



The Effect of Project-Based Blended Learning and Students' Creativity on Eleventh-Grade Students' Learning Achievement

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Project-based blended learning is an innovative learning model viewed as an alternative reflecting 21st century learning. This study intended to investigate the effect of project-based blended learning and students' creative towards their learning achievement. Pre-test and post-test quasi experimental with 2x2 factorial model were used as the research design by involving 60 eleventh-grade students of culinary study program at SMKN 2 Singaraja. They were selected as the research sample through conducting simple random sampling technique. A statistical analysis was conducted to analyse the obtained data from pre-test and post-test. The results of the study showed 1) there is different achievement between students who are taught using project-based blended learning and conventional method; 2) project-based blended learning is quite effective to increase students' achievement; 3) there is an interactional effect between project-based learning and creativity on students' achievement; 4) there is different achievement between students' with high creativity of experimental and high control group; and 5) there is different achievement between students' with low creativity of experimental and high control group. The application of project-based blended learning can improve students' achievement indirectly through the boost of students' creativity.

Keywords: blended learning, creativity, project-based blended learning, students' achievement, learning

INTRODUCTION

21st century is an era where the science and technology development grow rapidly at the same time. The science and technology development in 21st century leads to the shifting

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paradigm in education where the integration of technology in the learning process becoming the primary determination of learning quality (Claro et al., 2012). The massive development of technology in 21st century is regarded as an opportunity and necessity to increase the learning or education quality (Haswani, 2014; Velasco & Dolor, 2016; Wiranda et al., 2020). Yang and Wu (2012) argue that a rapid change of technology emerges 21st century learning shifting a new learning environment for the education system through an abundant source or information accessed by using technology itself. Technology is commonly regarded as a skill for producing a creativity in achieving the learning objectives viewed from educational context (Charlile & Jordan as cited in Fitriah, 2018). Kurniawati (2018) states that the influence of technology towards the current educational system suggests teachers to familiarize and apply technology in the learning process to improve its quality. The science and technology development reflects on the integration of technology to support the 21st century learning.

Integrating technology in the learning process is not only the indication of conducting 21st century learning. The 21st century learning as the indication of science and technology development is not only realized through the integration of technology but it also needs digital literacy, inventive and critical thinking, creativity and productivity, effective communication, and spiritual values as requirements of the developments (Rahmawanti & Umam, 2019; Sumarni et al., 2021). Lin and Wu (2016) recognize the 21st century skills as professional skills required for future talents where creativity covers several abilities; problem solving, collaborative ability (teamwork), communicative ability, and critical thinking. The policy makers support the implementation of 21st century learning by obligating teachers to provide learning activities stimulating students' creativity, communication, problem solving, and critical thinking (Fernández-Gutiérrez et al., 2020; Trilling & Fadel, 2009 as cited in Suwastini et al., 2021). 21st century skills become another main component involved in the learning process along with the integration of technology.

As a response towards 21st century learning, vocational high school has been emphasized creativity as one of 21st century skills in its learning process. Lestari et al (2021) state that vocational high school is an education level prioritizing the students for mastering a certain skill and ability for their professional development. Vocational high school has a goal for preparing its graduates to be ready in facing the rapid development of technology and science impacting the dynamic needs in work industry and society (Jalinus et al., 2017). Emphasizing students' creativity is a way for achieving the goals of vocational high school considering that creativity is a solution in facing industrial development as the impact of 21st century (Eliyasni et al., 2019). Ritter and Mostert (2016) state that the students who have been trained for developing their creativities are able to face challenges in the development era of technology and science. Kesuma et al (2020) view creativity as the interaction of skills, processes, and environment that leads an individual in producing products or creating ideas. It is relevant to the students' achievements expected in vocational high schools where the students are supposed to have skills in creating or producing creative ideas to solve problems appear in the real world context (Dewanto et al., 2018). Creativity bridges

students' thinking skills and problem-solving ability which prepares them to compete in 21st century era relevant to the goals of vocational high school.

Upgrading the quality of learning process by implementing innovative learning method is required to improve students' creativity. Syahril et al (2019) state that students' creativity can be increased by applying a systematic learning pattern through innovative learning method. Teachers are supposed to apply the learning method engaging students' actively to develop their potential creativity (Usmeldi, 2019). It is supported that implementing the learning method which reflects 21st century learning by integrating technology and understanding the characteristics of 21st century skills as an innovation is a key in achieving the learning objectives (Abuhmaid, 2020; Clark, 2010; Mirah et al., 2019; Sun et al., 2018). Applying innovative learning method assists students in promoting active learning and creativity of the students (Zare et al., 2016). The learning environment concerns on students' liveness and activeness support students' tendency in thinking and working creatively (Nami et al., 2014). Therefore, implementing appropriate learning method as an innovation in education is inseparable with promoting students' competence through their creativities (Seechaliao, 2017).

However, the current learning process conducted in vocational high schools shows that the students' creativity still needs an improvement since not all of teachers implement innovative teaching and learning method. Nursofah et al (2018) state that teachers are supposed to provide meaningful learning experience since the creativity of vocational high school students needs to be improved in which their lack of creativity influences the learning achievements. Teachers tend to conduct a learning process by delivering the materials conventionally and spending less time for students to do thinking process for stimulating their thinking skills and creativity (Pratomo et al., 2021). Less creativity tends to influence students' learning achievement since it is regarded as a solution to find various possible ways to solve complex problems (Runco, 2014; Mukti et al., 2020; Wati, 2019). It can be a serious problem demanding teachers to concern on designing the learning process that focuses on students' creativity to obtain optimal learning achievement (Prasetya et al., 2021).

The integration of blended learning and project-based learning has been widely discussed as an innovative teaching and learning model that reflects 21st century learning by integrating technology and student-centred learning. Nguyen (2017) states that blended learning offers flexible learning environment combining face to face learning and online learning. The flexibility offered through blended learning enhances students' communicative, interactive, and creative knowledge development in which it can be combined with project-based learning (Manggabarani & Masri, 2016). The combination of project-based learning and blended learning creates a fun and meaningful learning environment where the students are involved actively and creatively to solve the problem by designing a project (Isa & Azid, 2021; Tika & Agustiana, 2021). Students are allowed to design and finish the project by using technology to gain various form of information (Nopiyanto et al., 2021; Yustina et al., 2020). Mursid et al (2022) argue that blended learning assisted with project-based learning is a method that increases students' creativity, problem-solving, and thinking skills influencing their academic

achievements. It is added that students are also lead as independent learners through student-centred learning activity provided by implementing project-based learning and the flexibility offered in blended learning. As a teaching and learning method project-based blended learning adopts 21st century learning emphasizing students' creativity.

This study concerns on the effect of project-based blended learning and students' creativity towards their learning achievement in vocational high schools. It is due to the recent condition which shows that the integration between project-based learning and blended learning stimulate students' creativity (Sompong, 2018). The study tends to investigate the influence by obtaining the achievement difference between the students with high creativity and the ones with low creativity. Wu and Wu (2020) state that students' achievements are influenced by their backgrounds including high and low creativity. The effect of project-based blended learning has been studied by many experts. Alamri (2021) shows that implementing project-based blended learning enhances university students' self-efficacy and academic achievement by allowing students to share knowledge, information, and discuss the problem that they face through joyful learning. Besides, Suryani et al (2021) found out that there is a significant relationship between project-based blended learning and students' learning achievements or outcomes. Meanwhile another study reveals that project-based blended learning gives a significant influence towards spatial thinking skills and geography skills of the students when it is implemented with STEM approach. Students' attitudes are changed to be more active and creative (Putra et al., 2021). It is relevant to the finding gained by Mursid et al (2022) which shows that project-based blended learning improves students' learning achievements by influencing students' creativity. It is found out that students taught by project-based blended learning achieve higher score than students taught conventionally. Those studies point out the effect of project-based blended learning towards students' creativity and learning achievement but there is still limit study which discuss the implementation of project-based blended learning in vocational high schools. It is important to conduct further research related to the phenomenon of 21st century learning in vocational high schools as what has been elaborated previously.

Literature Review

Project-Based Learning

Project-based learning is an innovative and systematic learning and teaching method promoting students' engagement by providing complex questions to be investigated deeply (Eze et al., 2021). It provides students with a wide chance for planning their learning activities to conduct collaborative project to produce creative product (Darmuki et al., 2023). This method also allows students to involve in inquiry, collaboration, and solution building to assist students in solving a real-world issue or challenge (Haniah et al., 2021; Wahyudi & Winanto, 2018; Dai et al., 2021). Chua and Islam (2021) argue that project-based learning is a dynamic process to facilitate students in achieving Bloom's highest-level thinking. It integrates various disciplines in creating a project to improve students' critical thinking, creativity, and problem solving (Ummah

et al., 2019; Putra et al., 2021). Telaumbanua (2022) also adds project-based learning engaging students' motivation in finding a solution to complete their project.

Blended Learning

Blended learning is commonly selected to overcome a transition method of learning system (Shamsuddin & Kaur, 2020). It offers students an availability for arranging a flexible learning process (Alfi et al., 2016). Blended learning is a learning process which utilizes virtual learning and direct face-to-face learning. It trains students to find new and creative problem solving through the utilization of digital means and direct interaction (Atthachakara, 2021; Distyasa et al., 2021; Wahyudi et al., 2020; Zydney et al., 2020). Ardianti et al (2020) show that blended learning can be implemented as an innovative learning method to develop students' skills and knowledges including their creative and thinking skills. It combines traditional classroom and online environment to allow students in receiving real-world learning experience to explore students' creativity (Hujjatusnaini et al., 2022; Mielikäinen, 2022).

Creativity

21st century learning is not only indicated by the emphasize of critical thinking but it broadens the existence of creativity in the learning process. Creativity is highly perceived as the 21st century skills required for students in facing technology advance covering their cognition (Hanif et al., 2019; Kurniawati et al., 2022; Muldner & Burleson, 2015; Richardson & Mishra, 2018). It is considered as a thinking ability for solving a certain problem through the use of various alternatives (Cenberci & Yavuz, 2018; Husna et al., 2019). Wibowo (2021) states creativity is a determination of students' learning achievement. It leads students to discover and apply new ideas unconventionally towards their scope of learnings (Gunawan et al., 2017; Plucker as cited in Beghetto, 2005; Soh, 2017). Hennessey and Amabile (2010) argue that creativity is influenced by external factors covering the teaching method or models, teachers are supposed to foster students' creativity in an appropriate way since it brings a massive impact towards students' achievement.

Learning Achievement

How well students acquire the entire information during the learning process is reflected on the students learning achievement (Kpolovie et al., 2014). Harahap (2019) state learning achievement is a learning process product achieved by the students relevant to a particular unit that they learn. It is viewed as one of students' competences which bridges students' knowledges and real-world situations (Hoerunnisa et al., 2019). Learning achievement covers the students' learning process relating to their cognition, affection, and psychomotor (Kunandar, 2013; Wijayanto et al., 2015). Specifically, learning achievement is defined as a success achieved by students after joining the learning process in a certain period covering their knowledges, skills, and attitudes shown through observable changes (Jagantara et al., 2014; Taupik & Fitria, 2021). It can be used as an indicator to measure students' learning development that assists teachers to give feedbacks to the students (Nisah et al., 2021). Asvio et al (2017) add that

students' learning achievement is determined by students' ability and learning environment.

METHOD

Quantitative method was used as the research designed of this study by implementing pre-test and post-test Quasi Experimental with 2x2 factorial model. This study concerned on investigating three research variables; blended project-based learning method as independent variable, students' creativity as moderator variable, and students' learning achievement as dependent variable. The study was conducted at SMKN 2 Singaraja by involving 60 students of culinary study program. The students were selected as the sample of this study by using randomly sampling technique. Then, students were divided into four groups; 1) control group with high creativity, 2) control group with low creativity, 3) experimental group with high creativity, and 4) experimental group with low creativity. There was a difference in condition experience between the experimental and control group. In the control group, the students were given the conventional method. The students were asked to produce a product at the end of the learning process. However, in the experimental group, students followed some steps as follows. Firstly, students identified and formulate projects. Secondly, students prepared project plans. Thirdly, students collected needed information. Fourthly, students processed the obtained information. Lastly, students made their own reports and product. In the experimental group, students were given online and offline experiences. Online learning emphasized the use of technology to strengthen their knowledge whereas students did a practicum at the school. The present study employed two instruments to obtain the data, namely questionnaire and performance test. Questionnaires were distributed to the students to measure their level of creativity whether or not the level was high or low. It consisted of positive and negative statements of creativity in the questionnaire (see Appendix 1). It could be seen from the responses given by the students to the questionnaire. When the students have high positive responses to the questionnaire, then they belonged to high creativity and vice versa. Besides, performance test was conducted to measure students' achievement by conducting practicum in the classroom. In addition, content validity of the instruments was examined by two experts to check their validity. The validity was done by using Gregory's formula to get valid data from the samples of the study. Before the treatment was given to experimental group, pre-test was conducted to analyse students' achievement. Then, after treatment in the experimental group was accomplished, post-test was done to analyse students' achievement. The results of pre-test and post-test were analysed descriptively and inferentially with the assistance SPSS 25. Descriptive statistic was used to analysed the data descriptively meanwhile inferential analysis was conducted through analysis variance test (ANOVA). Perquisite testing was done to examine the normality and homogeneity of the data. Then, hypothesis testing was done covering five hypotheses of the study, namely 1) there was different achievement between students who are taught using project-based blended learning and conventional method; 2) project-based blended learning was quite effective to increase students' achievement; 3) there was an interactional effect between project-based learning and creativity on students' achievement; 4) there was different achievement between

students' with high creativity of experimental and high control group; and 5) there was different achievement between students' with low creativity of experimental and high control group.

FINDINGS

After conducting an analysis of the obtained data, the descriptive analysis showed that the mean score of students with high creativity in the control group was 77.60 with a standard deviation of 2.414, whereas students with low creativity in the control group got a mean score of 71.80 with a standard deviation of 1.568. On the other side, the mean score of students with high creativity in the experimental group was 93.47 with a standard deviation of 1.807, whereas low creative students got a mean score of 84.87 with a standard deviation of 2.446. Then, the inferential statistics were shown in the following table below.

The effect of project-based blended learning and students' creativity on their achievement

Table 1

Different effects on students' achievements between project-based blended learning and conventional method

| ANOVA | | | | | |
|----------------|----------------|----|-------------|---------|------|
| Score | | | | | |
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 3946.267 | 3 | 1315.422 | 300.096 | .000 |
| Within Groups | 245.467 | 56 | 4.383 | | |
| Total | 4191.733 | 59 | | | |

Table 1 shows the result of the One-way ANOVA test. The significance value (Sig.) was 0.000, less than 0.05. It indicated that students who were taught using project-based blended learning were different from students who were taught by the conventional method. There was different achievement among students in the learning process. Project-based blended learning provided students with exposure to the information about the discussed topic since they could do online and offline learning. This condition strengthened their knowledge about the topic through online learning and their performance through offline learning.

The significant achievement between students who were taught by using project-based blended learning and conventional method

Table 2
Significance effect of self-assessment and conventional method

| Descriptive | | Students | Statistic | Std. Error | |
|---------------------|---------------------|----------------------------------|-------------|------------|--|
| NGain_ Score | 1 | Mean | 30.2992 | 1.24776 | |
| | | 95% Confidence Interval for Mean | Lower Bound | 27.7473 | |
| | | | Upper Bound | 32.8512 | |
| | | 5% Trimmed Mean | 30.0842 | | |
| | | Median | 29.7059 | | |
| | | Variance | 46.707 | | |
| | | Std. Deviation | 6.83427 | | |
| | | Minimum | 20.00 | | |
| | | Maximum | 44.12 | | |
| | | Range | 24.12 | | |
| | Interquartile Range | 10.00 | | | |
| | Skewness | .606 | .427 | | |
| | Kurtosis | -.469 | .833 | | |
| | 2 | Mean | 71.2036 | 2.02204 | |
| | | 95% Confidence Interval for Mean | Lower Bound | 67.0680 | |
| | | | Upper Bound | 75.3391 | |
| | | 5% Trimmed Mean | 71.3365 | | |
| | | Median | 70.2941 | | |
| | | Variance | 122.660 | | |
| | | Std. Deviation | 11.07518 | | |
| Minimum | | 50.00 | | | |
| Maximum | | 89.19 | | | |
| Range | | 39.19 | | | |
| Interquartile Range | 19.03 | | | | |
| Skewness | -.145 | .427 | | | |
| Kurtosis | -1.154 | .833 | | | |

Table 2 shows the N-gain score for the two groups, namely the experimental and control groups. The mean score of N-gain for the control group using the conventional method was 30.30 which was categorized into low effective categories. On the other side, the mean score of N-gain for the experimental group using project-based blended learning was 71.20 which was categorized into quite effective categories. It can be concluded that the implementation of project-based blended learning more effective than conventional method in improving students' achievement. Students followed systematic steps from identifying and formulating projects, preparing project plans, collecting needed information, processing the obtained information, and making reports and product. These steps direct students to have real experience in learning. In addition, compared to the conventional method, project-based blended learning provides online learning which strengthen their insight. It is because the online learning provides a chance for the students to explore the information as much as they want. Therefore, they have equal experience for both theoretical and practical practice.

The interactional effect between the implementation of project-based learning and creativity on students' achievement

Table 3

The interactional effect between the implementation of project-based learning and creativity on students' achievement

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---------------------|-------------------------|----|-------------|-----------|------|
| Corrected Model | 3946.267 ^a | 3 | 1315.422 | 300.096 | .000 |
| Intercept | 402784.267 | 1 | 402784.267 | 91889.947 | .000 |
| Method | 3139.267 | 1 | 3139.267 | 716.183 | .000 |
| Creativity | 777.600 | 1 | 777.600 | 177.399 | .000 |
| Method * Creativity | 29.400 | 1 | 29.400 | 6.707 | .012 |
| Error | 245.467 | 56 | 4.383 | | |
| Total | 406976.000 | 60 | | | |
| Corrected Total | 4191.733 | 59 | | | |

a. R Squared = .941 (Adjusted R Squared = .938)

Table 3 shows the result of Two Way ANOVA. The significant value between project-based blended learning and students' creativity was 0.012. It showed that the sig. value was lower than 0.05. It indicated that there was an interaction effect between project-based blended learning and students' creativity toward students' achievement. It showed that students' creativity can be boosted by the provision of project-based blended learning. It is reflected from the steps of project-based blended learning in which the steps are in line with the characteristics of creativity. Project-based blended learning provides opportunity for the students to show their ability in the form of problem solving. The method directs students to explore their new ide, risk-taking, curiosity which boosts their creativity.

The difference on students' achievement between students with high creativity in experimental and control group

Table 4

Differences on students' achievement between high creativity of experimental and high control group

Multiple Comparisons

Scheffe

| (I) Group | (J) Group | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|-------------------|--------------|-----------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| High Experimental | High Control | 15.867* | .764 | .000 | 13.84 | 17.89 |

*. The mean difference is significant at the 0.0

Table 4 shows that the significant value was 0.000 which was lower than 0.05. It indicated that there was a difference on students' achievement between students with high creativity who were taught using project-based blended learning and those who were taught by conventional method. The use of project-based blended learning gave effect on students' achievement. The provision of project-based blended learning

provides opportunity for the high creativity to explore their creativity compared to the high creativity in the control group. Project-based blended learning presents real experience of learning in which they have to enrich their insight to solve the problems.

The difference on students' achievement between students with low creativity in experimental and control group

Table 5

Differences on students' achievement between low creativity of experimental and high control group

| Multiple Comparisons | | Scheffe | | Mean Difference | | | 95% Confidence Interval | |
|----------------------|-------------|---------|------------|-----------------|-------------|-------------|-------------------------|--|
| (I) Group | (J) Group | (I-J) | Std. Error | Sig. | Lower Bound | Upper Bound | | |
| Low Experimental | Low Control | 13.067* | .764 | .000 | 11.04 | 15.09 | | |

*. The mean difference is significant at the 0.05 level.

Table 5 shows that the significant value was 0.000 which was lower than 0.05. It indicated that there was a difference on students' achievement between students with low creativity who were taught using project-based blended learning and those who were taught by conventional method. The provision of project-based blended learning gave effect on students' achievement. Students with low creativity taught by project-based blended learning have different experience in which they get exposure for their insight and practicum. The students can use their prior knowledge and new information to do practicum. These situations direct students to have complex and authentic learning.

DISCUSSION

From the results of findings, it can be seen that there is significant difference between students who are taught by using project-based blended learning and conventional method. Students with project-based blended learning get higher achievement than students with conventional method. It indicates that the provision of blended and project-based learning give impact for students' achievement. It is in line with Isa & Azid (2021) and Tika & Agustiana (2021) in which the integration between project and blended learning offers new situation for students in learning process. It can boost students' activeness and creativity since student do their project assisted with technology. They can use their own creativity to formulate attractive project during learning which unconsciously lead students to be active. Project-based learning gives benefits for students in the learning process to support students in achieving better achievement. It can enhance students' critical thinking (Farida et al., 2017; Hikmah et al., 2016; Makrufi et al., 2018; Sularmi et al., 2018; Sumardiana et al., 2019). The provision of project helps students to develop critical thinking which lead them to solve the existing problems. They have to find the solution to face the discussed problems. Besides, project-based learning can increase students' creativity (Fatimah, 2016; Rati et al., 2017). The provision of project trains students to be more creative in designing the product of the project. Within this model, students are provided with real problem to be

solved which is related to their real life (Farida et al., 2017; Wulandari et al., 2021). Students have an experience to connect their knowledge to the real world. Overall, provision of project leads students to develop their soft skills.

Regarding the benefits obtained from project-based learning, blended learning completes the learning process with meaningful learning. As stated by Manggabarani & Masri (2016), blended learning creates meaningful experience of learning. Students have chance to conduct communicative communication, interactive discussion, as well as share creative ideas. In addition, blended learning provides a chance for students to experience the use of technology (Nopiyanto et al., 2021; Yustina et al., 2020). Students can make use technology to support themselves in finishing their works as well as enriching their insight. Moreover, blended learning presents flexibility for students and teacher to conduct online and offline learning assisted by internet and technology (Badaruddin et al., 2019; Simbolon, 2021; Verawadina et al., 2020). Students and teachers can conduct learning from home without coming to the school. In addition, students can still conduct face to face meeting but they can still access information online. Moreover, blended learning creates fun atmosphere (Faus et al., 2019; Muhtia et al., 2018). Students can access link which provides information related to materials discussed. It helps to decrease students boring in joining learning activities. Furthermore, the use of with e-learning in blended learning can increases students' digital literacy skills (Azmi et al., 2022; Eliana et al., 2016; Wahyuni & Sarosa, 2017). They have an experience to explore information from e-learning which helps them to develop their digital literacy skills from the exploration of digital information. In a nutshell, blended learning can strengthen the implementation of project-based learning.

From the benefits offered by project and blended learning, The integration of project and blended learning provides effective learning atmosphere for the students to enhance their ability. This effectiveness has been supported by the results of the previous studies as follows. A study conducted by Alamri (2021) finds out that project-based blended learning can enhances students' self-efficacy and academic achievement. It is due to the chance provided for the students to share knowledge, information, as well as conduct a discussion related to the investigated problem. It gives chance for students to experience joyful and meaningful learning. Besides, Suryani et al (2021) also find out significant relationship between project-based blended learning and students' learning achievements. It can be proven by score obtained by the students joining learning process with project-based blended learning. In addition, Putra et al. (2021) also find out that project-based blended learning gives impact on students' spatial and geography skills within STEM approach. The learning method directs students to explore their skills by providing them project during learning process. Moreover, Mursid et al (2022) recognizes that project-based blended learning can improves students' learning achievements through students' creativity. From the results of the previous studies, it can be concluded that project-based blended learning is effective to develop students' learning achievement.

Apart from the learning model, creativity also contributes to the students' achievement especially for preparing them to the real word workplace. Through creativity, students

use their skills and environment to create a product. It is supported by Kesuma et al (2020) in which creativity is viewed as an interaction of skills, processes, and environment leading to the production of products or creation of ideas. It indicates that creativity directs all the process, skills, and experience to result products or ideas. In addition, creativity also offers problem solving for vocational school students. It is proven by Dewanto et al. (2018) in which creativity provides creative ideas to solve problems in the real world context. It indicates that students are guided to create innovative solution for the faced problems. The level of creativity also influences the students' achievement. Higher creativity directs students to get more solutions, new idea, decision making, and risk taking and vice versa. It is in line with the characteristics of creativity as proposed by Sudarti (2020) in which creativity can be seen from their cognition and attitude. It indicates that creativity are reflected on how they think something and how they act to something. Creativity is needed to prepare vocational students to be ready in the real world. As stated by Eliyasni et al. (2019) Emphasizing students' creativity is a way for achieving the goals of vocational high school considering that creativity is a solution in facing industrial development as the impact of 21st century. It is also supported by Ritter and Mostert (2016) who state that the students with qualified creativity are able to face challenges in the development era of technology and science. Therefore, students are ready to face the 21st century demands.

CONCLUSION

This study concludes that the provision of project-based learning can increase students' achievement for vocational high school students. This model provides meaningful activity in which the benefits of project-based learning and blended learning are framed into one. The use of project-based blended learning is in line with the current learning situation in which students use technology for their learning. In addition, the model also provides real learning activity which is suitable for the demand of vocational students to be ready with the real world demands. Besides, students' creativity is also needed to strengthen the implementation of project-based blended learning. Higher creativity leads students to be more active and innovative. The present study suggests for teacher, to provide meaningful and authentic learning for the students to prepare them for the real world demands, for other researchers, other 21st century skills can be examined to prove the existence of project-based blended learning in the 21st century. The theoretical implication of the study shows that project-based blended learning suits for the 21st century learning since the learning model utilize the use of technology. Besides, practical implication can be found that the learning model is suitable to be used for vocational high school students to prepare them for the real-world demands.

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Appendix 1

Creativity Questionnaire

| No | Statements | Responses | | | | |
|----|--|-----------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | I have several solutions for discussed problems. | | | | | |
| 2 | I have limited solutions for discussed problems. | | | | | |
| 3 | I have a new idea for the discussed problems. | | | | | |
| 4 | I have no new idea for the discussed problems. | | | | | |
| 5 | I collected information about the discussed problem from many sources. | | | | | |
| 6 | I collected information from a particular source. | | | | | |
| 7 | I am curious to find the answer to the discussed problem. | | | | | |
| 8 | I am reluctant to find the answer to the discussed problem. | | | | | |
| 9 | I am ready to make a decision related to the discussed problems. | | | | | |
| 10 | I doubt making a decision related to the discussed problems. | | | | | |
| 11 | I am ready to take risks for my decision. | | | | | |
| 12 | I doubt taking risks for my decision. | | | | | |
| 13 | I consider some sources to discover something. | | | | | |
| 14 | I consider a source to discover something. | | | | | |