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Article

Meta-Analysis of Various Collaborative Learning Background in Natural Science Teaching and Learning Process

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ABSTRACT

This meta-analysis study aims to determine the background of collaborative learning in science learning. The sample used was purposive sampling related to research on the background of collaborative learning in natural science teaching and learning process with seventeen research samples. Six classes actions will be used as samples to find the background for the application of collaborative learning in science learning, while the other 11 plus 6 existing classroom action studies were used as supporting materials for the background. Results based on a meta-analysis study, it was found that 29.40% of collaborative learning was motivated by the lack of students' social skills. In addition, there were also 6 problems that underlie related or emerging studies, including the lack of absorption and mastery of student learning, passive students, low student motivation, lack of innovative learning strategies, lack of innovative learning media, lack of social skills of students, low critical thinking skills of students.

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INTRODUCTION

Elizabeth E. Barkley (2014:4), in his book Collaborative Learning Techniques states that collaborating means collaborating with other people. Collaborative learning practice means working in pairs or in small groups to achieve shared learning goals. According to Ted Panitz (1996), he argues that the term collaboration refers to the philosophy of interaction and personal or personal lifestyle. He explained that collaborative learning is a personal philosophy, not just a classroom learning technique. According to Asrori (2003:110), defining collaboration is defined as a process in which two or more people plan, carry out, and collaborative activities. Collaborative learning means learning tworking in pairs or groups, not learning in isolation.

Collaborative learning means learning working in pairs or groups, not learning in isolation. According to Susan Hill (1996: 5), she argues that collaborative classes can

increase awareness and sensitivity to one another so that they can build positive collaboration and can develop the ability to communicate ideas.

Flannery in Barkley (2007: 5), suggests that collaborative learning with groups can help the learning system to stay on the classical traditional line. According to KBBI classical means together in class. According to KBBI classical means together in class. According to Danic (2000:1), he argues that collaboration can be used as a way to encourage students to participate in a group. According to Foreman (1996), he revealed that there are four stages of collaborative learning, namely: (a) Forming (forming), (b) Storming (flowing), (c) Norming (norms), (d) Performing (doing).

Sukasmo (2016), collaborative learning is described as a learning model in which students work together in small groups to achieve the same goal. According to Eijil et al (2005:51), students will learn more by finding them together. Unnecessary, collaborative learning or collaborative learning is described starting from the division of students into several small heterogeneous groups with the number of members in each group consisting of 4-5 people After dividing the groups, each group will be given a problem that they must solve t group discussion and collaboration. Case, the source of knowledge is not only from the teacher but students can look for other sources of knowledge such as books, the internet or the object directly to solve the given problem. When working in groups, students will hone their social skills in communicating to solve problems. Then the results of their group discussions will be presented in front of the class either orally or in writing if necessary accompanied by interesting media to better explain the results. Next, the teacher will open a question and answer session between students to form a larger discussion and interactive learning. This discussion will support interactive learning. At this stage, teachers are always required to develop the competence and abilities of their students. According to Maslow in Anita Lie (2007: 5) he states that teachers need to make efforts to develop students' abilities and competencies.

Collaborative learning is based on different epistemologies and stems from social constructivism. According to Matthews (2014: 8) argues that photographing the philosophical essence that underlies collaborative learning by stating "Collaborative learning" can take place if educators and students work together to create knowledge. This can be in the form of interactive learning in the classroom. Social interaction between students and students as well as students and teachers will create an emotional and intellectual bond. Interactive learning is by following per Government Regulation Number 15 of 2015 concerning National Education Standards which states that the learning process should be carried out interactively, inspiring, fun, challenging, and motivating students to participate actively and provide sufficient space for initiative, creativity and independence by following per talents, interests, and development of learners.

Collaborative learning is a pedagogy that has its center in the assumption that humans always create shared meaning and the process always enriches and broadens their horizons. In an effort to enrich and broaden knowledge, social interaction with others is needed to exchange ideas, one of which is learning. Kaendler et al (2014: 505) state that collaborative learning occurs when students depend on each other because of different perspectives and knowledge. ach learning has its goals, one of which is collaborative learning. The purpose of collaborative learning is to increase student interaction in understanding a theoretical concept and students can explore whatever is on their mind. According to Bruffe in Barkley (2007: 6) states "Knowledge is something people construct by talking together and reaching agreement" which means that knowledge is built as a result of joint discussions and reaching an agreement.

Setiadi et al (2013:95) reveal that interaction is a process in which people communicate that influence each other in thoughts and actions. Basically, humans in everyday life will not

be separated from social interactions, both relationships with one another, where the behavior possessed by individuals influences, changes, or improves the behavior of other individuals or vice versa.

The form of social interaction in the classroom when collaborative learning is applied in natural science teaching and learning process is in the form of cooperation. Cooperation is an associative interaction where people or groups help to achieve common goals. In addition, there is a dissociative interaction in the form of competition. According to Sujarwanto (2012:62) competition is a social process, in which individuals or groups of people compete for profit areas of life that exist at a certain time to become the center of public attention by attracting public attention or by sharpening preconceived notions. exist, without the use of threats or violence.

The social interaction of students in the classroom in learning will have a positive impact on them. According to Melvin, when they study with friends, rather than alone, they get emotional and intellectual support that allows them to exceed the threshold of skills and knowledge they have now. Emotional and intellectual support arising from collaborative learning due to a sense of trust between others and sharing of knowledge. When the sense of trust and mutual knowledge sharing is higher, the emotional and intellectual ties will be closer and higher as well. This will increase the chances of successful interactive learning and students' social skills.

Before implementing collaborative learning in natural science teaching and learning process, teachers as educators must know the problems faced by students and the reasons for choosing collaborative learning to be applied to their learning. The background of the selection of collaborative learning in natural science teaching and learning process is very varied according to the problems faced by students in natural science teaching and learning process.

The choice of collaborative learning model carried out by teachers is because collaborative learning is seen as a process that can build and maintain the same concept on a problem. From this point of view, the collaborative learning model is efficient because each member of the study group is required to think interactively. The learning process that applies the collaborative learning model, the teacher can share authority with students in various special ways such as group learning. Teachers can encourage and convince students to use the knowledge they have, how to respect their colleagues and how to focus on high-level understanding. This can be used as a reference for assessing students' attitudes towards each other.

According to Daniel Muijs and David Reynolds (2008:89) states that the teacher acts as a facilitator, where the teacher only provides support but does not drive the group towards the results that have been prepared in advance. Teachers simply link new information to students' experiences with learning in other areas, helping students determine what to do if students have difficulty and helping them learn how to learn. In this case, students are required to always be active in learning while the teacher only monitors and helps a little when students feel they need it.

In addition, the teacher's role as a model can be realized by sharing thoughts about something (thinking aloud) or showing students how to do something gradually (demonstration). Teachers can show students how to think difficult group situations and equally important communication problems. This can be exemplified by how to make plans, monitor task completion and measure what has been learned. In addition, the teacher's role as a trainer has the main principle of providing sufficient assistance when students need it so that students remain responsible for their learning process. This is done by providing feedback cues, and redirecting students' efforts and helping them use certain strategies.

According to Barkley in Morgi Dayana (2015:7) he revealed that collaborative learning has advantages, including: (a) students can develop rational thinking, (b) students can learn to work together, (c) students can learn to negotiate, (d)) the existence of healthy competition, (e) students can learn to respect the opinions of others.

Meanwhile, according to Gunawan (2007:127-128) he argues that collaborative learning has several additional values, namely: (a) increasing respect for others, (b) training care, concern, and willingness to share, (c) prioritizing the interests of others. groups above personal interests, (d) train emotional intelligence, (e) train the ability to cooperate/teamwork, (f) hone interpersonal intelligence, (g) train conflict management, (h) train to listen to other people's opinions, (i) increase self-confident when asking their friends, (j) practicing communication skills, (k) improving memory of the material being studied, (l) increasing motivation and learning atmosphere, (m) speed and learning outcomes increasing rapidly.

However, collaborative learning also has weaknesses. According to Alwasilah (2007:25) explains that collaborative learning has several weaknesses as follows: (a) there is a tendency to imitate the work of others, (b) it requires good supervision from the teacher because if good supervision is not carried out, the collaboration process will not work. effective, (c) it is difficult to find friends who can work together, (d) it takes a long time because it must be done with great patience.

There are so many studies on collaborative learning that are intended to develop effective and interactive learning methods. This method will develop students' social skills. In addition, collaborative learning also hones students' critical thinking skills towards a problem. This is by following per the content of the 2013 curriculum. The 2013 curriculum applies a scientific approach where students will be directed to do critical scientific thinking in solving a problem. These skills will be needed by students when they enter the community environment in addition to social skills. So, the researcher intends to map some research related to the background of collaborative learning in science learning.

METHODS

The method in this study uses meta-analysis. Meta-analysis is a study of several some many research results that have similar problems. The instrument used is the Human Instrument. Data collection techniques using documentation techniques. The samples taken were 17 research results in the form of journal articles, theses, theses, and dissertations. These studies were then classified based on the methods used in the research namely, there were 2 quasi-experimental studies, 3 survey studies, 2 descriptive studies, 2 development studies, 2 literature studies, and 6 classroom action studies. The purposive sampling technique, the sample was taken with criteria 1) related to the collaborative learning method, 2) related to the application of methods in natural science teaching and learning procces and 3) published between 2005-2018 (15 last years).

The research procedure uses the meta-analysis step of David B. Wilson and George A. Kelley (Merriyana, 2006) namely, 1) suggesting that determining the topic to be researched, the topic in this study is to describe the background of collaborative learning in natural science teaching and learning procces, 2) determine the period research results that are used as sources of data in research, which are published between 2005-2018, 3) look for research reports related to the problems and topics studied, 4) read the title and abstract of the research report to see the suitability of the content with the problem to be studied, 5) focus of research on the problem, place and time of research, method, population, sample, sampling technique, data analysis technique, and results, 6) categorize each study, 7) compare the results of all studies according to their category; 8) analyze the conclusions found by reviewing research results by reviewing the methods and data analysis in each study so that the strengths and

weaknesses of previous research can be known, 9) draw conclusions from meta-analysis research on the basis of the seventh and eighth steps.

The data analysis step is to find out the background that appears in the studies studied using an observation table sheet which is then represented in the form of a percentage. The percentage result will be converted into a percentage graph.

RESULTS AND DISCUSSION

A total of 6 out of 17 studies are known to use the classroom action method. According to Suparno (2008) Classroom Action Research (CAR) is action research conducted by teachers to improve the quality of the implementation of learning in the classroom. Some of them explained the background of the application of collaborative learning in natural science teaching and learning process.

Meanwhile, based on the results of class actions, it is known that the material used is science (IPA) in research. Natural science teaching and learning process (IPA) is closely related to collaborative learning and problem-solving approaches.

The average of the most research subjects conducted to junior high school students amounted to 66.67%, then for the student level of 16.67%, high school of 16.67% and elementary school of 16.67%. The following is in Figure 1. The percentage distribution of the research trial subjects is presented.

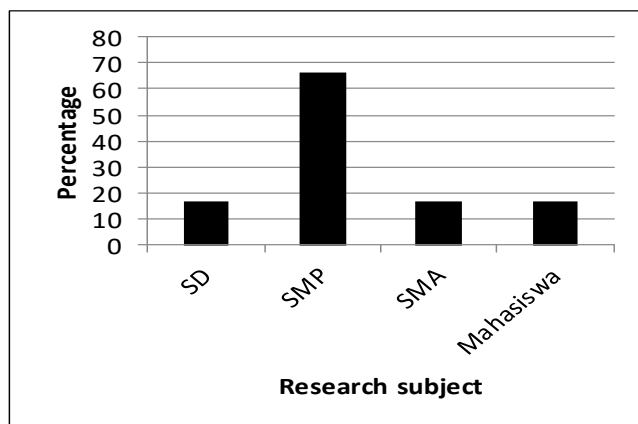


Figure 1. Percentage of test subjects of research related to collaborative learning.

According to the results of graphic observations, junior high school students are the most tested subjects. This is because junior high school learning has a close relationship and is still carrying out the researched activities in the form of fiber natural science teaching and learning process, they have sufficient time to be researched and get information. In addition, junior high school students can also be directed and conditioned so that learning takes place effectively.

Meanwhile, the second, third and fourth positions were occupied by elementary, high school, and college students with the same percentage of 16.67%.

In addition, there are many problems behind collaborative learning in natural science teaching and learning process. The problems behind collaborative learning in natural science teaching and learning process are the lack of absorption and mastery of student learning, passive students, low student motivation, lack of innovative learning strategies, lack of innovative learning media, lack of student social skills, and low critical thinking skills of students.

The average background behind research on collaborative learning in natural science teaching and learning process is the lack of absorption and mastery of student learning by 5.90%, passive students by 11.80%, low student learning motivation by 11.80%, lack of

effective learning strategies innovative by 17.60%, lack of innovative learning media by 11.80%, lack of student social skills by 29.40%, and low critical thinking ability of students by 11.80%.

This background emerged after the problems that arose in learning science. These problems will be the reason for implementing collaborative learning in science learning. The application of collaborative learning in natural science teaching and learning process is very compatible with the materials being studied. Science subject matter contains a lot of practicals to reveal a phenomenon in the field so that in proving it students can group up and exchange ideas with each other to solve it. This is by following the steps in collaborative learning. The following in Figure 2. is presented a diagram of the percentage of research background on collaborative learning in natural science teaching and learning process.

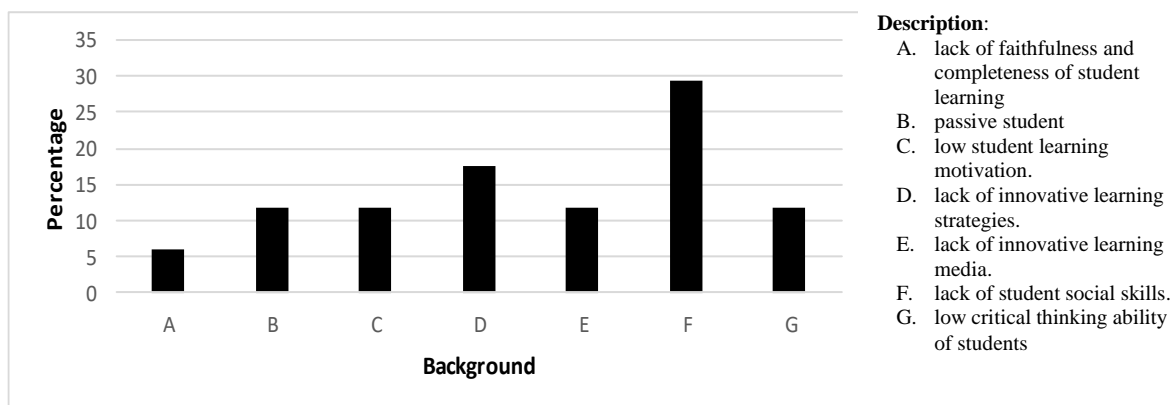


Figure 2. Percentage of research background on collaborative learning in natural science teaching and learning process

Based on the results of background mapping observations, it is known that 29.40% of collaborative learning backgrounds in natural science teaching and learning process are due to the lack of students' social skills at point F.

Basically the collaborative learning model is carried out in groups to gain emotional and intellectual experience from the social interactions carried out. According to Melvin (2007:173) he revealed that when they study with friends, rather than alone, they will get emotional and intellectual support that allows them to exceed the threshold of their current knowledge and skills.

Each student has different social skills, there are students who have high social skills and some have low social skills. Social skills according to Combs and Slaby in Cartledge and Milburn (1980) they reveal that social skills are the ability to interact with other people in a social context in a certain way that is acceptable and personally valued, mutually beneficial and beneficial to others. Social skills can be in the form of activities to form a group, participate in groups, encourage friends to participate, respect the differences of opinion of others in the form of tolerance, work together, and communicate ideas. This is following collaborative learning which emphasizes more on the social interactions that arise in learning. Therefore, the implementation of collaborative learning will improve students' social skills.

According to Styron (2014:25) states that interaction between students, group work, and conversation can increase collaboration and develop critical thinking skills..

This collaborative learning model requires teachers, lecturers, or educators who are creative to organize learning and can work responsively to learning. When students learn, they already have a clear goal. This model also provides reciprocity in the form of active interaction between students and students and students with teachers and finally, they are in

the same perspective namely, being learners. Even in certain situations, teachers and students will learn about the same thing (Mahmudatussa'adah, 2011: 3).

Collaborative learning is by following per natural science teaching and learning process because the stages are very suitable to be applied to science material where the science material contains many practicals that require group collaboration in solving a problem. According to Suyatno (2009:46) he argues that collaborative learning can provide opportunities that lead to successful learning practices that involve the active of students and minimize differences between individuals. These differences between individuals will be eroded along with a sense of complementarity and strong trust.

Perkins quoted by Martinis Yamin (2011:25) he revealed that collaborative learning is learning that students do together and solve problems together and not learn individually, this learning shows the distribution of intelligence between one student and another. during the collaborative learning process. Furthermore, according to Adi W. Gunawan shows that collaborative learning is not just working together in a group, but rather focuses on a learning process that includes a complete and fair communication process in the classroom. Good communication will create more relaxed interactions between individuals.

Then at point D occupies the second position after point F. At point D the percentage is 17.60%, namely the background in the form of a lack of innovative learning strategies. Monotonous learning will cause students not to be interested in learning so teachers need to make learning more interesting with the innovations they develop. According to Degeng (1999) argues that the current learning atmosphere is still boring, it has not been directed to an "exciting" learning atmosphere. Exciting here means "an interest in itself" were learning at this time has not attracted much interest in student learning.

According to Ardhana (1997) he argues that the learning process is not optimal due to two things: (a) the learning process is still centered on educators, that is, it has not been directed to learner-centered learning, (b) the learning process is still informative, that is, it has not been directed to the learning process. active learners to build their own knowledge.

In this case, the teacher has an important role in creating interesting and fun classes to form interactive but also interesting learning. According to Elizabeth B Hurlock, playing in groups with friends is more fun than playing alone. Similar to learning, group learning is more fun than individual learning. Fun learning will attract students to follow it. Fun learning usually includes innovations from the teacher that are applied in the classroom. Innovation must be equivalent to student activity in learning.

Learning experiences innovation, but if students are not active, then learning does not run smoothly and successfully, so it is necessary to actively participate in learning to turn on learning. One of the ways is collaborative learning that emphasizes students' social skills. The application of collaborative learning in learning will lead to an active class because of active social interaction in the classroom. In addition, with this learning, students will hone their social skills.

In addition to honing students' social skills, the teacher's social skills will also be hone because the teacher becomes a facilitator in the class. Interactive learning will make the classroom atmosphere more cheerful so that students will refocus because learning is interesting.

Furthermore, points B, C, E and G have the same percentage of 11.80% with successive backgrounds namely, passive students, low student motivation, lack of innovative learning media and low critical thinking skills of students. The existence of collaborative learning with various activities that emphasize social skills in learning will change the nature of students who were previously passive to become active because of a learning demand to be active. Students who were previously passive will always try to change themselves to be active with the support of an interactive classroom atmosphere.

In addition, if learning is given innovation in the form of creative ideas, students will be interested in learning which at a break-even level students will be motivated to take part in learning. One of the ideas is to place students in heterogeneous groups to solve a problem. Problems given to be solved require cooperation between group members which is based on strong social interaction skills and critical thinking skills to find solutions to these problems in a discussion. According to Fascione (2015: 31) he argues that the core of critical thinking is part of cognitive skills that include interpretation, analysis, evaluation, reasoning, explanation, and adjustment. Students who think critically usually actively ask the teacher and have high self-confidence. After finding the solution to the problem, students will present their results in oral and written form accompanied by interesting media to make it easier to explain the results of their group collaboration.

As in the previous discussion, point A has a percentage of 5.90% with a background of lack of absorption and mastery of student learning. Students' absorption of natural science teaching and learning process can be increased by implementing collaborative learning where students will be directed to understand the basic concepts of the material being studied, not just memorizing theory. If students understand the basic concepts of the material, then the absorption of the material is also easier and can last a long time compared to memorizing theory. The lack of student absorption of learning materials will have an impact on student learning mastery so that in delivering the material, the teacher must explain it gradually and not in a hurry because each student has different absorption of material.

According to Sudjana (2009:32) he argues that learning outcomes are the skills of a student after obtaining a learning experience. Meanwhile, in the opinion of Djamarah (1994:15) states that learning outcomes are the result of the educational of the progress made after learning activities. In essence, learning outcomes are the result of the material knowledge that can be accepted and understood by students after carrying out learning activities.

In collaborative learning or collaborative learning after presenting a group presentation, the teacher can form a question and answer session between students so that a class discussion is formed, then the teacher justifies the student's statement if an error occurs so that there are no misconceptions.

Before closing the lesson, the teacher can review the material again by throwing some provoking questions to students and then explaining the material in stages to students.

CONCLUSION

The reason behind doing collaborative learning research on natural science teaching and learning process is because the following problems are found: lack of absorption and mastery of student learning, passive students, low student motivation, lack of innovative learning strategies, lack of innovative learning media, lack of student social skills and the low critical thinking ability of students. The background that underlies or occupies the first position on the application of collaborative learning in natural science teaching and learning process is the lack of students' social skills. The second position is occupied by a background in the form of passive students, low student learning motivation, lack of innovative learning media and low critical thinking skills of students. The background in the form of a lack of absorption and mastery of student learning occupies the last position. Collaborative learning in natural science teaching and learning process is widely applied in junior high schools.

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