

GEOGRAPHY TEACHERS PERCEPTION ON THE IMPLEMENTATION OF MIND MAP ON SCIENTIFIC APPROACH

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Abstract— One of the learning components as a determinant of the learning success is learning the model. In fact, the components of learning can work effectively if a teacher has competences in applying the learning model that would fit into a learning. Therefore, this study aims to unravel geography teachers perception on the implementation of the mind map on a scientific approach. This study employed a qualitative research involving five geography teachers. The data was collected using a structured interview. It was then analyzed by reducing the data, coding, tabulating, displaying, and drawing conclusions. The results showed that there are problems in implementation mind map in the scientific approach. Teachers have difficulty in applying mind map on a scientific approach so that mind map is abandoned. It is caused by intrinsic and extrinsic factors. The intrinsic factor is teachers are less aware of the implementation and function of the mind map. Furthermore, the extrinsic factor is caused by the strict supervision department against the selection of learning models. This problem has an impact on a limited choice of learning models including the mind map with a scientific approach.

Keywords—*Learning Model, Mind Map, Scientific Approach, Geography Learning*

I. INTRODUCTION (HEADING 1)

Scientific approach transforms traditional learning into 21st-century learning. The scientific approach learning activities steps are namely observing, formulating questions, gathering information, associating, and drawing conclusions [1]. The process of learning activities using this scientific approach requires students' activities [2]. The students' activities encourage students to have curiosity, creativity enhancement, and ability to integrate communication [3]. These abilities can be enhanced through the aforementioned learning activities and freedom of student appreciation through oral or written forms [4], [5]. In other words, the activities steps in the scientific approach shift the traditional teacher with a teacher-centered learning paradigm into a student-centered learning.

The scientific approach itself can work on many subjects for instance geography learning by improving the quality of the learning. These improvements include improving teacher's abilities, providing knowledge and skills, facilities, libraries, management, and guarantee system of geography learning [6]–[8]. Initial efforts undertook one of them is improving the quality of geography teachers, especially the quality of learning implementation.

Geography teachers should implement the scientific approach in every learning activity. This includes the demand for 21st-century learning. Scientific-based learning is a challenge for teachers [8]. These challenges include the ability of the teacher in making learning innovation [4], [5], [7]. Learning innovation is concerned with teachers' efforts to improve the learning quality [2], [9]. One example to improve classroom learning component is the development of teachers competence, materials, assessment, media, and learning model [4], [10], [11].

Learning development is important to overcome the obstacles students to learn geography. These constraints are caused by widely geographical content. Geography learning contains studies about the natural and human environment [12]–[14], [5]. This makes students have a negative perception about learning geography, especially to memorize the geography content [15], [16] so that they feel less interested in studying geography [17]. Human and environmental studies need to be related to actual environmental conditions [18]. Therefore, it is necessary to develop the learning that makes students are able to interpret every learning activity.

One of the learning development steps is selecting the right learning model. Among many learning models, the mind map learning model is one of them. Mindmap is known since the 3rd century AD by Porphyry Tyros. Furthermore, mind map was adopted by Ramon Llull and Leonardo da Vinci in Early 1960s. It was introduced by Dr. Collins and grew rapidly at the end of 1960. At the time, the

mind map was introduced by Tony Buzan [11], [19]. Since 1960, mind map was developed in the educational activity.

Implementing a mind map on education gives many advantages. In geography learning, a mind map can help students collect geography content. It is very helpful to memorize a separated concept. This means that students can be facilitated in the process of connecting the knowledge and experience that they have acquired with new knowledge in a more structured manner. Mindmap captures concepts, writes keywords, and connects with each other; thus, it forms new knowledge [19], [20]. Most ideas that still fragmented are due to problem scope. Mindmap incorporates fragmented ideas in students mind becoming more organized ideas in writing activities [21]. In addition, students will understand each topic easily.

The implementation of the mind map itself aims to increase students' learning effectiveness. The learning effectiveness was done through the use of pictures and words [22], [19], [23]. Learning by using mind map can stimulate the left and right brain functions, focus on the subject, join separated information relationships, provide a clear picture of whole material, make a meaningful learning, and help students to group and increase short-term to long-term memories [11], [19], [24]–[26]. Therefore, a mind map is important to be implemented in geography teaching and learning with a comprehensive study material object.

The implementation of a mind map can also improve the ability to read information during the learning activities. Students ability to read some information becomes more focus and has a systematic sequence [27], [28], [23], [29], [30]. The random basic idea can be organized through using a mind map.

A mind map can improve students' ability to remember the information. The process of remembering the information can be obtained if students' make their own mind map [30]. Students' own mind map will make them easier to learn a topic. Overall, students can develop knowledge through information obtained.

Mindmap is suitable for improving students' cognitive abilities. Students' cognitive abilities in many disciplines are such as language, biology, technology, business economics, social and writing skills become more effective by using mind map [31], [32], [20], [33], [34], [21]. Improving learning outcomes can also be seen in geography learning outcomes of using mind map [35]–[37]. Students learning outcomes can be improved through the use of a mind map as a tool effectively.

The tool is used as an organized note with the idea. The use of a mind map as a tool becomes an effective method of recording [24], [38]. Separate records will find relevance through interconnected branches of the mind map [21]. This will facilitate students when they want to find important notes of supporting answers by looking at the main point of mind maps' branch.

In addition, mind map provides convenience in summarizing the material, so the idea of each subject easily remembered. Mindmap is also used as a tool to remember

fact and more detailed information [39], [40]. However, the problem of remembering belongs to a low-level cognitive ability, so it does not answer the demands of scientific based learning outcome.

The learning demands of scientific based learning accentuate students' analytical abilities. This is necessary for 21st-century learning. Analytical students' thinking process can be obtained through the growth of students' activities in learning interpreting. This is different from the ability to record the books' content [41]. Therefore, remembering process cannot answer the ability that must be possessed in the 21st-century learning

Some researchers have conducted research on the mind map. The results show that the mind map can improve learning effectiveness. This can be seen from the brain thinking ability, reading effectiveness, communication, information, and generating ideas since mind map applied to learn activity [22], [19], [20], [28], [23], [30]. This increased learning effectiveness can be seen from the increase in students' cognitive value. Students who studied geography by using a mind map can improve students' cognitive abilities [35]–[37]. In addition, a mind map can improve students' writing skills [21], [31]. However, some research studies still also revealed weaknesses in mind map implementation.

Mindmap is still used as a smart method for remembering ideas. This reduces students' ability to analyze [41]. Another weakness of the mind map is the lack of the development of critical thinking ability [39], [40]. This is because the mind map implementation is solely used to the low-level cognitive ability.

The results of the research studies conducted on the mind map emphasized the need for more in-depth research to reveal mind map implementation on learning activities. All research studies have revealed the implementation, advantages, and disadvantages of learning with a mind map. However, the difference of this study with the previous research studies conducted by [39], [35]–[37], [40] is that this study reveals the geography teachers perception on the implementation of a mind map with a scientific approach.

II. RESEARCH METHOD

A. *Research Subjects*

This study employed a qualitative research. The subjects as the source of information of this study were five high school geography teachers in Malang. The main purpose of the interview is to answer the focus of the study including the application of the mind map on a scientific approach. Furthermore, as a follow up of a research focus, questions related to the expectations of teachers in learning to use the model of the mind map with a scientific approach to the subjects of geography were given.

B. *Data Collection*

The data of this study was collected using a structured interview. It answered the research questions related to the geography teachers perception on the implementation of the

mind map. The data was collected based on the need to achieve the research objectives (see table 1).

TABLE I. DATA COLLECTION TECHNIQUES

No.	Data Collected	Data Collection Techniques
1.	Implementation of mind map data in the scientific approach	Interview
2.	Teacher expectations data on learning using mind map with a scientific approach to the geography learning	Interview

The data was collected using a structured interview. The interview is part of a qualitative research approach [42]. The core of the in-depth interview study aims to determine the model of the mind map on a scientific approach in the classroom. The interview was held in April 2017. The guidelines of the structured interview are shown in Table 2.

TABLE II. STRUCTURED INTERVIEW GUIDELINES

No.	Questions
1.	Do you know the mind map learning model?
2.	How do you apply the scientific approach to geography learning? are there any difficulties?
3.	What are the difficulties often encountered in the application of scientific approaches to geography learning?
4.	Whether the mind map learning model can be applied to geography learning especially on the scientific approach?
5.	Is the mind map learning model still used by teachers in geography learning?
6.	What are the advantages and disadvantages of the mind map learning model?
7.	What is the teacher's expectations for application of mind map learning model on scientific approach?

C. Data Analysis

The data obtained from the results of the structured interview was then analyzed. The data was described as the results of the study. It was described in words, not in the forms of numbers [43], [42]. All the data was processed to the data reduction. In this step, the data were edited, coded, and tabulated. All of the subject's responses given on the interview were recorded. They are then coded and tabulated. Then, all of the data was displayed and verified. Finally, conclusions were drawn based on the available data and supporting data of this study.

III. RESULTS

The results of the structured interview to explore the knowledge of teachers to the model of the mind map show that the teachers already know mind map. This knowledge is then applied to the learning activities using simple facilities. The excerpts of the interview are as follows:

"Yes, I often assign children to create a mind map of simple tools that they can buy" – Subject 1.

"Yes, I know the mind map. The model is good to make children more creative" – Subject 2

"... if the mind map it, good yes .. I ever use that model .." - Subject 3.

Furthermore, the follow-up question is to know the implementation of the scientific approach. Based on the results of the interview, the scientific approach has been applied to all high schools in Malang since the beginning of the new curriculum. Malang becomes a pilot project setting for the implementation of the curriculum since the beginning of 2017.

"Already, .. in Malang, this happened to be prioritized early start has been scientific, elsewhere might not have been, we have when there first and has been used scientific .." - Subject 2.

".... in fact we have already implemented the 5M scientific approach and we associate the learning material according to the recommendations of duty" – Subject 3.

"We connect syntax learning model with scientific activities. For example syntax preliminary observes, we connect with 5M observed. The syntax of this example is in the syntax associate, later adapted, and so on .." - Subject 4.

Since the scientific approach is applied in all high schools in Malang, teachers had difficulty at first to understand the purpose of the scientific study. Teachers taught themselves to examine the meaning of scientific learning and scientific approach steps in the learning activities. In addition, teachers also take advantage of a good teacher discussion forum through face to face and Whatsapp group to share information related to the scientific approach. This is expressed by some teachers as follows.

Since the scientific approach shall be applied to all subjects including geography, the model of the mind map has many disadvantages and difficulties to meet the scientific activities of students. The findings are expressed on the following excerpts:

"The issue, yes sometimes we did not get ya difficulty to observe..observe for examples videos, view pictures, but for example, directly to other activities itu..what is it.. like...equation is all so lo, it can not be given the limited first scientific step for example..sooo..we just mix all .." - Subject 2.

"Actually right yes indeed we have done, Just yes ... not as detailed as intended". – Subject 4.

"So far we are so promiscuous models such as determining what is suitable material yaa..that model of what normally." - Subject 5.

In addition, the geography teachers are suggested to apply the scientific approach to any learning activity and demanded to use scientific learning model. In the curriculum, there are four scientific based learning models implemented in the classroom. Such models include discovery, inquiry, problem-based learning, and project-based learning. The findings are seen as follows.

"Mind map already reduced its use in my class, because it is a model which is recommended only

four models. Since then, all RPP is written using four models of recommendations. – Subject 2.

"..furthermore, must use scientific models, we are still using a model other than the four that, adjusted by the material. – Subject 1.

As the impact of the government policy, the geography teachers in Malang are advised to use the four recommended learning models. However, geography teachers feel their creativity is limited by the application of the four models suggested.

In mind map, teachers thought mind map is as a tool for learning. This tool is not used as the learning model that includes apperception until the conclusion drawing. However, it is used in early learning and as a concept map that serves to illustrate to students the material to be studied. The findings phrased as follows:

"Mind map is still used ... especially in the tenth grade is a lot of material .. so required a mind map to provide an overview to the students." – Subject 1.

"The subject matter that much usually helped with a mind map, with students using it, he will make a summary of its activities was reading through the material." – Subject 5.

In a geography lesson, using a model mind map is considered inhibiting good communication skills. Students just focused on making notes on what they read. Mind map is only considered as a summary, so it makes students have fewer communication skills ability. In addition, according to the results of the interview conducted, a mind map is less able to answer the challenge of scientific based learning subjects, especially geography.

"Mind map ??? For now, we rarely use sih. Besides, it is not recommended a model, the 5M is also difficult scientific activities we sorted out where the withdrawal of its conclusions. For example, so .. "- Subject 3

"for use with a model scientific mind map, what is causing growing process, we had trouble finding the right formula "- Subject 2.

Teachers know that the model of the mind map can still be applied to the learning activity using a scientific approach. However, teachers feel free to apply. The doubt, due to the lack of knowledge of teachers to the model of the mind map and fear of the supervisor of the department of education, the teachers do not apply to the four models that have been recommended. Findings phrased as follows:

"If the correct Discovery yes indeed watching, we anticipate that problem-based children were given the problem, then your child finds a solution if the project to no avail. For example, there is a result mind map material. So it is better we use the model recommended. "- Subject 4.

"..so there has been a related development education trip, we followed until now, we replace the changed syllabus... bit revisions, we were revised again. So

suggested four models, so we follow because that means it's RPP scientific writing. "- Subject 2.

At each regular meeting held every month, the agenda discussed with regard to learning geography with a scientific approach. Teachers in Malang strongly agree with the application of the scientific approach. However, they found it difficult to choose the right method for the implementation of learning to be effective. Teachers simply follow the instructions on the student's worksheet and the materials obtained from the Department of Education and Culture of Malang.

Based on the interview, the geography teachers expect the mind map learning model can be applied to scientific activities undertaken by students. The mind map model is expected to give students the ability to communicate, to develop the idea of thinking and to answer the demands of scientific learning.

"If the model Mind map was nice yes, could be used to support student activities provided in accordance with 5 M on a scientific approach." – Subject 2.

"Yes it is because we had the scientific demands, yes means we use these four models then it is considered scientific. The hope mind map can be used for scientific activities that boy "- Subject 5.

"The purpose of scientific study should be achieved by the model of the mind map. So what the four models featured an earlier inquiry be used, can also be used on a mind map "- Subject 1.

IV. DISCUSSION

Each classroom requires active students. Through the students' activity, ideas will easily be expressed by students [44]. Various forms of methods can be used to increase the students' activity. Therefore, we need an appropriate selection and method in accordance with the expected goals in learning.

Selection of learning models needs to answer the challenges of the future. The initial step in answering the challenges of the future and can be one step and an important step that is through education. Education is a form of effort into improving the quality of students. The quality question is formed of skilled students to think critically, solve everyday problems, and communicate well [8], [45]. The ability of students needs to have been answered through scientific approaches.

The effectiveness of learning in the scientific approach can be made through the selection of the learning model. The learning model used should answer all-purpose scientific approach to learning activities [3]. The activity is the ability to observe, formulate questions, gather information, associates, and draw conclusions [46]. The learning activities in a scientific approach can be supported by the ability of teachers to choose the model of learning relevant to the learning activities are carried out.

Mind map as a learning model has advantages. Various studies indicate a mind map can improve the effectiveness

of learning geography in the classroom. Advantages of mind mapping can increase the motivation to learn the geography of high school students [37]. Motivation to learn geography can be improved through the use of mind mapping is modified. The use of a mind map is modified by combining the audio-visual media will increase the motivation of students in the natural formation of matter and the universe. In addition, through the application of the model of a mind map with a modified audio-visual media to improve learning outcomes geography high school students, especially in the formation history of the material and earth.

Research conducted by other researchers also showed that learning to use the model of the mind map can improve student learning outcomes geography and improve students learning outcomes as it is seen from the increasing power analysis. The power analysis can be seen from the ability to decompose or separate something into several parts [35], [47]. Furthermore, it is from the partially used to answer the problem through the parts that have been divided.

Based on the model of excellence mind in teaching geography map, the model applied by geography teachers in Malang. To understand the application of the mind map, the necessary awareness of teachers themselves to study the model of the mind map is needed. Strong motivation to learn and make the driving force to understand everything that happens in the learning activities [44]. Geography teachers always progressed through consultation activities are conducted every month and discussion activities via Whatsapp group of Malang and East Java Province MGMPs. This is an important action to create learning that is able to achieve the goal.

The problems that occurred and is the focus of this study indicate that there are problems or deficiencies in the application of the mind map with a scientific approach, especially on the subjects of geography. The study found that the high school geography teachers are not yet fully applied the learning model of the mind map due to the intrinsic and extrinsic factors.

Intrinsic factor is everything attached to or arises from the teacher. One of the intrinsic factors are doubts in themselves teachers in applying the model of the mind map. Doubts meant that teachers were not convinced that the model of the mind map is able to meet the demands of the scientific activities of the student. The application of the model mind map in a scientific approach to the subjects of geography is difficult to achieve if the teacher has a less positive perception of the model fit mind map to accommodate the scientific activities of students. These perceptions may determine the attitudes of teachers in the decisions made [48]. The scientific approach thus mandatory since admission to all subjects, especially geography, the model of the mind map is not implemented again on learning activities.

The second intrinsic factor is the lack of knowledge of the model of the mind map. A model mind map is only used as a mere tool in explaining the learning path to be taken by students [38], [40]. Learning path using a mind map displayed at the beginning of the learning activities. Based

on the review of the literature that the researchers did, the workflow learning is a teacher as a mind map concept. Obviously, the difference of concept maps and mind map [26], [39]. Map concept only describes that part of learning and is a summary of the material. Meanwhile, the mind map is able to express the ideas and results of students' critical thinking [21]. Because of the lack of knowledge about the purpose of the mind map on the learning, the teachers choose to apply more scientific models.

Then, extrinsic factors that influence the application mind mapping raises another weakness in the model mind map. The application of the model mind map with a scientific approach is not only influenced by the conditions of teachers, but also the reality of the service. Learning is fully regulated by the curriculum. Position the curriculum on learning activities used by teachers as the main guideline [5], [45]. In the curriculum, there are four models of scientific learning that the teacher applied.

Based on the results of research on the interviews, it obtained the finding that in addition to the four models suggested curriculum, the model is no scientific. Therefore, teachers felt obliged to write every plan of learning using four models suggested. Supervision of the study is routinely conducted by the Department of Education and Culture so the teachers are not given space in selecting appropriate learning model with actual learning conditions.

Based on information obtained on the implementation of the model mind map with a scientific approach to the subjects of geography, then a new question arises. The question related to the expectations of teachers to the model of the mind map with a scientific approach. Results showed that the model of the mind map is applied to the scientific approach should be able to achieve the expected learning goals on the approach [45]. Teachers suggested four learning model suggested not curb teachers in determining appropriate learning model. The mind map model required a modification [3]. This modification aims to be a model mind map can be implemented on a scientific approach.

V. CONCLUSION

Based on the results of the study that focuses on answering the teachers perception in the implementation of map mind with a scientific approach, it can be concluded that the model of the mind map still possesses some weaknesses in the application of the scientific approach. These problems are caused by the intrinsic and extrinsic factors. The intrinsic factors include doubts of teachers to choose the type of mind map. This is because teachers are skeptical about the model of the mind map that is able to meet the scientific activities of students. The second intrinsic factor is the lack of knowledge of teachers to the model of the mind map. Teachers consider a model mind map as a tool to write summaries and help teachers explain the learning path taken by the students. Meanwhile, the extrinsic factors include strict supervision of the election official learning model that positioned the teacher to choose the learning model that has been proposed in the curriculum.

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