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Learning models that can improve elementary school students' creative thinking ability

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Abstract: There are several abilities that can accommodate students in facing the 21st century, one of which is the ability to think creatively, but based on educational report cards, students' ability to think creatively is low. This study aims to describe a learning model that can stimulate the emergence of creative thinking abilities of elementary school students through the literature study method. Based on the results of the research and discussion, the researchers concluded that increasing the ability to think creatively can be pursued through three types of *learning models, including (1) problem-based learning models, (2) discovery-based learning models*, and (3) project-based learning models. These learning models include problem-solving*, problem-posing, problem-based learning, guided inquiry learning, discovery learning*, and project-based learning. This learning model was chosen because it has been proven by many researchers and has syntactic relations and indicators of creative thinking ability.

Key Words*: The 21st Century; Creative thinking; Learning model; Elementary students*

Introduction

The 21st century seems to be a milestone that is different from other centuries. The 21st century is different because it is quite in the spotlight in several fields. One of them is the education sector. Education in Indonesia needs to make improvements and developments in various aspects of the world of education in order to be able to prepare competent human resources to welcome the 21st century. The 21st century is considered the century of globalization, the meaning of the statement of the century of globalization is that life in this century is considered to be a lot of change in the governance of human life (Wijaya et al., 2016). Therefore, stakeholders in every line are required to prepare students to be ready to face this globalization era. Preparing students to work and socialize in the 21st century is very complicated (Wahyudi et al., 2019). There are several abilities that can accommodate students for the arrival of the 21st century. These abilities include critical thinking and problem-solving, communication, collaboration, creativity, and innovation (Association, 2012). These abilities are considered important and needed in the 21st century. According to (Council, 2010) the first is (1) economic reasons. The company will seriously consider recruiting. Recruitment will be very possible for people with high-level expertise or someone who has high-order thinking skills, plus also because the 21st century is the century of globalization it can be predicted that competition will be carried out globally. The second reason is (2) social reasons. This means that schools are involved in improving the development of students' skills to face the 21st century. This is explained in the Minister of Education Regulation Number 20 which was issued in 2016. The competence of graduates at the elementary school level includes several aspects, including the competence to think and

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act creatively, critically, productively, communicatively, independently, and collaboratively using a scientific approach based on the context studied through relevant learning resources. Based on these regulations, schools have demands and obligations in developing the abilities of students related to the required competencies. In order to stimulate these abilities, it is necessary to develop at the stage of planning the learning process so as to be able to improve the skills needed in the 21st century, including in terms of communication, expressing opinions openly about new policy proposals, and defending citizens' rights.

The ability to think creatively is one of the abilities mentioned in the paragraph above and is also considered important. There are several levels in thinking, the first is the ability to think at the basic level, one level above is the ability to think critically and the abilities that occupy the top at that level include the ability to think creatively (Krulik &; Rudnick, 1995; Siswono, 2010). The ability to think creatively can is defined as a thinking process in which there is a process of developing new ideas and new thoughts. This creative thinking cannot be obtained without good thought development (Febrianti et al., 2018). This is relevant to what was conveyed by Paul &; Elder (2004) that "The media frequently represents the creative person as a cousin to the nutty professor, highly imaginative, spontaneous, emotional, a source of off-beat ideas, but often out of touch. with everyday reality". The meaning of this understanding is that creative people are imaginative people, have unusual sources of ideas, and are rarely found in everyday life. The ability to think creatively is not without reason it must be mastered by students. There are several benefits of the ability to think creatively which are considered very useful for everyday life by students, including achievements that are above the average level that students can get (Supardi, 2015). These benefits can also be described as follows: the ability to think creatively is assessed as an ability to see opportunities in solving problems. Doing creative activities is useful for giving satisfaction to individuals who succeed in doing it (Meika &; Sujana, 2017).

Guilford (1967) states that to bring up "creative action in a classroom lesson is to take into account the insights that lead to creative activity (Fasko, 2001). The creative activity itself can be defined as an activity related to the process of creation. When teaching students Sternberg (2010) states that in order to process information creatively, teachers can encourage students to create, discover, explore, imagine, and think. Based on this description it can be concluded that activities that can stimulate this creative process require student-centered activities. Ministry of Education Report on Education 2022 explained that literacy skills and also numeracy skills are still below the minimum competency. This low literacy and numeracy ability is closely related to the low ability to think creatively. It is said that someone who has the ability to think creatively is also someone who has mathematical literacy skills because someone is accustomed to reading or writing from the ability to write, speak and the knowledge used to understand the texts that are often read by him and communicate the results of these readings and solve mathematical problems related to these readings. The ability to solve problems here is included in the indicators of students' creative thinking (Siswono, 2010a; Tatag, 2011).

Opinion Siswono (2010); Tatag, (2011) above is supported by the results of research belonging to Avico et al (2019) who conducted research on numeracy literacy midwives. It

was conveyed that there are several things that are indicators of numeracy literacy skills. The first is the familiarity of a student's able to use a certain procedure or steps when the student is faced with a problem. Second, students are used to verifying answers or checking answers after solving a problem. The third is the knowledge possessed by students based on experience as a supporting factor for completing contextual-based learning. The last is when students are faced with a problem, students will tend to choose to use the formula in solving it. The abilities above can be indicated by the ability to think creatively (Webster, 1990). From the findings of the opinions of these experts, it can be concluded that the ability to think creatively is closely related to the numeracy literacy skills possessed by students, and researchers can conclude that students' creative thinking abilities based on data from the Ministry of Education's report card for Education still do not meet the standard or are below the minimum competency.

The low ability to think creatively is an urgency that must be resolved immediately by teachers who are at the forefront of our education. Learning that stimulates student activities to be able to spark creative thinking skills can be done by presenting a lesson that makes students actively create or find solutions to a problem (Siswono, 2010a; Sternberg, 2010). In previous research belonging to (Muti'ah &; Mulyono, 2019) stated that students' creative thinking skills can be developed problem solving creative learning models. There is also research belonging to Mardhiyana &; Sejati (2016) which concludes that students' creative thinking abilities can develop by applying problem based learning models, and research belonging to Leksani &; Syaodih (2018) states that creative thinking abilities can be enhanced by discovery abilities learning.

There are many learning models that are considered to be able to stimulate and stimulate students' creative thinking skills. In previous articles or research, much was explained regarding the application of learning models to measure students' creative thinking abilities. As a novelty of the research, the researcher aims to examine learning models which syntactically and in steps can improve the ability to think creatively in elementary school students. This research is considered important to do which is also a novelty of this research considering that several previous studies on average only tried to prove using quasi-experimental research methods or classroom action research related to one model that has an influence on students' creative thinking abilities. The research will examine in detail each learning model based on literacy studies in previous research which can be used by teachers as an interesting form of learning reference material which can also improve students' creative thinking abilities at the elementary school level.

Method

Researchers have constructed a research objective above. Based on the research objectives to be addressed, the researcher feels that qualitative research is a type of research that is suitable for use in this study. Qualitative research itself has several types and several types of underlying paradigms. The researcher chooses the post-positivism paradigm as a lens that will help the researcher to form a framework for this study. The framework resulting from the selection of the paradigm forms the definition for this study, namely a method for

exploring or understanding the meaning of a number of groups or objects that one wants to know (Crowe et al., 2011). As with other types of research, qualitative type research also has a goal, which is to understand a phenomenon that exists in a social life where this understanding is obtained through several processes ranging from observation to interpreting the results of observations which are the main focus of a study (Moriarty, 2011) Qualitative research is considered to have a main focus on "meaning". In qualitative research, the participation of researchers in the process is key to success (Gerring, 2017; Sofaer, 1999). Based on the objectives and types of research that have been constructed, the data collection technique or method chosen by the researcher is the literature study method (Sasmita &; Mariana, 2020).

The literature study is the same as the data collection method with documentation (Patten, 2017). It can be defined as a process for collecting library sources, writing what is sought from the library sources, and processing it to become a result of research. Inquiry can be started by reading books, documents, or other records that can help to obtain research data (Tellis, 1997). The documents investigated in this study are documents related to previous research related to the discussion of relevant learning models used to improve creative thinking skills.

If data related to relevant and suitable learning models have been obtained, after collecting data from documents related to learning models, researchers can verify whether the data is in accordance with the research objectives that have been constructed at the beginning. If the data taken is appropriate, the researcher can compile the data obtained, make categories of the data and sort back, which data is not needed, ending with drawing conclusions according to the research objectives (have the research objectives have been achieved)(Moleong &; Edition, 2004). The process of analyzing the data is also in accordance with the qualitative research data analysis technique owned by Miles et al., 2018; Miles & Huberman, (1994). There are several steps that must be carried out by researchers to fulfill this one data analysis technique after the desired data has been collected, namely presenting the data and drawing conclusions from the data that has been collected (Miles et al., 2018).

Qualitative research also has several techniques to ensure that the data obtained by researchers through the data collection process is valid. Data validity techniques here will discuss how this research can be assessed because the data taken is not in the form of numbers, therefore this research is equipped with data validity techniques which are also termed quality standards to strengthen the credibility of this research itself) (Guba &; Lincoln, 1989). There are three types of data validity techniques used, including (i) internal validity, in this study, internal validity is based on the quality of data collection techniques and data interpretation which leads to conclusions so that good data quality can influence the conclusions drawn by researchers with the results which is also good (Carter, 1969). (ii) In qualitative research, there are two ways to find out its reliability, namely data triangulation which is used to see the relationship and connection between the data and the findings obtained through data collection techniques and cross-interpretation which here aims to ask for advice from experts so that it will reduce subjectivity on the findings obtained from data collection techniques (Guba &; Lincoln, 1989).

An explanation regarding the above method can be read more concisely in chart 1 below:

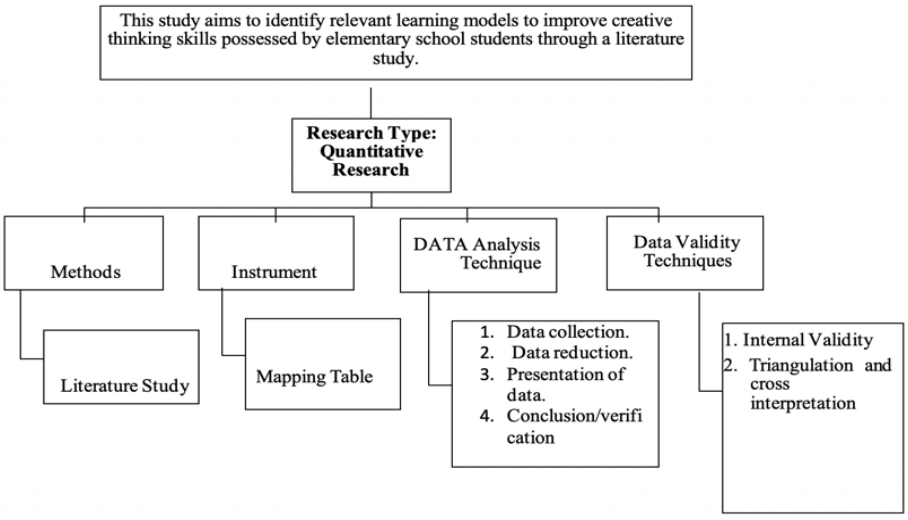

Chart 1. Research Method

Results and Discussion

This research was carried out using the data collection techniques described above. Based on the results of literature studies that have been carried out, the results can be presented in table 1 and table 2 below. Learning models that can stigmatize students' creative thinking ability based on include:

Table 1. Learning Models That Can improve Creative Thinking Ability in Elementary Schools

No	Learning Models That Can Improve Creative thinking Ability	Explanation of syntax that can impro students' creative thinking ability
1.	***Problem Solving*** ((Anggara, 2013; Avico et al., 2019; Azizah &; Edie, 2014; Bonotto & Santo, 2015; Dakhi, 2022; D. Haylock, 1997; D. W. Haylock, 1987; Kamalasari et al., 2019; Kaufmann, 1988; Leung, 1997; Maier, 1970; Pramestika et al., 2020; Septian et al., 2019; Shella et al., 2018; Silver, 1997; Siswono, 2010a, 2010b, 2016, 2018; Siswono &; Novitasari, 2007; Weisberg, 1988; Yuliati &; Lestari, 2019)	The interaction between formulating a problem-solving plan and solving a problem can be seen as a creative process that takes place. This statement can be supported that in one of the (Polya, 2004)*syntax* of problem solving there is a process of sharing ideas and solving a problem or choosing the right solution to be used as a solution to a problem. The process of solving problems or divergent processes is in accordance with indicators of creative thinking, namely solving problems. There are several indicators of creative thinking ability, including (Silver, 1997; Siswono, 2010a, 2016, 2018; Siswono &; Novitasari, 2007)*fluency, flexibility,* and *novelty (silver citations; tatag citations).* Fluency indicators can be met at the stage of students exploring open problems, with many interpretations on problem solutions and answers. Flexibility indicators are met at the stage of students solving problems in various ways. Lastly on the *novelty* indicator is fulfilled Students re-examine the solution method or answer they have encountered

No	Learning Models That Can Improve Creative thinking Ability	Explanation of syntax that can impro students' creative thinking ability
		); Then proceed to produce other, different solutions to the problem (Polya, 2004; Silver, 1997; Siswono &; Novitasari, 2007)
2.	***Problem Posing*** ((Ayllón et al., 2016; Bonotto & Santo, 2015; Kontorovich et al., 2011; Leung, 1997; Shriki, 2013; Silver, 1997; Siswono, 2005, 2010a, 2010b, 2018; van Harpen &; Sriraman, 2013; Yuan & Sriraman, 2011)	Issue filing, or issue discovery, has long been viewed as a characteristic of creative activity or extraordinary talent in various fields of human endeavor. For example, it studies artistic creativity and characterized problem search as central to creative artistic experience. Related observations have been made about professionals in different fields of science. Policastro & Gardner, (1999) Mansfield & Busse, (1981) explain that Problemsolving is an activity task that leads to a critical and creative attitude. Because in submitting problems students are asked to make questions from the information provided. Even though asking is the root of all creation. People who have the ability to create (create) are said to have a creative attitude The opinion is relevant that in the syntax of (Shaheen, 2010)*problem posing*, the teacher selects a topic and asks students to divide groups. Each group is tasked with creating a story problem as well as solving it. Students are given questions and asked to list a number of questions related to the problem which according to asking questions and listing questions related to the problem is a creative activity. Fluency or Siswono, (2005)*fluency* indicators are met on syntax Students create many solvable problems Students share the problems posed. The *flexibility* indicator is filled with Students posing problems that can be solved in different ways. The last indicator is novelty which can be met by students examining several problems posed then posing a different problem(Polya, 2004; Silver, 1997; Siswono, 2005)
3.	***Problem Based Learning***(Awang & Ramly, 2008; Birgili, 2015; Hagi &; Mawardi, 2021; Khoiri et al., 2013; MZ et al., 2021; Zinc, 2000; Suparman & Husen, 2015; Tan et al., 2009; Utomo et al., 2014; Vera et al., 2019)	Creativity researchers have recommended problem-based learning (PBL) as a program to achieve the goal of enhancing creativity in general, rather than a specific ability domain (. Problem-based learning (PBL) has been advocated as an alternative, more progressive approach to instruction and one that is based on offering, opportunity, for, coaching, creativity, and for its development. divergent thinking processes are also well formed using the PBL learning model (neber's citation). This statement is also supported by the opinion that there are seven steps or syntax of PBL that when applied from beginning to end can explicitly stimulate the divergent thinking process and also the creative thinking process of the student (Neber's citation; walsh citation): (1) Identify the problem (2) Explore pre-existing knowledge. This syntax can satisfy Plucker & Nowak, 2000)(Zinc, 2000; Tan et al., 2009)*the fluency* indicator(3) Generate several hypotheses to solve the problem. This syntax can

No	Learning Models That Can Improve Creative thinking Ability	Explanation of syntax that can impro students' creative thinking ability
		meet indicators of creative thinking *ability flexibility* (4) Identify learning problems (5) Self-study (6) Application of new knowledge to solve problems (7) Assessment and reflection of learning. This syntax satisfies the indicators of novelty's creative thinking ability
4.	***Guided Inquiry***(Klein, 1982; Malau et al., 2020; Thompson, 2017; Wahyudi et al., 2019; Wahyuni &; Husein, 2019; Zubaidah et al., 2017).	One learning model that can support creativity is guided inquiry. The guided inquiry learning model is designed to provide a learning experience for students through the scientific method. In this model, students ask questions and conduct investigations to find answers. Students are actively involved in observing, questioning, making hypotheses, seeking information, discussing, expressing opinions and objections, concluding, and presenting their findings. The process that occurs in this activity provides opportunities to come up with unexpected new ideas. The inquiry learning model emphasizes student activities that are active in learning. Activities in inquiry learning provide learning experiences that attract students' attention, encourage students to make discoveries through various observations and experiments, help students to reveal their various potentials, help students actively through the creative process and maximize memory of activities obtained through direct experience.
5.	***Project Based learning*** (Gunawan et al., 2017; Hanif et al., 2019; Husna et al., 2019; Ismuwardani et al., 2019; Leksani &; Syaodih, 2018; Lindawati et al., 2013; Lou et al., 2017; Pujiriyanto et al., 2017; Sari &; Angreni, 2018; Titu, 2015; Ummah et al., 2019; Zhou, 2012)	Project-based learning is able to guide students in conducting group research on a project so that they can gain new insights and solve problems with their knowledge. explained that project-based learning (Pjbl) has the opportunity to have a positive impact on creativity because students will develop their own ideas to create products that these products will later be used in the solution of problems presented by teachers to students. states that PjBL provides opportunities for learners to research, plan, design and reflect on making technology projects The process of thinking about what kind of project design can be a solution to a problem is one of the syntax that can improve the creative thinking skills of students.(Bell, 2010)Hanif et al., (2019) Zhou (2012)
6.	***Discovery Learning*** (Fasko, 2001; Istiqomah et al., 2018; Karlins & Schroder, 1967; Kirschner et al., 2006; Kusumawardhani et al., 2019; Nazirun & Candra, 2021; Nurhayati &; Wahyuni, 2020; Rahman, 2017; Ratnaningsih, 2017; Suwandari et al., 2019; Wahyudi et al., 2019).	Another technique for developing creativity is the inquiry-discovery or problem-solving approach, which is an indirect teaching method suggesting that creativity is related to the process of discovery. They state that "experience with discovery learning enhances creative performance by facilitating students to manipulate the environment and generate new ideas". It has also concluded through its research that the creative process of fluency, flexibility, elaboration, and originality is contained or contained in the discovery learning model. (5) Provide time for students to manipulate, discuss,

No	Learning Models That Can Improve Creative thinking Ability	Explanation of syntax that can impro students' creative thinking ability
		experiment, fail, and succeed, the fifth syntax of this discovery learning model that best demonstrates the syntax that can trigger creative thinking skills.(Treffinger, 1980).Treffinger (1986)Treffinger (1980)

Based on the data presented above, there are several learning models that can improve the creative thinking ability of students. There are among them: problem-solving learning models, problem posing, problem-based learning, project-based *learning, inquiry,* and *discovery learning*. Researchers put learning models into the data, because there are many researchers who have proven it (see Table I) with various types of research used, and there is a coherence of opinion among one another. When examined in more detail, learning models that can stimulate students' creative thinking skills can be grouped into (1) problem-based learning models (2) *inquiry-based* learning models, and project-based learning models. The grouping of these models can be seen in table 2 below:

Table 2. Grouping of learning models that can improve students' creative thinking skills

Problem-Based Learning Model	Discovery-Based Learning Model (*inquiry)*	Project-Based Learning Model
Problem Solving, Problem Posing, Problem based learning.	*Guided inquiry, Discovery learning.*	*Project based learning*

The models found above are a collection of models obtained by researchers from previous research, which when juxtaposed with research with other types are proven to improve creative thinking skills such as PTK, experiments and development of the theory in the(Leksani &; Syaodih, 2018; Mardhiyana &; Sejati, 2016; Muti'ah &; Mulyono, 2019; Subakti et al., 2021). study is evident from the results of the research above which contains models that have been proven valid to improve creative thinking skills. In the ability to think creatively built by students, the ability to think creatively is not an ability that can be formed instantly. states that there are processes and indicators in the level of creative thinking. These indicators include: synthesizing ideas, building or generating ideas and applying these ideas in a solution to the problems presented. This is in accordance with the opinion of Lesh et al (2000) and (Kozlowski et al., 2019) which states that when teachers provide learning to students in the form of activities that can produce models and concept discovery, it will foster students' mathematical creative thinking skills. As well as the results of research by Rambe, Sinaga, &; Yusnadi (2018), Anggraeni &; Suparman (2019) and Istiqomah &Suparman (2020) which said that by developing mathematics learning tools based on discovery learning, giving projects and problems, it will provide results in increasing students' creative thinking skills. Krulik & Rudnick, (1995); Tatag, (2011)

This is relevant to those who suggest that the creative thinking process according to consists of several processes, including: Students understand the problems given by the teacher who has also been described in the table above. The process of understanding this problem includes the stages of finding goals, finding data or facts and finding problems as the target of questions. At this stage students are divided into groups. Each group is given a data

or fact. Through this fact, students can be stimulated to make a problem as a question to be answered or solved together. The second stage includes building ideas and planning actions. Generating ideas involves decreasing options for answering open-ended problems. Students together a group that has been formed since the beginning builds and designs ideas together as a way of solving the problems presented.) At this stage, students are very likely to produce many choices of ideas (thinking fluently), giving a variety of possible choices (flexible thinking), producing something new or unusual (original thinking) and refining or examining in detail those choices (elaborative/detailed thinking). Once the ideas have been mutually agreed upon, students together with the group can design actions to solve the problem given by the teacher. Understand problems, build ideas and plan actions. The steps of planning action include the stage of finding solutions and finding support (research courtesy of D. Haylock (1997)*acceptance-finding*). This stage, the individual analyzes, refines or develops a selection of suitable ideas. At the last stage, students can choose the one idea that is most likely to solve the problem given by the teacher and carry out the idea with an action.

In short, this indicator of creative thinking consists of building an idea and turning that idea into a step (citation lumsdaine). These indicators as well as these measures are indeed all in the models that the researchers have mentioned in the table. All of these models have syntax to make a solution to the problem constructed by the teacher. This problem-solving process is what creates a creative process so that it can encourage and stimulate the creative thinking ability of students to form. Creativity or the ability to think creatively itself can be formed through an activity that can accommodate someone to be able to compile a solution, evaluate and compile again (Balka citation). Therefore, learning models that can facilitate it do have the characteristics of student-centered or student-centered learning, of course. In addition, the models above have syntax characteristics to solve or find something independently, because with the ongoing process students become able to think creatively to find how to find or solve it.

Conclusion

Based on the results of research and discussion described above, researchers can conclude that learning models that can improve creative thinking skills can be classified into three types of learning models. The three types of models include: (1) problem-based learning models, (2) discovery-based learning models, and (3) project-based teaching models. The learning models include: problem solving, problem posing, problem based learning, *guided inquiry learning, discovery learning, and project based learning.* The learning model was chosen because it has been proven by many researchers and coherence on syntax and indicators of creative thinking ability. This research certainly has shortcomings that can be refined by other researchers and can be an input for researchers who then want to develop products to improve the creative thinking ability of elementary school students, considering the importance of this creative thinking ability, teachers in elementary schools should pay more attention to this by critically evaluating whether the learning that has been given has accommodated these abilities.

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