Implementation of coding learning to train art creativity for elementary school teacher education students

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ABSTRACT

Introduction: The development of technology today is moving very rapidly. Various kinds of activities are associated with technology. In response to this, it is necessary to adopt technology by everyone so that adults and children are not left behind. It is important to introduce technology adaptation to students in order to face the increasingly rapid technological developments in the future. Therefore, one of the efforts to apply technology in the field of art is through the introduction of coding learning. The purpose of this research is to implement learning coding to train the artistic creativity of Elementary School Teacher Education Students at FKIP UNUSA.

Methods: This research method uses a qualitative research method. The subjects of this study were PGSD 4th semester students as many as 90 people. The research was carried out using the code.org website with dance party material.

Results: The results showed that the implementation of coding learning can train students’ creativity in making simple dance moves that are unique and interesting. In addition, students can also be creative with the background of the stage setting and the floor pattern of the dancers. As many as 80 students are able to make dance choreography by using the code.org website for dance party materials.

Conclusion: It can be concluded that the artistic creativity of students increases through learning coding.

INTRODUCTION

The development of digital technology is also in line with the literacy aspect. The evolution of digital technology affects the method when interacting with students. As a result, it is important to integrate the use of technology into ELA teaching and learning, because it’s important very give learning coding to children to increase creativity as well as logic think children specifically students in Elementary School.1

The use of logic and creativity is a key skill that is essential for learning to code as well as developing and organizing ideas in writing and giving a base for studying this. Ideas use logic to arrange arguments which is strong in writing and originated from Aristotle.2 Fulkerson’s study in 1988 explains that forming arguments is essential for all types of writing “because logic is a dedicated intellectual discipline” To analyze and evaluate arguments, logic must often be used to decide to solve the problem.2

It is also emphasized by earlier studies, that learning coding is a method for increasing the ability of the student to use logic and reasoning through argument, which could increase the creativity child.3 In a block coding program, such as scratch, students use logic to choose and sort block code for operating programs. Process selection and organizing code for making a program could compare with process development and organizing ideas for making a story. Learning to code is useful because gives practice to students using technology; however, one should not ignore that platform used for this research, Scratch, can be used effectively for teaching various subjects such as ELA and mathematics.4 Through coding, the student can learn many skills include: (1) finding and writing ideas creative for original games; (2) making or choosing illustrations, images, colors, and sounds for the game; (3) using logic programming to create the code that going to make a game work; and (4) writing instruction which tells how to play the game. This skill is not only important for literacy digital but also can strengthen ELA standards through direct experience.1

Programming language visuals like Scratch allow a student from “all ages, background back, and interests, to arrange the story, games, animations, and interactive simulations of their own, and share their creations”.5 Scratch was originally proposed in 2003 by MIT Media Laboratory to improve digital literacy for students who live in disadvantaged areas economics. Laboratory MIT Media designing Scratch to make ends meet identified through the Computer project their clubhouse, which is a “central network learning after school for youth from the community that less fortunate economically”.

The easy-to-use Scratch platform allows the creation of projects with minimal teacher support. This is achieved through the application of an “approach from lower to on for write script in where
piece small code assembled and tested, then combined becomes units which larger.6 Furthermore, it refers to this trial and error process as “the ability to tinker” (p. 1173). Students can see visually how adding, removing, or changing code block order affects the project. Clicking on the code block allows students to see the results code and create the adjustment needed. According to the previous study, one of the main reasons the type of visual programming offered by Scratch is useful is because allows for “the creation of external representations of the problem-solving process, programming provides opportunities for students to contemplate their thoughts, and even for think about thoughts itself.”9 Virtual platforms provide an opportunity for students to work together whether they are in different locations or with peers at school or in the same class. Students will often seek advice from one another, share ideas and offer support one each other in project improvement.

During the lesson, students are guided to make simple games that include problem-solving concepts to train their logical thinking and design simple games to increase their creativity. This lesson is designed to strengthen Common Core State Standards: English Language Arts Anchor Standards (CCSS ELA). Scratch is designed to be used in almost any classroom by both students and teachers who have no experience with coding.6 Resnick, the creator of Scratch, explains that through Scratch students “not only learn coding, but coding to learn”. Based on the explanation above, the formulation of the problem in this research is how to implement coding learning to train the artistic creativity of Elementary School Teacher Education Students.5 The purpose of this study is to describe the implementation of coding learning to train the artistic creativity of Elementary School Teacher Education Students.

METHODS

Study Design
This study was a qualitative study that allows the exploration of various realities and a collection of rich textual.28 This study observed and describes the implementation of learning to code for increased creativity art and logic think which sample used in the study is PGSD UNUSA students as many as 90 people. The reason why the PGSD students were included in the study is that they have the ability for developing creativity in the art. In addition, this skill can be transmitted to their students in elementary school if they already plunge into the field. In addition, the elementary school was chosen in this study because it can be considered as an important point to start increasing their knowledge.

Data Collection
This study was conducted for three months, which consisted of one month for implementation of coding learning, one month for observing the ability of the student, and one month for research data analysis as well as composing a report.9

The data is collected through interviews with students to document information related to the perception of students about their ability in coding learning. Interview semi-structured conducted to gather data about how learning coding could increase creativity as well as logic think students. Students who were chosen randomly for the process interview were asked if they were ready to participate in the process Interview stare face. Ten interviewed students are determined enough to give outlook experience to obtain a better understanding of the experience together between students about the experience they learn to code.10

After students are selected, interviews in progress are about 15-20 for every participating student. Protocol Interviews are designed to gather information related to perception and experience from lesson coding. Example question about protocol Interview covers things following: 1) Skills coding what have You learned During time learning art? 2) Is you could understand the coding lessons that have been taught? 3) Is You convinced experience could make You more creative? Why? 4) Is according to Your study coding beneficial for a student like You? Why? 5) Is coding lessons can practice creating art for you? Why?

Upgrade result creativity art obtained from results test students who carried out as many as two cycles. The test is done by each student by an individual so that see clear results create student-related making dance with application coding.

Data Analysis
Data analysis was performed during investigation in progress to give details about the perspectives of various participants. This data analysis process includes the coding learning process, the resulting project student every time you look face and result in creativity art student in designing creation art following direction.

RESULTS
Playspace is a room game where a dancer will appear, while the middle area is a box tool. On the right side is room work or workspaces. On the workspace, the block can be pulled out from the box tools and equipment room work for building your
program. If you want to see instructions with details, can press the light bulb on the side picture cat. If will get started, please choose the dancer by clicking the red block in the toolbox.

First of all, pull the red block out from the box tools and then move it to lower the orange block in the room work. Besides dancers, you can also determine the appearance of a dancer, the music as well as the movement of dancers who follow the tempo of the music. You can also arrange the amount dancers, their position, or the location of each dancer. Following this is a picture result of improvisation in making simple dance programming with the application code.org.

**DISCUSSION**

**Implementation Coding Learning**

Creativity is the power or ability to create new things with certain modifications or create something that has not been there yet. Creativity has more meanings which include: 1) the ability to adapt self in every situation, 2) Smoothness to respond something a problem, idea, or material 3) Having authenticity or always could disclose something different than others 4) Able to think integrally, can connect one with others as well could make a proper analysis.¹¹

Several experts believe that someone's creativity is made during the learning process with an informal approach. To achieve this, the school must have a creative environment so that child happy to be at school. Children also can be free from fear and stress. They gain a sense of security, respect, and recognition role with it in the learning process.¹² One of the learning methods that can increase creativity is art learning. As we know that fun learning is a learning method that can be applied to playing something. The activity can be done in art education, including fine arts, dance, and music. Scribbling, jumping, or doing dynamic moves are certain activities that can develop creativity. Creativity can be developed from a young age. It can be developed when someone still becomes a student in the school. Education is one of the ways to reach better creative skills and may lead to success. It also includes art education. Therefore, any branch of arts can be used as the media in educational aspects.¹¹

One of the media that can support creativity art loved by children is learning to code. According to the previous study,
studying coding also makes children think creatively, and imaginatively, and develop the desired ability to know high. Study programming doesn’t need to have special condition. However, it needs desire to learn more about it. On the other hand, defines think computing as a form think analytical, purposeful for understanding the behavior of humans and suggesting related patterns with a draft basic, meant to solve the problem, generate a design system for solve problems and process information.13

Implementation of coding learning for the development of creative art students could through stages of exploration, improvisation, and composition.14 Stage exploration is the beginning step in creating creative art. Particularly, the focus is dance art. At exploration stage, the student was introduced to the code.org website. Code.org is an organization non-profit that owns a mission so that everyone can study knowledge computers specifically programming. With the use of code.org, we can study and make a program with a block or script starting from the beginner level step by step. Many topics can our choose among them science, math, social studies, language arts, or computer science only. Materials used in the article this that is about the arts in it there is a topic dance party.

Second stage is improvisation, Stage improvisation is often called Step dabble or activities carried out by spontaneity.14 At improvisation stage, the student attempted to dabble in application coding to make a dance composition. Students try to understand every detail stage available programming in application. It produces an interesting and fun dance.

The third stage is formation or composition. Formation (forming) or composition stage is the last stage of the choreography process. Furthermore the step, including selecting or evaluating, compiling, composing, or arranging motion motifs Becomes one unit called choreography.14 At composition stage, the whole component in good dance component main like dance moves and components support that including music, lighting, stage setting, and patterns floor has succeeded programmed. Though already successfully programmed, will permanently need to be tested to try to see maximum results. If still, something is missing appropriate, the student will attempt to program and repeat the dance composition until truly result is good.

**Implementation Results Learning coding**

Artificial limitations in learning art remain a challenge until now. Learning art also has a sensitivity to recent generations, known as the digital generation, about digital generation. Furthermore, it recalls the term digital natives to students who grow up with technology.15 Using the better understanding of construction that can shape attitude, to coding, we review attitude creative scale that may increase with utilizing computer science.16 As for the five behaviors, creatives can be including fluency, flexibility, originality, elaboration, and sensitivity.17

Based on recapitulation charts, the In the pre-cycle, the student only a little once can make dance moves, the thing which is seen in the graph above for the pre-average cycle only 20 students know application coding. In cycle 1, students already start can get creative in making dance moves with application coding. So that amount increased from 20 to an average of 60 students. Likewise in cycle 2, there are improvements in five behaviors own creative students in making dance moves. The results obtained in cycle 2 increased to an average of 80 students already dominating application coding. It can be concluded that there is an increase in the creativity value of art in students with the use of application coding, is an increasing value of students’ creativity in making dance moves with application coding. There is also the increased value of the five behaviors of creative students, which include fluency, flexibility, originality, elaboration, and sensitivity student start from pre-action or pre-cycle, cycle 1, and cycle II.

Enhancement of creating art is one of the methods of student-oriented learning. Enhancement quality is developed by student-oriented learning. Student-oriented learning could conduct with a built system enabling learning students to have the ability to study more interesting, interactive, and varied. Students must be capable and have useful competence for the future.18

**CONCLUSION**

Learning to code is one fun alternative as well as growing interest in studying student school even students. Besides fun, code learning can also practice critical thinking as well as someone’s creativity. Based on the implementation of coding learning in courses art PGSD students, creativity among art students increases. A total of eighty students have already dominated application coding specifically in making composition unique and interesting dance moves. Students are very enthusiastic during implementation learning and they are capable of composing appropriate dance moves material that has been taught.

**DISCLOSURE**

**Author Contribution**

All authors have contributed to this research process, including conception and design, analysis and interpretation of the data, drafting of the article, critical revision of the article for important intellectual content, final approval of the article, collection and assembly of data.

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**Conflict of Interest**

There is no conflict of interest for this manuscript.

**Ethical Consideration**

This research was approved by the Research Ethics Committee of Teacher Training and Education, Elementary School Teacher Education Faculty, Nahdatul Ulama Surabaya University, Surabaya, Indonesia. Letter of exemption Ref. No.200/EC/KEPK/UNUSA/2022

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