

# Designing of Blended Learning Environment

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## ABSTRACT

The learning environment is very important in supporting learning behavior and transactions. Blended learning provides learning alternatives that facilitate learning through 3 modes, namely online, face-to-face and independent learnings. During the Covid 19 pandemic disaster, the blended learning was an option for educators so that the learning outcomes of students could be more comprehensive. the blended learning designs are very varied and become a challenge for educators to develop them. More specifically for subjects that require more complete processes such as cognitive, skills, and attitudes. The composition of the 3 blended learning modes is interesting to discuss.

**Keywords:** Learning environment, Blended learning, Face to face, Self learning.

## 1. INTRODUCTION

During the Covid 19 pandemic, colleges and schools were forced to use online learning for health reasons. A drastic change from the face-to-face learning mode to online learning mode. This of course encountered many obstacles from the teachers' and students' sides. The constraints found can be reduced over time and experiences. Through the online learning experiences during the Covid 19 pandemic outbreak, there is a belief that after the Covid 19 pandemic outbreak, online learning is still used but it will be combined with face-to-face learning. Campuses and schools have felt the advantages of the online learning. The combination of online, face-to-face, and independent learning models is called blended learning.

Blended Learning Environment has been known for two decades and at this time the use of blended learning environment has been in all aspects because of the many advantages that can be taken. The learning environment requires students to be disciplined, work hard, and be consistent in learning. On the other hand, instructional design developers must pay attention to learning objectives, learning outcomes, learning activities, and assessment in each mode.

Many research results in blended learning environments, such as: Vo, et.all. concluded that in their research clear objectives and expectations, the

quality of learning and collaborative learning were significant predictors of student performance in blended learning [1]. The use of blended learning can improve student satisfaction and performance [2]. Developing of learning science process skills through a blended learning environment [3]. Science practicum learning with a blended learning environment is more effective than a regular learning environment [4];[5];[6].

Blended learning is interesting to discuss because of the many advantages that can be obtained from this learning. In addition, during the COVID-19 period, blended learning was a favorite alternative to use. Therefore, how to design a blended learning environment becomes interesting to discuss. This paper will discuss how to design a blended learning environment in science practicum courses?

## 2. DISCUSSION

Blended learning design can use existing instructional development models, for example, the ADDIE development model. All development models have their own advantages and disadvantages. The existing development model is specifically designed for an instructional activity. The cycle of designing blended learning starts with planning, designing, implementing, reviewing, and improving [7];[8]. This paper will describe the planning and designing stages in more detail than other stages.

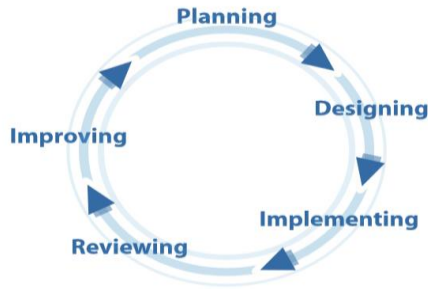


Figure 1. The Blended Learning Design Process [7]

In this stage, the critical consideration of the needs analysis is required. These considerations include courses that will be developed through a blended learning environment, elements of courses, student learning activities, and supporting things needed by students. What is usually done is to analyze the curriculum starting from the graduate profile and how the role of this course supports graduate competencies. Figure 2 is an example of a needs analysis for the Science Practicum course.

2.1 Planning

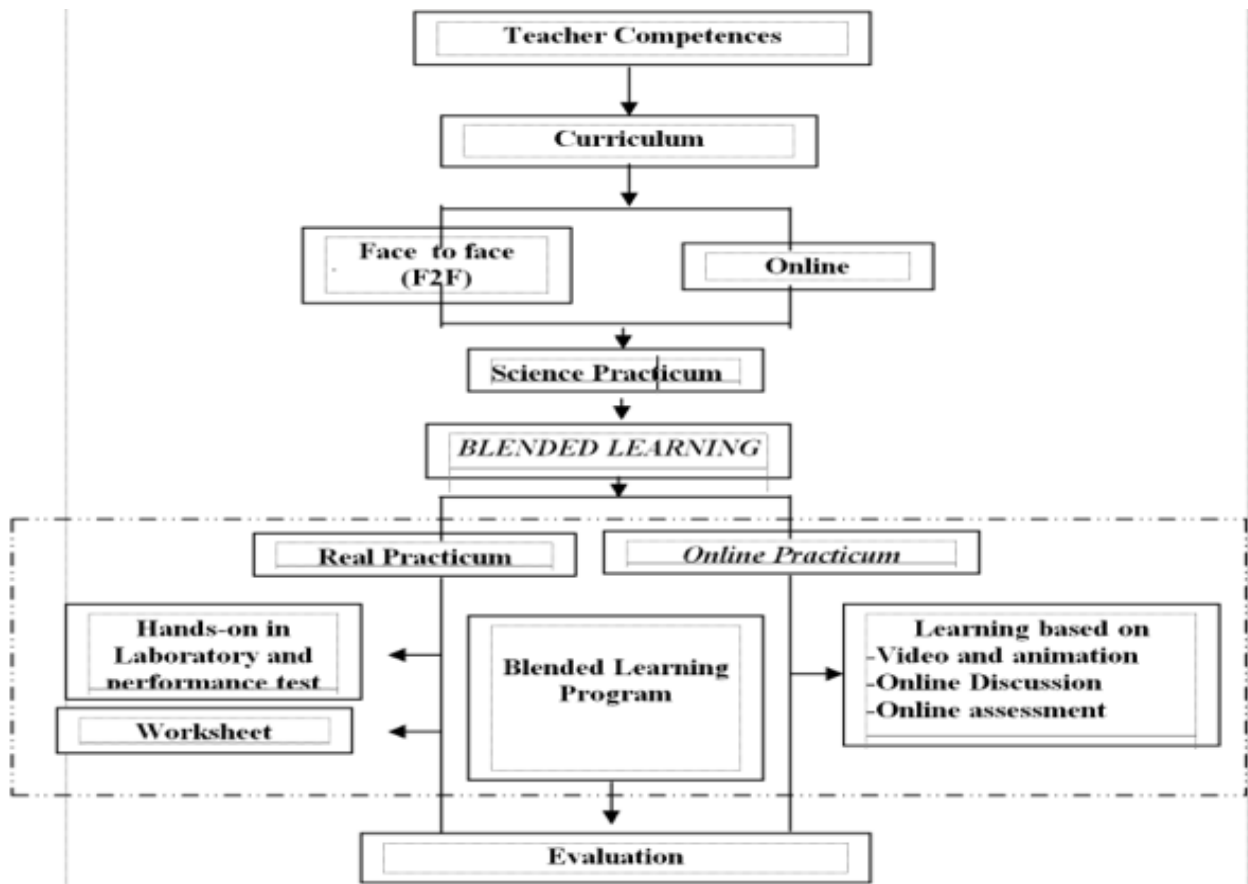


Figure 2. Need Analysis [9]

2.2 Designing

The general principles in designing are (1) course learning objectives, teaching and learning activities and assessment, (2) activities have goals, (3) teaching and learning activities have a relationship between time and material, (4) learning hours with blended learning is not must be heavier than face-to-face classes with the same credits, (5) Note the proportion of time, effort, and resources involved in developing blended learning

in terms of the impact and importance of the course. Examples of help questions in designing are as follows.

What will be developed ? 2) Why do I need to develop it? 3) What do I want my students to do? 4) How it can help my students learn and what role it plays in the course.

2.3 Implementation

The implementation of the Natural Science Practicum Course delivered by blended learning for 1 semester is as follows [9].

**Table 1.** Example of designs from blended learning

Learning Objectives	Blended learning to support learning objectives
Identification of moon shapes	Providing image access based on internet-based data and laboratory activities
Analysis of bacterial colony forms	Providing access to videos of bacterial breeding and laboratory activities
Recalling lecture materials and demonstrating practicum materials.	Periodically at the end of each chapter, there are online quizzes and performance exams in the laboratory.
Critical analysis of science process skills	Group work activities through online discussion forums and group work in the laboratory

**Table 2.** Online program for implementation blended learning

Time	Topic	Learning Process	Learning Strategy	Assignment
5x50'	Introduction	Orientation for using web-based on LMS	Explanation, demonstration, and simulation	Practice to <i>Log in application</i>
First week	Bacteria reproduction	-Observation on video and count bacteria cluster -Describe shapes and color bacteria colony -Determine Petri dishes (variables) as controls and treatments -Explain why so must be sterilized prior to investigation	Virtual Laboratory / Practicum <i>online</i>	Submission of task
Second week	Measurement by means of a caliper	-Observe the demonstration of measuring length using a caliper -Determine the inner and outer diameter of a pipe	Virtual Laboratory / Practicum <i>online</i>	Students send answers via the web
Third week	Factors affecting the performance of the toy propeller	-Make data in table form -Determine the factors that influence the time the ball in Toy reaches ground level	Virtual Laboratory / Practicum <i>online</i>	Students send data of practicum results and answers via the web
Fourth week	Investigating Electrical circuits	-Observing animation -Making inferences why light bulbs in electric circuits can turn on and not light.	Virtual Laboratory / Practicum <i>online</i>	Students send answers via the web
Fifth week	Investigate the shape of the moon	Interact with animation so that students can describe the movement and appearance of the moon shape based on the moon's revolution against the earth	Virtual Laboratory / Practicum <i>online</i>	Students submit answers via web
Sixth week	Discussion	Students read and then answer questions a topic of discussion after discussion with friends groups	discussion <i>online</i> (discussion and question and answer)	Students submit answers via web
Assessment	Student answers the multiple-choice KPS	assessment <i>online</i>	Students send answers via the web	Students send answers via the web
Questionnaire	Students	Questionnaire <i>online</i>	Students send	Students send

nnaire	respond to a closed-form		answers via the web	answers via the web
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**Table 3.** Face to face blended learning implementation

Time	Topic	Learning Process	Learning Strategy	Assignment
2 X 50'	Introduction and pretest	-Explaining the order lab work, the scope of the materials lab, lab strategy, systems assessment and explanation of student worksheets -Pretest (exam practice)	Lecture and Q & A pretest practice exam be done with the <i>station</i>	No
2 X 50'	Caliper	-Reading the caliper scale -Determine the inner and outer diameter of a pipe.	real practicum	Journal of Practicum Results
2 X 50'	Purity of substances	-Measuring the volume of irregular solid objects -Measuring the mass of objects -Performing division operations between the mass and volume of objects. -Identify the similarities and differences between objects that have mass and ratio the same volume. -Determine the trend toward regularity of mass ratio and volume.	Real practicum	Journal of Practicum Results
2 X 50'	Genetic	-Identifying immortal traits that students have -Grouping immortal traits that appear from classmates -Calculating the percentage of immortal properties obtained from classmates from	real practicum.	Journal of Practicum Results
2 X 50'	Electrical Circuits	- Simple electrical circuit -Predict and manipulate simple electrical circuits on electric circuits with light bulbs on and off	Real practicum.	Journal of Practicum Results
2 X 50'	Natural and Synthetic Polymers	1. Observing the differences between synthetic polymer fabrics and natural polymer fabrics by means of; naked eye, loops, touching with palms, and tearing cloth with hands. 2. Distinguishing the strength of synthetic polymer fabrics and natural polymers against bleaching agents and vinegar. 3. Distinguish the absorption response of synthetic polymer fabrics and natural polymers to water droplets and oil droplets. 4. Apply the concept of natural polymer fabrics and polymers Synthetic to the types of clothing used for various jobs.	Real practicum.	Journal of Practicum Results
2 X 50'	Propeller Toy	- Measuring length carefully -State the height variable that affects the length and quality of the toy's flying. -Count time carefully. -State the variables in the material and size of the toy that affect the length and quality of the toy propeller flying -Making a model of a toy figure with the best duration and flying quality -Formulate hypotheses about what variables affect the quality of flying toys.	Real practicum.	Journal of practical results. Model of toy propeller
2 X 50'	Leaf Investigation	1. Make traces of leaf shapes using cake coloring 2. Make traces of leaf bones with stamp ink 3. Categorize shape groups leaf. 4. Observe and touch the leaf edge.	Real lab	Practicum Outcome Journal Tracing bone

		5. Draw the edges of the leaves. 6. Observing and touching the petiole. 7. Draw a petiole. 8. Observe and touch the top and bottom surfaces of the leaves. 9. Collect various types of leaves and group the dried leaves according to leaf shape, leaf bone, leaf edge, and leaf tip.		leaf shape and leaf
2 X 50'	Assessment	<i>Written Post Test and Practicum Post Test</i>	Exam Practice with systems station	No

The implementation of the blended learning program in Table 2 and Table 3 is a design that has been implemented by Hartono[9]. Table 2 is the implementation program for online activities for 8 weeks and Table 3 is face-to-face activities in the laboratory for 1 month. In online activities students are given online discussion activities to discuss assigned topics and practice questions in the form of quizzes on each topic as well as online summative tests as a vehicle for practice. Furthermore, Table 3 describes face-to-face activities, namely working in the laboratory for one month during the residential period students come to campus. They learn directly and interact with equipment, materials, fellow friends in the group. At the end of the activity, students perform a performance test with the system station.

#### 2.4 Reviewing and Improving

Reviewing is very important stage because of determining quality of blended learning program. Many things of blended learning to be reviewed namely online teaching materials, ICT, face to face teaching materials, design of blended learning and evaluation. Goal of reviewing is to know how is good the program and does the program need revision to be recommended at planning stage. Many research said in order to reviewing of blended learning program [3], [4], [9].

After reviewing of the blended learning program, it is necessary to improve the component of program. It is needed some experts to give consideration to revise the components. Many things of components so the revision might be useful for the next delivery of the course based on blended learning experiences.

### 3. CONCLUSION

Designing for blended learning requires a systematic approach, such as: 1. Planning for integrating blended learning into your course, followed by; 2. Designing and developing the blended learning elements; 3. Implementing the blended learning design; 4. Reviewing (evaluating) the effectiveness of your blended learning design, and finally; 5. Planning for the next delivery of your course then involves improving the blended learning experience for both staff and students.

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