Analysis of Blended Learning Implementation on Waste Treatment Subjects in Agricultural Vocational School

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Analysis of Blended Learning Implementation on Waste Treatment Subjects in Agricultural Vocational School

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Abstract. Waste treatment is one of the productive subjects in vocational high school in programs of Agricultural Processing Technology which is one of the objectives learning has been assigned in graduate competency standards (SKL) of Vocational High School. Based on case studies that have been conducted in SMK Pertanian Pembangunan Negeri Lembang, waste treatment subjects had still use the lecture method or conventional method, and students are less enthusiastic in learning process. Therefore, the implementation of more interactive learning models such as blended learning with Edmodo is one of alternative models to resolve the issue. So, the purpose of this study is to formulate the appropriate learning syntax for the implementation of blended learning with Edmodo to agree the requirement characteristics of students and waste treatment subject and explain the learning outcome obtained by students in the cognitive aspects on the subjects of waste treatment. This research was conducted by the method of classroom action research (CAR) with a Mc. Tagart model. The result from this research is the implementation of blended learning with Edmodo on the subjects of waste treatment can improve student learning outcomes in the cognitive aspects with the maximum increase in the value of N-gain 0.82, as well as student learning completeness criteria reaching 100% on cycle 2. Based on the condition of subject research the formulation of appropriate learning syntax for implementation of blended learning model with Edmodo on waste treatment subject are 1) Self-paced learning, 2) Group networking, 3) Live Event- collaboration, 4) Association - communication, 5) Assessment - Performance material support. In summary, implementation of blended learning model with Edmodo on waste treatment subject can improve improve student learning outcomes in the cognitive aspects and conducted in five steps on syntax.

1. Introduction

Based on Government Regulation No. 19 of 2005 Article 26 paragraph 3 Vocational High School have the aims to improve intelligence, knowledge, personality, noble character, and skills to live independently and follow further education in accordance with the vocational. The objective of learning SMK is formulated in twenty-three SKL SMK which is an outcome of competence demands to be mastered by students to adjusted the needs of the business and industry field (DU-DI) [1]. One of the existing expertise programs in SMK is Agricultural Product Processing Technology (APPT) that produces graduates according to graduate standards required by the food processing industry. One of the SKLs that must be mastered by students is to utilize the environment productively and responsible. Along with the standard of competence, the purpose of learning subjects of waste treatment is productive utilizing agricultural resources and byproducts and able to process agricultural processing waste.
Based on preliminary observation at SMK Pertanian Pembangunan Negeri Lembang by direct interview with subject teachers, waste treatment subjects are still delivered by using lecture method and learning more dominated by teacher than student. These conditions will affect the quality of learning in achieving learning objectives. In order for learning to take place well and able to achieve learning objectives, then the learning process should refer to the standard process which is one of the standard education. Teacher needs to have the ability to design and implement various learning strategies that are considered to match the interests and talents and in accordance with the stage of student development, including utilizing various sources and instructional media to ensure the effectiveness of learning [2].

On the other hand, SMK Pertanian Pembangunan Negeri Lembang is one of the School that implement one of West Java Province program, it is called as Jabar Smart School that is an integration program of information and communication and technology to improve the quality management (on aspects of learning, managerial, supporting system) within the scope of educational units using digital technology In West Java. Learning media used to support the program is Edmodo. Edmodo is a social media platform, such as a facebook which is developed specifically for students and teachers in a virtual classroom that can serve to implement interesting and easy-to-use learning [3].

The existence of Edmodo's learning media enables teachers and students to interact more in more direction, one of them is by applying blended learning model. Blended learning is an integration between face to face and online learning to help the classroom experience by developing information and communication technologies [2]. There is an increase in motivation and student learning outcomes due to the application of blended learning [4]. So, with the media Edmodo in the program JABAR Smart School followed by SMK Agricultural Development Lembang, blended learning model is very potential to be applied especially efforts to improve the quality of learning on waste treatment subjects. So, this research entitled "Analysis of the implementation of learning blended learning model on waste treatment subjects (case study at SMK Pertanian Pembangunan Negeri Lembang)". The research objectives are to formulate the best of learning strategies in blended learning model with Edmodo as media which agreed with student character and the subject of waste treatment and describe the student learning outcome in cognitive aspect in waste treatment subject. The data analysed with Normalized gain test which is conducted to knows the effectiveness of the improvement of student learning outcomes on the scale of values 1 - 4 and minimal criteria (KKM) in accordance with the Minister of Education and Culture of the Republic of Indonesia No. 104 of 2014 is 2.67. The N-gain value criterion is shown in table 2.1.

2. Observation data Analysis

Data from observation result that is result of student learning on affective and psychomotor aspect is processed with sumative differential analysis and presented in graph.

<table>
<thead>
<tr>
<th>N-gain Score</th>
<th>N-gain Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.70 &lt; N-gain</td>
<td>High</td>
</tr>
<tr>
<td>0.30 ≤ N-gain &lt; 0.70</td>
<td>Middle</td>
</tr>
<tr>
<td>N-gain &lt; 0.30</td>
<td>Low</td>
</tr>
</tbody>
</table>

Details:

\[ N - Gain = \frac{post\ test\ score - pre\ test\ score}{ideal\ score - pre\ test\ score} \]

3. Methods

The research method using classroom action research (CAR) model consisting of 3 cycles with the research design in figures 1 and 2. The subjects of this research are 24 students of APT program. The Data are obtained using data collection technique of objective test and class observation.
3. Results and discussion
3.1. Formulation of learning steps that match the characteristics of students and waste treatment subjects

3.1.1. Planning
Planning prior to learning is to make RPP consistent with blended learning syntax, create a virtual class in Edmodo, upload teaching materials, and ensure that the classroom and student barcode schemes are ready for barcode system tests through the Plickers application.

3.1.2. Implementation
Implementation of learning done for three cycles. Cycle 1 is done according to learning syntax) in Figure 3 [5]:

Based on the result of reflection from cycle 1, it is found that student attendance in virtual class is only 91.67% meaning 8.33% of students are not present in the virtual class and do not download and study the material, so that the self-paced learning stage is less than the maximum and less support stage live event. The impact is 8.33% of students did not get mastery learning with KKM 2.67. Based on that, the syntactic modification needs to be done to better suit the characteristics of the students and the subjects of waste treatment in the next cycle. In cycle 2, the blended learning syntax has been modified and shown in Figure 4.2.
The syntax of blended learning based group networking consists of 5 stages as follows:

1. Group networking, the stage students learn the material and do the tasks assigned by Edmodo. This stage aims to train the constructive power of student thinking and ensure students can learn the material by exchanging information with members of their group. The result of group networking is a resume that must be individually uploaded by the students. So the risk of students not being present in a virtual class and not studying material before a live event can be suppressed.

2. Self-paced learning, stage of self-learning students before the live event stage in class. Students can directly ask or think according to the material being studied in the virtual classroom and then respond to the teacher and other class members.

3. Live event, face-to-face learning stage in the classroom which is a collaboration between group networking and self-paced learning, in this stage the teacher will explain the material according to the results of the student's constructive to avoid the occurrence of verbalism.

4. Association-Communication, the student stage associates the learning outcomes of group networking, self-paced learning, and live events so that it becomes a meaningful learning experience and is made in a portfolio of notes in a virtual classroom to communicate the learning outcomes.

5. Assessment, the stage students do evaluation of the learning given by teachers either individual or group. This stage can be combined with group networking to start the next learning cycle.

The selection of group networking steps is the application of group learning to students can increase students' motivation and interest up to 89.3% and student achievement cognitively up to 79.825% [6]. Group learning is a process of knowledge acceptance by a group of individuals who perform an activity logically and systematically for the process of behavior change through the improvement of knowledge, skills, attitudes, and abilities [7].

In addition to network grouping actions that can be done to overcome the problems that exist in the cycle one of them, giving punishment to students who do not open teaching materials in Edmodo and do not make a resume. The punishment or punishment is a consequence that lowers the probability of something happening [8]. In probability research that may appear is the students download and study the material in Edmodo and vice versa, students do not do it, with the application of punishment is expected probability students do not download and do not study the material in Edmodo decline. However, in implementation, the application of punishment that is not appropriate will affect the emotional aspects of students. There is a possibility that students cannot accept that they get punishment, but instead do social deviation as a form of emotion [8].

Another treatment that can also be done to anticipate the reflection of cycle 1 is to blend learning model with recitation model. The learning model of recitation is a model of learning that makes students...
resume their own resume [9]. Through this model students must create a resume sourced from the module in Edmodo so that each student must access individually. The downside of this alloy of recitation models is that they cannot address infrastructure problems such as the lack of available internet connections that students have at home. In addition, the results of student recitation are the result of the construction of individual thoughts and materials in the module.

However, based on the material suitability and characteristics of students, the most appropriate action to solve the problems that occurred in cycle 1 is with Group networking. In addition to train student’s cohesiveness, the ability to construct students will also be more honed because in addition to source from the module, the material can also be sourced from the opinions of other students in the group. Problems such as internet access facilities of each student can be overcome by providing information to help students access the module.

Based on the results of reflection from cycle 2 obtained information that the attendance of students in the virtual class has 100% and student learning completeness has reached 100% therefore cycle 3 is done according to the syntax of learning blended learning based group networking that has been formulated in cycle 2.

3.2. Results of Student Learning on Waste Treatment Subjects

The results of cognitive learning are one of the indicators to measure the improvement of student learning outcomes, especially in aspects of intelligence, reasoning and analysis power that is needed in waste treatment subject. The development of student learning outcomes on this cognitive aspect was analysed by the N-gain or Normalized gain method of each cycle and presented in Figure 3.3

![Figure 5. The Increase of N-gain value](image)

Based on Figure 3.3 it can be explained that there is an increase in student learning outcomes from cycle 1 which is initially moderate, then to cycle 2 that has entered a high level, and finally in cycle 3 to achieve higher learning outcomes at the value of 0.82. The students' learning mastery has reached 100% in cycle 2 with the value of mode 3.3. Improving learning outcomes in blended learning may occur because this model helps students to better develop in the learning process, in accordance with learning styles and preferences in learning and provides realistic, practical opportunities for teachers and students for learning Independent, useful, and growing [10].

In addition, blended learning models with Edmodo media can also enhance flexible scheduling for students, combining the best aspects of face-to-face and online instruction. The face-to-face classes can be used to engage students in interactive experiences. Online portions provide students with rich, knowledge-rich content at any time, and anywhere as long as students have internet access. Addressing learning problems that require completion through the use of varied learning methods.
4. Conclusion
Based on the result and discussion of the research can be conclude:

1. Formulation learning steps that appropriate with Edmodo and the subject of waste treatment are Self-paced learning, Group networking, Live Event and collaboration, Association and communication, and Assessment.
2. The implementation of blended learning model with Edmodo on waste treatment subject can improve student learning outcomes in cognitive aspects with N-gain maximum increase reaching 0.82, and students learning completeness can reach 100% in cycle 2.

References