

Learning to Make Digital Maps Using Project-Based Learning Based on Lesson Study in Cartography Course

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Abstract

Lack of support for learning facilities owned by students in learning cartography, especially in making digital maps, causes less achievement of learning objectives. Learning to make digital maps using the PJBL model and carried out in the form of Lesson Study activities The purpose of this research is to describe Learning to make digital maps using the PJBL model and implemented in Lesson Study activities The method used is descriptive which describes in full the information obtained by researchers from the implementation of lesson studies. The results obtained in the Do stage for positive things are, First, there is a high enthusiasm from some students to learn, second, students gain new knowledge in making digital maps. While for the negative things are First, one computer is used by several students, second, the number of students is too large for the type of skills courses, and third, students are less focused on learning. The See stage is first, the need for lecturers to pay attention to the number of students in one class, second, the need for lecturers to make preparations before learning begins.

Keywords: Digital Map, Project Based Learning, Lesson Study, Cartography



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Introduction

The cartography course in the Elementary School Teacher Education department is a group of expertise courses. So, those who take these courses are students who choose social studies (Social Sciences) expertise, meaning that not all elementary school teacher education students take these courses. Menno-Jan Kraak & Sara Irina Fabrikant (2017) stated that cartography is a science, art, and technology regarding map making, including its study as scientific documents and works of art. Furthermore, Rystedt B (2004) stated that cartography is a discipline that unites (dealing) between maps and mapping.

Digital mapping is a process of making maps in digital format that can be saved and printed according to the wishes of the maker, either in the number or scale of the resulting map. The digital format consists of 2 kinds:

1. Raster, is a data format with units of pixels (resolution/density) determined in PPI (pixels per inch). This type of format is not good for making digital maps, because data corruption will occur when enlarged or reduced. Examples of raster data formats: bitmap (such as tiff, Targa, BMP), jpeg, gif, and PNG.
2. Vector is a data format expressed by coordinate units (points and lines including polygons). This format is used for making digital maps or sketches. Examples of these formats are Dxf (Autocad), fix (fig), tgif (tgif), and ps/eps (postscript) (Douglas, A. V. (1984). Perth 1984).

Based on the two types of data, both raster data and vector data, students are required to make a digital map by the Semester Learning Plan (RPS) which has been detailed in the Lecture Program Unit (SAP). However, because so far it has never been practiced, the students feel something new with cartography, they think this cartography is only studied by students of the Geography Department, while in PGSD itself there is also this course. The problems that arise in making digital media are caused by not having laptops by students who take the cartography course. The data obtained show that 40 students who take cartography courses, out of 40 students who have laptops only 17 people. Of these 17 students, it turned out that they did not have the specifications that should be used in making digital maps. So that the learning carried out is not carried out as desired according to what has been stated in the Lecture Program Unit (SAP).

In the lesson, study activities are carried out using Project Based Learning (PJBL) which will produce a digital map.

Based on this problem, it is necessary to guide to improve the quality of lecturers. Lecturers have an important role in the learning process to improve the quality of education. Improving the quality of education has been carried out by increasing the competence of lecturers through education, workshops, seminars, and so on. However, these activities do not make an impression on the activities of the lecturer as an educator. This is what underlies the birth of Law Number 14 of 2005 concerning Teachers and Lecturers who play a role in improving the quality of education.

One of the activities carried out to develop lecturers' professional abilities is Lesson Study activities. According to Wiyono, H., & Daryanto, W. M. (2020). Daryanto (2012), lesson study is a model of professional development for educators to discuss learning problems cooperatively and sustainably by the principle of mutual learning. So that a learning community can be formed. At the Education Personnel Education Institution (LPTK) Lesson Study activities are carried out in addition to fostering the teaching profession, as well as a model for students in learning.

To improve student competence in making digital maps, a PJBL learning model was developed. Fathurrohman (2016) stated that project-based learning or PJBL is a learning model that uses projects or activities as a learning tool to achieve attitude, knowledge, and skill competencies. Meanwhile, Saefudin (2014,) argues that PJBL is a learning method that uses problems as the first step in collecting and integrating new knowledge based on his experience in real activities. Cartography learning is taught to use problems as a first step and combine it with new knowledge based on real experience.

In connection with this, the question arises "how is the learning of making digital maps using Lesson Study-based PJBL for PGSD UNP students at the plan, do, and see stages?" This paper aims to describe learning to make digital maps using Lesson Study-based PJBL for PGSD UNP students at the plan, do, and see stages?

Method

Based on the purpose of this study, the researcher used a descriptive type of research. The data described in this study is a complete picture of the information obtained by the researcher from the implementation of the lesson study. Starting from activities at the plan, do, and see stages.

The data obtained in this study include data from reflections by the cartography course group, and data from the documentation review at the Plan stage. Next, make observations on learning activities. By using qualitative methods, it is hoped that in-depth and meaningful data can be obtained so that the objectives of this study can be achieved.

The place of this research is in the Department of PGSD, Faculty of Education, State University of Padang. city of Padang, This research is focused on the course of Cartography. This course belongs to the social studies course group and is part of the courses in the PGSD curriculum.

The subjects in this study were lecturers who taught cartography courses at the PGSD Department of Padang State University and 40 students who took this course in the fifth semester. The research was carried out from October 20 to November 13, 2021.

The research tools used were observation sheets and documentation, recordings, and videos. The observation sheet was made by the Padang State University Learning Center. Observation sheets, recordings, and videos were used to obtain data from lesson study activities at the plan, do, and see stages.

The data analysis technique used in this study was Creswell. Stake (in Creswell, 2015), suggests four forms of data analysis and interpreting them in lesson study research, as follows: (1) Collecting categories, researchers search for and collect through data examples in the hope of getting a meaning that is relatively the same as the issues that will be raised. ; (2) Direct interpretation, the researcher observes an event (example) and derives meaning from the case without looking at many examples. It is a process of extracting data separately and reassembling it together to make it more meaningful; (3) Researchers make patterns and determine similarities between two or more categories. This similarity can be accomplished with a 2x2 table that illustrates the relationship between the two categories; (4) At the end, the researcher generalizes naturally by analyzing the data, generalizing with people who can learn from an event, through their events or apply it to other events. Lesson study implementation activities are carried out using PBJL with the following steps: 1) determining the basic (essential) questions; (2) designing project plans; (3) drawing up a schedule; (4) monitoring project progress; (5) test the process and learning outcomes; (6) evaluate the experience of making projects or learning experiences.

Results and Discussion

Implementation of Lesson Study at the Plan Stage

The planned activity was carried out on Monday, October 20, 2021, through a ZOOM meeting attended by three lecturers. The activity begins with revealing problems in learning to make digital maps. The problem that arises in making digital media is that only 17 out of 40 students have laptops. All laptops used also do not have the specifications that should be used in making digital maps. So that learning can not be implemented optimally.

After analyzing the problems faced by lecturers and students in learning to make digital maps, a learning model is determined that can solve these problems. The learning model chosen is the PJBL learning model. According to Supriadi, Y., Nisa, A. A., & Wulandari, S. (2020), PJBL is a project-based learning model that can provide students with direct experience in solving problems. Students are expected to be able to solve problems in groups or independently. In making digital maps using the PJBL model, lecturers are expected to be able to design and implement the learning that can invite students to think critically and creatively.

Furthermore, the Lecture Program Unit (SAP) was designed with the topic "Making a bite map". The SAP design used a design prepared by the Lesson Study team. The making of a learning design begins with the selection of material according to the subject being studied. Based on this material, indicators, materials, learning steps, and assessments are formulated. Then, a model lecturer was assigned.

Implementation of Lesson Study at the Do Stage

The do and see activity was held on Saturday, November 13, 2021. This activity was held at the UPP Air Tawar campus, Padang. This activity was attended by four lecturers, with details of one person as a model lecturer and three as observers.

Before the do activity is carried out, the lecturer informs the students about learning activities with the PJBL model that have been carried out previously. Students in groups have found problems in making maps during the pandemic. Problems have also been solved together and reported to the course supervisor. Then the problem is formulated, namely how to make a map using the application. The next activity is to develop a project plan. Students do project activities. report the resulting product.

At the stage of project implementation, students have difficulty using the application. This is because only a small number of students have computers and no computers can access information. Based on this, an agreement was made to make the digital map on campus offline by using computer labor. So the Do and See activities described in this article are at the stage of monitoring project work.

Before starting the Do activity, the observer lecturer conducted a discussion about the observation sheet. Observations were made by observers by sharing in different places so that students were not disturbed in learning and almost most of the students could be observed. Observations were made on student activities in interacting with lecturers, fellow students, media, learning resources, and the environment during learning. Aspects that are observed are positive things and negative things done by students and how to solve them. At the end of the Do activity, students were also given an observation sheet and asked to fill it out.

Based on the results of the analysis of the positive things in learning that have been observed, the results were obtained. First, there is a high enthusiasm from some students to learn, second, students gain new knowledge in making digital maps. The existence of high enthusiasm from students to learn can be observed, among others, from student activities asking spontaneously on parts of the material that have not been understood by the lecturer. Due to the limitations of obtaining information from lecturers about the material, some students seemed to ask their friends. They also looked to the front of the class to ask questions or look directly at the Whiteboard. As stated by one of the resource persons, "The enthusiasm of students is high enough to learn". From the learning that has been done by the students, it appears that the students have carried out learning that is by the characteristics of the PJBL learning model. Namely, students are creative in solving problems, collaborative and scientific. Eprilianto, D. F., Pradana, G. W., & Sari, Y. E. K. (2020). states that based on the characteristics of the PJBL model, this model will be able to increase students' creativity in learning. As the word of God in QS. Maryam: 12. mandatory for every student, earnest, continuous, and committed, not stopping until the goal in studying is achieved

Students gain new knowledge in making digital maps. So far, students only know how to make analog maps. It turns out that map-making can also be done digitally. This can be seen from the student's expression "Knowing how to make digital maps that were previously unknown". Get new knowledge in map-making". According to Nuryadin (2005), digital maps are representations of geographic phenomena that are stored to be displayed and analyzed by digital computers. Furthermore, he stated that the use of digital maps has actually been widely used but slowly making analog maps is starting to be abandoned.

Furthermore, based on the results of the analysis of the negative things in learning that have been observed, the results were obtained. First, one computer is used by several students, second, the number of students exceeds the ideal number of students for one class, and third, students are less focused on learning. First, the existence of one computer used by several people can be seen from several groups of students who work using one computer. The limitations of the media have an impact on the fluency of students in completing assignments. Arsyad (2002) suggests that one of the benefits of teaching media in learning is that it can clarify the presentation of messages and information so that it can facilitate and improve learning processes and outcomes.

With both students practicing digital map making, not all students can produce a digital map properly. Then, with limited learning time so that the students with the two computers had not had time to try it directly independently, so it took more time to practice so that they could produce digital maps correctly.

Second, the number of students exceeds the ideal number of students for one class. That is 1:20 for exact. This causes students to be less comfortable in learning. Moreover, the focus is only at one point, so students sitting in the back cannot see the material displayed through infocus. According to the Higher Education Law No. 12/2012 and Government Regulation No. 4/2014 concerning the Implementation of Higher Education, it is stated that the ratio of lecturers to students is ideal, namely 1:20 for exact sciences and 1:30 for social sciences.

Third, students are less focused on learning. Based on observations, some students stand when the lecturer explains the material. Walk to the front of the class to hear and see the material on the focus. Lessons that are carried out are not able to encourage students to be active and have fun overall.

Implementation of Lesson Study Phase See

The see activity was carried out on the same day after the do activity, which was attended by four lecturers, as well as students. The goal is to discuss the findings of unfavorable symptoms during the learning process. The activity is led by a moderator. In the first activity, the lecturer models the delivery of feelings and impressions from the learning that has been done. The model lecturer revealed that the learning he carried out today was quite satisfactory. Most of the students seemed enthusiastic even though there were still many shortcomings, such as the availability of computers that did not match the number of students and the number of students that exceeded the applicable rules.

Next, the moderator invites observers to convey their observations. The results of the observations submitted are related to student learning activities. Observers are not looking for faults or judging model lecturers, but are limited to providing observations during the learning process. Observers convey the results of observations in turn as well as deliver solutions to the problems found in the implementation of learning at the Do stage.

Based on the results of the analysis of the negative things found by observers in learning and delivered at the See stage, several solutions were revealed to solve the problem. The solutions to solve these problems are (1) the need for lecturers to pay attention to the number of students in one class, (2) second, the need for lecturers to make preparations before learning begins.

First, the lecturer needs to pay attention to the number of students in one class. The lecturers need to pay attention to the supervision of the number of students in one class so that learning can be carried out properly. Based on the Ministerial Regulation, the ratio of the ideal number of lecturers to students in private universities is one in 30 (1:30) for exact subjects and one in 45 (1:45) Meanwhile, for state universities, the ratio of lecturers to students is 1:20 for exact sciences and 1:30 for social sciences. Regulation of the Minister of Research, Technology and Higher Education Number 51 of 2018 Article 24 letter j (Ratio of Lecturers to Students). With the ideal number of students, the lecturer can manage the class well. Lecturers can observe students individually.

Second, the lecturer needs to make preparations before learning begins. Preparation before the implementation of learning needs to be done carefully and well by the lecturer. Moreover, it has been almost three semesters of doing distance learning. The preparations were made not only on the learning devices but also on the media used. Mulyasa (2008) states that professional teachers must be able to develop good, logical, and systematic teaching preparation because, in addition to the interests of learning implementation, teaching preparation is a form of "professional accountability".

In addition to preparing for learning, lecturers also need to pay attention to the use of learning media in the classroom. Lecturers need to examine the media needed in learning both in terms of the amount required by students and the state of the media. The use of media in learning needs to pay attention to several things, including learning materials, student characteristics, and available time allocation. Purwono (2014) states that learning media has an important role in supporting the quality of the teaching and learning process. The use of appropriate learning media can make students learn to easily understand the subject matter, making learning more fun.

Conclusion

Cartography learning has the stigma of difficult learning because it is not supported by adequate facilities. The renewal of the implementation of learning needs to be addressed because it is an achievement in the curriculum that must be achieved by students. For this reason, serious handling must be carried out so that the learning process about the achievements of making digital maps can be carried out properly.

Using the Project Based Learning (PjBL) method carried out in computer labor can overcome the lack of facilities in learning to make digital maps and at the same time improve student learning outcomes and can change the stigma of learning difficult cartography into fun. This PjBL method recognizes a learning model that is designed based on a project task that must be done by students through learning activities.

In addition, it can also hone critical thinking skills, and student activities to produce a digital map that matches the actual data. Therefore, learning cartography using the PjBL method has been appropriately applied to overcome the problem of the lack of support for the facilities owned by students in making digital maps by bringing students to the computer laboratory.

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