Improving Vocational High School Students Digital Literacy Skill through Blended Learning Model

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Abstract. The accelerated development of information and communication technology (ICT) has an impact on ease of access to digital information. Information disseminated in the digital world is not always true and valid, thus vocational students as prospective professional workers should be equipped with digital literacy skills. One effort to improve student's digital literacy skills is by applying blended learning model that combines conventional learning model (face-to-face) with online learning model based on Learning Management System (LMS). This study aims at discovering whether there is a significant difference between control classes that apply conventional models with experimental classes that apply blended learning model. The research method used was Pretest-Posttest Control Group Design with 3 experimental classes and 3 control classes. The results of this study indicate that there are significant differences in digital literacy skills between the control classes and the experimental class, which means that the implementation of blended models can improve students' digital literacy skills.

1. Introduction

Vocational High School is an educational institution that aims at generating qualified graduates for professional working circumstances, possessing entrepreneurial passion, qualified skill, and able to compete in the global market. The vocational education system is designed to produce learning outcomes that correspond to the needs of the world of work [1]. States that vocational education is an effort of social development of labor, sustainment, acceleration, and enhancement of the quality of labor in order to increase community productivity [2]. In addition to focusing on individual skills development on an ongoing basis, vocational education also focuses on developing competencies outside of their work[3]. This suggests that the development of a vocational education curriculum is required to be adaptable to the changing needs of the professional working circumstance and society’s lifestyle to enable the learners mastering a field of expertise in terms of soft [3], [4] as well as hard skills [5], [6].

In fact, only a few number of graduates can meet the demands of employment in accordance with the specialization. This is due to the gap between skills possessed by vocational graduates and the skills required in the business and industry. The business and industry circumstances demand the specific skills (hard skills) and general skills (soft skills) required to complete the needs of job careers [7].

In the twentieth century, professional working circumstance and demands for labor qualifications are significantly changing [8]. One typical attribute of twentieth-century demands is the increase of
demand on generic skills possessed by the labor [9]. A survey result indicates that labor recruitment within corporations and companies primarily consider employability skills or soft skills instead of hard skills [10]. Education oriented in professional working circumstance through technical skill and employability skills enhancement, thus, are indispensable for supporting economic growth in during twentieth century [11].

To bridge the gap between the skills of vocational students as prospective workers with the expectations of business and industry, it is necessary to develop an attitude to be able to adapt to the times. Various information, data, and knowledge of both fact and opinion can be easily obtained. Therefore, the ability to select, process, and interpret the acquired digital information is very important for the master. These skills are called digital literacy skills [12]. Digital literacy skills consists of the skills to build a complex and systematic knowledge such as browsing, then interpreting data and information, creating and sharing content on the web, chatting via chat rooms and communicating in social networks[13], [14].

Human life’s pattern in this era of Z generation is undergoing some adjustments[15]. This phenomenon is commonly referred to as "digital native" which has the characteristics of the occurrence of adjustments dealing with: advanced in digital technologies, global connection, and changes in the paradigm of learning[16], [17]. Related to the adjustments of learning paradigm, the characteristics of the 21st century that affect the learning process consists of four domains, namely: knowledge work, thinking tools, digital lifestyles, and learning research[18]. Considering all occurring phenomena of adjustments, the Ministry of Education and Culture of Indonesia formulates that the paradigm of learning in the 21st century emphasizes the ability of learners in discovering information from various sources, be able to formulate problems, be able to think analytic and be able to cooperate and collaborate in solving problems (DitPSMK, 2016).

The factual response that is feasible to be considered by the teachers as an executor of policy in the field is by utilizing Information and Communication Technology as a media and source of learning in the classroom[15]. Currently, however, the rapid development of Information and Communication Technology is still inadequately utilized within the process of learning [19]. To conclude, the utilization of Information and Communication Technology (ICT) within learning process is both opportunity and challenges for teachers in establishing a meaningful and delightful learning.

One of the learning models that utilize ICT is blended learning. Blended Learning concept is defined as a learning process that utilizes various approaches. The approaches can take advantage of various media and technology. The blended learning context of integrating physical and virtual components is seen as an important strategy for educational institutions[20]. Blended Learning is a learning that combines face-to-face (conventional learning, where students and educators interact directly, each can exchange information about learning materials), self-learning Online[21]. Implementation of blended learning in this research is done by using Edmodo as learning management system.

2. Methodology
This research is an experimental research design with pretest-posttest control group design, which considers the initial ability of students as equality guarantees the initial conditions before the experiments were carried out[22]. The test used in this research is a test conducted to determine the digital literacy skills of students. During the implementation of this research, experiment class was observed using blended learning, while control class was observed using conventional learning (face-to-face learning approach). The sample taken from the study was 172 students, consisting of 85 experimental group students and 87 control group students, determined by employing random sampling technique (to take one experimental class and one control class from each skill competency in 3 schools, SMK Islam 1 Blitar, SMKN 2 Probolinggo, and SMKN Winongan). The location of the research in the three vocational schools spread across the three districts representing State and Private Vocational High School in East Java. The experimental activities were conducted on productive subjects Computer and Network Engineering for one semester, precisely in 2016/2017 academic year.
The implementation of blended learning model is done by applying conventional model combined with online learning model. During conventional learning, students are attained classical material in the classroom. In online learning, students access Edmodo (LMS) for access materials, videos, animations, and quizzes as additional material outside of school hours. It aims at ensuring students who are less understanding of the material during face-to-face learning to be able to learn and explore the material online.

The research data were collected by using the non-test technique for student's digital literacy skills variable. The instrument is a questionnaire using a Likert scale consisting of 5 choices of answers. The instrument was developed from 18 indicators consisting of 87 questions. The quality of non-test instrument (questionnaire on digital literacy skills variable) has met the validation of experts with a validity value of 0.89. While the field validation test resulted in a validity level of 0.82 and reliability of 0.74. The analysis used in this study was a different test (t-test) with prerequisite analysis consisting of normality and homogeneity test.

3. Findings and Discussion

3.1. Findings
Before conducting the research, a pre-test was first conducted to ensure that both determined class (experimental and control group) possess no difference regarding the initial ability of digital literacy.

The description of the data regarding the initial ability of digital literacy is presented in Table 1. The result of hypothesis testing of the average similarity of digital literacy skills of vocational high school students in this research is obtained from paired difference test of pre-test result of digital literacy skills of students before following learning activities. The result of the different test of initial skills of control and experiment class can be seen in Table 1. Before performing paired difference test, then first test prerequisite analysis consisted of normality test and homogeneity test was conducted. The acceptance or rejection of the hypothesis is in accordance with the large numbers of significance (Sig.) Or \( t \) count than \( t \) table.

Table 1. Pre-test Results on Digital Literacy Skills

| School          | Group  | N | Mean | Normality | Homogeneity | t-test |
|-----------------|--------|---|------|-----------|-------------|-------|
| SMKI Blitar      | Experi | 2 | 194, | 0,492     | 3,84        | 0,05  |
|                 | Control| 0 | 95   |           | 4           | 7     | 3     |
| SMKN Probolinggo| Experi | 3 | 217, | 0,867     | 1,64        | 0,20  | 1,24  | 0,21  |
|                 | Control| 5 | 70   |           | 4           | 7     | 6     |
| SMKN Winongan   | Experi | 2 | 212, | 0,802     | 3,57        | 0,06  | 1,74  | 0,08  |
|                 | Control| 7 | 63   |           | 2           | 4     | 1     | 7     |

In Table 1, it can be seen that the overall research data is normally distributed which can be seen from normality > 0.05. As for homogeneity testing, the whole class has a significance value > 0.05 which means that the data between the control class and the experiment has the homogeneity of the data. After passing the prerequisite analysis test, it can be seen the result of a different test which shows that the control and experimental value (Sig.) The value of control and experiment class has
value > 0.05 which has to mean that there is no difference of initial skills of digital literacy. In other words, after passing a series of conventional learning during this time in school, the two classes in each school have the same level of digital literacy skills, hence it deserves to be a research sample.

Then, it was continued by conducting the next learning activity and implementing the learning model of the entire one semester. At the end of research, it was conducted a post-test to discover the improvement of a student in digital literacy skill. In Table 2, it can be seen that the overall data is normally distributed, which is indicated by a normality value > 0.05. While homogeneity test concludes that the whole of homogeneous data with significance value > 0.05. Since it has met the prerequisite test analysis with normal and homogeneous data, it can be done a parametric test using t-test. The t-test results show that the overall significance value (Sig.) Produced is <0.05, thus it can be concluded that there is a significant difference between the control class and the experimental class. If it is seen from the average score on the entire sample research, the experimental class average is higher than control class. Proceeding from these results, it can be concluded that with the application of blended learning model, digital literacy skills of vocational students can increase compared with the application of conventional models.

Table 2. Post-test Results on Digital Literacy Skills

| School         | Group    | N  | Mean | Normality | Homogeneity Level | Homogeneity Sig. | t-test Sig. |
|----------------|----------|----|------|-----------|-------------------|------------------|-------------|
| SMKI Blitar    | Experiment | 2  | 271,05 | 0.976 | 3,34  | 0.07  | 2.87 | 0.00 |
| SMKI Blitar    | Control   | 2  | 234,95 | 0.493 | 8      | 5     | 8   | 7   |
| SMKN 2 Probolinggo | Experiment | 3  | 273,79 | 0.693 | 3,48  | 0.06  | 2.23 | 0.02 |
| SMKN 2 Probolinggo | Control   | 3  | 259,80 | 0.989 | 6      | 6     | 2   | 9   |
| SMKN Winongan | Experiment | 2  | 260,15 | 0.726 | 4.66  | 0.35  | 2.57 | 0.01 |
| SMKN Winongan | Control    | 3  | 232,97 | 0.119 | 8      | 0     | 3   | 3   |

3.2. Discussion

The empirical findings in this study are pursuant to the theories advocated[23]. Advocate that effective computer-assisted learning can provide successful guidance for learners, both through regular learning and self-learning[23]. That blended learning represents all teaching models integrated with technology, such as e-mail, streaming media, and the Internet, and can be combined with traditional teaching methods [24].

The results of this study indicate that the application of blended learning model that has been designed in such a way and applied in different institutions have the resembling conclusion, that there is a significant difference between the class using the conventional learning model with the class using blended learning model. Classes using blended learning models have enhanced digital literacy skill higher than the conventional one. This suggests that blended learning models accommodate student learning styles better[25].

Utilization Edmodo as a learning management system provides facilities for teachers and students, a convenient place to communicate, collaborate, share learning content, discuss in virtual classrooms, make quizzes, and apply online learning evaluations[26]. Essentially, Edmodo provides everything that can be done in the classroom in learning activities, including the creation and implementation of
learning evaluation and management of student learning outcomes. The learning process of blended learning using Edmodo is shown in Figure 1.

![Blended Learning Model Proses Design](image)

**Figure 1.** Blended Learning Model Proses Design

Learning strategy by using social media platform, such as Edmodo, offers a unique opportunity to connect teachers with students in creating a new learning atmosphere. The blended learning model embodies the current student learning style that enters the Z generation, a generation familiar with digital devices and an easy to accept learning model integrated with ICT[27]. The design of the learning process in Figure 1 shows that face-to-face learning begins with a material explanation by the teacher in accordance with the lesson plan using various methods. The learning is continued outside school hours with online activity containing material sharing activities, round table discussions, and progress evaluation. Lastly, the learning stage is complemented through face-to-face models as the evaluation phase of the study which has been carried out, both face-to-face evaluation of previous meetings and the implementation of online learning. The whole process of blended learning model is focused on improving students' skills and knowledge, particularly digital literacy skills. This blended learning model accommodates the lack of learning that is fully implemented conventionally or completely online, therefore it complements each other.

Within the century of knowledge, students of the Z generation are equipped with better multitasking skills and are more productive than previous generations. This is because in current days students are very easy to access information and social media from an early age, thus the Z generation possesses a good ability to process much of the information they[13]. In addition, Z generation also has characteristics with prominent self-confidence, high initiative, and more creative and innovative to create new opportunities[27]. Therefore, the implementation of blended learning model by utilizing learning management system can help students in developing digital literacy skills. This is reinforced by Saliyeva, et al. (2016) arguing that Z-generation students are very capable of utilizing digital media to support the construction of knowledge.

Students’ digital literacy is confirmed increasing after students follow a series of the learning process with blended learning model. When students are accustomed to seeking information through digital devices and process them into knowledge, then in the daily life students will not be easily stuck on information that has not been valid. Particularly in response to the current phenomenon of the digital world today various social media which are overgrown with numerous negative viruses such as hoax content, hate speech, bullying, radicalism, and a variety of fraudulent practices. It can be overcome by equipping the student's sufficient digital literacy skills.

Sufficient digital literacy skills enrich students to have creative and critical thinking, which in the future they will not be easily ingested by provocative issues, be avoided from victims of hoax or digital-based fraud. Digital literacy skills are not just the ability to locate and manage information, but also dealing with information research and integration[28]. Digital literacy skills can be seen from the skills and knowledge to use the application of digital media software and hardware; The ability to comprehensively understand digital media content; And most importantly is the ability to use digital
technology creatively to produce works [29]. Therefore, in the digital era today, the improvement of digital literacy skills of students should continue to be pursued by diversifying various models and instructional media, one of which is done in this research is using blended learning model.

4. Conclusion
As reported by the results of data analysis and discussion above, it can be concluded that the implementation of blended learning model improves the digital literacy skills of vocational high school students. Students are very familiar with the digital world, hence the implementation of the learning model that combines the conventional learning model (face-to-face) with blended learning model (online) is the right breakthrough. In the conventional learning, students attain direct knowledge from teachers, while the deepening of the material is done online through the learning management system media, in this study using Edmodo. Improved digital literacy skills are obtained by habituating students to search, process, analyze, and interpret information and data gained during face-to-face and online learning. Significant improvement is also supported by the characteristics of Z-generation students who have high confidence, multitasking, innovative, creative, and familiar with the digital world, thus during the online learning, students are easy to process, analyze, and interpret the information provided. With the increase in digital literacy skills, students are expected to possess a creative and critical thinking, which in the future they will not be affected easily by negative information to validate the correctness of the information.

Referring to the findings of this study, it is suggested that: (1) blended learning model should be applied by teachers in learning activities, to improve student's digital literacy skills in particular; (2) teachers can diversify media and methods to make learning implementation to be more attractive, innovative, interesting, and fun particularly by utilizing the development of ICT; And (3) teachers should improve their ability, notably in the field of ICT that can be implemented in learning process.

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