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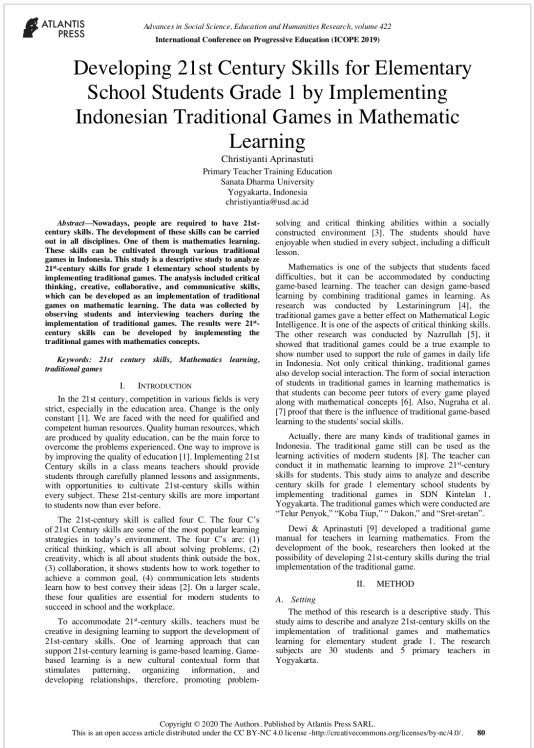

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Developing 21st Century Skills for Elementary School Students Grade 1 by Implementing Indonesian Traditional Games in Mathematic Learning

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***Abstract*—Nowadays, people are required to have 21st-century skills. The development of these skills can be carried out in all disciplines. One of them is mathematics learning. These skills can be cultivated through various traditional games in Indonesia. This study is a descriptive study to analyze 21st-century skills for grade 1 elementary school students by implementing traditional games. The analysis included critical thinking, creative, collaborative, and communicative skills, which can be developed as an implementation of traditional games on mathematic learning. The data was collected by observing students and interviewing teachers during the implementation of traditional games. The results were 21st-century skills can be developed by implementing the traditional games with mathematics concepts.**

Keywords: 21st century skills, Mathematics learning, traditional games

I. INTRODUCTION

In the 21st century, competition in various fields is very strict, especially in the education area. Change is the only constant [1]. We are faced with the need for qualified and competent human resources. Quality human resources, which are produced by quality education, can be the main force to overcome the problems experienced. One way to improve is by improving the quality of education [1]. Implementing 21st Century skills in a class means teachers should provide students through carefully planned lessons and assignments, with opportunities to cultivate 21st-century skills within every subject. These 21st-century skills are more important to students now than ever before.

The 21st-century skill is called four C. The four C's of 21st Century skills are some of the most popular learning strategies in today's environment. The four C's are: (1) critical thinking, which is all about solving problems, (2) creativity, which is all about students think outside the box, (3) collaboration, it shows students how to work together to achieve a common goal, (4) communication lets students learn how to best convey their ideas [2]. On a larger scale, these four qualities are essential for modern students to succeed in school and the workplace.

To accommodate 21st-century skills, teachers must be creative in designing learning to support the development of 21st-century skills. One of learning approach that can support 21st-century learning is game-based learning. Game-based learning is a new cultural contextual form that stimulates patterning, organizing information, and developing relationships, therefore, promoting problem-solving and critical thinking abilities within a socially constructed environment [3]. The students should have enjoyable when studied in every subject, including a difficult lesson.

Mathematics is one of the subjects that students faced difficulties, but it can be accommodated by conducting game-based learning. The teacher can design game-based learning by combining traditional games in learning. As research was conducted by Lestariningrum [4], the traditional games gave a better effect on Mathematical Logic Intelligence. It is one of the aspects of critical thinking skills. The other research was conducted by Nazrullah [5], it showed that traditional games could be a true example to show number used to support the rule of games in daily life in Indonesia. Not only critical thinking, traditional games also develop social interaction. The form of social interaction of students in traditional games in learning mathematics is that students can become peer tutors of every game played along with mathematical concepts [6]. Also, Nugraha et al. [7] proof that there is the influence of traditional game-based learning to the students' social skills.

Actually, there are many kinds of traditional games in Indonesia. The traditional game still can be used as the learning activities of modern students [8]. The teacher can conduct it in mathematic learning to improve 21st-century skills for students. This study aims to analyze and describe century skills for grade 1 elementary school students by implementing traditional games in SDN Kintelan 1, Yogyakarta. The traditional games which were conducted are "Telur Penyok," "Koba Tiup," " Dakon," and "Sret-sretan".

Dewi & Aprinastuti [9] developed a traditional game manual for teachers in learning mathematics. From the development of the book, researchers then looked at the possibility of developing 21st-century skills during the trial implementation of the traditional game.

II. METHOD

A. Setting

The method of this research is a descriptive study. This study aims to describe and analyze 21st-century skills on the implementation of traditional games and mathematics learning for elementary student grade 1. The research subjects are 30 students and 5 primary teachers in Yogyakarta.

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B. Data Collection

The data were collected by (1) observing, which was observed during the implementation of traditional games, (2) the questionnaire, which was distributed to teachers, (3) interviewing which was conducted in an informal setting, (4) documenting, which was during implemented traditional games.

C. Data Analysis

Data that has been gathered then analyzed using descriptive qualitative [10].The analysis step of descriptive model data was (1) data description, (2) data reduction, (3) checking data validity, (4) data analysis, and interpretation based on substantive theory.

III. RESULTS AND DISCUSSION

The results of this study about developing 21st-century skill are bellow (1) critical thinking, which is all about solving problems, (2) creativity, which is all about students think outside the box, (3) collaboration, it shows students how to work together to achieve a common goal, (4) communication lets students learn how to best convey their ideas

A. Developing 21st Century Skill by Implementing "Telor Penyok" game

Fig. 1. Telor Penyok Game

TABLE I. DEVELOPING 21ST CENTURY SKILL BY IMPLEMENTING "TELOR PENYOK" GAME

Procedure	***Category 21st Century Skill***	***Developing 21st Century Skill***
Students are divided into groups of 3-8 students The stake is plunged around "the parent" with a strategy to determine the exact location and amount so that the egg is not taken	Creativity	Students should make a strategy and think outside the box how to determine the egg
students who do not become "parents" set a strategy so that the eggs can be taken at most from the others	Creativity	Students should make a strategy and think outside the box how to take the egg
students take eggs and count the numbers	Critical thinking	The student should solve the problem given
when students succeed in taking it then write down on paper and communicate the results accompanied by reasons	Communication and Collaboration	The student should make collaboration with others and communicate the result and reason

B. Developing 21st Century Skill by Implementing "Koba Tiup" game

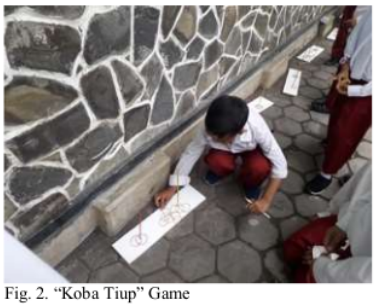

Fig. 2. "Koba Tiup" Game

TABLE II. DEVELOPING 21ST CENTURY SKILL BY IMPLEMENTING "KOBA TIUP" GAME

Procedure	***Category 21st Century Skill***	***Developing 21st Century Skill***
The game is done in pairs using rubber which is played by applying distributive properties students make a starting line horizontally, two sticks are stuck with a distance of more than 2 meters as a place of tens and units	Creativity	The student should make a strategy to make the starting line so that they can solve the place value of the numbers
the teacher gives a signal by saying numbers then student think how to solve	Critical thinking	When the teacher gives a signal, the student should think about how to solve the problem within the best solution
students throw the rubber from the start line according to the color on the stick place value	Collaboration	The student should make collaboration with others so they can get the right answer
students communicate the results of numbers	Communication	The student should present the answer

C. Developing 21st Century Skill by Implementing "Dakon" game

Fig. 3. Dakon game

TABLE III. DEVELOPING 21ST CENTURY SKILL BY IMPLEMENTING "DAKON" GAME

Procedure	*Category 21st Century Skill*	*Developing 21st Century Skill*
the game is done by 2 people seeds are placed in the Dakon place students put grain into a hole except for the opponent's place	Creativity	The student should make a strategy to put the grain
students determine more or less the right symbol card	Critical thinking and Creativity	The student should solve the problem and make a strategy to determine more or less of the number
if finished, students determine many numbers	Critical thinking	Student solve the problem
students write results and submit solutions	Communication	The student should communicate the answer well

D. Developing 21st Century Skill by Implementing "Sret-sretan" game

Fig. 4. Sret-sretan game

TABLE IV. DEVELOPING 21ST CENTURY SKILL BY IMPLEMENTING "SRET-SRETAN" GAME

Procedure	*Category 21st Century Skill*	*Developing 21st Century Skill*
the teacher makes a starting line horizontally with a number card the teacher mentions the question	Critical thinking and creativity	When the teacher mention question, student should think about how to solve the problem and make strategy
students write and work on the worksheet which provided	Critical thinking	Student solve the problem
students take the banana midrib until it rings loudly and runs towards the number card provided	Creativity	The student should make a strategy to get the card
students submit answers and reasons	Critical thinking and Communication	Student solve the problem and communicate the reason

Critical and inventive thinking is one of the Emerging 21st Century (Kaur & Toh, 2016). The development of critical thinking skills is seen in each of these games. The four traditional games require students to 13 able to solve the given problem. In another word, the traditional game above can be used as a medium to develop students' critical thinking skills. This is 17pported by the results of interviews with teachers stating that traditional games can be used to develop the ability to solve problems. Therefore, according to Kaur & Toh [1], which states that having critical thinking skills means having the ability to solve problems. Creative thinking skills are seen during the game process. Students must develop strategies in order to solve problems. Collaborative skills are seen when students work together with their partners to get the right answers. Communication skills are seen in every game because students present and submit answers verbally and in writing.

IV. CONCLUSION AND SUGGESTION

According to results and discussion, the conclusion of this study is 21st-century skills can be developed by implementing traditional games with mathematics concepts. The researcher recommends that the next research should make descriptive of the other traditional games.

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