Application of Online-Based Mind Mapping Model as a Development Economy Learning Media for Economics Students at Regional Campus

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ABSTRACT

Background: *Teaching and learning activities are replaced with online learning. There is monotony in online lectures. As a result, the students have difficulty understanding the materials presented. Also, the students are less creative. These shortages suggest that online learning activities remain far from what is expected, which, in turn, impacts students' learning outcomes, including the pretest and posttest formative evaluations. This study aims to analyze the application of an online-based mind mapping model as a development economics learning medium for students of the Economics Study Program at the Payakumbuh campus.*

Methods: *The type of present research is Classroom Action Research. There are four steps in carrying out classroom action research: Planning, Implementation, Observation, and Reflection. The subjects in this study are the students of the E1 class of the special Economics Study Program with a total of 34 people. The Data analysis techniques performed include (1) student activity observation data and (2) analysis of test data. This study was planned to cover two cycles by examining the improvement of the ability of 3rd-semester students in the Development Economics course by applying the mind mapping method.*

Results: *1). The results of the observation of student learning activities show that the average percentage of 65% in the first cycle, while the second cycle is 78%. This figure shows an increase in student learning activities in the learning process for the Development Economics Course using a mind mapping model; 2). The data obtained from data collection with the pretest learning evaluation test technique for 59% of the students in the first cycle are categorized as complete, while for the posttest, 53% of the students in the first cycle are categorized as having minimum score completeness criteria. While the pretest in the second cycle of 53% is categorized as complete, for the posttest of students in the second cycle, 67% is categorized as complete. This demonstrates an increase of the students learning outcomes in the Development Economics Course by using the mind mapping model.*

Conclusions: *1). The application of the mind mapping model to improve student learning outcomes for class E1 in the Development Economics Course at the Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus, has improved our students' learning outcomes. The observation of students' learning activities in the first cycle reached 65%, and it increased significantly in the second cycle to 78%; 2). The results of the student learning evaluation seen from the posttest score with the percentage of the first cycle score of 53% can be categorized as having the minimum completeness criteria value. This value increases significantly in the second cycle, namely 67% with the minimum completeness category.*

Keywords: *mind mapping model, creativity, learning outcomes*

1. INTRODUCTION

The quality of education is closely related to the quality of learning. Learning activities are a form of implementation of education. Learning can also be interpreted as a process of implementing a particular curriculum in a determined educational institution. Utilizing learning resources in the surrounding environment has great benefits, especially in enriching student learning experiences to increase their learning outcomes.[1]

The Covid-19 virus outbreak has hit almost all countries in the world. The outbreak forces us to make a lot of adjustments in life. Many policies have been put in place to prevent the spread of the virus from spreading, ranging from work from home to large-scale social restrictions.

Amid a pandemic, to prevent the spread of the virus from spreading, many universities have decided to stop teaching and learning activities in the classroom and replace it with online learning. Through the Ministry of Education and Culture and the Indonesian Ministry of Religion, the Indonesian government has set a policy of studying and working from home starting from mid-March 2020. However, due to time urgency and lack of preparation, many teachers are still confused about changing the material usually taught in classrooms into becoming an online class.

During the Covid-19 pandemic, lectures must continue to be carried out by way of study from home by utilizing information and communication technology learning / online learning. Sadikin et al. [2] explained that the application of online learning help prevent the transmission of Covid-19 on campus and can also make it easier for students to attend lectures during the Covid-19 pandemic.

Based on observations in the implementation of online learning, there are still the following problems:
1. Students look bored with very monotonous online lectures;
2. Students have difficulty in understanding the material presented by the lecturer in charge of the course;
3. Students are less creative in attending lectures, so that online learning activities are very far from what is expected;
4. Students learning outcomes in the cognitive domain in the Development Economics Course, which are given in the form of pretest (beginning of learning) and posttest (end of learning) formative evaluations, are still categorized as far from the expected criteria, from 66 students it can be seen that the average test score obtained is 64.6 means that 30% of students get a B-, 23% a B, and some even get a D of 9% in their online learning outcomes.

Here's picture 1 of the distribution of student test scores for the class of 2020 in the Development Economics Course.
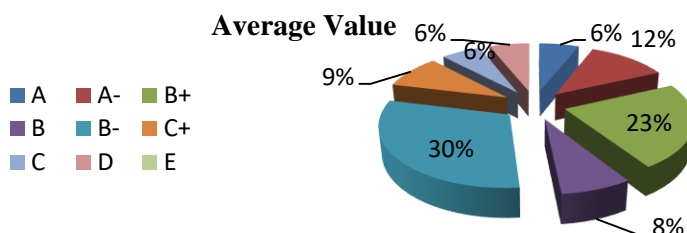
Source: primary data 2021

Figure 1
Student Score Results

In order for students' cognitive learning outcomes to increase, efforts that can be made by lecturers carrying the courses are to apply an online-based mind mapping learning model as a learning medium in the Development Economics Course for students of the Payakumbuh campus Economics Study Program during the Covid 19 Pandemic.

Making mind maps can help students in planning/designing the problem-solving process. With the creation of mind mapping, students have directed steps to solve problems so that in solving problems later, students are familiar with the flow depicted in the mind mapping that has been designed.

The purpose of this study is to analyze the application of an online-based mind mapping model as a development economics learning medium for students of the Payakumbuh campus economics study program.

The benefits that can be obtained in this research are as a reference or reference for educators to improve student learning outcomes that are less than satisfactory and provide an interesting atmosphere amid teaching and learning activities to students during the covid 19 pandemic.

The learning method is the method used by educators in establishing relationships with students/students during learning.[3] In the learning method, there is a model that will be applied in it. Suprihatiningrum[4] states that the learning model is a conceptual framework that describes learning procedures systematically to manage student learning experiences so that certain desired learning goals can be achieved. Meanwhile, according to Trianto[5], the learning model is a plan or pattern used as a guide in carrying out learning in class or in tutorials.

The mind mapping learning model is a learning model that can develop creativity, activity, memorization, knowledge, and independence of students in achieving learning goals. According to Aris Shoimin[6], "Mind Mapping is a technique of utilizing the whole brain by using visual images and other graphic infrastructure to form an impression." Meanwhile, according to Michalko in Tony Buzan[7], "Mind Map is an alternative thinking of the whole brain to linear thinking, mind maps reach in all directions and capture various thoughts from all angles."

According to Komar and Supriyono[8,] mind mapping can be used as a tool in the learning process to increase interest, understanding of learning concepts, and student achievement.

Darmuki et al.[9] explain that the mind mapping model can arouse student interest in learning to make students interested and enthusiastic in lectures. Mind mapping that has been prepared is presented in front of the class to direct students to the material being studied and identify information that is not relevant to the material. The outline of the material contained in mind mapping is learned through discussion in learning[10].

According to Zein[11], to create a mind mapping, the steps consist of:
1) Starting from the middle of a blank paper that is placed in an elongated position by writing down the central topic, usually the chapter title, and try to take the form of an image,
2) Make the main basic idea/Basic Ordering Ideas-BOIs, usually, the sub-chapter titles made using SWH (what, why, where, when, and how),
3) Complete each BOI with branches containing supporting data

4) Connect the branches of the second and third tiers of the first and second tiers, and so on,
5) Use color on the whole mind map,
6) Make the mind map branches form an arc/curvy, not a straight line,
7) Use one keyword per line, and
8) Complete each branch with symbols, pictures, code lists, or graphics.

The benefits of mind mapping, according to Siregar[12] are, accelerating learning, making it easier to see the relationship between different topics, helping brainstorming so ideas flow easily, seeing the big picture, making it easier to remember, and simplifying the structure.

According to Fatmawati[13], with the application of mind mapping, students are able to express their creative ideas, which consist of: fluency in thinking and creating many ideas, creating new ideas that are different or seen from another point of view, as well as creating unusual types/never existed before.

The steps for implementing the mind mapping model in learning according to DePorter[14] are as follows:
1) Ambak strength; the lecturer provides information about the benefits that will be obtained after studying the material,
2) Structuring the learning environment; the learning environment is made to be comfortable so that it can relax the mind and can provide enthusiasm for learning,
3) Cultivating a winning attitude; praise is given to students who have completed assignments well and is encouraged to students who have not completed assignments well.
4) Free the learning style; the students are given the freedom to determine the learning style they want,
5) Get used to taking notes; students summarize the material given by the lecturer,
6) Get used to reading, students confirm and repeat the material that has been delivered,
7) Make students more creative; students are given the opportunity to solve problems according to what they have understood and are given questions that must be solved in a relay,
8) To train memory power, students are given questions in stages in order to train their memory, and
9) Celebrate; lecturers give awards to students.

The mind mapping model is considered suitable to be used in order to improve student cognitive learning outcomes. With mind mapping, it is hoped that students will no longer have difficulty understanding, mastering, and understanding the lecture material being studied.[15] Ferwati[16] explains that classes that use the mind mapping model have better learning outcomes than conventional classes. This claim is also supported by Monariska[17] classes that receive learning using the mind mapping model have better conceptual understanding abilities compared to students who acquire learning through conventional methods. According to Hatchi and Sari[18,] the application of the mind mapping model can also increase student learning activities with an average cycle ending of 81.82%. Through the use of mind mapping models assisted by e-learning, student learning outcomes have increased, seen from the average value of student cognition in the last cycle reaching 86.[19]. A similar study conducted by Misidawati[20] found that the mind mapping model can improve learning outcomes for 44 students, with completeness in cycle two reaching 88%.

2.   METHODS
Research Settings
The work procedure in action research has stages that must be carried out in a cycle. This research was conducted using a classroom action research design

in which, from one cycle to the next, there must be differences in the actions taken. This research is carried out in collaboration by involving lecturers/researchers in the field of study to conduct research. The role of the lecturer/researcher in the field of study in this PTK acts as a teacher, while two colleagues assist the researcher as observers. The activities observed include student learning activities and improving student learning outcomes as the main variables in this study.

Activities carried out in each cycle include planning, action, observation, and reflection. The work procedure, in general, can be explained by a general description of classroom action research.[21]

A pretest was carried out before the action in each cycle to determine the student's initial abilities. Meanwhile, at the end of the action, a posttest was conducted to determine student learning outcomes. This study observes two things, namely improving learning outcomes and technical implementation of learning through mind mapping models that can improve student learning outcomes.

The population in this study were students who took the Development Economics Course at the Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh Campus, class of 2020, semester 3 (three) in the odd semester of 2021/2022. So the subjects in this study are students of the E1 class of the special Economics Study Program, totaling 34 people. The researcher only took the E1 class as the research subject because, in that class, many student scores were not in line with expectations in learning the Development Economics Course.

The type of research used is Classroom Action Research. Classroom action research is research conducted in the classroom to improve the quality of the teaching and learning process to obtain better results than before.

Broadly speaking, there are four steps in carrying out classroom action research, namely:1). Planning 2). Implementation 3). Observation 4). Reflection.

The data sources in this study were third-semester students who took part in the teaching and learning process for the E1 class of the Development Economics Course. There are two kinds of data in this study, namely qualitative data and quantitative data. Qualitative data is student activity during the learning process. Quantitative data are learning outcomes with a mind mapping model.

Data collection technique
a. Observation
In this observation, the researcher used the type of participatory observation and class activities. In participatory observation, the researcher is directly involved in a participatory and active way in the activities of the subject under study who directs the event so that an event is directed according to the researcher's scenario as well as a facilitator who directs the students being studied to carry out actions that lead to the data, while in the observation of class activities, that is, the researcher pays attention to the positive behavior of students directly during the teaching and learning process.
b. Measurement of learning outcomes test
The learning outcomes test is to determine the ability of students to understand the material presented and determine whether there is an increase in student learning outcomes after applying the mind mapping model in the Development Economics Course. The data obtained by researchers to measure the increase in student learning outcomes by comparing the results of the pretest evaluation with the posttest.

Data analysis

The data analysis techniques carried out are as follows:

1.Student activity observation data

2.Analysis of test data

Completeness of learning outcomes is determined based on the criteria of completeness with a minimum score of 65. If a student gets a score below less than 65, it is categorized as incomplete, and a student who scores more than or equal to 65 is said to be a completed student.

As for the success of the class, it can be seen from the number of students who can complete or achieve at least 65 of the number of students in the class.

In this study, we designed two cycles by examining the improvement of the ability of 3rd-semester students in the Development Economics course by applying the mind mapping method. This learning is considered if:

1.Through observation, students show high enthusiasm for learning and achievement indicators reach 70% or more;

2.Indicators of student success in improving learning outcomes through the mind mapping method are said to be complete if students can obtain scores set in the Minimum Completeness Criteria, namely a score of 65.

Smaldino et al.[22] the achievement of the action hypothesis is determined based on the established success indicators. The success indicators are:

1. Student learning outcomes in a class average of at least 65;

2. Students are said to have good learning activities if the achievement indicator reaches 70%;

3. Students are expected to be able to re-explain the material taught using the mind mapping method;

4. Student activities in the course of Development Economics using the mind mapping method are characterized by minimal student activity both in observation.

**The theoretical framework of the research:**
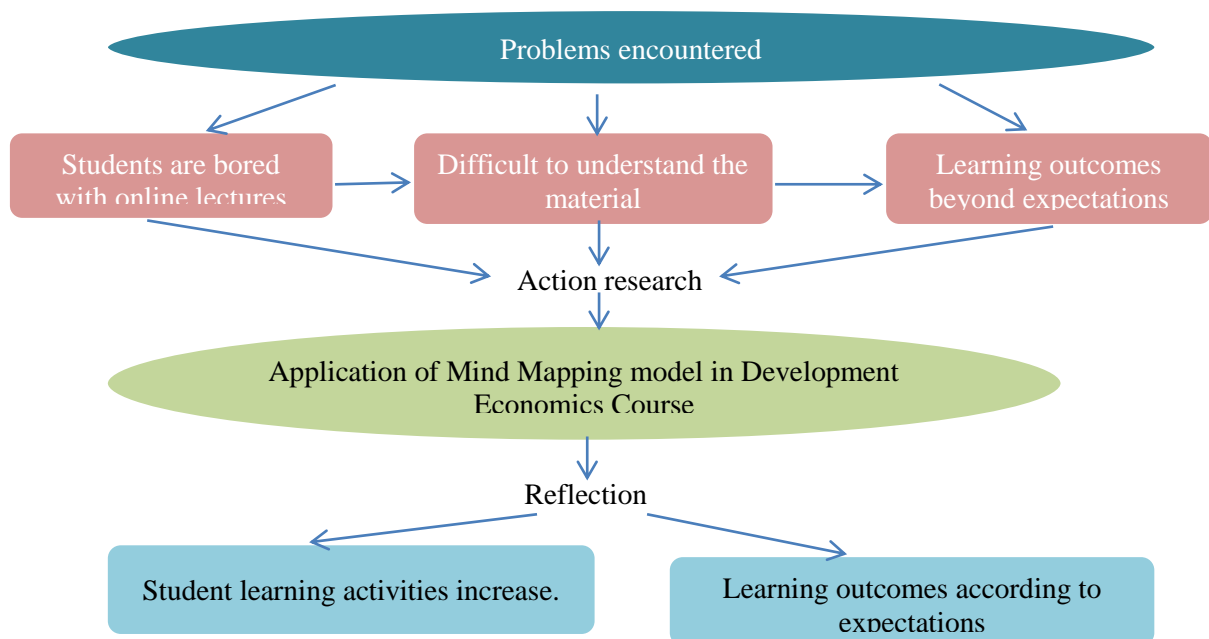
Figure 2
conceptual framework

As for the action hypothesis in this study, applying online-based mind mapping methods as a learning medium for development economics can improve student learning outcomes of the Payakumbuh campus economics study program.

3. RESULTS AND DISCUSSION

Initial conditions for student pretest and posttest scores were carried out using Google Classroom in the E1 class Development Economics Course on the Theory of Development Adam Smith and John Stuart Mill on September 20, 2021.
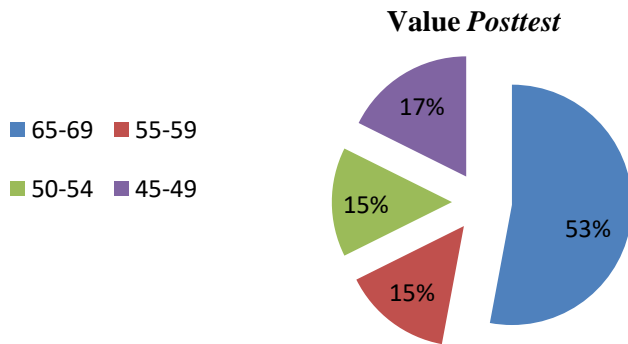
Value *Pretest*
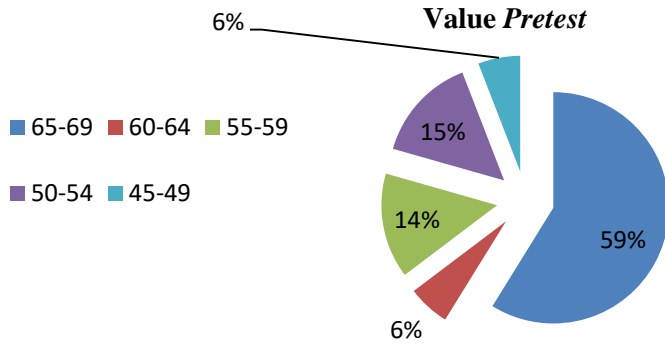
Source: primary data 2021

Figure 3
Pretest Score

The picture above explains that students who can be categorized as complete in the pretest in the Development Theory of Adam Smith and John Stuart Mill in the Development Economics Course are only 59% of the total number of E1 class students. This means that from the total number of students in class E1, many have not obtained the threshold value of completeness. This failure is because students do not understand the material well, and there is a tendency to be lazy in opening lecture material, which will be discussed at the next meeting.

Value *Posttest*

Source: primary data 2021

Figure 4
Posttest Score

The picture above explains that the posttest scores of students in the Development Theory of Adam Smith and John Stuart Mill in the Development Economics Course, which are categorized as complete, are only 53% of the total number of E1 class students who attend lectures. This means that there are still

many students who have not obtained scores on the threshold of completeness. This is due to monotonous learning activities, so that student activities in learning do not have enthusiasm in understanding the material. Moreover, the material in the Development Economics course completely contains theory, so that critical thinking and seriousness in analyzing it are needed.

From the daily results, students had the researchers/lecturers who are influential in the subject conduct classroom action research in class E1 to improve student learning outcomes by applying learning through an online-based mind mapping model as a medium for learning development economics.

This research was conducted from September 20, 2021, until September 27, 2021. This research was carried out in two cycles where each cycle wass carried out in two meetings: one meeting for giving action and another meeting for student learning outcomes. The learning actions carried out in each cycle are adjusted to the lesson plan. The implementation of the Development Economics course by learning the mind mapping model in class E1 of the Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus, with 34 students consisting of 28 female students and six male students. The implementation of this classroom action research went through four stages, namely the planning stage, the implementation stage, the observation stage, and the reflection stage. After going through these stages, data related to the research objectives were obtained.

1. Cycle I

Cycle one is carried out for one learning meeting starting on September 20, 2021.

a. Planning stage

At this stage, the researcher prepares a design that will be carried out for next week, namely preparing a learning implementation plan with David Ricardo and Thomas Robert Malthus Development Theory, compiling teaching materials, observation sheets on the implementation of the student learning process through the zoom application platform to accommodate students presenting the results of their creativity in writing. The students applied the making mind maps and explanations in front of their classmates as well as documenting activities during the research.

b. Implementation Stage

At this stage, the researchers formed groups of students to design mind mapping according to the topics to be discussed at each meeting that will begin next week, and the researchers also explained that each group member must have a responsibility in working on the mind mapping model. Assignments are sent through the i-learn of the Faculty of Economics, which will be assessed after the meeting is completed. Then the lecturer explained a little about the material to be discussed for the next meeting, namely the subject of "Development Theory of David Ricardo and Thomas Robert Malthus" so that there is an overview of the mind mapping process and there are materials for the preparation of the pretest next week.

c. Observation Stage

As shown in Figures 3 and 4, it can be seen that student activity in the learning process for the Development Economics Course is not optimal, namely both from the results of the evaluation of the pretest with an average of 59% while the posttest with an average of 53%, this means that the grade E1 student scores in the Development Economics Course, it is still below the minimum criteria of 65.

d. Reflection stage

The reflection stage is carried out after passing the action implementation stage and the observation stage. Reflection activities are intended to determine success or not, besides that the results of reflection activities can be used as a reference for

researchers in designing action plans in the next cycle to improve student learning outcomes that are expected

2. Cycle 2

Cycle two is carried out for one learning meeting starting on September 27, 2021, during session 2 or, to be precise, at 10.15 WIB.

a. Planning Stage

At this stage, the researcher prepares a design that will be implemented, namely preparing a learning implementation plan for the David Ricardo and Thomas Robert Malthus Development Theory material which will use learning media with an online-based mind mapping model, compiling teaching charts, compiling and preparing observation sheets for the implementation of the learning process and prepare test questions for final learning outcomes for cycle 2 and prepare documentation of activities during the research.

Value *Pretest*
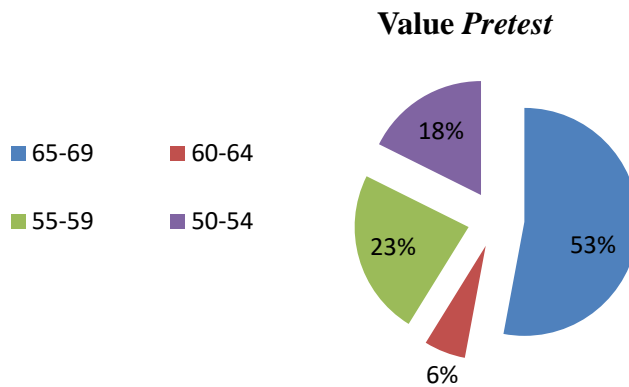
Source: primary data 2021

Figure 5
Pretest Score

The figure above explains that students who got 53% of the total number of E1 class students were categorized as complete in the pretest, conducted on the Google classroom platform with David Ricardo and Thomas Robert Malthus Development Theory for Development Economics subject. This means that from the total number of students in class E1, there are still many who have not obtained the threshold value of completeness. This is because the material is not well understood by students, and there is no enthusiasm in discussing the next material at home, which will be studied during the meeting.

b. Implementation Stage

At this stage, the researcher instructs students to present their work in designing mind mapping with the topic of David Ricardo and Thomas Robert Malthus Development Theory, according to last week's instructions in group formation and the material to be discussed. Student presentations are carried out using the zoom platform.

The following are the stages of implementing the learning activities for the Development Economics Course:

1) Initial activities

The initial activity of the lecturer/researcher was greetings and collective praying, led by the class committee. Then the lecturer conveys the competency standards and learning objectives to be achieved. Furthermore, the lecturer gave motivation about the goals and benefits of studying the Development Theory of David Ricardo and Thomas Robert Malthus.

2) Core activities

The lecturer invited the group determined last week to present the results of the

discussion using mind mapping learning media.
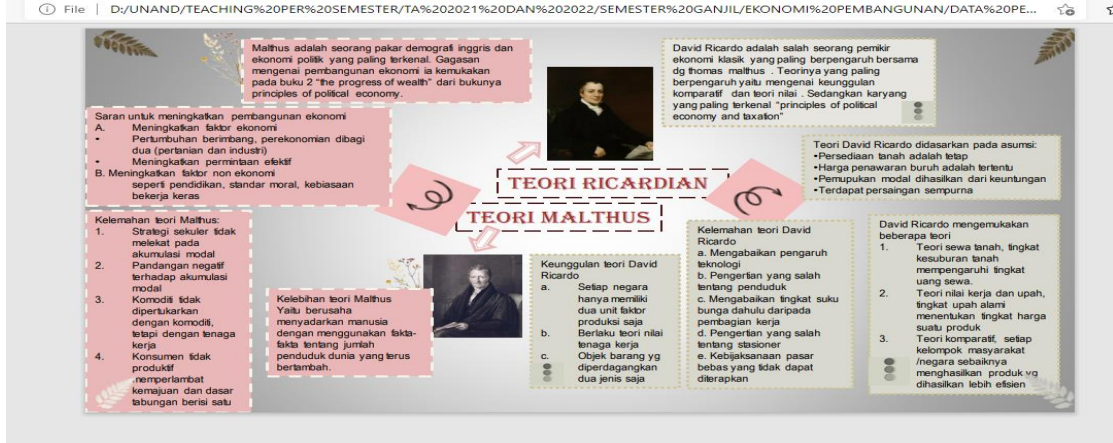
Source: primary data 2021

Figure 6
Mind mapping theory of Development Theory of David Ricardo and Thomas Robert Malthus

And then, the other groups were given the opportunity to refute or add opinions from the presenting group through the Whatshap group platform.

3) Final activity
Students and lecturers conclude the current learning. During the activity, students were enthusiastic about analyzing the mind mapping that had been made. Therefore, there was less time for discussion due to learning activities even though lectures were online.

After concluding the lesson, the lecturer provides a posttest evaluation of the learning outcomes that have been completed.
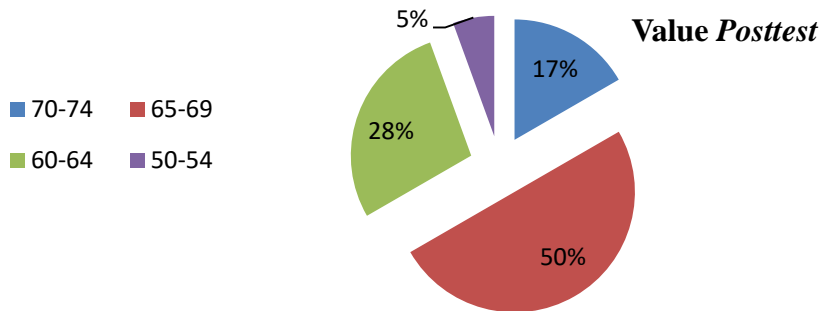
Source: primary data 2021

Figure 7
Posttest Score

The picture above explains that the posttest scores of students in the Development Theory of David Ricardo and Thomas Robert Malthus in the Development Economics Course who have used learning media with the mind mapping model as many as 33% of students are categorized as still below the posttest completeness threshold while 67% are categorized as complete. This means that there is a change in the percentage of students' mastery scores when evaluated with different learning strategies. Learning activities are no longer monotonous so that student activities in learning provoke enthusiasm in understanding the material when using the mind mapping model. The existence of colors in mind mapping makes previously boring learning become engaging and can explore student

creativity in designing skills and group cohesiveness in compiling materials in mind mapping.

c. Observation Stage

Achievement indicators can be seen in the following table:

Table 1
The results of observing the learning activities of class E1 students after using the mind mapping model

No	Indicators or aspects observed	Skor	Average (%)
1	Students open the lesson with a prayer	4	100
2	Students pay attention to the lecturer's explanation of the David Ricardo and Thomas Robert Malthus Development Theory learning materials	3	75
3	Students respond to questions or instructions given by the lecturer	3	75
4	Students actively participate when online class discussions are taking place	3	75
5	Students are allowed to ask questions that are not understood	2	50
6	Students and teachers draw conclusions for today's lesson	3	75
	Total	**18**	**450**
	Average (%)	**3%**	**75%**
	Overall average (%)	**78%**	

In the table above, it can be seen that the achievement indicator is above 70%. This means that it is known that student activities in the learning process of David Ricardo and Thomas Robert Malthus' Development Theory with online-based mind mapping models as learning media have increased. Students are more enthusiastic in participating in learning activities because students work together with their respective groups to solve problems, and almost all students are actively involved in the learning process because they feel motivated and challenged to solve questions from peers regarding the material contained in the mind mapping.

d. Reflection Stage

Reflection activities are intended to determine whether the actions taken in cycle 2 have reached the indicators obtained, indicating an improvement and an increase in results in cycle 2. This can be seen from an increase in student learning activities and student learning outcomes on evaluation tests/student learning outcomes in cycle II which have reached the predetermined success indicators.

Based on the results of these reflections, the research in cycle II is said to have been successful because it has met the indicators of the success of the actions that have been set, namely an increase in student learning activities and an increase in student learning outcomes into the good category, which is 78%, the giving of action in this research ends in cycle II. . And it can be applied to the next material in the Development Economics Course.

From the results of data analysis, information was obtained that in the implementation of the first cycle from the results of observations made during the learning process showed learning activities and student learning outcomes were not optimal. However, there was an increase in learning activities and student learning

outcomes after improvements were made in cycle II. The data obtained are as follows:

1. Observation sheet

The observation sheet is used as a guide for observers/researchers to observe ongoing student learning activities. The results obtained are used as material for reflection on the action research carried out and as a reference for making improvements in the next cycle. The results of the observations obtained in this study are as follows:

student learning activities
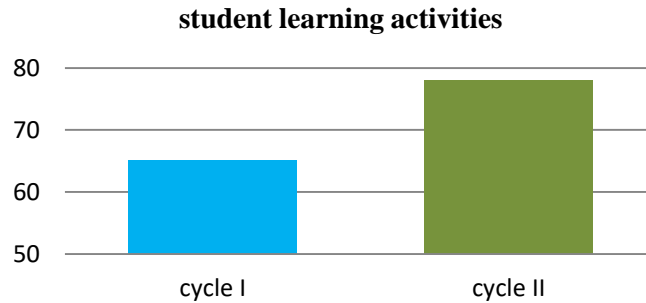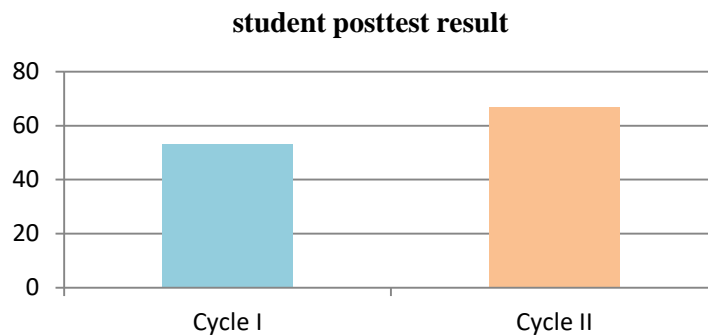

Source: primary data 2021

Figure 8
Student learning activities for Development Economics Course

Based on the picture above, there was an increase in student learning activities from cycle I to cycle II. This result shows that learning Development Economics Course using a mind mapping model can increase the learning activities of E1 class students of Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus during the learning process.

2. Learning Outcomes

Student learning evaluation tests used were pretest and posttest, namely tests carried out at the beginning of learning and at the end of learning. This test aims to measure the increase in learning outcomes in each material discussed at the meeting. The student learning outcomes in each final test (posttest) of the cycle can be seen in the following figure:

student posttest result

Source: secondary data 2021

Figure 9
The results of the posttest scores of students in the Development Economics Course

The picture above shows an increase in student learning outcomes from cycle I to cycle II with 67%. The increase in the results of this evaluation indicates the achievement of indicators of success.

This research is a classroom action research to improve student learning outcomes by using an online-based mind mapping model as a learning medium by applying mind mapping learning. This can be seen from the increase in student learning activities and student learning outcomes/test evaluations because, in the learning process using mind mapping, students are actively involved in learning. This result is proven based on the results of observations of student learning activities carried out in Cycle I as much as 65%, and in Cycle 2 it increased to 78% in line with the increase in student learning activities, an increase also occurred in the evaluation test of student learning outcomes. Based on the results of the assessment test for improving student learning outcomes in class E1 of the Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus, in the first cycle, a percentage of 53% was obtained, which could be categorized as having the minimum completeness criteria value and experienced a significant increase in the second cycle, namely 67% with the minimum completeness category.

Based on the analysis of the test cycle I and cycle II, the learning outcomes of E1 class students of Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus have increased in each indicator. So it can be concluded that applying an online-based mind mapping model as a learning medium can improve learning outcomes for development economics courses.

4. CONCLUSION

Based on the analysis of the results of classroom action research, the following conclusions can be drawn:

1. The application of the mind mapping model to improve student learning outcomes for class E1 in the Development Economics Course at the Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus, has improved student learning outcomes. The observation of student learning activities in the first cycle obtained a percentage of 65% and experienced a significant increase in the second cycle to 78%.

2. The results of the student learning evaluation seen from the posttest score with the percentage of the first cycle score of 53%, which can be categorized as having the minimum completeness criteria value and experiencing a significant increase in the second cycle, namely 67% with the minimum completeness category.

5. RECOMMENDATION

Based on the results of the study, the researcher recommends the following suggestions:

1. Learning through the mind mapping model applied to E1 class students of Economics Study Program, Faculty of Economics, Andalas University, Payakumbuh campus can improve student learning outcomes so that it can be used as an alternative in learning Development Economics Courses.

2. The mind mapping model can be applied to courses that focus on the amount of material/theory to be applied as an alternative solution to creating active learning activities.

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