably the solution to problems prevailing in our educational system [19]. If implemented with a well-planned design, and then organized with the right attitudes it may become the future of our educational system. However, as Jeffrey et al. said there is a potential danger that blended learning courses will not meet its full potential if teachers do not change their practices and attitudes in order to develop blended experiences [20]. That’s mean despite the good instructional models, media or resources, the teacher still play an important role in the future of learning.

V. CONCLUSION

The need to implementing online learning is inevitable. Internet and computer keep growing rapidly. And it is changing the world, including our education system and process. It might be depending to us to involve changing the education habits, or stay with conventional education tradition rather than start implementing and developing online learning fully like e-learning, or half-used like blended learning. Implementation of blended learning with flipped classroom model can be using various way. GALE model of flipped classroom implementation is only one way to do it. This model’s advantage is technical sequences are detailed, but still have plenty rooms for innovation in its implementation. One of most disadvantage of this model haven’t been tried and tested much enough. So it reliability on various implementation have not been known. Both of motivation and creativity reflect a specific information about what an implementation of blended learning with flipped classroom model can change. Although it positive result, the condition of other implementation might be different. So the pattern result cannot be generated in others implementation directly. It is need deeper and more specific research.

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