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Abstract. One of the problems faced by students in developing the skills to learn about concepts and procedures in the material development of instructional videos is the lack of initiatives to search for and to determine concepts and procedures which will be used in developing instructional videos. Therefore, a learning scenario is necessary to instil the idea of learning early and regularly at the beginning of non-face-to-face session, followed up by face-to-face session, and resumed to non-face-to-face session. One of the learning models that are able to give students an opportunity to perform experimental learning is blended learning. This study aims to 1) develop the management of blended leaning-based materials and activities, 2) discover the effectiveness of blended learning. The development of management of materials and activities adopting the Absorb-Do-Connect (ADC) model. At the *absorb* stage, the activities include reading, watching, and listening. At the *do* stage, the activities include answering, deciding, building, organizing, searching, games, simulations, and scenarios. At the *connect* stage, the activities include case studies, planning, reflections, and taking notes. The results show that the model of management development of materials and activities had fulfilled the utility and accuracy of building knowledge of concepts and procedures effectively.

1. Introduction

One of the challenges of the current e-learning deals with how to harmonize between objectives, materials, and learning scenarios to form unity. Hence, it is hoped that a pleasant learning atmosphere can be created to build knowledge, skills, and positive learning attitudes. The spirit of e-learning is the spirit of independent learning so that in the e-learning classroom, self-regulation is vital for the e-learning students. Another important element is an understanding of information technology mediating the interaction between the materials, students, and teachers. The focus of the attention for the e-learning teachers is how to organize a learning scenario that is truly able to activate students' independent and reflective learning creativities by remaining to refer to the creation of learning atmosphere that provides

ease in learning, rooms for students to actively involve, and empirical, repetitive, and interactive student-centred learning experiences [1]-[2].

Skill which should be owned by e-learning teachers is not only about accommodating the students' creative learning level, but also providing with experiences of basic teaching skills used for active conventional classes in order to teach in e-learning classes. In addition, learning designs are necessary to encourage new literacy, which includes communication, humanity, and design, among students as human beings [3] so that students are encouraged to work or study in a team, to be full of initiatives as a leader, and to have good problem-solving skill and an ability to connect various aspects of information, media, and technology [4].

One of alternative methods which can be implemented in e-learning class is by mixing between e-learning and off-learning, which is called blended learning. Blended learning is incorporated by conducting face-to-face learning in the beginning, followed up by non-face-to-face learning, and ended with face-to-face learning. Blended learning becomes an alternative that is expected to enable teachers to remain focused on the use of ICT-based media tools by prioritizing computer principles as an area in designing, managing, evaluating, developing, and utilizing them [1] as great media for blended learning.

This study investigates blended learning as an approach in designing, managing, evaluating, developing, and utilizing technology (use of technology) and as a learning model (use of pedagogy). In relation to blended learning as the use of technology and the use of pedagogy, software that supports blended learning classes to take place is *courseware technology*, which is software to arrange and create tutorials, and *learning management system*, which is software to manage the administration and the system to support the learning process. Blended learning as the use of pedagogy serves as software to actively administer subjects and to design learning activities, such as reading, writing, observing, questioning, discussion, assigning, doing tasks, evaluating, and reflections [5].

Blended learning classes facilitate specific learning attitudes, build independent learning intentions, and encourage curiosity about new understanding in an effort to reach learning goals [6]-[7]. Learning activities developed in blended learning can serve as the main activator in facilitating learning in physical rooms (in classrooms), in virtual space, and in physical presence (real in the fields). Learning in three-dimensional space gives students an opportunity to experience various learning methods so that they do not feel bored and passive. Instead, students will actively take parts in empowering their own learning potential. Thus, this study is focused on how to develop effective learning activities in blended classes as part of learning management system in accordance with learning goals.

2. Methods

This study used research and development approach to develop the learning management system in one of the learning materials about the development of instructional videos in Study Program of Agricultural Technology Education, Faculty of Engineering, Universitas Negeri Makassar. The lesson plans adopted the ADC model of learning [5]. Horton's model of learning (2016) is illustrated in details in Picture 1 below.

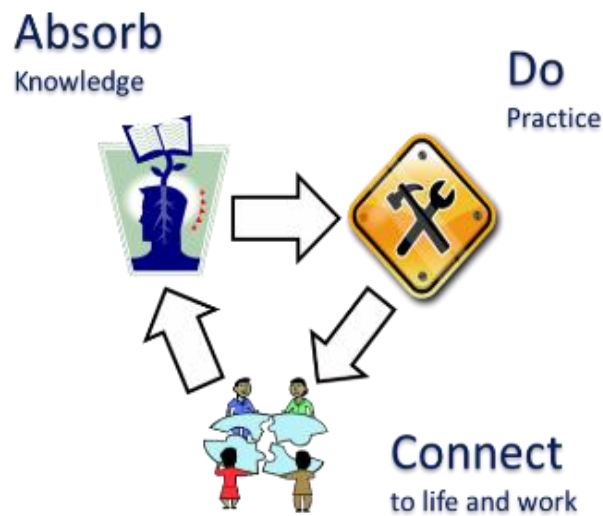


Figure 1. The development model of *blended learning*

The current study was focused primarily on the analysis of the preparation of the learning scenario in starting the stages of ADC. The analysis covered the learning scenario facilitating the opportunities for students to conduct activities, such as *presentations, demonstrations, stories, and field trips*. The goal of *absorb* activities was to allow students to absorb initial knowledge related to the to-be reviewed materials. The next analysis covered the development of the core activities of blended learning at the *do* stage which included *practice, discovery, and playing games*.

Students were conditioned to be able to answer questions, share information, construct knowledge, especially knowledge about procedures, organize materials, search for information, play games while learning, perform simulations, and create scenarios in completing practical tasks. The main goal of *do* activities was to allow students to be able to conduct pleasant practical activities. The next analysis dealt with the development of the *connect* activities, learning activities which directed real life in the field (life and work). In this phase, students were conditioned to perform activities that connected learning with real life, working in teams, and learning that produced tangible products from the results of work projects.

3. Results and Discussion

The results of the lesson plan development of blended learning using ADC model on the instructional video development show active and constructive online learning activities.

1. *Absorb* Scenario (A)

Absorb (A) is a learning scenario of blended learning that facilitates students in processing the information. This activity started with greeting and briefing the students to read learning instructions. In this regard, students were instructed to read the short overview of **the class** conducted using blended learning. The overview contained motivations at the beginning of the learning process, instructions on what learning methods would be used, and the learning objectives.

Students were recommended reading all the instructions of the class before reading the materials in the form of PDF. Students were conditioned to read the materials thoroughly and suggested that they truly understood the materials as a provision for face-to-face session. In the *absorb* scenario, materials

in the form of PowerPoint (PPT) were provided and downloadable to be used in face-to-face session. All of these activities were conducted using blended learning outside classrooms hours before face-to-face meeting started. These activities were performed in the evening or in the morning after the students were informed to read the instructions on lms.unm.ac.id through WhatsApp learning group. When the class is started, it was conducted face-to-face by explaining the materials in PPT. In this phase, students were conditioned to be skillful at listening to the information from the lecturer through the activities that utilized cognitive strategies, such as discursive, adaptive, interactive, and reflective learning [8].

The image shows a screenshot of a learning management system (LMS) interface. At the top, there is a header section with a plus icon on the left, the text "PENGEMBANGAN MEDIA VIDEO" in the center, and an "Edit" button with a dropdown arrow on the right. Below this is a sub-header section with the text "PEMBELAJARAN (1 March - 7 March)". The main content area starts with another plus icon, followed by the text "Sebelum mempelajari materi Pengembangan Media Video Pembelajaran, terlebih dahulu mahasiswa memperhatikan instruksi berikut:". Below this text is a numbered list of five instructions. To the right of the text and list, there is an "Edit" button with a dropdown arrow.

✚ PENGEMBANGAN MEDIA VIDEO Edit ▾

PEMBELAJARAN (1 March - 7 March)

✚ Sebelum mempelajari materi Pengembangan Media Video Pembelajaran, terlebih dahulu mahasiswa memperhatikan instruksi berikut: Edit ▾

1. Mahasiswa secara aktif membaca setiap instruksi, mendownload bacaan, mengerjakan tugas dan partisipatif dalam berdiskusi.
2. Tugas yang diberikan hendaknya dikerjakan sesuai dengan batas due date yang ditentukan
3. Agar terbiasa mengerjakan tugas secara mandiri dan membebaskan diri dari unsur plagiasi dengan cara menyebutkan sumber bacaan yang diacu
4. Menjaga sikap saling menghargai pendapat antara pribadi dan kelompok dan menghindari bully.
5. Diskusi hanya akan berlangsung jika mahasiswa mengedepankan cara berfikir reflektif, mengkonstruksi pikiran dengan

Figure 2. Instructions of activities of the *absorb* scenario

The class of the instructional video development was conducted by implementing active learning with *project-based learning* (PjBL) method. By referring to the PjBL scenario, the project themes were formulated by the project groups. Every group had the opportunity to present the title of the project which was generally about the development of instructional videos with material substances covering: 1) agricultural tools and machines, 2) agricultural land cultivation, 3) plant fertilization, 4) vegetable bed preparation, and 5) plant tissue culture. Every project group divided roles to make the script or the content of the instructional video.

The project groups were instructed to visit the sources of information, to do field trips to examine the objects related to the video recording, land, materials, and tools. All these scenarios were parts of *absorb* activities in blended learning. As a comparison in developing instructional videos, examples of instructional videos were provided and downloadable for each project group in blended learning classes.

The end of the *absorb* activities was characterized by a good amount of information related to learning the materials, constructing assignments, making association between assignments, and preparing action plans as in the development of instructional videos. All of the results of *absorb* activities were the results of learning processes through reading, listening, presentations, demonstrations, stories, and field trips.

2. Do Scenario

Do activities gave students an opportunity to explore the process of material synthesis and reading sources. The reviewed materials were related with the development of instructional videos created by each project group. *Do* activities were characterized by practices on designing instructional videos. It was preceded by reviewing literature, such as material or content of the video, story development, tools to make videos, and software to edit videos.

Do activities encouraged project groups to work in teams who thought creatively and worked innovatively. The results were the development of applicable instructional videos that were able to be used as teaching media by teachers of agriculture vocational schools. The scenario of *do* activities in blended learning was started with greeting to motivate students in learning. Given that *do* scenario was the continuation of *absorb* scenario, the activities in *do* scenario had been formulated in the previous scenario. In developing the video materials and designs, each group had to be cohesive, cooperative, and creative so that each project group was able to work independently to discover video designs. Instructions in blended learning were to write assignments which were five project tasks with five different titles. In this part, the project groups were reminded to make sure whether the schedule to complete the projects was corresponding to the deadline.



Figure 3. One of the pictures is the result of developing learning video

3. *Connect* Scenario

The *connect* scenario was the last phase of blended learning model. The activities performed in this scenario were the project groups designed the instructional videos and were conditioned to develop the contents and the material substances in the real situation in the fields. The contents of the instructional videos were original obtained from group ideas constructed from the results of field studies. Therefore, *connect* activities were loaded with activities involving research, such as needs analysis of video media, material and data collection, video processing and production. In developing *connect* activities, an assignment template was created: A Report of Video-based Learning Media Project.

The completed instructional videos were shown and reviewed in a discussion and non-face-to-face presentation. The project groups who were finished earlier were recorded as the project groups who met the accuracy standards earlier than the agreed time interval. After the non-face-to-face discussion and review, face-to-face learning was conducted in a classroom. Each project group was presenting the video they had developed. At this stage, *connect* activities required students to possess critical, scientific, and reflective attitudes towards the material content of the instructional video.

Discussion

Learning through the blended learning system by developing learning videos on various basic topics in plant cultivation has been able to accommodate student's skill in learning concepts and procedures. The findings show that students have demonstrated their learning skills at the application until evaluation level. At the application level, students have been able to work in groups in developing video scripts based on the stages of video development. Result of observation shows that the five teams are in very active category in exploring material resources related to the content of learning videos such as: agricultural machinery and tools, processing agricultural land, fertilizing plants, beds of vegetable plants, and plant tissue culture. Students also took pictures in the field such as in laboratory equipment and agricultural machinery, and on agricultural land. Another activity done by students was practicing directly to design and create pictures and videos as part of video production activities

The activity of students in the stages of absorb, do, and connect shows the ability of students in regulating their learning attitudes in groups. Blended learning has accommodated the characteristics of students in managing their learning skills. In absorptive activities, students' skills in reading, listening and observing directly in the field on the object of the problem are the skills in learning concepts and procedures. The knowledge gained by reading, listening or field trips is an absorptive work method [5]. It is similar with the information processing learning theory by Gagne [9]. This theory explains that the student's learning process has been going on since exploring the information material needed for the contents of learning videos, where the process of searching, receiving, and processing information is occurred. Therefore, the information in the form of reading material will be used as content of video. Absorptive works when students read, hear, and visit information sources. It is a process of information coding to be processed into information that is more easily understood and stored in working memory of students [10]. Furthermore, information stored in working memory will be used at the stage of do activity.

Do activities carried out by students in blended learning are a continuation of absorptive activities, namely producing learning videos. This activity is in line with the learning concept based on work and project. The concept of activities built in work-based learning is in the form of habits and association skills through concept of learning by doing [11]-[12]. Project-based learning builds collaborative work activities to produce videos and analyzes deeply where the results can facilitate metacognitive thinking skills [13]-[14]-[15]. At this stage according to Major, [16] there is a review independently in groups and negotiating in a participatory manner, in order to achieve learning outcomes in the form of work experience resulting design of the development of learning videos. Through *do* activities, all

metacognitive learning skills can be obtained as a learning process in a real context that will be integrated in the connect activity stage.

Connect activities are carried out in an effort to find real ideas in the form of contextual learning video material. According to Horton [5], *connect* activity is an exercise in finding and connecting the contents of video material produced with the real situations. As a learning process, creating of the manuscript and video is carried out in the context of real and contextual events. The goal is to obtain learning videos that are able to accommodate the ability to think concepts and procedures. Learning videos developed can train understanding, providing material from abstract to concrete, and encouraging critical thinking skills [17]-[18]-[19].

4. Conclusions

Based on the aims and the results of the study, it can be concluded that the results of the development show that material management and blended learning-based learning activities have met the criteria to be valid and obtained the level of acceptance from the users (lecturers and students) effectively. Thus, the material development and video-based learning activities by adopting ADC model can be implemented in blended learning-based classes. ADC activities have been able to accommodate the students' learning abilities in conceptualizing information and practicing it in the procedures of the development of instructional videos of agriculture.

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