

# The Impact of Digital-Based Mind Map on Creative Thinking Skills in Civic Education Learning

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## ABSTRAK

*Kemampuan berpikir kreatif siswa rendah jika menggunakan media pembelajaran konvensional. Dengan demikian, proses pembelajaran PKn membutuhkan media pembelajaran yang inovatif seperti mind map berbasis digital untuk meningkatkan kemampuan berpikir kreatif siswa. Penelitian ini bertujuan untuk menganalisis pengaruh media mind map berbasis digital terhadap keterampilan berpikir kreatif siswa kelas X dalam pembelajaran PKn di SMK. Penelitian ini merupakan penelitian eksperimen semu dengan pendekatan kuantitatif. Populasi dalam penelitian ini berjumlah 477 siswa dengan menggunakan simple random sampling. Penelitian ini menggunakan instrumen dengan soal tes berupa esai. Pengumpulan data digunakan untuk pretest dan posttest. Pengujian hipotesis menggunakan analisis uji-t dengan taraf signifikansi 5%. Sampel ditentukan melalui teknik random sampling yang berjumlah 62 siswa yang dibagi menjadi dua kelas. Hasil penelitian menunjukkan bahwa nilai post-test lebih signifikan. Oleh karena itu, dapat disimpulkan bahwa terdapat pengaruh yang signifikan media mind map berbasis digital terhadap kemampuan berpikir kreatif siswa kelas X dalam pembelajaran PKn di SMK. Media mind map berbasis digital dapat meningkatkan kemampuan berpikir kreatif pada siswa. Diharapkan guru menggunakan dalam media mind map dalam pembelajaran Pendidikan kewarganegaraan.*

## ABSTRACT

Students' creative thinking ability is low when using conventional learning media. Thus, the Civics learning process requires innovative learning media such as digital-based mind maps to improve students' creative thinking skills. This study aims to analyze the effect of digital-based mind map media on the creative thinking skills of class X students in Civics learning in vocational high schools. This research is a quasi-experimental research with a quantitative approach. The population in this study found 477 students using simple random sampling. This study used a test instrument in the form of an essay. Data collection was used for pretest and posttest. Hypothesis testing using t-test analysis with a significance level of 5%. The sample was determined through a random sampling technique which collected 62 students who were divided into two classes. The results showed that the posttest scores were more significant. Therefore, it can be said that there is a significant effect of digital-based mind maps on the creative thinking skills of class X students in Civics learning in SMK. Digital-based mind map media can improve students' creative thinking skills. It is expected that teachers use mind map media in learning civics education.

## 1. INTRODUCTION

The presence of civic education in the school curriculum is a breakthrough in improving problem-solving, interpersonal and communication skills, critical and creative thinking skills, and strengthening self-confidence and social responsibility, facilitating open thinking about differences and tolerance in society (Komalasari & Rahmat, 2019; Lee, 2015; Sumardjoko & Musyiam, 2018). The complexity of the study of citizenship material requires efforts and support from various parties, including schools as formal cultural institutions, to achieve civic education goals (Marzuki & Basariah, 2017; Susetyo et al., 2018). Civic education includes three knowledge competencies, namely civic knowledge (related to material content that must be known as citizens), civic skills (the development of

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skills so that citizens can actively participate in community life), and civic disposition (citizenship characters as attitudes and habits of thinking in encouraging the development of social functions and good interaction between citizens to realize interests in a democratic country) (Davies et al., 2017; Farisia, 2016). Teachers must use technology in civic education learning so that learning activities are more accessible (Ananda, 2017; Sari et al., 2020).

Based on the results of preliminary observations regarding the use of innovative learning media, at Vocational High School 1 of Bandar Lampung, civic education learning is still lacking in innovating technological developments. The media used in civic education learning is still in the form of regular Microsoft PowerPoint usage, even though the media can be developed in the form of concept maps that are more varied, innovative, and easier in learning. The applied media finally are ineffective in improving students' creative thinking skills because the students usually tend to be passive and do not clearly understand the material being studied. Teachers should use the entry of technology in life to provide the best learning by utilizing existing digital media, including digital-based mind maps, and creating an understandable concept map that helps the students understand the lesson can continue to be integrated (Al-Hariri & Al-Hattami, 2017; M. Astuti et al., 2021; Buchori et al., 2017).

Especially considering the world that was shocked by the Covid-19 pandemic that attacked global health (El Refae et al., 2021; Salisu & Akanni, 2020). It requires more active use of information and communication technology (ICT). The Covid-19 pandemic makes learning unable to take place offline and becomes a challenge to improve students' creative skills (El Refae et al., 2021; Saputra et al., 2021). Creative thinking involves a complex activity of cognitive skills and abilities, personality and motivation factors, styles, strategies, and metacognition skills (Chávez-Eakle et al., 2012; Leggett, 2017). A series of cognitive processes in creative thinking such as acquiring knowledge and skills and transforming knowledge in new forms and product standards from internal to external (Jia et al., 2019; Kim et al., 2019).. The essence of creative thinking skills is the use of divergent and convergent thinking processes. Divergent thinking is generative and requires new thoughts and ideas, while convergent thinking is evaluative, where there must be reflection and evaluation of new thoughts or ideas that have been poured (Maskur et al., 2020; Schut et al., 2020).. So, the role of the school is to equip students by teaching and practicing knowledge to produce creative ideas for problem-solving (Chiu et al., 2019; Noh, 2017; Ritter et al., 2020).

Creative thinking skills are the basis needed in forming an awareness and the ability to innovate in the 21<sup>st</sup> century era that is all about using digital products to increase creativity (He, 2016; Saprudin et al., 2019; Şener et al., 2015). Therefore, in achieving success in shaping the ability to compete in the 21<sup>st</sup> century, learning media are needed that can develop students' creative thinking. One of them is digital-based mind map media. Technology is recently entering so fast in human life that all activities are carried out through digital platforms (Bayles et al., 2021; Sert & Boynueğri, 2017). The use of digital-based learning media will be oriented towards learning so that there will be an increase in vitality in the learning process; besides that, it can transfer information and learning content (Trisiana, 2020). From the description of the problems described above, it is necessary to solve problems to improve students' thinking skills in learning civic education using innovative learning media.

Digital-based mind map media effectively presents information that can be heard, seen, and rich in visual forms (Buran & Filyukov, 2015; Susilawati et al., 2017). Mind maps allow students to explore all brain abilities by using the right and left brain simultaneously to help students present their ideas easier (Chang, J.-H., Chiu, P.-S. & Huang, 2019). A mind map is a way of taking notes creatively, effectively, and literally mapping students' thoughts. The use of digital-based mind map media makes it easier for students to take notes using words, colours, lines, symbols and combine and develop the work potential of the brain to remember various assignments or materials given by the teacher (Astuti et al., 2013; Kiong et al., 2012; Liu et al., 2018).

Research other research supported that the guided inquiry learning model assisted by mind map media positively affected creative thinking skills (Pratama et al., 2020). Other research shows that the student facilitator and explaining (SFAE) learning model using mind map media has an effect on increasing students' learning creativity (Dewi et al., 2020). Furthermore, similar research with resulted that the speed reading-mind map (SR-MM) had a significant effect on students' creative thinking skills (Sulistiyono et al., 2017). The objective of this study was to analyze the effect of digital-based mind map media on creative thinking skills in civic education learning. The effect of digital-based mind map media on students' creative thinking skills was measured using the pre-test and post-test results from the experimental and control classes before and after treatment of digital-based mind map media. This research is expected to be a good reference for readers and further researchers in understanding the effect of digital-based mind map media in the continuity of students' creative thinking skills in innovative civic education learning.

## 2. METHOD

This research was quasi-experimental research using the Non-equivalent Control Group research design. The population in this study consisted of 477 students from the tenth grade of Vocational High School 1 of Bandar Lampung, who were divided into 13 classes. This study used simple random sampling because the study population was homogeneous (Cresswell, 2016). Sampling is based on theory if the population is more than 100 people, only 10-15% or 20-25% or more samples can be taken (Arikunto, 2010). This research was taken 13% of the total population, so that the sample amounted to 13% x 477 students = 62 students. The researcher used an experimental class and a control class; therefore, the researcher divided 62 students into two classes.

The study began by giving pre-test questions to the two classes to determine the basic skills of students' creative thinking. Then, students from the two classes were given different treatments. The learning used digital-based mind map media in the experimental group, while the control group used ordinary Microsoft PowerPoint media and discussion without using digital-based mind map media. Then, the final stage was to provide post-test questions to both classes to find out the final results of students' creative thinking skills. This study used an instrument with test questions in the form of essays. The researcher divided the instrument into pre-test and post-test questions, which each consisting of 8 essay questions. In making the questions for the tests in this research, the researcher used the National Integration material in the *Bhineka Tunggal Ika* (Unity in Diversity) frame. The research instrument used a try-out process to determine the level of validity and reliability. The instrument testing was carried out using statistical tests with the formula product-moment coefficient from *Karl Pearson* and *Alpha Cronbach* to two classes. Then, the validity was carried out using experts' opinions or expert judgment in consulting the instrument assisted by the research instrument matrix. The basis for decision making in the validity test was that if the value of  $r_{count} \geq r_{table}$ , then it was declared as valid; conversely, if the value of  $r_{count} < r_{table}$ , it was declared invalid. The validity test results from the expert judgment indicated that all the question items in this research were valid. It was because  $r_{count} \geq r_{table}$ . Furthermore, the reliability test showed that the instrument used in the research was reliable, with a *Cronbach Alpha* value > 0.06.

Data collection in this study used descriptive statistical data techniques, which were carried out with two tests, namely the prerequisite analysis test and hypothesis testing. The prerequisite test includes the normality test and data homogeneity test. The normality test used the *Kolmogorov-Smirnov* test. The criterion for acceptance of normality was that if the significance value of the calculation results was more significant than  $\alpha = 0.05$ , the distribution could be regarded as normal, then if it was smaller than  $\alpha = 0.05$ , the distribution was not normal. Furthermore, the homogeneity test obtained from the final pre-test and post-test scores through the experimental class and the control class was carried out using *Levene's* test. The variance requirement was homogeneous if the significance was more significant than 0.05 or  $F_{count} < F_{table}$ . The hypothesis test was carried out by implementing the T-test with Paired Sample T-test analysis through the SPSS 20.0 for Windows program. Paired sample T-test analysis was used to determine between research variables, whether there was an effect relationship or not using digital-based mind map media on students' creative thinking skills in civic education learning conducted in tenth-grade students Vocational High School 1 of Bandar Lampung. The criteria for acceptance of the hypothesis the 5% significance level or the data requirements were significant if  $p$  was less than 0.05 or  $t_{count} > t_{table}$ . Meanwhile, if  $t_{count} < t_{table}$ , it meant that  $H_0$  was rejected.

## 3. RESULT AND DISCUSSION

### Result

The normality test was carried out on the control class group (pre-test and post-test) and the experimental class group (pre-test and post-test) with the calculation results using SPSS 20.0. The data distribution in this study had a significance value greater than 0.05 ( $p > 0.05$ ), so it was concluded that this study was normally distributed, meaning that this data had met the analysis requirements. The following are the results of the research normality test in Table 1.

**Table 1.** The Results of Normality Test

Group	Sig (p)	Description
Control Class (Pre-Test)	0,173	Normal
Control Class (Post-Test)	0,227	Normal
Experimental Class (Pre-Test)	0,380	Normal
Experimental Class (Post-Test)	0,254	Normal

In the homogeneity test using the SPSS 20.0 program, the results showed that the research data had a homogeneous variance based on a significance value greater than 5% ( $p > 0.05$ ) or had  $F_{\text{count}} < F_{\text{table}}$ . Thus, the data had met the criteria to be analyzed in hypothesis testing. The results of the homogeneity test are presented in [Table 2](#).

**Table 2.** The Results of Homogeneity Test

Group	F Count	F Table	Sig.	Description
Pre-Test	0.127	3.15	0.723	Homogen
Post-Test	1.640	3.15	0.205	Homogen

Furthermore, the results of the t-test between the control class and the experimental class were based on the research hypothesis: there is an effect of digital-based mind map media on creative thinking skills in civic education learning at SMK Negeri 1 Bandar Lampung. Based on the results of data analysis, it was known that the t-test results showed that the  $t_{\text{count}}$  was 9.790 and the  $t_{\text{table}}$  score with df 60 with a 5% significance level was 2,000. The  $t_{\text{count}}$  score  $> t_{\text{table}}$ , or the p-value was less than 0.05 ( $p = 0.000 < 0.05$ ). Descriptively, the research results showed that the research hypothesis was accepted. There was a significant effect of digital-based mind map media on creative thinking skills in learning civic education at Vocational High School 1 of Bandar Lampung. It can be proven based on the results of the post-test that was carried out on both groups.

## Discussion

The application of learning media aims to help students learn and understand learning material ([Buchori et al., 2017](#); [Hendrick et al., 2019](#); [Setiawan & Wiedarti, 2020](#)). Therefore, the media must be made as attractive as possible. Innovative learning media that can be used are digital-based mind map media. Mind maps are a popular (media) tool in generating and organizing higher-order thinking concepts in the process ([Camburn et al., 2020](#); [Susilawati et al., 2017](#)). Mind map media can help teachers and students in learning because mind maps help summarize important learning material into several mind map sheets, making it easier for students to learn and remember ([Astuti et al., 2013](#); [Kiong et al., 2012](#)). The mind map combines concepts from the whole brain, including logic, procedures, words, and numbers from left brain theory. Then, pictures, imagination, color, and space of the entire right brain. A mind map is defined as a kind of thinking tool (media) by combining words, pictures, symbols, and other information representation tools. A mind map application can help store information and increase students' understanding and learning efficiency ([Liu et al., 2018](#); [Sartono et al., 2018](#)).

Mind maps generally consist of a hierarchical sequence of categories and concepts, often expressed through words, phrases, colors, or sketches ([Camburn et al., 2020](#); [Sulfemi, 2019](#)). The need for an educational curriculum in the 21<sup>st</sup> century is oriented towards creating a productive, creative, innovative, and effective generation with the integration of knowledge, skills, and attitudes in life ([Siburian et al., 2019](#)). Creative thinking skills are essential for finding creative ideas for solving complex problems ([Meyer, 2020](#)). Creative thinking is a strategic skill in the 21<sup>st</sup> century, so it requires the involvement of students in developing their creativity ([Şener et al., 2015](#); [Songkram, 2015](#)). Creative thinking skills can train students to develop many ideas and arguments, ask questions, acknowledge the truth of various arguments, and even make students open-minded and responsive to different perspectives ([Khoiriyah & Husamah, 2018](#); [Wechsler et al., 2018](#)). To get life skills, it is necessary to optimize creative thinking skills to overcome all complex problems over time because creative thinking skills will produce fluency, flexibility, and originality.

The experimental class results after given treatment showed that students who used digital-based mind map media could better understand the learning material. Digital-based mind map media made it easier for students to learn through digital media that students could carry and read continuously. Students in the class discussed making digital-based mind maps, then mapped the material that had been learned in class related to national integration material in a single diversity frame, then presented the digital-based mind map media in front of the class so that it triggered student learning activeness for developing creative thinking skills. Digital-based mind map media helps students create, interpret concepts more quickly, and is helpful as a communication channel. Students can improve various skills, including creative thinking skills, and increase productivity through a mind map ([Fardhila & Istiyono, 2019](#); [Priyaadharshini & Vinayaga Sundaram, 2018](#)).

It is in line with the digital-based mind map media that functions to determine what students have learned and think about detailed information. Assessment with a mind map allows teachers to know how students think in receiving and processing information on learning in the classroom ([Camburn et al., 2020](#); [Fardhila & Istiyono, 2019](#)). In contrast, the control class used standard Microsoft

PowerPoint learning media. In detail, the control class students were passive and did not understand the material well, so that the learning process required to be optimized using innovative learning media. Therefore, through the development of the 21<sup>st</sup> century, students must develop their creative thinking as the younger generation (Churchill et al., 2013; Jannah et al., 2020). Of course, this must be facilitated by teachers in schools. The teacher's job is to be responsible for seeing everything in classroom learning and helping the students' self-development process. In developing creative thinking, students can become the next generation of quality in the future. The highest educational achievement of educational institutions is to improve the quality of education to produce professional students (Siburian et al., 2019).

The findings of this research supported previous research which showed that the guided inquiry learning model assisted by mind map media helped students be more active in the learning process in class (Pratama et al., 2020). Using conventional learning media such as PowerPoint media with regular discussion was proven to be less effective in improving students' creative thinking skills. A similar research showed that there was an influence on the Student Facilitator and Explaining (SFAE) learning model with mind map media on students' creativity (Dewi et al., 2020; Saisabila, 2018). This can prove that learning by using mind map media can increase the creativity of students in learning in the classroom (Buran & Filyukov, 2015; Susilawati et al., 2017). It was reinforced by research which showed a significant difference between the use of Speed Reading-Mind Mapping (SR-MM) media in increasing students' creative thinking skills (Sulistiyono et al., 2017).

From the discussion that has been described by looking at the study results, it can be concluded that students' creative thinking skills could be improved through digital-based mind map media in Civic education learning conducted on tenth-grade students at Vocational High School 1 of Bandar Lampung. Students created, analyzed, and understood the content of the material being studied in a class by mapping the main parts through visualization. The benefits of a mind map as a creative recording medium made it easier for students to remember much information obtained about the subject matter because it was enough for students to remember parts or ideas of learning to stimulate memory easily (Masliani et al., 2019). In addition, students could save time to arrange writing regularly, explore new ideas, and gain various experiences to improve creative thinking skills so that the final result of learning could be better.

#### 4. CONCLUSION

Digital-based mind map media had a significant effect on students' creative thinking skills in civic education learning. This research was limited to the tenth-grade students at Vocational High School 1 of Bandar Lampung. There was a significant difference between the post-test scores of the experimental class, which was higher than the post-test scores in the control class. Therefore, it showed that teachers must use innovative learning media such as digital-based mind maps to help students improve their creative thinking skills as their learning outcome well.

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