

Hypothetical Web-Based Flipped Classroom Model Of Instruction For Student Of Sport Science

Hastria Effendi, Nurhizrah Gistituati, Azwar Ananda

Abstract: One of the main problems of the Indonesian Ministry of Research, Technology and Higher Education (Kemendikbud) is how to increase the ratio of participation and unequal distribution of tertiary education throughout the Republic of Indonesia. One of the main programs to solve the problem is to encourage public universities to provide online higher education services. Research on the development of web-based learning models has indeed been done a lot both nationally and globally. But no one has linked it to an effort to improve and overcome the inequality of higher education. This paper is about a hypothetical Web-Based Flipped Classroom Model of Instruction, as one of the learning models that utilize online services, which aims to produce a model of instruction in higher education that is expected to meet the desires of Kemendikbud. This model was developed through R&D research using Borg and Gall procedures. This model has been tested by learning design experts, learning media, content, and linguists. These experts agree that this model is valid and can be implemented in a real class.

Index Terms: Education Technology, Flipped classroom, Model of Instruction, Web-based Learning

1. INTRODUCTION

Online instruction in any form is predicted to become a more important instructional model in Indonesian universities in the future. This is mainly supported by the rapid advancement of information and communication technology (ICT), the pressure of limited resources owned by universities, Indonesia's vast geographical conditions, and demands for the expansion and even distribution of education that need to be improved. The Indonesian government has issued two regulations to regulate and protect the implementation of the web-based instruction in Indonesia, namely Law No. 12 the Year 2012 on Higher Education and Regulation of the Minister of Education and Culture No. 24 the Year 2012, which was later renewed by No. 109 the Year 2013 on the provision of distance education. Distance education, in this case, is defined as an instructional process carried out remotely through the use of various communication media.

Distance education as referred to paragraph (1) of Article 31 Law No 12 the Year 2012 aims to:

- a) provide Higher Education services to community groups who can not attend face to face or regular education, and
- b) expand access and simplify the learning services of Higher Education [1].

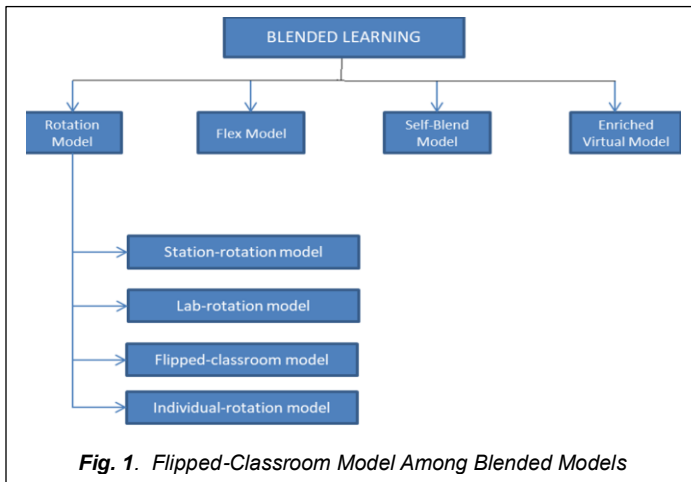
One form of distance education is the web-based instruction. There are many kinds of web-based instruction. ICT makes possibilities to develop many other web-based instructions. Flipped classroom model of instruction for instance, as a variance of blended instruction, can be developed to a web-based instruction in nature, and it is expected constantly to achieve the objectives of distance education as stated in the law, in order to increase the number of people's participation in

higher education in Indonesia.

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

Web-based instruction, sometimes also called web-based education can be defined as a web technology application in the learning process. All learning done by utilizing internet technology can be referred to as web-based instruction. Web-based instruction is a teaching-learning process that can be accessed through the internet network. So all instruction that utilizes internet technology can be called web-based instruction [2,3]. A flipped classroom is one type of blended learning model (see figure: 1) which simply means "what is done at school is done at home, homework is done in class" [4]. The initial and general forms flipped classroom implementation are: student activities begin by watching the theoretical part of the lesson through various tools such as videos, presentations, taking notes, preparing questions about parts they do not understand. Then in class, they do activities such as finding shared answers to the questions they prepared before the lesson, group work, problem-solving, discussion and making conclusions [5]. The paradigm of constructivism is the main philosophical foundation and is considered the most appropriate for this Web-Based Flipped Classroom Model of Instructional (WBFCMI). The constructivism paradigm formulates that all knowledge is built on the previous knowledge of the learners; there are learners who are active in gaining knowledge; the learning process is the process of reconstructing or finding knowledge, student-centered learning process, and interactive.

- *Hastria Effendi is currently pursuing doctorate program in education in Universitas Negeri Padang, Indonesia, PH-08116602203. E-mail: hastriaeffendi@fik.unp.ac.id*
- *Nurhizrah Gistituati is a lecturer in educational administration department faculty of education in Universitas Negeri Padang, Indonesia, E-mail: gistituatinurhizrah@gmail.com*
- *Azwar Ananda is a lecturer in citizenship education department faculty of social science in Universitas Negeri Padang, Indonesia, Email: ananda.azwar4127@gmail.com*



The constructivism paradigm underlies learning and instructing theories. Learning for example, according to constructivism-based learning theory learning is an active process in which students build new ideas or concepts based on current knowledge or past knowledge [6]. Further, learning is (1) a process of interaction between what is already known by what will be learned; (2) a social process; (3) a process with a particular situation; and (4) is a cognitive meta-process [7]. When examined more deeply, the four explanations of the intended learning process emphasize that the learning process involves the issue of the interaction of various aspects which, if simplified, can mean the learning process includes interaction with matter, people, the environment, and mental or thought interaction [8]. Some learning theories based on constructivism paradigms include the theory put forward by Dewey. Dewey is known as the father of constructivism through discovery learning. He argued that learning depends on the experiences and interests of the students themselves and the topics in the curriculum should be integrated with each other not separate or not related to each other. Learning must be active, student-centered in the context of social experience [9]. Piaget is also seen as a respected constructivism learning theory because of his original thoughts and ideas about children's thinking and the conceptualization of the stages of development of children's thinking. According to Piaget, observation is very important and becomes the basis for guiding children's thinking processes, in contrast to seeing actions that only involve the eyes, observations involving the entire senses, storing impressions longer and causing sensations that imprint on students. Therefore, in learning, students are encouraged to experience themselves and engage directly in realistic situations with the objects they learn [10]. Vygotsky's role in constructivism learning concepts is also very important, especially in relation to his learning theory called the "Zone Proximal Development" (ZPD). ZPD is "the distance between what can be done without assistance with what can be done with the help of adults, or working with more capable colleagues" Vygotsky (1978). Vygotsky believes that when a student is in the ZPD for a particular task, providing appropriate assistance will give students "encouragement" enough to complete the task [11]. In addition to the theory of constructivism, this study also uses the concept of learning according to the theory of connectivity which explains how network technology provides opportunities for humans to learn and share information between them through networks. Siemens views learning as a process that

occurs in an ambiguous environment of shifting core elements that are not completely under individual control. Therefore learning can be outside of us (in organizations or databases), focused on connecting specific sets of information, and connections that allow students to learn more and this is more important than the current state of knowledge [12]. There are eight principles of the theory of learning, according to connective theory: 1) Learning and knowledge lie in the diversity of opinions; 2) learning is the process of connecting information; 3) learning may be in non-human equipment; 4) the capacity to know more is more important than what is currently known; 5) maintaining and maintaining connections needed for continuous learning; 6) the ability to see relationships between fields, ideas, and concepts is a core skill; 7) accurate and current knowledge is the goal of all learning and connectivity; 8) decision making is a learning process. What is known today may change tomorrow The right decision today may be the wrong decision tomorrow [12].

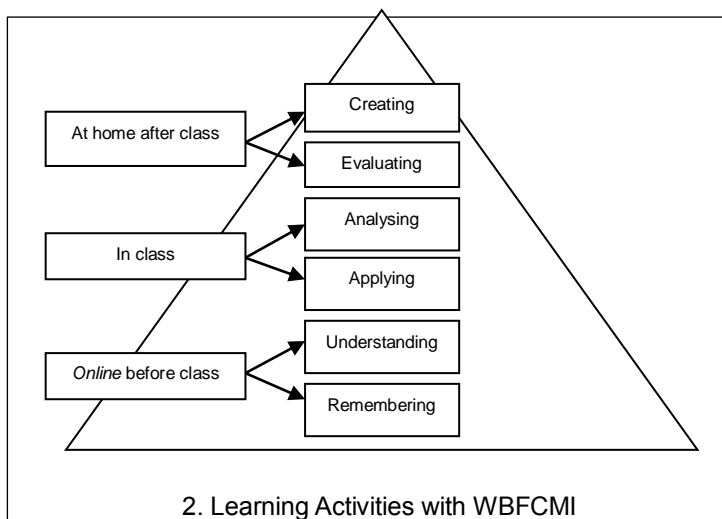
3. METHODOLOGY

This research was a research and development using Borg and Gall's (2003) which are modified into four stages: (1) the problem identification and requirement analysis stage; (2) the design, validation, and revision stage; (3) the limited field test and revision; (4) the broad field test and final revisions. This research only covered the two steps of the four stages of the research, which results in a hypothetical learning model called Web-Based Flipped Classroom Model of Instruction (WBFCMI). The sample used to develop WBFCMI was 90 students and 20 lecturers of the Sports and Recreation Study Program at the Faculty of Sports Science, who were randomly selected from 780 students and 38 lecturers. To ensure the quality of WBFCMI, the following activities have been carried out: (1) Arranging a grid of WBFCMI components based on theoretical studies, preliminary research on the usability and acceptability of students and lecturers on web-based instruction, and the availability of web-based learning facilities owned by the University, as a basis to develop the conceptual WBFCMI; 2) Validate conceptual WBFCMI by experts, consisting of material experts, teaching design experts, media experts, and linguists; 3) Test the results of expert judgment with a statistical test consisting of the Aiken's V formula for content validity, and the correlation coefficient between assessors (ICC) for consistency of expert judgment.

4. THE RESULTS

1) The Basic Concept of WBFCMI

Simply, the basic concept of the flipped classroom in WBFCMI is the lower-order thinking skills (LOTS) are learned online before class and the higher-order thinking skills (HOTS) are learned in the classroom and continued at home. Specifically, it was formulated that in WBFCMI, the flipped classroom refers to the skills of remembering and understanding are learned online before class, applying and analyzing skills are learned in the classroom, and assessing and creating skills are learned at home after class. Learning activities at WBFCMI such as this are based on the revised taxonomy of Bloom's cognitive domain [13]. This learning activity is presented in figure 2.



2) The Model

Based on the information obtained from preliminary research, the theoretical foundation that supports the model, and empirical information from the experts, the WBFCMI is visualized through figure 3. This model was developed based on 3 factors described previously: (1) constructivism learning, (2) interactivity, and (3) connectivity. Constructivism learning indicators include knowledge reconstruction, finding a process, student-centered, social interaction, and reflective. Indicators for interactivity include the interaction between learners with materials, learners with educators, learners with other learners, and learners with technology. While the WBFCMI device consists of model components, instructional components, and assessments.

a. Syntax

The WBFCMI which is a combination of web-based learning (e-learning) with face-to-face learning has some syntax as follows: (1) orientation, (2) web-based learning

activities, (3) face-to-face discussions in class, and (4) assessment.

1. Step 1: Face to face: Orientation

The orientation activity is only done once at the beginning of the semester and is done in class. In this step, the lecturers explain through face to face in the class about the WBFCMI such as course objectives, organization of course materials, learning strategies used, lecture rules, and assessment process. Students need to be given sufficient time to inquire and discuss everything about learning using the WBFCMI, as well as foster and maintain student motivation for web-based learning to run smoothly.

2. Step 2: The learning activities through the network before class, consisting of:

- a) Learning instructional material. The material is in the form of digital manuscripts, files, simulations, videos, and e-books that already exist in the Moodle-based e-learning portal. Students can organize what components of instruction are needed, how they order, including the allocation of time to learn the components of the selected impressions.
- b) Making a summary. To ensure that students have studied the material then each material should be summarized and the results are sent by uploading it to the link provided.
- c) Feedback. Each summary is given feedback (feedback) and value by the lecturer.
- d) Online discussion. Discussions are made through discussion forums whose facilities have been provided. The discussion was conducted among the students, while the lecturer supervised the discussion through the correction and direction of the discussion.

3. Step 3: A face-to-face discussion in class

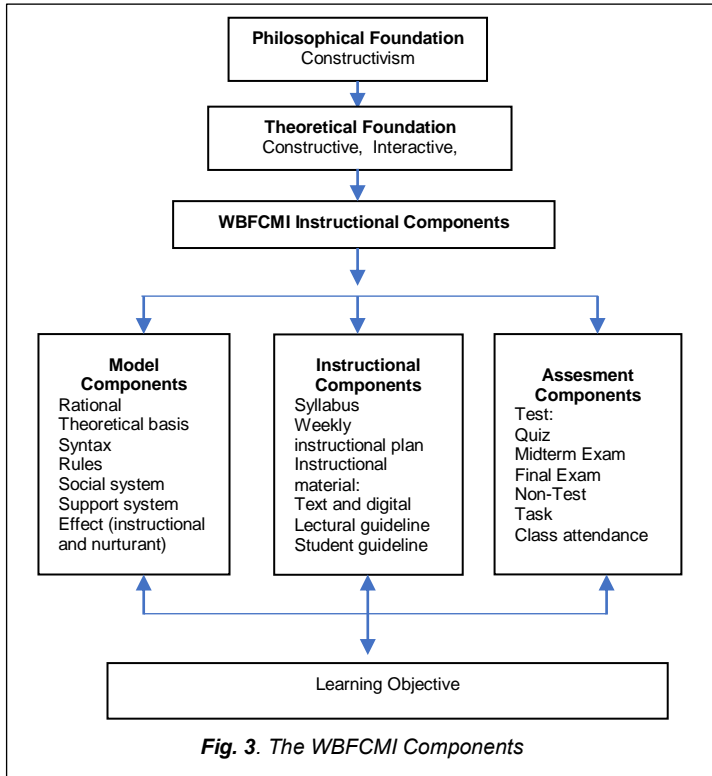
At the end of a particular topic is scheduled a face-to-face meeting in the classroom that comprehensively addresses the issues faced by students in learning topics that have been learned online. This is where the error in understanding and using concepts, procedures, and rules learned through the network is rectified.

4. Step 4: Learning at home after class, consist of the following activities:

- a) Making conclusions on class discussions individually, the results sent to the link provided.
- b) Reflection (Writing a three-page essay about the subject being studied, the results sent to the link provided.
- c) Chating with friends

5. Step 5: Assessment

Assessments were conducted on each of the topics in the form of exercises, quizzes being implemented online for formative purposes. While the task, midterm exam, and semester exams are used for the summative purpose.



b. Social System

This WBFCMI is a mixed learning model between web-based learning (e-learning) and face-to-face (face-to-face). The implementation of WBFCMI in this research is designed in accordance with the faculty policy of 50% e-learning and 50% face to face. In online learning, students can learn independently or cooperatively with other students with the facilities provided to achieve competence in accordance with the speed, learning style, and needs. This activity is needed in an environment that supports and motivates students to learn and require an active role of students in learning. In the face-to-face discussions in the class will be discussed about the problems faced by students in learning and understanding the concepts in Electrical Machinery courses. The student's active role is also required to share information with other students about what he gets in learning. While in the assessment will be created an environment in which students can conduct an independent assessment of learning, assessment with other students, and assessment by lecturers. This assessment can be done online or offline. Lecturers act as planners, executors, mentors, motivators, and as assessors of the learning process. At the beginning of lectures, lecturers must condition students so that they understand how to access e-learning because this media is a core media in web-based learning. Later on, the lecturers' learning process must ensure students are in the right direction by monitoring student progress in learning through the giving of exercises, duties, and quiz.

c. The Rules

Some rules that need to be understood by lecturers and students in learning using WBFCMI are:

Lecturer:

- 1) Lecturers ensure every student understands the instructional process using WBFCMI.
- 2) The lecturer provides all instructional tools and uploaded them to the e-learning portal.
- 3) The lecturer answers all student questions as soon as possible.
- 4) Lecturers provide feedback on all tasks sent by students.
- 5) The assessment is done transparently, so the students know where their advantages and disadvantages.

Students:

- 1) Students should understand the learning objectives, materials organization, learning process, lecturing rules and learning methods using the WBFCMI.
- 2) Students must actively discuss in learning either through online or face-to-face in class because the model refers to student-centered learning.
- 3) Students should make a summary of each subject and send it to e-learning in accordance with the stipulated provisions.

d. Supporting System

This WBFCMI requires a support system as listed below:

1. Computer
2. An adequate internet network
3. Moodle-based LMS or other LMS
4. Manual for students and lecturers in the use of WBFCMI
5. Textbooks (Print and Digital)
6. Video
7. Simulation
8. Links to other relevant material

3) The View of WBFCMI On the E-Learning Portal

The example of the appearance of each subject in WBFCMI format on the e-learning portal is shown in figure 4.

4) The quality of WBFCMI

The quality of WBFCMI is reflected by two indicators namely the validity and reliability of WBFCMI according to experts. There are three types of validity used in maintaining WBFCMI validity, namely construct validity, content validity, and item validity from the instruments used by experts to validate WBFCMI. The construct validity is guaranteed by the theories and research results relevant to the development of the WBFCMI; Content validity is maintained by including all construct dimensions covered in the instrument used for data collection. The trick is to make the instrument lattice so that it can be ascertained that there are no construction dimensions that are not represented. In addition, content validity was analyzed using the Aiken'V formula with a result of Aiken'V = 0.819. Item validity was analyzed with Product Moment Correlation, resulting in 4 of 34 items from instruments used to validate invalid WBFCMI. Reliability is used to determine the consistency of expert judgment about WBFCMI. Cronbach's alpha coefficient, to reflect the internal consistency of all items in the experts' agreement scale, was 0.986; while the ICC, which reflects the consistency of expert assessments, is 0.718.

5. DISCUSSION

In terms of validity and reliability, the developed WBFCMI both theoretically and from empirical facts can be said to be valid and reliable. There are several factors that need to be considered in-depth to implement WBFCMI successfully, including the availability of adequate information and communication technology devices both hardware and software, owned by students, lecturers, and universities. So there are no technical obstacles to organizing learning with WBFCMI. In this connection, the technical ability of students and lecturers to use technology such as

SECOND SESSION: STRUCTURE OF MATERIALS AND CHEMICAL REACTIONS

Learning Objectives:

After studying this subject, students are able to explain the chemical elements and their functions in the human body; atomic structure and the differences between atoms, ions, molecules; and explain endergonic, exergonic, synthesis, decomposition, reversible, exchange, phosphorylation/dephosphorylation, and oxidation/reduction reactions.

A. ONLINE LEARNING BEFORE CLASS WITH THE FOLLOWING ACTIVITIES:

1. Reading the sports biochemistry material book Chapter 1.
2. Watching the video
3. Studying powerpoint
 - Do the next following tasks:
 - a. Looking for key concepts on the internet, the results are sent to this link.
 - b. Making a summary of the structure of matter and chemical reactions, sent to this link.
 - c. Making 5 (five) questions to be discussed in class, send to this link
4. Online discussion, must be attended by all students. Forum
5. Doing exercises, if 80% correct, read the textbook again. Quiz
6. Working on formative questions, answer send to this link Assignment

B. LEARNING IN CLASS WITH THE FOLLOWING ACTIVITIES:

- a. Presentation of the subject matter by assigned groups.
- b. Discussion of the topics that have been presented.

C. LEARNING AT HOME AFTER CLASS WITH THE FOLLOWING ACTIVITIES:

- a. Making conclusions on class discussions individually, the results send to this link.
- b. Reflection (Writing a three-page essay about the subject being studied, the results send to this link.
- c. Chating with friends

Fig. 4. The View of WBFCMI On the E-Learning Portal

computers and applications that are needed is certainly important too. Willingness and ability of lecturers to design learning subjects they care for using WBFCMI also become important. For this reason, it may be necessary to have the training to understand and be able to use a learning management system (LMS) such as Moodle or other LMS that is used as a learning portal platform. Finally, the existence of academic rules governing web-based learning, especially at the university level, is very much needed in organizing learning with WBFCMI to become legal

6. CONCLUSION

How to increase the ratio of community participation and inequality distribution of higher education faster in all parts of Indonesia is still one of the important issues to date. For decades programs to solve this problem are still listed in the Strategic Plan of the Ministry of Research and Higher Education (Kemenristek Dikti). One of the main programs to solve this problem is to encourage state universities to develop various online-based learning models that can increase enrollment and equity in higher education. This paper reports the results of a study that developed a web-based learning model, called the Web-Based Flipped Classroom Model of Instruction (WBFCMI), which aims to solve the problem of increasing participation and equity in higher education in Indonesia.

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