Using Cooperative Learning Models of The Bamboo Dancing Type to Improve the Skills of 4C Students.

Arvyaty¹, Salim¹*, Kadir¹, Kodirun¹, Ruslan², Hariani²

¹Department of Mathematics Education, Universitas Halu Oleo, Indonesia
²Sekolah Menengah Pertama Negeri 10 Kendari, Indonesia

* e-mail: salimmps@gmail.com

Abstract. Mathematical learning is essentially related to problem solving, reasoning and abstraction, which can be used to level 4C skills. One interesting mathematical learning model for practicing creative and critical thinking skills is a cooperative learning model of the bamboo dancing type. This Model emphasizes the occurrence of cooperation between students in pairs in large groups, shifting each other to move position according to the clockwise direction to solve a problem, students actively communicate and Collaborate to resolve specific issues and within specific time constraints. The results of this study show that: (1) Students can explain and exchange information with their friends, (2) students can learn how to convey information correctly, so that their friends can understand it, (3) students can grow and increased cooperation in a group to resolve a particular problem, (4) students can increase its tolerance to differing cognitive abilities of students, (5) students can strive to think critically and creatively.

Keywords: mathematical learning, communicate and collaborative, critical, creative

1. Introduction

People are in an ever-expanding global era and of course, this is also a challenge for mankind. This global development makes people never satisfied with everything, especially developments in the field of technology. The developments are not separated from the educational and learning world aimed at helping learners to be critical, active, creative and innovative human beings so that people can continue to survive in the era of globalization and rapid technological developments.

One of the implementations that can be used is related to development of learning activities that refer to the four characters studying in the 21st century or called the 4C skill, which is creative thinking; critical thinking and problem solving; communication, and collaboration. Furthermore, the Partnership for 21st Century states that to prepare for learning and innovating skills, the community requires a skill of 4C [1].

Skills of 4C also emphasized the 2013 curriculum where creative active learning activities are centered on learners with teachers as facilitators. The 2013 curriculum proclaimed by the Government of Indonesia refers to the 21st Century Skills based on the domain knowledge, skills, attitudes, values, and ethics known as KSAVE [2]. One of the learning models to support the 4C skills of 21st century skills is the cooperative learning model of bamboo dancing.
The implementation of the cooperative learning model of bamboo dancing type will essentially relate to the effort to answer the challenge of learning in the 21st century that is required to have 4C skills, namely creative thinking; critical thinking and problem solving; communication and collaboration in order to be able to compete both in national and international. In mathematics learning, it also emphasized skills in problem-solving. In fact, to solve a problem (mathematics) required skills of creative and critical thinking. Therefore, the cooperative learning model of bamboo dancing type can improve students’ communication and collaboration skills as well as be a learning model that can enable students to learn. According to Eioson, active learning strategies can be used to engage students in matters; (a) to think critically or creatively, (b) communicate with colleagues in both small and one class groups, (c) express ideas by writing, (d) explore attitudes and personality values, (e) give and receive feedback, and (f) reflection learning process [3].

The cooperative learning model of bamboo dancing type has an impact on the learning that is: (a) the occurrence of the flow information between students and thus enriching student knowledge; (b) learning media for students to properly convey information so that other students can understand and understand it; (c) to foster and improve cooperation between students; (d) increasing the tolerance and mutual respect among students in the event of a disagreement. (f) increase student thinking because later students engage in discussions.

The purpose of the study was to analyze the application of the cooperative learning model of bamboo dancing type to improve the skills of 4C students.

2. Literature Reviewer
Cooperative learning results in students' learning outcomes to be better than individual learning [4]. Cooperative learning is more effective than conventional learning [5, 6]. Teachers need to master the mathematical subject matter given to students and can choose a cooperative learning model that matches the content of the material being taught [7]. Bamboo dancing is a model of cooperative learning that can be used. Learning with bamboo dancing is learning that will activate the cognitive structure of students where at the beginning of students will listen to the presentation of information from the teacher and then students will learn in a group of in pairs and students will share information at the same time [8].

The 2013 curriculum demands in Indonesia make each teacher must design creative learning and bamboo dancing is one of the cooperative learning models that is suitable to be applied because it can train the creativity of students. This is because cooperative learning adheres to the constructivism theory that knowledge is built by students [9]. The steps of bamboo dancing model are: (a) half the class (or quarter if the number of students too much) stands parallel. If there is a large space, students can row in front of the class. Can also students stand lined during rows of benches; (b) the other half of the class interlining and facing the first line; (3) two students who are paired together and intertwined with sharing information; (4) two students who stood at the end of one of the ranks moved to the other end in his ranks. This lineup will continue to shift. Each student gets a new pair to share [10].

The 21st century prowess that reflects the 4C that these skills include the ability to solve complex problems, critical thinking about assignments, communicating effectively with people from different cultures and using A variety of different techniques, working with others, adapting to the rapidly changing environment and conditions to perform tasks, to effectively manage a person's work, and to acquire skills and information own new [11].

Skill of 4C includes: (a) critical and problem-solving skills, (b) collaboration skills, (c) communication skills, and (d) creativity and innovation skills. These four skills are known as 4C [1]. Measurement of 4C capability can use HOTS with characteristics that are nonalgorithmic, complex, multiple solutions, involving a variation of decision making and interpretation, application of multiple criteria, and is effortful [12].

The ability of 4C is a competency that must be mastered by current students in order to meet the demands of the development of science and technology and world industry [13]. Students must hone
their skills and improve their learning to be able to face global challenges, such as critical thinking skills, effectively communicating skills, innovating and resolving problems through negotiation and Collaboration [14]

3. Method
The approach in this study uses quasi-experiments with the research design of one group pretest-post test design. This design can be described in advance that the experiment class was given a pre-test, after which the experiment class was given treatment by applying a cooperative learning model of bamboo dancing type and the end of the meeting was given questions post-test. This study was conducted at the 10th State Junior High School in Kendari, with the group of experimental subjects involving only one class of students from Grade VII-5 years in 2018/2019. Research instruments to measure the increased ability of 4C students using tests in the form of a higher-order Thinking category (HOTS)

Analysis of the increased ability of 4C students using inference statistics with test paired t-test with the formula [15]:

\[ t = \frac{M_d}{\sqrt{\frac{\sum x^2}{n(n-1)}}} \]

Increased ability of 4C students also presented in the form of bar charts and strengthened by statistical analysis using the test paired t-test. Data processing uses the SPSS program's help with the decline of Ho criteria if the value of significance is less than \( \alpha = 0.05 \) which means that there is a significant increase in the ability of 4C students after the implementation of the cooperative learning model of bamboo dancing type.

4. Results and Discussion
The implementation of the cooperative learning model of bamboo dancing in the mathematics learning class six times a meeting on the material of algebraic. The results of the analysis of the capacity of 4C based on HOTS problems given by the students after obtaining treatment with a cooperative learning model of bamboo dancing shows that there is an increase in the ability of 4C students. The analysis results are presented in Figure 1 below.

![Figure 1. Increased skills of 4C students](image)

The result in Figure 1 shows that there was an increased ability of 4C students of 35.5 from an early average of 36.72 to 72.22. To know the significance of the increased ability of 4C students followed by statistical analysis of test paired t-test. The recapitulation of the statistical test results is presented in Table 1 below.
Table 1. Statistical Test Increased Ability of 4C Students

| Data      | Average | Sig   | Conclusion   |
|-----------|---------|-------|--------------|
| Pre-Test  | 36,72   | 0,000 | Reject Ho    |
| Post-Test | 72,22   |       |              |

The results of the analysis in Table 1 above indicate that the value of sig = 0.000 < 0.05. This means Ho is rejected so that there can be a significant increase in the ability of 4C students after obtaining treatment with a cooperative learning model of the bamboo dancing type.

The application of bamboo dancing in class VII-5 students of the state Junior high School 10 Kendari, each meeting is given a student worksheet that always contains the same 3 problems/questions for each group, and the paper to record the answers to results of the discussion in the group prepared 3 pieces/group, to accommodate the answers of each pair (small group). When a pair changes to discuss a new question, the paper answer is not transferred. It aims to detect how the students answer the model when getting a new pair.

There is some information obtained from the answer sheet which is filled by various small groups, among other others: (a) the spouse that both women members, more regularly how to answer, more communicative and understandable answer (though sometimes the results are less precise) and more active in discussions. This tends to see whether the female student's partner is different or equal in its ability, (b) the couple who are both male members, there are two phenomena, if both happen to be high enough of their ability, then the answer is often right Although less orderly and less communicative. The time used to solve the problem is a quite short, consequently less noticeable discussion with the couple. If a small group of students is clever and less combined, there is more clever domination of students to solve the problem and students who are less resourceful. If both students are less resourceful, they look resigned and less effort to solve the problem, just see the answer to the other pair, (c) if both are different genders, there are obstacles when discussing the question. The process of adaptation because of new students from different schools is a factor of triggering the situation. But when they have known each other, the discussion is live and the answers they make are also more often appropriate.

The other general tendency also appears that there are less happy students when the partner is changing, especially if it gets a lower-spouse ability. An Alternative solution is to: (a) familiarize them with anyone in the large group, which is arranged heterogeneous, (b) to provide character reinforcement to students who tend to choose friends, (c) to give students the opportunity who are less resourceful to perform group presentations representing the group, even when answering on the board, guided by the teacher. This aims to arouse his confidence and also so that a group of friends believes that students are less intelligent can answer the origin given the opportunity to learn and be guided. A student's work to guide a friend/partner.

The cooperative learning model of bamboo dancing type makes students bolder to raise their hands when responding to apperception in the initial activity, even students who have been very passive in the study have ventured to answer. Character tolerance is already quite visible among many couples, including different pairs of their own abilities. Cooperation begins to wake up to every couple, after getting used to discussions. This has a positive impact on the value of each group's improved task. The support of the research results was also expressed by Ma'ruf and Rika [16] that using bamboo dancing methods can increase students' motivation in the fluency of speech and make students active to speak in the learning process.

5. Conclusion
The conclusion of the research results is to improve the skills of 4C (creative thinking, critical thinking, and problem-solving, communication, and collaboration) students of the junior high school class VII, teachers can apply the cooperative learning model of bamboo dancing type. This is because applying a model of bamboo dancing students can: (1) explain and exchange information with his friend, (2) learn how to convey information correctly, so that his friend can understand and
understand, (3) cultivate and increased cooperation in a group to solve certain problems, (4) improve its tolerance to the difference in cognitive ability of students, (5) seek to think critically and creatively.

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