Implementation of Blended Learning on Basic Programming at Vocational High Schools

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Implementation of Blended Learning on Basic Programming at Vocational High Schools

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Abstract. Blended learning is increases the lack of e-learning. E-learning is online distance learning. Using e-learning, interaction between teacher and student is lacking because learning is not only about knowledge but also attitude. This study aims to determine: (1) to find what is blended learning and (2) to find out the students results of basic programming after being teach blended learning. One shot case study design was used in this research, the treatments are only given to one class which was X RPL SMK 17 Agustus 1945 Surabaya. The results of this study were: (1) blended learning is combination two learning environment that is face to face and online learning and (2) Test result have passed with 81,25% student are passed.

1. Introduction

One of the growing technologies in the world is Internet. Internet is a world-scale communication network that can be used to communicate widely and fast. As the technology development is increasing, education also must be able to adapt and take advantage of these growth [1]. One of the innovation in education is by using the internet network for the learning basis, which is e-learning. Darmawan stated that e-learning is a learning which its implementation is supported by electronics devices such as telephone, audi, satellite transmission, videotape, and computer [1]. By using the computer and internet network, teachers and students are connected and able to carry out the learning process anywhere and anytime.

E-learning has both advantages and disadvantages. Husamah explained e-learning is more favoured than conventional learning because it triggers the change of paradigm from teacher-centered learning to student-centered learning [2]. The challenge of this point comes from Human Resources. According to Rusman, Kurniawan & Rivani this disadvantage comes from direct interaction between teachers and students or students with other students [3]. Even though e-learning facilitate the students to have a live interaction, the direct interaction between humans cannot be replaced because education emphasizes not only transferring knowledge but also teaching morals and attitudes. This issue then brings a new term called blended learning to minimize these shortcomings.

There are four competencies in the computer engineering and informatics skills program; Software Engineering (RPL), Computer Engineering and Networking (TKJ), Multimedia, and Network and Application Information Systems (SIJA). Arini stated that Sofware Engineering is a competency of expertise that studies software development starting from manufacturing, maintenance, organizational management, and quality management[11]. Basic programming subjects are one of the subjects in Software Engineering expertise competencies. SMK 17 is a private vocational school in which the

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teacher teaches basic programming subjects through PPT for the learning media. After the theory given the students practice it in the computer lab and the students cannot repeat the material at home.

Based on the background above, this study aims to determine, to find out the students' results of basic programming after being taught blended learning.

2. Method

This research was conducted at Surabaya Vacational High School 17 Agustus 1945 in class X RPL 1. This research employed One-shot Case Study method to find out the results of the students' learning.

. **Figure 1.** *One-shot Case Study design*

Information:
X = Treatment of learning using blended learning
O = Students' learning results after being treated using blended learning.

3. Blended Learning

Husamah stated that blended learning is the combination of the advantages of face-to-face and virtual learning. Yalcinkaya also stated that blended learning is the combination of traditional education and modern technology-based education to enable the students to adapt with the needs of the business world and industrial world [4]. This statement is supported by Graham that stated the blended learning systems combine face-to-face instruction with computer mediated instruction [5]. Stapa, Ibrahim, & Yusof concluded that blended learning combines two methods of e-learning and face-to-face inside or outside the class, which focus on the learning scenarios in which the students learn in groups to achieve answers to problems in the classroom [6]. Hubackova argued that blended learning develops rapidly in education and that it is the combination of the teachers and students in the preparation of independent learning and on-line learning [7]. Niekerk stated that blended learning is the educational approach that combines face-to-face model and online model in learning that combines learning material substantially and effectively [8].

The combination of historically separate learning model between learning systems and distributed learning systems emphasize the role of the computer-based technology in blended learning. The combination of both models can be seen in Figure 2. It can be concluded that blended learning is the combination of two learning environments which are face-to-face and online learning.

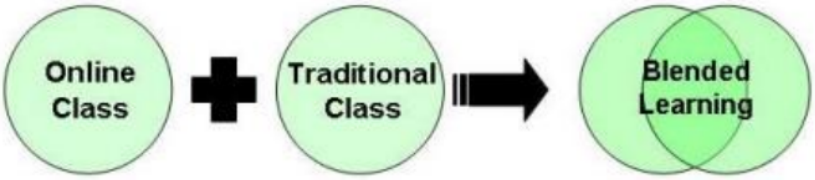

Figure 2. Blended Learning

Graham suggested several reasons of using blended learning model: (1) improving pedagogy; (2) increasing access / flexibility; and (3) increasing effective cost. Husamah (2014) also stated several purposes of blended learning as follows: 2) helping pupils to develop in the learning process adjusted to their learning styles and preferences; (2) providing practical-realistic opportunities for teachers and

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students to learn independently, be useful and continue to grow; (3) increasing flexibility scheduling for students by combining the best aspects of face-to-face and online learning [5].

Discroll stated four concepts of blended learning: (1) combining the web-based technology to achieve educational goals; (2) combining pedagogical approaches to produce learning outcomes optimally either with learning technology or without; (3) combining all teaching technologies such as video recording, CD-ROM, and web-based instruction in face-to-face class; and (4) combining the learning technologies with the actual work tasks to ccreate learning effects and work in harmony. Graham (2006) documents from Graham (2006) document from Graham, Allen, dan Ure (2003) such as, (1) combining instructional modalities (or delivery media) (Bersin & Associates, 2003; Orey, 2002a; Singh & Reed, 2001; Thomson, 2002); (2) Combining instructional methods (Discroll, 2002; House, 2002; Rosset, 2002); (3) Combining online and face-to-face instruction (Reay, 2001; Rooney, 2003; Sands, 2002; Ward & LaBranche, 2003; Young, 2002). From some of the opinions above, the mixed components in blended learning include the mixing between online learning environment and face-to-face learning environment.

4. The Implementation of Blended Learning for Basic Programming

The implementation of blended learning for basic programming subject in class XI RPL 1 at Vacational High School 17 Agustus 1945 Lusamah stated some of the components of blended learning are face-to-face and e-learning [2]. Face-to-face learning requires a learning model to achieve a learning goal. The learning model used in this study is direct learning xombined with daring learning (networks). Adopted from Sandi [9] and Wiboolyasarin [10] the blended learning syntax used as follows: (1) preparing and providing online course; (2) informing pupils to learn the lessons that have been uploaded; (3) checking the success of the pupils working on tasks; (4) checking pupils' attendance; (5) motivating, guiding to gather information, carrying out experiments, conducting discussions both in groups and in class, and solving problems regarding material that are difficult to understand; and (6) providing evaluations.

The e-learning process requires a Learning Management System (LMS) that regulates the management of learning in the learning model or online learning. In this study, the LMS employed was Edmodo for online classes. Edmodo is a LMS website which has many features that can facilitate learning process. Edmodo supports various types of files, namely .doc, .pdf, and .ppt which can be used by teachers to upload learning materials. Not only files, Edmodo also supports video or animations so that the students are enable to learn from various sources. Edmodo has a chat feature so that the students can communicate with fellow students or teachers to discuss during the lesson. Furthermore, Edmodo supports learning evaluation system within the network, so that teachers can measure the results of the students' tests through Edmodo.

Edmodo is used in this research to support the teaching learning process with the blended learning model in which the students are enable to learn anywhere and anytime without leaving the direct learning in the classroom. The virtual learning using LMS Edmodo is as the complement of face-to-face learning, so that the students can learn anywhere and anytime when the internet connection is provided.

The students' results used to measure the students' understanding of basic programming subjects with basic competencies in branching control structure. Learning outcomes given by to the students were in form of post-test with multiple choices questions. The learning outcomes were given when the students had used the blended learning model.

Table 2. Blended Learning

	Completeness

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Number of students	Complete	Incomplete
32 students	26 students	6 students

From the figure 3, the completeness of the students' of class X RPL 1 at SMK 17 Agustus 1945 was 81.25% complete and 18.75% incomplete

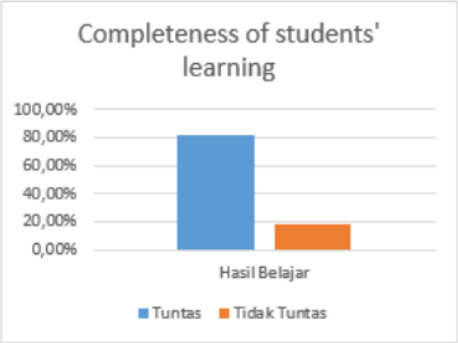

Figure 3. Graph of completeness of students' learning results

5. Conclusion

Based on the result of the study, the conclusions are blended learning is the combination two learning environments, which are face-to-face and online learning. There are two learning environments in blended learning: face-to-face learning and online learning. Online learning uses LMS Ednodo. Ednodo can accessed by the students anytime as long as the internet connection is available. In face-to-face environment, the learning process uses the combination of online learning and direct interaction. The test conducted to elicit the students' results was basic programming materials with basic competence of branching control structures and loop control structures. The test was multiple choices questions with the number of 30 questions. The student is verified to be completed if the score is above 75. The percentage of completion using blended learning was 81.25%.

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