Mind Mapping Based Mobile Learning System to Increase Student Creativity

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Abstract. Authentic online learning is applied at pandemic corona as a strategy to reduce face-to-face in the learning process. The rise of use handphone, gave the idea to implement a mind mapping-based mobile learning system. This research aims to provide an overview of the need to improve student creativity by using mobile learning system-based learning. The study used the class action research method, using the Kemmis and Taggart models. The implementation of research has been conducted with two cycles through planning, implementation, observation, and reflection. The research object was 40 people consisting of 15 males and 25 women. The programs used in this study are using Microsoft PowerPoint, ISpring, and Website2apkbuilder. The research object is a student of Semester II Civics Education, University PGRI Yogyakarta. Validity of data using face validity. Based on the results of the study obtained data, the use of mind mapping by using the mobile learning system impacts increasing student creativity. It can be examined from the student creativity evaluation results on pre-research with the average value of 59.41 to 78.21 at Cycle 1, and at 2 increased back creativity to 82.03. Mind mapping based mobile learning can be an online learning alternative by giving the program integrated in one semester. This learning Program can reduce Internet quota use because it can be learned online through Android application.

1. Introduction
The current learning paradigm has undergone many changes from conventional to the use of information technology. Many technological discoveries in education require the adaptation of educational actors to adapt their learning techniques[1]. Educators must carry out this demand because students currently have mastered many skills related to educational development.

One of the most rapid technological developments is the handphone. Students in urban areas are almost predominantly using Android-based cellphones[2]. Based on data from 2018, the Ministry of Communication and Information Technology of the Republic of Indonesia, of the 250 million Indonesians, more than 100 million have used cell phones in all their activities. Indonesia occupies the fourth country in accessing the internet.

The rapid discovery in technology has made the current learning paradigm shift to learning based on the Industrial revolution 4.0. Learning no longer uses conventional methods but uses online-based and internet-based technology. The current government has made various policies to use learning models to use information technology in the learning process[3].

Learning does not only develop knowledge but also skills and practical. All studies are more likely to develop the cognitive domain, but few are concerned with developing the affective domain—college student. In preliminary observations, students cannot develop creativity because the learning
system that is followed does not provide many opportunities in the affective domain[4]. The results of other observations found that student characteristics were more likely to have less mastery of technology, so there was a need for an increase in applying technology in learning.

Based on these conditions, it is necessary to provide technology-based learning that provides a cognitive improvement and needs to be given thorough learning for affective and psychomotor aspects. One learning method that seeks to improve learning is the mind mapping method[5]. This method seeks to map thoughts using letters and pictures as part of learning. The use of letters and images was introduced by Tony Buzan[6], with a technique of changing learning material in the form of images and writing to be used for learning[7].

Various studies have discussed a lot about the use of technology in learning, but this study applying new learning, namely, mind mapping based on android applications. This study combines the mind mapping method using the I-Spring software and Responsive Voice as the audio filler in Mind Mapping. Website2APKBuilder is used to change the internet language in the Android language. The research carried out involved students in making media to be Student Active Learning[8]. The use of mind mapping based on Android applications is expected to improve creativity in the Media course in Semester II of the Pancasila and Citizenship Education Study Program, Faculty of Teacher Training and Education, University PGRI Yogyakarta.

The formulation of the problem in this study is how to increase creativity through mind mapping based on student android applications in learning instructional media? This study aimed to find out about the impact of increasing the use of mind mapping based on Android applications on student creativity, especially in learning media courses.

2. Method

This research was conducted in Semester II in the Learning Media course, Department of Civic Education, Faculty of Teacher Training and Education, Universitas PGRI Yogyakarta. The location of the Department of Civic Education Program is in Unit II. This location is Sonosewu Number 117 Sonosewu Kasihan Bantul, Yogyakarta. The timing of this research is from December 2019 to July 2020. The timing of the research is adjusted to the course hours in the even semester.

The method used in this study caused Classroom Action Research techniques[9]. Classroom Action Research is one type of research used to determine students’ changes due to changes in learning[10]. Classroom Action Research uses four main steps[11]: planning, implementation, observation, and reflection. The four stages are carried out in a cycle. If the learning indicators cannot be exceeded in the first cycle, the next cycle is carried out by looking at the reflection as an evaluation of learning.

This study's primary data source results from the second-semester Civics Education student learning evaluation, in the Media course using the Android-based mind mapping method. The Number of students is 39 people. This data was also strengthened by collaborator observations to analyze the development of student creativity in making mind maps using Android-based technology. This study uses several research data collection techniques of observation, test, and documentation techniques.

Exposure to data analysis used a qualitative descriptive paradigm. Exposure data is described using descriptive data supported by quantitative data derived from the results of the creativity and observations about student creativity when using the mind mapping method based on the android application. Qualitative exposure is described in depth by observing each stage of student development directly related to the teaching and learning process. This observation becomes an exposure study strengthened by the evaluation test results for each cycle by giving students questions in the form of tests related to creativity in Media courses.

The final evaluation of learning can be calculated through the average creativity of students in the Learning Media course:
Formula (1) is used to calculate the total average of student creativity. This research is categorized as successful if the average score of students on creativity is at least 80. This value is taken from the results of student evaluations on mastery of creativity.

3. Discussion

This research begins with conducting preliminary observations in Semester II Department of Civic Education, Faculty of Teacher Training and Education Universitas PGRI Yogyakarta. Based on the results of interviews with Academic Advisors, it was found that semester II students had positive characteristics, namely having a strong ability in the learning field, but did not get many assignments that explored their creativity.

Semester II students from various provinces in Indonesia tend to have unequal abilities in mastering learning materials and mastery of technology. Students from outside Java tend to have language problems and mastery of computer technology.

There was a corona pandemic at the time of the research, so learning tends to be done online. Students are encouraged by the government to stay at home to reduce teaching and learning activities on campus. Educators finally attempt to create online learning models that are effective in the learning process.

Based on these conditions, researchers and observers designed learning that could accommodate the Covid 19 pandemic conditions, namely by using an online strategy. Students interact more with cellphones in the learning process because there are students who do not have computers. The design of the learning strategy with the collaborators resulted in the idea of implementing blended learning techniques by utilizing the Learning Management System, which is addressed at www.elearning.upy.ac.id, and class management programs google classroom and google form.

In one to three meeting lectures, researchers have tested various abilities possessed by second-semester students. Based on these observations and tests, two things need to be considered, namely the student creativity. Based on conventional learning, the level of student creativity has been assessed. The criteria obtain creativity for the ability to express ideas in the learning process.

Conventional learning is carried out using presentation techniques. Presentation techniques are carried out, referring to the material that has been given in the module book. Students are free to explore their abilities in making presentation media. Media presentation that has been made is used to analyze student creativity in exploring the media. Based on the assessment results, the pre-research got an average level of student creativity of 59.41.

3.1. Cycle 1

In the research process using Classroom Action Research techniques, four stages need to be passed, namely (1) planning, (2) implementation; (3) observation; and (4) reflection. At the beginning of the study, students were living at home, so that the learning process could not be carried out face to face. The discussion with observers was agreed to use a Learning Management System (e-learning) to carry out learning. The next thought is to try to use android-based applications for learning. This condition because students interact a lot with Android rather than opening material on a computer. The learning system that is most suitable during the corona pandemic is simple learning that is easy
to learn anywhere, also tends to be understood by students. The learning method chosen is mind mapping based on Android.

At the planning stage, the lecturer does e-learning modules for Learning Media subjects. The learning materials are arranged systematically by containing eduction systematics, materials, presentations, discussions, assignments, and learning evaluations.

E-learning helps students to get learning materials and examples of learning evaluation. This condition is made to bridge students who cannot come to campus for the learning process but can see the learning material that has been prepared by the subject lecturer.

Preparation for learning is done by making learning materials that already exist in e-learning using mind mapping. Making mind mapping, which is usually done manually, is currently using a digital process so that students can be comfortable to see and appear professional. The author discovered this learning innovation by combining the mind mapping method with added voice. Voices can be added by utilizing several voice recording applications such as responsive voice. The mind mapping program that has been created to carry out planning in cycle 1 is as follows:

![Fig 1. Mind Mapping Learning Media Material](image1)

In Figure 1, an Android-based mind mapping display is shown in cycle 1. The mind mapping is made digitally, equipped with a sound attached to the written presentation on the mind mapping. After all these preparations have been made, the next step is to create an Android program by combining various learning media. That has been made to be used as an application on Android. The concept of the android application:

![Fig 2. Mind Mapping Program based on Android](image2)

In Figure 2, the initial menu for learning mind mapping based on Android is shown. The initial menu consists of menu cycle 1 and cycle 1. Students can choose by pressing the menu that has been provided. Students have many learning alternatives to enrich their knowledge in this preparation
process, namely by using modules, presentations, mind mapping, and application programs that have all been integrated.

At the implementation stage, the lecturer sends the program to students via E-learning. The program is then downloaded by students and installed on their respective cellphones. Students begin to learn in a structured manner from learning materials, mind mapping equipped with sound.

The observation stage is carried out by monitoring student development in E-learning integrated with the Android program—monitored who has done the assignment and the grades obtained. The observations made can also see all the answers given by students and the percentage of correct answers. Graphics can also be displayed based on the results of student answers.

The answers that have been obtained from students are then tabulated in tabular form. In the process of evaluating the creativity evaluation of student essays, they must be assessed in detail to measure the level of student creativity.

Based on the results of the evaluation of creativity, the resulting student average score is 78.21. In the reflection process, researchers and collaborators discuss various matters relating to the cycle's implementation and results. Based on the discussion results, several recommendations for the use of sound in mind mapping learning need to be replaced because the text images that have been included in mind mapping have no impact on enriching mastery of the material. Mastery of creativity is good but needs to be improved by direct practice using mind mapping. This production needs to be explicitly given in the form of a video, considering that students cannot practice making learning media. The results of the evaluation of creativity did not meet the indicators of research success, so it was continued to cycle 2.

3.2. Cycle 2

The planning stage of the second cycle is based on the evaluation in cycle I. In the reflection stage of cycle 1, observers have been given input about removing voices, replaced with video, and the need for direct practice. Planning cycle 2 is not much different from cycle 1. In material preparation, all modules, presentations have been uploaded on e-learning. Additionally, making a video about the practice material of making media on YouTube, then integrating it into E-learning. The next step is to assign students to read the next material.

At the implementation stage, students are given the task of making a mind mapping based on material about learning media courses. Students collect through E-learning. This assignment is based on practice. The lecturer provides a video to explain to students about making practical assignments that must be done. Students are given one week to make mind mapping media, and it is collected at a predetermined time.

![Fig 3. Mind mapping of students' work in cycle 2](image)

After all, assignments are collected, the lecturer provides an android application that is used to combine learning cycles 1 and 2. This condition is carried out considering that in cycle 2, making mind mapping is left to students. The mind mapping with the best value will be used for making evaluation questions in cycle 2. At this time, the difference is it does not use voice on mind mapping media but is replaced with a video tutorial.
At the observation stage, collaborators monitor the progress of the answers given by students. Two tasks need to be considered, namely the initial task of making mind-mapping; the second task is evaluating learning using google form. The first assignment will be used as an assessment of creativity. Based on the results of the evaluation of creativity, the value was 82.03. In the reflection stage, the researcher and the collaborator discuss several things related to the results and learning process in cycle 2. Based on the results of observation and evaluation, several things can be decided because creativity has reached an indicator of the success of classroom action research so that this research is terminated.

4. Results
Research on student creativity is motivated by the need for soft student skills in addition to cognitive abilities[12]. Student creativity will increase the ability to create something creative to support cognitive abilities in learning. This ability needs to be improved so that students can make something new from the start. Research on student creativity begins by conducting pre-research on student creativity in creating something. The object of student creation is to use the impression creation technique. The results of the acquisition of student creativity scores in the pre-research are 59.41. This value is considered low because students do not know about developing creativity, especially in learning media. The knowledge taught by the high school did not support much in creating creativity in using learning media. Students sometimes hesitate in creating a challenge, and there are conditions that students ignore rules that refer to the creativity of media making. In cycle 1 research, the technique of making instructional media using mind mapping was used. This media is used as a method of implementing creativity, considering that making can be done individually and monitored carefully. In the initial stage, students are presented with mind mapping and analyzing the manufacturing process. This condition can be seen about the ability of student creativity in seeing a learning media. The evaluation results are sent via E-learning with essay questions on various things related to student creativity in analyzing a learning medium. The evaluation results illustrate that in cycle 1 there was an increase in student creativity. The increase that occurred was 18.78 from the pre-study, with a value of 59.41 to 78.21. This condition is influenced by student creativity in the online system. Students are expected to learn independently and complete various things on their own. Students are accustomed to immediately working on assigned assignments. The previous meetings 1 to 3 have been emphasized to explore creativity. This motivational rhythm encourages students to be able to analyze various learning media that require creativity.
In cycle 2 research, the learning strategy was changed to be more active in students. Students make the process of making mind mapping. The best mind mapping will be used for evaluation questions in cycle 2 learning. In cycle 2 the android program is combined between cycle 1 and cycle 2. The level of student creativity is assessed from the results of the mind mapping that has been sent. Based on the results of the evaluation of creativity in cycle 2. It can be compared with cycle 1, as follows from 78.21 to 82.03. These results were assessed from the creativity of mind mapping, so there was an increase of 3.82. A change in learning methods triggered this increase by assigning students to make their mind maps used to study learning materials related to learning media.

| Research Stage | Increased Creativity | Value |
|----------------|----------------------|-------|
| Pre-Research   | 59.41                | 0     |
| Cycle 1        | 78.21                | 18.79 |
| Cycle 2        | 82.03                | 3.82  |

Table 1. Comparison of Student Creativity Levels on Pre-Research, Cycle 1 and Cycle 2

Table 1 describes the difference between the level of pre-research creativity, cycle 1, and cycle 2. Based on the research table from pre-research, cycle 1, and cycle 2, it can be explained that there was an increase from the pre-research with an average value of 59.41 to 78.21 in cycle 1, increasing to 18.79. In the application of cycle 2, there was an increase in creativity to 82.03, so there was an increase of 3.82.

To clarify the increase in student creativity from the initial pre-research, cycle 1 and cycle 2 can be presented in the following graph:

Figure 5 can illustrate that there is an increase in student creativity in the learning process. The increase was seen significantly in the pre-study to cycle 1, while the increase to cycle 2 was not so drastic.

5. Conclusion
Based on the research results, it can be concluded that the use of mind mapping using an Android application has an impact on increasing student creativity. This can be seen from the results of the evaluation of student creativity. The pre-research with an average value of 59.41 to 78.21 in cycle 1, and at 2, the creativity returned to 82.03. A mind mapping program needs to be developed as much
as possible by finding new, more uncomplicated techniques for making mind mapping. Lecturers need to improve their abilities to master many programs that support online learning so that it does not become an obstacle to creating material content and presenting it online.

Implementation of research on the use of mind mapping based on Android. 1. Students can study offline by keeping quotas because this program can be run offline. This program can be developed by integrating an online evaluation. This program can be developed as a learning innovation to increase innovation in e-learning.

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