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SPADE: Geometry Learning Model within Elementary School

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Abstract

This research was initiated by a problem in learning geometry in primary schools, namely the use of learning models that tend to be monotonous and less attractive to students. In addition, the research is based on efforts to preserve existing cultures in Indonesia, especially those from Kampung Naga, Tasikmalaya, West Java Province. Kampung Naga is an area that still maintains traditional life and cultural wealth. Based on these conditions, research was carried out to solve problems through the development of the SPADE as a geometry learning model in elementary schools. SPADE stands for five activities, namely singing, playing, analyzing, discussing, and evaluating.

Research & development model by Plomp was used on this project. The research was conducted for three years and involved lecturers, students, teachers, and primary school students in Tasikmalaya City, West Java Province. The research instruments used were observation sheets, interview guidelines, learning assessment sheets, learning implementation videos, questionnaires, and field notes. The data were analyzed interactively with the following activities: 1) data reduction; 2) data presentations; 3) data verification. The research finds that SPADE is relevant as a learning model and got a positive response to be implemented in primary school. The SPADE learning model is expected to be implemented in a broader scope..

Keywords:*SPADE, Geometry, traditional games, Kampung Naga, geometry learning models*

Abstract

The research was initiated by the existence of problems in learning geometry in elementary schools, namely the use of learning models that tend to be monotonous and less attractive to students. In addition, the research is based on efforts to preserve the existing culture in Indonesia, especially those from Kampung Naga, Tasikmalaya, West Java Province. Kampung Naga is an area that still maintains traditional life and maintains cultural wealth. Based on these conditions, research was carried out to solve problems through the development of the SPADE learning model as a geometry learning model in elementary schools. SPADE stands for five activities, namely singing, playing, analyzing, discussing, and evaluating.

The research uses the research & development type with the development model from Plomp. The research was carried out for three years and involved lecturers, students, teachers, and elementary school students in Tasikmalaya City, West Java Province. The research instruments used were observation sheets, interview guidelines, learning assessment sheets, learning implementation videos, questionnaires, and field notes. Data were analyzed interactively with the following activities: 1) data reduction; 2) data presentation; 3) data verification. The research found that SPADE is relevant as a learning model and received a positive response to be implemented in elementary schools. The SPADE learning model is expected to be implemented in a wider scope.

Keywords:*SPADE, geometry, traditional games, dragon village, geometry learning model*

PRELIMINARY

One of the successes of learning mathematics is determined by classroom management carried out by the teacher. Teachers who are able to create the right teaching and learning climate through good classroom management, enable students to feel safe to learn [1]. Thus, teachers must be able to choose and use learning models that can support students in understanding the material being taught. Learning design needs to pay attention to innovation and meaningfulness as well as direct student involvement in the learning process.

The reality on the ground shows that the use of innovative and meaningful learning

models in mathematics learning is not optimal. Ottevenger said that today's learning conditions still tend to be 'chalk and talk' [2] so that learning tends to be monotonous and less interesting for students. Moreover, when learning is associated with the environment of students who have certain cultural characteristics as part of the structure of society.

The relationship between culture and mathematics is known as ethnomathematics. The success of ethnomathematics in learning mathematics has been proven in other countries, such as Japan and China [3]. When compared with the two countries, Indonesia has a variety of cultures in the form of artifacts (tangible) and traditions (intangible) which are more capital in the development of learning.

The cultural development that will be applied in learning mathematics is in the form of traditional games originating from the Kampung Naga community. Traditional games that are applied will be developed in a geometry learning model related to students' social relationships so that the quality of children's games becomes more social [4]. In addition, the people of Kampung Naga were chosen because they are indigenous people who still have tangible and intangible traditions that are still maintained. Kampung Naga is an area located in Tasikmalaya Regency which has long been used as a research place for professional and amateur academics who are interested in the lifestyle of indigenous peoples.

Based on this, the general objective of this research is to develop the SPADE learning model as a geometry learning model based on the traditional game of Kampung Naga. The specific objectives of this research are as follows:

a. How is SPADE as a Geometry Learning Model based on Kampung Naga Traditional Games?
b. How is the teacher's response to the development of traditional games in geometry learning?
c. How is the teacher's response regarding the relevance of the SPADE learning model to geometry learning in elementary schools?

RESEARCH METHODS

The research involved lecturers, students, teachers, and elementary school students in Tasikmalaya City and was carried out for three years, from 2018 to 2020. This research uses research and development and focuses on developing SPADE as a learning model. Geometry based on the traditional game of Kampung Naga. The development of learning devices uses the design proposed by Plomp [5] as shown in Figure 1 below.

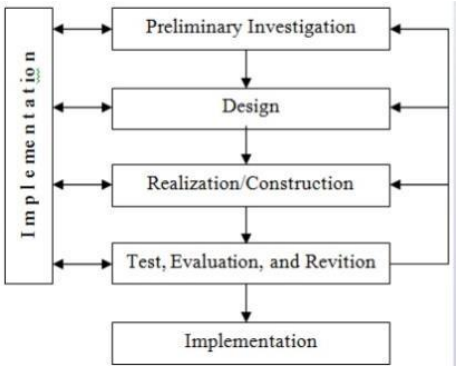

Image 1
Development Model from Plomp

Figure 1 shows the design of the research and development process used. The initial stages in the research are preliminary investigation by identifying problems that occur in the field, preliminary studies in Kampung Naga, and implementing a group discussion forum (FGD) with experts. Furthermore, the preparation and development of the design is carried out with periodic tests, evaluations, and revisions until it is implemented. The research instruments used were observation sheets, interview

guidelines, learning assessment sheets, learning implementation videos, questionnaires, and field notes. Data were analyzed interactively with the following activities: 1) data reduction; 2) data presentation; 3) data verification.

RESULTS AND DISCUSSION

SPADE as a Learning Model

The SPADE learning model is the result of the development of research conducted by researchers for three years, since 2018. SPADE is implemented based on the traditional game of Kampung Naga. Kampung Naga is a village located in Neglasari Village, Salawu District, Tasikmalaya Regency. Traditional games of Kampung Naga which were adopted into geometry learning through the SPADE learning model, namely: 1) Pecle; 2) Gobak sodor; 3) Dam-daman; 4) Oray-orayan; 5) Boi-boian; 6) Baseball; and 7) Hahayaman.

The SPADE learning model can be classified as a learning model based on the reaction principle. The principle of reaction is the response made by the teacher to the student's response in the learning process. In line with this statement, it is stated that the principle of reaction is the learner's reaction to the student's activities [6]. The principle of reaction in the SPADE learning model is presented in table 1 below.

Table 1
SPADE Learning Model Reaction Principle

Reaction Principle	Information
Facilitator	Teachers serve all things related to student activities in the learning process.
Advisor	The teacher guides students so that they can understand the material being studied, in this case the teacher asks questions and provides direction in working on assignments or questions.
Motivator	The teacher motivates students so that students are excited and motivated to take part in learning.
innovator	Teachers package learning by presenting varied learning activities, including singing and playing.

In addition to discussing social principles, there are 3 (three) main meanings in social systems [7], namely 'descriptions of the various roles of learners and learners; a description of the hierarchical relationship/authority of the learner and the learner; and a description of various rules to encourage learners'. Thus, the social system is a relationship that exists between teachers and students during the learning process.

The description of the various roles of the learner and the learner is the role that the teacher performs when he is on an equal footing with the students. Description of the hierarchical relationship / authority of the learner and the learner is a relationship in which the teacher acts as the holder of control over the running of the learning process. Descriptions of various rules to encourage students are norms or values that students must obey and do when the teacher gives freedom during the learning process. The social system in the SPADE learning model is presented in table 2 below.

Table 2
SPADE . Learning Model Social System

Social System	Information
teacher	The teacher gives an explanation of what students should do in learning and explains the material to be studied
Demonstrator	The teacher demonstrates the activities that must be done by students, one of which is singing.
Manager	The teacher regulates and controls the learning process so that it remains orderly and conducive.
Advisor	The teacher provides advice, input or suggestions to students so that students can make choices in taking action.
Evaluator	The teacher evaluates the knowledge, attitudes and skills of students to determine the extent to which the development and changes of students and teachers evaluate the success of teachers in teaching.

In addition to the social system contained in table 2, the social system contained in the SPADE learning model is the student's contribution to learning. The contribution of students to this learning is very important considering that this learning is student-centered [8]. In line with this, communication between teachers and students and communication between students is also a social system in the SPADE learning model. This is so important, considering that in the communication or dialogical process students are able to explain, reason and defend their opinions to the extent that the most correct knowledge is known [9].

SPADE as a learning model has a support system. The support system is in the form of capabilities/skills and technical facilities [10]. The support system in the SPADE learning model is a crowded class condition which means the class becomes more alive with the support of the teacher's role and the contribution of the students themselves as well as the facilities that have been provided. These facilities include the use of various learning media, songs, and traditional games.

This SPADE learning model is patterned on 5 activity steps, namely singing, playing, analyzing, discussing, and evaluating [11]. The description of each activity step is as follows:

a. *Singing*
   The teacher demonstrates the song in its entirety, then proceeds to demonstrate each line. This process is carried out so that it is easy for students to follow and understand. Students do repetition indirectly about the material raised as song lyrics. Repetition can be very important in learning in general [12,13].
b. *Playing*
   The teacher gives direction to students before playing activities are carried out. This direction includes an understanding of the rules of the game and the relationship with the learning activities carried out. The teacher includes concepts or learning materials in the traditional games that are carried out. Learning activities that are integrated with play activities encourage students to be active and communicate and collaborate with other students.
   Teachers need to be more intense in conditioning students when playing

activities take place so that the process can run conducive.

c. *Analyzing*
Students make observations, ask questions, reason and analyze information based on the playing activities that have been carried out. This is related to students' connection thinking skills in connecting contextual activities carried out with learning concepts/theories. Students analyze the relationship between traditional game activities and learning geometry.

d. *Discussing*
The teacher makes rules if necessary in order to keep the discussion process interactive and conducive. The teacher can ask some questions about students' understanding of the material before the activity begins

e. *Evaluating*
The teacher guides students to evaluate the activities that have been carried out since the beginning. The teacher evaluates with various instruments, both in the form of academic and non-academic or in the form of tests and non-tests.

Teacher's Response to the Development of Traditional Games in Geometry Learning

Researchers conducted interviews with teachers in schools that were used as testing laboratories for the SPADE learning model. The teacher's response to the development of traditional games in geometry learning is as follows.

a. AN stated that the development of traditional games in geometry learning in relation to technological developments looks balanced and in proportion. As we know, when we hear the word "traditional games" it will appear an "old-fashioned" paradigm that is difficult to relate to if it is supported by technological developments. However, this model directs that learning cannot be separated from the development of traditional things but does not forget modern principles in learning. In addition, the development of traditional games in geometry learning is closely related to the preservation of local wisdom where nowadays students rarely know about traditional games.

b. MF stated that the development of traditional games in geometry learning in relation to technological developments was appropriate and balanced in its portion. Even though technology is very developed, traditional games still have to be introduced in geometry learning. In addition, the development of traditional games in geometry learning in relation to the preservation of local wisdom is very good, because traditional games need to be preserved, one of which is by using the SPADE learning model.

c. NN stated that today's traditional games are something new for students because they are rarely found. In addition, the preservation of local wisdom through the SPADE learning model is very necessary to provide a pleasant experience for children.

d. IY stated that geometry learning activities using traditional games will be more interesting and fun and can develop intellectual intelligence, train motor skills, develop emotional intelligence, and can improve social skills.

e. VN stated that learning geometry using traditional games is very supportive in student activity. In addition, traditional games can be combined with learning geometry so that it has a positive impact on students' motor skills.

f. RW stated that the development of traditional games can be collaborated with technological developments in geometry learning. Traditional games and technology can complement each other,

although both have their drawbacks and weaknesses. In addition, local wisdom must be preserved because it is a national culture that has been passed down from generation to generation. This was introduced through the SPADE model of learning activities.

g. RRJ and RK stated that traditional games need to be preserved. One of the efforts made, for example, is by making learning videos about the application of traditional games in learning mathematics in geometry. In addition, traditional games applied in geometry learning can have a positive impact, including: 1) students are more familiar with local culture; 2) as a means of preserving local wisdom values; and 3) make learning more innovative and fun.

In general, teachers gave a positive response to the implementation of traditional games in geometry learning in elementary schools. The teacher stated that traditional games were relevant and had a positive impact on student learning in elementary schools. Learning using traditional games can encourage learning success. This is due to the use of more than one kind of resource and the combination of various resources that support each other so that it becomes an integral system [14].

Teacher's Response to the Relevance of the SPADE Learning Model in Geometry Learning in Elementary Schools

Researchers conducted interviews with teachers in schools that were used as testing laboratories for the SPADE learning model. The teacher's response to the relevance of the SPADE learning model in geometry learning in elementary schools is as follows.

a. MF stated that the SPADE learning model was very relevant to learning geometry in elementary schools. The stages of activities in the SPADE learning model can make it easier for students to understand geometry and encourage students to learn more fun. In addition, the SPADE learning model has been appropriately applied in elementary schools. Activities in the SPADE learning model are very suitable for the character of students who like to sing and play.
b. NN stated that the SPADE learning model can be applied in learning geometry with a fun syntax for students. The SPADE learning model can be applied in thematic learning of one sub-theme for one week.
c. AN stated that the stages in the SPADE model are very relevant if applied in learning geometry. Learning materials are more meaningful and easy to understand so as to encourage students to be active during the learning process. The stages in the SPADE model can meet the needs of students' characteristics related to audio, visual, and audio visual. The SPADE learning model also meets the criteria as a fun learning model so that it supports effective and innovative learning situations in elementary schools.
d. VN stated that the SPADE learning model is very supportive for memory, reasoning, and developing students' logic towards geometric concepts. The SPADE model can make students more enthusiastic and enthusiastic and is suitable for the age of elementary school students who prefer to play while learning.
e. IY stated that the SPADE learning model can make children more motivated and not bored in learning mathematics so it is very suitable for use in learning in elementary schools.
f. PK stated that the SPADE learning model is very suitable for learning geometry because students understand the material more easily and can make learning more lively, interesting, and fun for students.

g. RRK stated that the SPADE learning model encourages students to more easily understand the material, be active and creative in learning. The SPADE learning model is one of the innovations in learning that provides meaningful learning for students through the stages in it.

In general, the teacher gave a positive response to the SPADE learning model in learning geometry in elementary schools. The SPADE learning model is seen as a learning model that is relevant to student development. In addition, the SPADE learning model makes it easier for students to improve memory, reasoning, and logic in learning geometry. This is in line with the finding that traditional games can develop reasoning abilities in learning mathematics [15].

CONCLUSION

SPADE as a Geometry learning model based on the traditional game of Kampung Naga fulfills the components of the learning model with the presence of syntax, reaction principles, social systems, and support systems. SPADE consists of 7 (seven) types of traditional games, namely: 1) Pecle; 2) Gobak sodor; 3) Dam-daman; 4) Oray-orayan; 5) Boi-boian; 6) Baseball; and 7) Hahayaman. SPADE consists of 5 activities, namely: singing, playing, analyzing, discussing, and evaluating.

The teacher gave a positive response to the implementation of traditional games in geometry learning in elementary schools. The teacher stated that traditional games were relevant and had a positive impact on student learning in elementary schools.

The teacher gave a positive response to the SPADE learning model in learning geometry in elementary schools. The SPADE learning model is seen as a learning model that is relevant to student development. In addition, the SPADE learning model makes it easier for students to improve memory, reasoning, and logic in learning geometry.

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