

# APPLICATION OF A BLENDED LEARNING MODEL IN AGRICULTURAL VOCATIONAL HIGH SCHOOLS

**Sari Nurmayani, Yatti Sugiarti, Siti Mujdalipah**

Universitas Pendidikan Indonesia  
E-mail: sari.nurmayani26@gmail.com

## ABSTRACT

Based on case studies that have been conducted in SMK Pertanian Pembangunan Negeri Lembang, waste treatment subjects still used a conventional method, and the students were less enthusiastic in the 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 thus 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, affective and psychometric aspects on the subjects of waste treatment. This study was conducted by the method of classroom action research (CAR) with a Mc. Tagart model. The results of this study concluded that the implementation of blended learning with Edmodo on the subjects of waste treatment can improve the students' learning outcomes in the cognitive, affective and psychometric aspects with the maximum increase in the value of N-gain 0.82, as well as students' learning completeness criteria reached 100% in cycle 2. The formulation of the appropriate learning syntax for the blended learning model implementation with Edmodo in the waste treatment subject are (1) Self-paced learning, (2) Group networking, (3) Live Event-collaboration, (4) Association- communication, (5) Assessment-Performance material supports.

**Keywords:** affective, cognitive, psychometric, blended learning, edmodo, waste treatment

## INTRODUCTION

Government Regulation No. 19 of 2005 article 26, paragraph 3 states that Vocational High Schools (SMK) aim to improve intelligence, knowledge, personality, noble character, as well as skills to live independently and follow further education in accordance with the vocational. Sudira (2006) revealed that the objectives of SMK learning are formulated in the twenty-third Graduate Competency Standards (GCS) of SMK which is an outcome of competence demands that must be mastered by students according to the needs of business and industry (DU-DI). One of the existing expertise programs in SMK is Agricultural Processing Technology (APT) that produces graduates according to graduate standards required by the food processing industry. One of the GCSs that must be mastered by students is to utilize the environment productively and responsibly. The standard of competence is contained in the purpose of waste processing subjects, which is productive in utilizing

agricultural resources and by products and able to process waste from agricultural processing.

Based on preliminary observation at SMK Pertanian Pembangunan Negeri Lembang with direct interviews with the subject teacher, waste treatment subject was still delivered by using a conventional method. Preliminary research results conducted on students of grade XI at SMK Pertanian Pembangunan Negeri Lembang explained that 79.2% of the students were not enthusiastic to follow the subject of waste treatment, only 58.2% of the students revealed that they studied first before following the waste treatment learning, 62.5% of students answered did not focus and concentrate on waste processing learning during the class, 37.5% did not pay attention to the teacher's explanation in the learning process, 70.8% of students did not ask the teacher if there were any materials that they do not understand and 87.5% of students did not explore the waste treatment materials by their selves to enrich their knowledge.

These conditions affected the quality of learning in achieving learning objectives. In order for learning to take place effectively and able to achieve learning objectives, the learning process should refer to the standard process which is one of the standard education. Sanjaya (2010) explains that a teacher needs to have the ability to design and implement various learning strategies that are considered to match the interests and talents as well as in accordance with the stage of students' development, including utilizing various sources and instructional media to ensure the effectiveness of learning.

On the other hand SMK Pertanian Pembangunan Negeri Lembang is one of participant of the West Java Province program namely JABAR Smart Schools. It is an integration program of information and communication technology and improvement of quality management (in the aspects of learning, managerial and supporting systems) within the scope of educational units using digital technology. In West Java. Learning media used to support the program is Edmodo application. Edmodo is a social media platform, such as a facebook developed specifically for students and teachers in a virtual classroom that can serve to implement interesting and easy-to-use learning (Seamolec Team, 2013).

Based on the explanation before, this research entitled "Application of Blended Learning Model in Agricultural Vocational High Schools" especially in the application of blended learning model with Edmodo as media for waste treatment subject in grade XI of APT. This study had two objectives, they were (1) to formulate appropriate learning steps for the implementation of blended learning model with Edmodo media to meet the students' characteristics and waste treatment subjects and (2) to explain the learning outcomes obtained by students on cognitive, affective and psychometric aspects in waste treatment subjects.

## METHOD

This study applied the model of classroom action research (CAR) formulated by Kemmis and Mc. Taggart (1989). The model consisted of three cycles. The research design is presented in Figures 1 and Figure 2. The subjects of this study were 24 students of the program of Agricultural Processing Technology (APT). The data collection was conducted by an objective test and observations. The objective test measured the development of student learning outcomes in the cognitive aspects during the learning process. The observations were conducted to obtain the students' learning outcomes on the psychometric and affective aspects through a skill and attitude assessment sheet. Observation was also used to assess the learning conducted by the teacher in accordance with the lesson plan. The N-gain determined the effectiveness of the improvement of students' learning outcomes on the scale of 1 up to 4 and the minimum criteria of completeness (MCC) according to the Minister of Education and Culture of the Republic of Indonesia No. 104 of 2014 which is 2.67. The N-gain value criteria is presented in Table 1. The data of observation results of student learning on affective and psychometric aspects was processed with summative differential analysis.

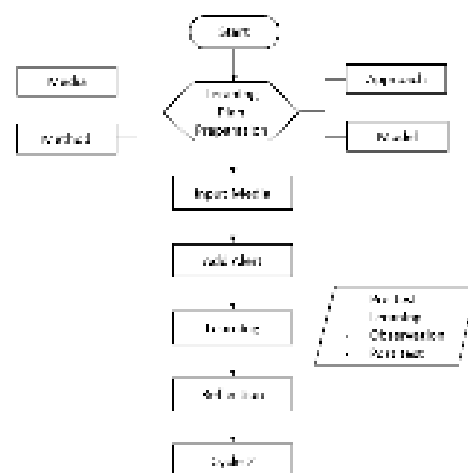


Figure 1. Cycle 1

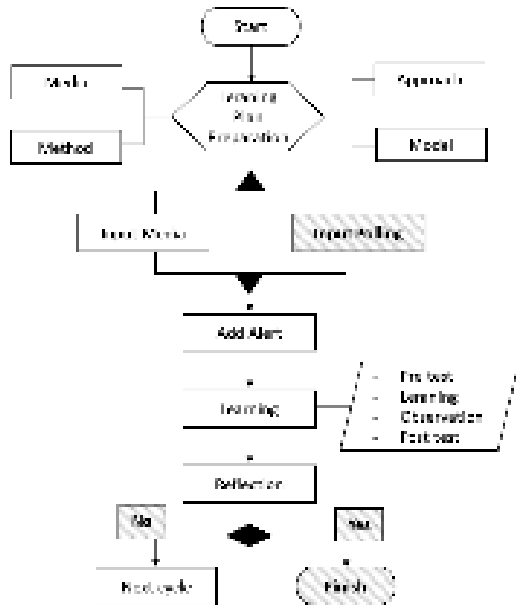


Figure 2. Cycle 2 and Cycle 3

Table 1. N-gain Criteria

N-gain scores	N-gain criteria
$0,70 < N\text{-gain}$	High
$0,30 \leq N\text{-gain}$	Medium
$N\text{-gain} < 0,30$	Low

(Source: Siregar and Wiharna, 2014)

## RESULTS AND DISCUSSION

This study was started with creating Learning Plan Sheet (LPS) that consisted of blended learning syntax, creating a virtual class in Edmodo, uploading teaching materials, and preparing the classroom and the students' barcode schemes to be ready for barcode system tests through the Plickers application in the end of learning. The implementation of learning was conducted in three cycles. The first cycle was conducted according to learning syntax from Curtis et.al (2006) presented in Figure 3.

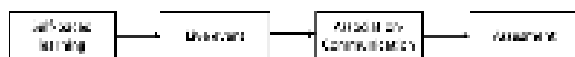


Figure 3. Blended Learning Syntax

Based on the result of reflection from cycle 1, it was revealed that the students' attendance in the virtual class was only 91.67%. It meant there were 8.33% of students who were not present in the virtual class and did not

download the lesson materials. Because of that, self-paced learning stage was less maximum and could not support the stage of live event. The impact was 8.33% of students did not reach the minimum criteria of completeness of 2.67. Therefore, it was necessary to modify the syntax to be more relevant with the characteristics of students and waste treatment subjects in the next cycle. In cycle 2, the blended learning syntax was modified and explained in Figure 4.

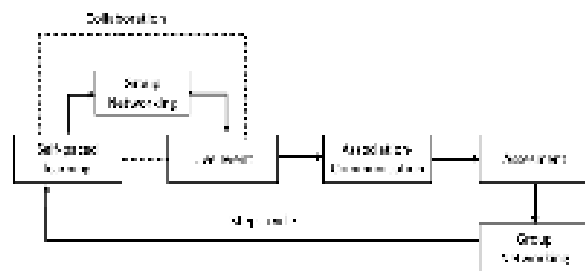


Figure 4. Blended Learning Based Group Networking Syntax

The syntax of blended learning based group networking consists of 5 stages as follows: (1) Group networking, in this stage students learned the material and did the tasks through their accounts in Edmodo. This stage aimed to support the constructive thinking and ensure students to learn the material by exchanging information with the members of their groups. The result of group networking was a resume that must be individually uploaded by the students thus the students should present in the virtual class and learn the materials before the live event suppressed. (2) Self-paced learning is before the live event stage in the class. The students could directly ask or give their feedbacks about the materials in the virtual classroom and then the teacher and other class members responded them. (3) Live event is face-to-face learning stage in the classroom which is a collaboration between group networking and self-paced learning, in this stage the teacher explained the materials according to the results of the student's learning from the virtual class to avoid verbalism. (4) Association-Communication is the stage that

the students should associate the learning outcomes from group networking, self-paced learning, and live events. All of the processes would be a meaningful learning experience. (5) Assessment is the stage when students do evaluation of the learning. The assessment is given by teachers either individually or in groups. This stage can be combined with group networking to start the next learning cycle.

The selection of group networking steps is based on Setiawan (2015) who stated that the implementation of group learning can increase the student's motivation and interest up to 89.3%. Then the student achievement in cognitive aspect can be improved up to 79.825%. This is supported by the statement of Lonn (2009), group learning is a process of knowledge acceptance by a group who performs an activity logically and systematically for the process of behavior change through the improvement of knowledge, skills, attitudes, and abilities.

In addition, the actions of group networking is the best action to overcome the problems that exist in the first cycle than the other actions for example giving punishment to students who do not open teaching materials in Edmodo and do not make a resume. Santrock (2007) states that punishment have a negative consequence such as social-emotional problem. Briefly punishment is expected can suppress the probability of students who do not download and study the materials in Edmodo. However in the implementation, the punishment is not appropriate and will affect the emotional aspects of the students. There is a possibility that students cannot accept the punishment and instead do social deviation as a form of emotion (Santrock, 2007).

Another example is mix the learning model with a recitation model. The recitation model is a model of learning that makes students resume the material by their own word (Faliestin, 2010). Through this model, students must create a resume so from the module in Edmodo. It will force student to access Edmodo individually. The downside of this models is the

occasional problems cannot be avoid such as the lack of internet connections at students' houses.

However, based on the relevancy of materials and students' characteristic, the most appropriate action to solve the problems that occurred in the first cycle was Group networking. It supported students' cohesiveness and the ability to construct since the students could access more learning sources from the module and the opinions of other students in the group.

Based on the results of reflection from cycle 2, the attendance of students in the virtual class was 100% and the student learning completeness reached 100%. Therefore cycle 3 was conducted according to the syntax of blended learning based on group networking that had been formulated in cycle 2.

Learning outcomes in cognitive aspects were analyzed with N-gain and the result are presented in Figure 5.

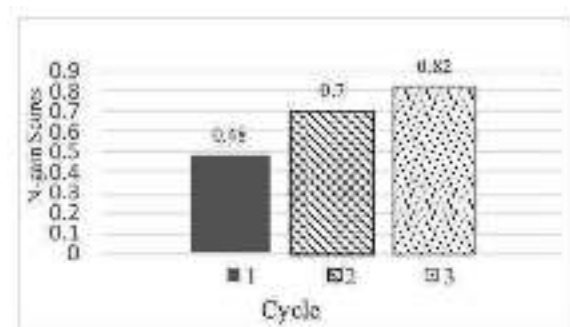


Figure 5. N-gain Score

Based on Figure 5 it can be explained that there is improvement in students' learning outcomes from cycle 1 which was initially moderate, then in cycle 2 it entered a high level, and finally in cycle 3 it achieved higher learning outcomes at the value of 0.82. All of students has reached minimum criteria of completeness in cycle 2 with the average value as much as 3.3.

According to Prabowo (2014), blended learning can improve learning outcomes because this model helps students to more develop in the learning process, in accordance with learning styles, preferences in learning

provides realistic and practical opportunities for teachers and students. That makes the learning be more independent, useful, and grow. Blended learning combines face to face and e-learning. Prasetyo et al. (2016) explains that to maximize the implementation process of the blended learning model, the school should provide adequate facilities for example personal computers and internet connection. Teachers and school boards are expected to work collaboratively thus the implementation of blended learning can be maximized.

In addition, blended learning models with Edmodo media can also enhance flexible learning schedule for students, combining the best aspects of face-to-face and online learning. The face-to-face classes can be used to engage students in interactive experiences. Online portions provide students with knowledge-rich content at anytime and anywhere as long as students have internet access to virtual classes.

Psychometric learning outcomes obtained from the learning activity in laboratory with the topic of processing vegetable and animal based solid waste. The students made yoghurt from outside skin of purple cabbage in the topic of vegetables solid waste. In addition, the students made noodles from fish bone in the topic of animals solid waste. Beside learning activity in laboratories, psycometric outcomes are also obtained from activity in the class in the topic of basic materials in industrial effluent of agricultural processing. Psychometric learning outcomes is presented in Figure 6.

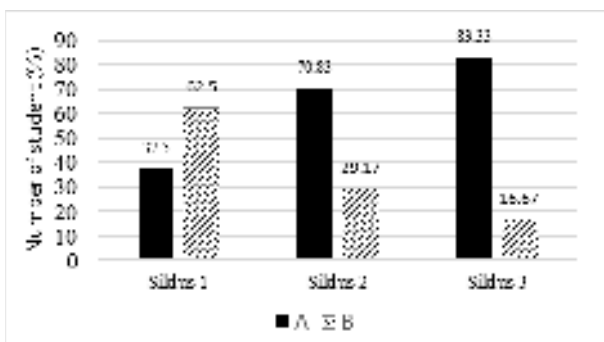


Figure 6. Psychometric Values

Figure 6 describes that there are two predominant psychometric values predicates, namely A with range of value 3.0 to 4.0 and B with range of value 2.0 to 2.9. There is increasing number of student which get A that as much as 83.33%. This is due to a combination of learning models and media that help students to plan their activities better. Learning with blended learning combines face to face and e-learning then students will be more ready to study. Before implementing learning or practicum, the teacher has uploaded learning media and work procedures. In addition, the space to interact in Edmodo media is also very open and students can directly ask the teacher or read the guide whenever and wherever they uses the device. In this study, the interaction occurred 205 times, with 113 notes and 92 comments from cycle 1 to cycle 3. The psycometic aspect measures the learning indicators including preparing the tool materials, making the preparation of waste processing products, observing the product characteristics, performing the tasks and checking the sanitation. Each indicator scale on 1 to 4.

The affective learning outcome is obtained from the observation during learning activities in cycle 1 to cycle 3 observed directly by the fixed observer. Affective learning results is presented in Figure 7.

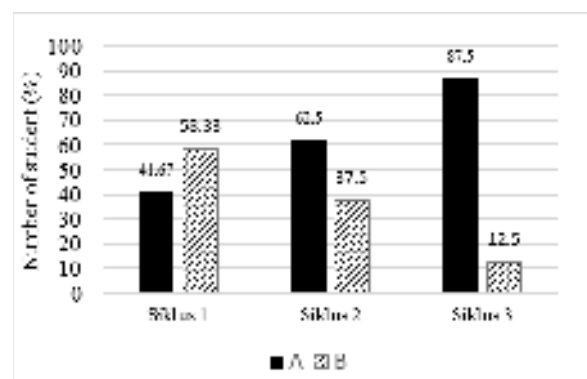


Figure 7. Affective Values

Based on Figure 7, there was improvement in the number of students who get

A that reached 87.5% in cycle 3. The students learning outcomes can be influenced by several factors. Enriquez (2014) explains that the student learning outcomes can be influenced by internal factors such as student learning motivation, physical circumstances and learning needs and achievement. It is also influenced by environmental factors such as the quality of learning conditioned by the teacher.

Syarif (2012) concluded that there was a significant difference between motivation and student achievement using blended learning model with students who used face to face learning. There was significant increase in motivation and students' achievement due to the application of the blended learning model. A blended learning model with Edmodo helps students to learn the materials, to construct their knowledge and ask questions in the direct and the virtual classes, to be responsive in answering questions, to be proactive to argue about teaching materials, meticulously at the time of classroom and laboratory learning, and more discipline both at the laboratories and at the time of collecting assignments in Edmodo thus the affective value obtained by students always increased. The indicators of affective learning were responsive, proactive, responsibility, environmentally care and discipline with a range of values 1 to 4.

## CONCLUSION

The formulation of learning steps that is appropriate with Edmodo and the subject of waste treatment consists of self-paced learning, group networking, live event and collaboration, association and communication, and assessment. The implementation of blended learning model with Edmodo in the subject of waste treatment can improve the students' learning outcomes in cognitive, affective and psychometric aspects with N-gain maximum increase and the students learning completeness in cycle 2 were 0.82 and 100% respectively.

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