

The Effectiveness of E-Comic Learning Media Based on Teaching Factory on Creative Projects and Entrepreneurship in Increasing Learning Outcomes and Interest in Entrepreneurship

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Abstract

This study aims to test the effectiveness of teaching factory-based mobile e-comic learning media on Creative Projects and Entrepreneurship subjects with e-commerce menus in improving student learning outcomes and entrepreneurial interest in Vocational High Schools. The type of research used is experimental research using the Pretest-Posttest Control Group design. The research was conducted at SMK Negeri 12 Surabaya with the research subjects of class XI Metal 1 as the experimental class and class XI Metal 2 as the control class. Using the analysis technique of independent t-test and N-gain test to measure the effectiveness of learning outcomes, as for measuring the effectiveness of interest in entrepreneurship, it was analyzed using the Mann-Whitney U test and Wilcoxon test because the data results were not normal so using non-parametric data analysis. The results of this study are (1) the average pretest value of the experimental class is 64.75 and the posttest value is 80.50 while in the control class the average pretest is 65.50 and the posttest value is 70.00 (2) Independent t-test shows the results where $T_{count} > T_{table}$ is $3.438 > 2.024$ ($0. < 0.05$) and the significance value is $0.001 < 0.05$; (3) The N-gain test for experimental class students' learning outcomes is 0.4 and the control class N-gain is 0.1; (4) Mann Whitney Test with Posttest results for both classes obtained a significance of $0.000 < 0.05$; (2) Wilcoxon's test with a significance result of $0.000 < 0.05$ with an average value of 10.50 for the experimental class while in the control class of 8.50.

Keywords

E-Comic; learning media; teaching factory; creative projects



I. Introduction

The existence of an educational institution called a school where its existence is part of the social system of the state and nation. In its achievement, it is very necessary to have a programmed, planned, and implemented process that is effective, efficient, and relevant in the midst of the era of globalization accompanied by challenges and open opportunities that are able to survive with human resources and are able to support the implementation of the education system. Soedijarto (2008). This includes the Vocational High School (SMK) which is a school with the priority of students to develop professionalism and create a skilled and competent workforce when entering the world of work or entrepreneurship. Education is a very important human need because education has a duty to prepare Human Resources (HR) for the development of the nation and state (Pradana et al, 2020). According to Astuti et al (2019) Education is an obligation of every human being that must be pursued to hold responsibilities and try to produce progress in knowledge and

experience for the lives of every individual. Education is one of the efforts to improve the ability of human intelligence, thus he is able to improve the quality of his life (Saleh and Mujahiddin, 2020). Education is expected to be able to answer all the challenges of the times and be able to foster national generations, so that people become reliable and of high quality, with strong characteristics, clear identities and able to deal with current and future problems (Azhar, 2018). Education and skills are the main keys in gaining social status in community life (Lubis et al, 2019).

In accordance with global developments regarding Human Resources (HR) in the industrial 4.0 era, vocational education institutions must always pay attention to it, especially Vocational High Schools (SMK), including the emergence of digital technology that allows students to be able to learn wherever they are. With the advancement of digital technology, learning can not only be carried out in formal schools and allows access to education throughout Indonesia. Ainur Rosyida & Suhartini (2021). Because of this, Vocational Schools during teaching and learning activities are required to be able to harmonize the needs of the industrial world and the orientation of Vocational High Schools (SMK) itself is to prepare graduates who are ready to work by creating emphasis and a harmonious learning approach. The government focuses on implementing efforts to develop Vocational High Schools (SMK) in order to provide solutions to labor problems in order to face global competition. Trimo & Maksum (2021).

Efforts to develop Vocational High Schools (SMK) to provide solutions to labor problems so that they can face global competition for success in teaching and learning activities at Vocational High Schools (SMK), namely carrying out efficient and effective teaching and learning activities that are able to prepare students in the industrial world or the world of work. The program is a Center of Excellence Vocational High School program or known as SMK PK. This program has technical implementation, namely by implementing link and match, strengthening Human Resources (HR), as well as by strengthening facilities and infrastructure which will later be entrusted with the task of advancing other SMKs.

One of the Links and Matches in question is the teaching factory which is a business and production orientation in a learning program at school. The implementation in implementing the teaching factory program in learning is to combine education in vocational high schools with business concepts in the world of work or industry that are in harmony with the competencies, skills or majors taken are relevant. The technology used in innovative learning activities is to carry out productive practices that apply educational concepts and methods that are oriented towards production management management by students in learning to be in line between industrial needs and production management management by students. Kuswantoro (2014).

To include material with the teaching factory program, you need a tool to visualize a material that is difficult to understand by utilizing learning media. Moreover, according to Gagne' and Briggs (Arsyad, 2017) "Learning media is a display which in its physical form is used as a tool to transmit the contents of learning materials, which include books, tapes, photos, pictures, charts, television, computers, tape recorders, video cameras, video recorders, and films, slides or picture frame". Learning media that can be used for all subjects taught, one of which is Creative Projects and Entrepreneurship.

The purpose of the productive subjects of Creative Projects and Entrepreneurship is to emphasize students by instilling a true entrepreneurial attitude that invites them to always be full of enthusiasm, dare to take financial or psychological risks for a new work or a work that is different from the others and already exists. previously, and receive

rewards and self-satisfaction and dedication to the environment around them. Nur Aisyah et al., (2019).

The material in productive subjects, namely Creative Projects and Entrepreneurship, one of which is business opportunities, which is material on the basis of how to analyze a business opportunity. The complexity that builds this material indicates that there are different approaches in transferring knowledge in the classroom. It is classified on the properties of matter that is definitively oriented, understanding concepts with contextual examples, and calculations. The characteristics of the material that are complex and different approaches to delivering the material make the material need to be taught more intensely and it takes a lot of time.

Thus, learning about the business opportunity material for the Creative Projects and Entrepreneurship subjects above, researchers feel the need to test the effectiveness of the media in accordance with learning theory and material needs, as well as adapting students' learning styles to maximize the learning process. The media that is applied is strived to be able to support teaching materials and assist teachers in understanding the material to be conveyed and can cover the shortcomings of the existing media in schools, and of course able to increase students' interest in entrepreneurship. The learning media is a teaching factory-based mobile e-comic in the subjects of Creative Projects and Entrepreneurship with an e-commerce menu that helps complement the material in the module and through the visual appeal of the comics, which is able to convey subject matter using series and sequences. short stories using language that is easy to understand, understand and relate to the life around students, accompanied by stories of successful entrepreneurs who are good at exploring business opportunities that clarify learning materials can make it easier for them to get a good understanding of the material and so can improve their understanding. This is in line with the opinion of Levie & Levie (Arsyad, 2017) that, learning with the presence of image stimuli and visual stimuli will foster better learning outcomes, which include tasks such as remembering, recognizing, recalling, as well as linking facts and concepts and the understanding obtained is stronger.

This is supported by research from the selection of e-comic learning media in research Fradani & Astuti, (2020) which explains if students who learn to use learning media in the form of comics gain a better understanding of the material than students who learn without using learning media in the form of comics. The above results strengthen the indication that the use of e-comic media when used in analyzing business opportunity materials is also able to have implications for students' understanding of learning, especially in the construction of analytical material.

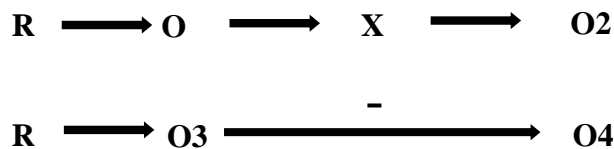
In addition, regarding the increase in interest in entrepreneurship in line with research from Ega et al., (2018) with the result that the design of comic strips is able to increase entrepreneurial interest which is matched according to the current trend that is well known in the lives of the younger generation, accompanied by elements of jokes or humor in the design of comics outside of having the purpose of entertaining as well as having the aim of educating.

By applying the use of teaching factory-based mobile e-comic learning media in Creative Projects and Entrepreneurship subjects with e-commerce menus through visual appeals in comics, which are able to convey subject matter using short series and sequences of stories using easy language. understood, understood and associated with life around students, accompanied by stories of successful entrepreneurs who are good at exploring business opportunities that clarify learning materials can improve learning outcomes and students' interest in entrepreneurship. From the description above, research was conducted with the title "The Effectiveness of Teaching Factory-Based Moving E-

Comic Learning Media on Creative Projects and Entrepreneurship Subjects with E-Commerce Menus in Improving Learning Outcomes and Entrepreneurial Interests of Students in Vocational High Schools".

II. Research Method

This study uses a quantitative approach. The type of research used is experimental research using the Pretest-Posttest Control Group design. According to Sugiyono (2018) the type of Pretest-Posttest Control Group design is carried out through the selection of two groups which is done randomly and then given an initial test which is a pretest to determine the initial ability of the experimental group and the control group. Then in the experimental class treatment was applied using e-comic learning media while in the control class no treatment was applied, aka still applying conventional learning and then compared. The description of this design is as follows:



Information:

- O1 and O2 : Pretest and Posttest scores in the experimental class
- O3 and O4 : Pretest and Posttest scores in class and control
- X : *Treatment provided (e-comic learning media)*
- : Conventional learning

This research was carried out at SMK Negeri 12 Surabaya, in the odd semester of the 2022/2023 academic year with the subjects of this research being students of class IX Metal Crafts which included class XI Metal 1 as an experimental class and class XI Metal 2 as a control class with each class consists of 20 students. The instrument used to obtain data on learning outcomes was obtained using multiple choice items (pretest and posttest) with a total of 20 items. The data on interest in entrepreneurship uses a questionnaire instrument for entrepreneurship interest.

The data analysis technique used to determine the effectiveness of the teaching factory-based mobile e-comic learning media on Creative Projects and Entrepreneurship subjects with an e-commerce menu on learning outcomes was carried out by independent t-test and N-gain test to measure differences in the level of increase in learning outcomes. learners. The data on entrepreneurial interest were analyzed only using the Mann-Whitney U test and the Wilcoxon test because the data obtained were not normal, so using non-parametric data analysis techniques.

III. Result and Discussion

3.1 Learning outcomes

Before learning is done, the teacher does a pretest first. The pretest values for the experimental class and the control class can be seen in the following figure:

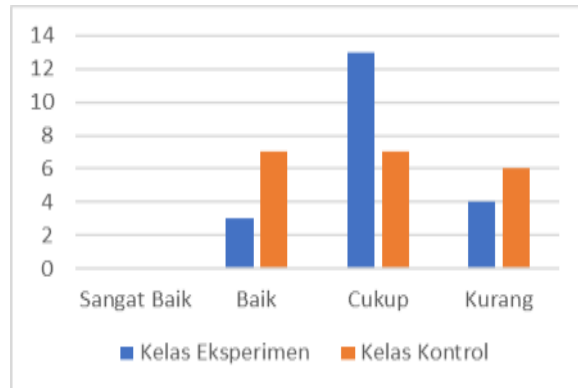


Figure 1. Diagram of the Pretest Results of Experimental Class and Class students

Control Based on the results obtained from the pretest value, it was shown that both the control class and the experimental class had almost the same average value. This was also confirmed by Wulandari et al., (2018) who concluded that the average value of the ability of students in the experimental class and control class for the pretest questions must be the same or not different because they have not received any treatment at all. After the learning process was carried out in the control and experimental classes, the average posttest score was obtained. The posttest scores for the experimental class and the control class can be seen in the following figure:

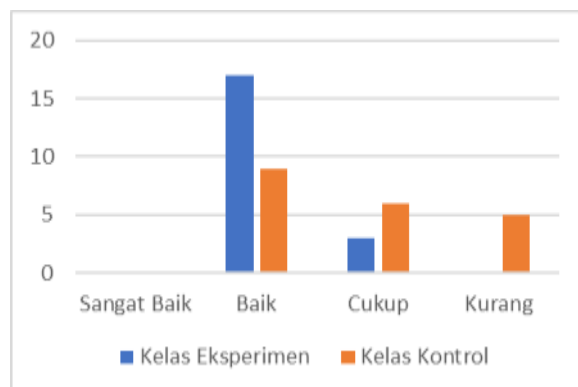


Figure 2. Diagram of Posttest Results of Experimental Class students and

The figure shows that the experimental class has the highest posttest score, which is greater than the control class in the good category, as well as the average cognitive learning outcomes of the experimental class.

After the posttest was carried out, statistical tests were carried out to show the effectiveness of the teaching factory-based mobile e-comic learning media in the subjects of Creative Projects and Entrepreneurship with the e-commerce menu using an independent t test on the posttest data of the experimental class and control class by testing the difference in the average results. studied in both classes with the following results:

Table 1. Average Difference Test Results

		Group	N	Mean	Std. Deviation	Std. Error Mean
Posttest	Experiment		20	80.5	7.052	
	Control		20	70	11.698	

The table shows that there is a significant difference in student learning outcomes between the experimental class and the control class. Some of the results of the calculation of the average difference test, it is known that the average increase in the experimental group is 80.5 while the increase in the control class is 70, so it is known that the increase in learning outcomes for the experimental class is 10.5 larger than the control class. For independent t-test on posttest data obtained the following results:

Table 2. Independent t-test results on Posttest Data

		F	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Posttest	Equal variances assumed	5.275	3.438	38	0.001	10.5	3.054	4.317	16.683
	Equal variances not assumed		3.438	31.2	0.002	10.5	3.054	4.272	16.728

From the table above, it is also known that the Tcount value is 3,438 with a significance of 0.001. The value of T table is 2.024 so it can be concluded that Tcount > Ttable is $3.438 > 2.024$ and the significance value in the paired sample test is $0.001 < 0.05$. So it can be concluded that there is a significant difference between the posttest learning outcomes in the experimental class and the control class.

The results of the N-gain test for the experimental and control classes to determine the increase in learning outcomes are shown in the following table:

Table 3. N-gain Test of Student Learning Outcomes

Class	Pretest	Posttest	N-Gain	Kategori
Experiment	64.75	80.50	0.4	Sedang
Control	65.50	70.00	0.1	Sedang

The results in the table above show an increase in the pretest to posttest scores for the experimental class and control class students, respectively, which are 0.4 and 0.1 which are included in the medium category. According to value

The N-gain where the N-gain of the experimental class is higher than the control class means that there is an increase in student learning outcomes that are more in the experimental class after using the teaching factory-based mobile e-comic learning media in Creative Project subjects with the e-comic menu. commerce.

By looking at the t test and the value of the N-gain between the experimental class and the control class, the experimental class has a significantly higher improvement in learning outcomes than the control class. So it can be concluded that the teaching factory-based mobile e-comic learning media on Creative Projects and Entrepreneurship subjects

with an effective e-commerce menu is able to improve student learning outcomes in Vocational High Schools.

The effectiveness of learning media on learning outcomes is also supported by research by Fradani & Astuti (2020) which explains if students who learn to use learning media in the form of comics gain a better understanding of the material than students who learn without using comics learning media with an average score. The average in the class used by the researcher as the experimental class is 90.88 while the average value in the class used by the researcher as the control class is 84.71. In addition, it is also supported by the results of research from Ais Rosyida (2019) with research results showing that the media is effective in improving student learning outcomes. Comic media has an influence on student learning outcomes as seen from the results of the t-test which shows that the T-count is $2.55 >$ from the T-table 2.093.

The use of this learning media is implemented based on the theory of constructivism which states that the purpose of teaching and learning activities is to emphasize the emergence of understanding, where this understanding requires activities that involve creativity and productivity with real life contexts so that they can benefit from increasing students' understanding so that learning outcomes are complete. Suprijono (2019). It is also related to the increase in students' reasoning abilities that can be given through the constructivism learning process. there are orientation phases, idea discovery, idea reconstruction, idea application, review which are the phases contained in constructivism learning to direct students to have critical thinking skills. Susanto (2013).

3.2 Entrepreneurial Interests

After the posttest was carried out, statistical tests were carried out to show the effectiveness of the teaching factory-based mobile e-comic learning media in the subjects of Creative Projects and Entrepreneurship with the e-commerce menu using the. The first is the Mann Whiteny Test to test the hypothesis that there is a difference between the results of the Pretest of the control class and the experimental class and the results of the Posttest of the control class and the experimental class with the following results:

Table 4. Results of the Mann Whiteny Test Hypothesis Test

	PretestKew	PosttestKew
Mann-Whitney U	176.000	58.000
Wilcoxon W	386.000	268.000
Z	-.655	-3.853
Asymp. Sig. (2-tailed)	.512	.000

From the table above, the pretest of the experimental class and the control class obtained a significance of $0.512 > 0.05$ so that the results showed that there was no average difference between the pretest of the experimental group and the control group. This is in accordance with Wulandari et al., (2018) which concludes that the average value of the ability of students in the experimental class and control class for the Pretest questions must be the same or not different because they have not received any treatment at all. While the results of the posttest control class and experimental class obtained a significance of $0.000 > 0.05$ so that the results obtained are there are differences in the posttest average between the experimental group and the control group.

Based on the results of the pretest and posttest scores for the experimental class and the control class, the Wilcoxon test was also carried out, namely testing the hypothesis

about a change between the results of the pretest and posttest between the control class and the experimental class with the following results:

Table 5. Summary of Hypothesis Results Using Wilcoxon's Test

	PostEksKew - PreEksKew	PostKonKew - PreKonKew
Z	-3.922 ^b	-3.518 ^b
Asymp. Sig. (2-tailed)	.000	.000
Mean Rank		
Negative Ranks	0	0
Positive Ranks	10.50	8.50

From the table above, it is obtained that the significance result is $0.000 < 0.05$ in the two classes so that there are differences in the results of the pretest and posttest of interest in entrepreneurship, both the experimental group and the control group. However, even though the two groups both experienced differences between the results of the Pretest and Posttest and experienced an increase in both classes where there was a Negative rank 0 meaning that there was no decrease, they both experienced an increase in the results of the pretest to the posttest of interest in entrepreneurship. However, even though the two classes experienced differences in the results of the pretest and posttest and experienced a significant increase in interest in entrepreneurship, the two classes experienced significant differences in the average value where the experimental class obtained an average result of 10.50 while in the control class it was 8.50. so it is known that the increase in the result score of the experimental class's interest in entrepreneurship is 2.00 greater than the control class.

Based on the data obtained above, it can be seen that the class that was given treatment in the form of the application of teaching factory-based mobile e-comic learning media on Creative Projects and Entrepreneurship subjects with an e-commerce menu would get an increase in entrepreneurial interest that was different or higher than the class that did not receive the treatment. So that the teaching factory-based mobile e-comic learning media in the subjects of Creative Projects and Entrepreneurship with an e-commerce menu is effective in increasing the entrepreneurial interest of students in Vocational High Schools.

This is supported by research from Ega et al., (2018) where the design of comic strips is able to increase entrepreneurial interest which is matched according to the current trend that is well known in the lives of the younger generation, accompanied by elements of jokes or humor in the design of comics outside of having the purpose of entertaining as well as It also has an educational purpose.

Interest in entrepreneurship arises from a sense of attachment to a thing or activity, but there is nothing comprehensive where the interest itself can be expressed through statements that show that students prefer one thing to another, and that interest is not brought from birth, it will but found later. Djaali, (2013). In addition, an increase in interest in entrepreneurship is started or obtained because of better learning outcomes where Slameto (2013) has stated that this interest is not innate, but is acquired later. Interest in something can be learned so that further learning will be able to have an influence on the acceptance of new interests. So, to foster a better interest in entrepreneurship, good learning outcomes are needed through the use of e-comic learning media.

IV. Conclusion

Based on the results of the research as described, the first conclusion can be drawn that the teaching factory-based mobile e-comic learning media in the subjects of Creative Projects and Entrepreneurship with e-commerce menus is effective in improving student learning outcomes in Vocational High Schools. This can be shown by: (1) The average pretest value of the experimental class is 64.75 and the posttest value is 80.50 while in the control class the average pretest is 65.50 and the posttest value is 70.00 so that the average posttest value of the experimental class is more higher than the average posttest score for the control class; (2) Independent t-test shows that there is a significant difference between the posttest learning outcomes of the experimental class and the control class where $T_{count} > T_{table}$ is $3.438 > 2.024$ and the significance value is $0.001 < 0.05$; The N-gain test of experimental class students' learning outcomes was 0.4 including the medium category, the control class N-gain of 0.1 was also included in the medium category.

The conclusion of the two mobile e-comic learning media based on teaching factory on Creative Projects and Entrepreneurship subjects with an e-commerce menu is effective in increasing students' interest in entrepreneurship in Vocational High Schools as shown by the results of (1) Mann Whiteny Test with control class Posttest results and the experimental class obtained a significance of $0.000 < 0.05$; (2) Wilcokson's test with a significance result of $0.000 < 0.05$ with an average value of 10.50 for the experimental class while in the control class of 8.50, so it is known that the increase in the result score of the experimental class's interest in entrepreneurship is 2.00 greater than the control class.

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