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Project-based learning design in improving 21st century skills

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Abstract: Education in the 4.0 revolution era demands the formation and development of student skills in dealing with the development of student skills in the face of increasingly rapid developments in science and technology. The skills targeted for national education are 21st century skills, namely critical thinking and problem solving, skills, creativity, communication skills, and collaboration. Meanwhile, science education that takes place in schools has not provided meaningful education for students in the learning process. Based on the results of several studies, project-based learning has the potential to form and develop meaningful learning, so that teacher skills are needed in designing project-based learning that is relevant to the goals of National Education.

Keywords: Design, 21st century skills, project-based learning

INTRODUCTION

Today, the main goal of education is not to teach reading, writing or arithmetic, but to teach how to use thinking skills such as not only creativity. but also quality problem solving skills, scientific and technological literacy skills. Skills needed for sustainability and lifelong education in addition to basic education. In a lifelong process, it can be said that learners are faced with many real-life problems. The goal is to guide students to become skilled in dealing with problems that often occur in their lives.

The 21st century, also known as the 4.0 century of the Industrial Revolution, is a century of rapid development of science and technology. This means that humans must have the skills to include 4C skills in the 21st century learning process, namely creativity, critical thinking, communication, and collaboration. The National Education Association (nd) has identified 21st century skills as "The 4Cs." "The 4Cs" include critical thinking, creativity, communication, and collaboration. Critical thinking skills are skills to carry out various analyses, assessments, evaluations, reconstructions, decision-making that lead to rational and logical actions (King, et al, 2010).

Learning in the 21st Century The rapid development of innovation and technology in the 21st century has encouraged the education sector in various countries to analyze and look for types of learning in the classroom that are suitable for the demands of the 21st century. The Ministry of Education and Culture of the Republic of Indonesia is also trying to develop an educational curriculum that adheres to three concepts of 21st century education. The three concepts are century skills (Trilling & Fadel, C., 2009), scientific approach (Dyers, 2011), and authentic assessment (Wiggins & McTighe, J., 2011). The three concepts of 21st century education are then adapted to develop education towards Creative Indonesia in 2045. It is necessary to adapt the three concepts to suit the capacity of students and the competence of educators and education staff in Indonesia (Murti,

However, the current exam system in Indonesia still emphasizes questions related to memory knowledge (Marambe, Vermunt, Jan D., & Boshuizen, Henny PA, 2012) and most teachers still apply traditional learning centered on teachers so that 21st century skills cannot be trained properly. Therefore, it is necessary to change the learning paradigm that is adapted to the needs of education in the 21st century.

The shift in the 21st century learning paradigm proposed by BSNP (2010) Many students have not acquired 21st century skills when they study in school. According to the RAND Corporation (2012), the reason is that the transfer model of knowledge from teachers to students is still used by most of the world as a learning approach, where educators transfer knowledge through lectures and dominate learning so that learning is teacher-centered.

In addition, the assessment system used is still only on knowledge recall. Through the delivery learning model, students will get a lot of information but do not have the opportunity to practice applying knowledge in new contexts, communicating in more complex ways, using information to solve problems, or using information as a basis for developing their creativity. Therefore, the delivery model is not an effective model for 21st century education.

Learning that can practice 21st century skills must be student-centered learning, teamwork, and learning related to the context of students' daily lives. Problems encountered in everyday life can be used as learning topics to be solved by utilizing the concepts of knowledge that have been obtained by students. One of the learning approaches that meet the above criteria is the constructivist approach. The popular learning model in the constructivism approach is the project based learning model.

The project based learning model is reported to be able to train 21st century skills in the era of globalization (Wagner, 2008; Slough & Milam, JO, 2013). Haigt, Kelly, R. , & Bogda, B. (2005) stated that project based learning has the potential to improve higher order thinking skills-analysis, synthesis, and evaluation. This is supported by the results of the EdVisions report (2007) which revealed that more than 70 schools that applied project based learning showed an increase in 21st century skills, and an increase in students' self-concept and students' higher-order thinking skills.

Through project-based learning, students use communication skills and skills to convey ideas, organization and time management, inquiry skills, self-assessment and reflection skills, participation in groups, and leadership skills. therefore an interesting learning design is needed to be developed in order to improve 21st century learning. Based on the background of the problems that have been described, the researcher is interested in discussing "Project-based learning design in improving 21st century skills".

METHOD

This research method uses a method of collecting data with a predetermined topic from several relevant journals. The focus of this article review method is to find various data and results from research to analyze a problem. This article review method uses secondary data, which is data obtained not from direct observation, but by adopting the results of previous research.

RESULT AND DISCUSSION

The Partnership for 21st Century Skills (P21) (2009) identified 21st century skills into several aspects, namely life and career skills, learning and innovation skills-4Cs, information, media, and technology skills. Among the three aspects, the aspect of learning and innovation skills is an important aspect to be mastered by students. This aspect includes critical thinking (critical thinking), communication (communication), collaboration (collaboration), and creativity (creativity) which is then abbreviated and known as 4Cs. Critical thinking means that students are able to respond critically to science and knowledge, able to use it for humanity. Table 1. Details of the research background of each article.

Communication skills refer to the ability to identify, access, utilize and optimize communication tools and techniques to receive and convey information to other parties. Collaborative skills mean being able to collaborate with other parties to increase synergy. In line with P21, NEA (2002) reinforces that to achieve success and be able to compete in a global society, students must be experts and have skills as communicators, creators, critical thinkers, and collaborators.

One form of learning innovation that is currently getting a lot of attention is Project Based Learning (PJBL) or Project-Based Learning (PJBP). PJBP is learning that is deliberately designed so that students do more of the learning process autonomously. The teacher functions more as a facilitator. However, a learning design is needed which in the end (output) gets real results.

The learning design starts from synthesizing strategic issues that will be solved through approaches from the subject areas studied, followed by problem formulation, problem solving methodologies, decision making, and finally getting a solution. With this process students will learn autonomously and get results from learning

autonomously as well. In the implementation of PjBL, teachers are required to play more roles as facilitators for students with various characters due to different socio-cultural backgrounds.

Table 1. Details of the Research Background of Each Article.

Topics	**Article**				
	1	2	3	4	**5**
21st century learning demands	□	□	□	□	□
Conventional learning	□		□	□	
Scientific literacy in Indonesia is still low					□
Critical thinking and learning outcomes are still low		□			
Creativity and learning outcomes are still low	□		□		
The important role of teachers and lecturers to improve scientific literacy skills, creativity					□
Teacher-centered learning	□	□	□		
The important role of learning models to support learning Learning	□		□	□	
Model learnern PJBL	□	□	□	□	□

Project Based Learning (PJBL) is a series of student learning activities that lead students to carry out problem solving activities through learning steps that include observation, interviews or questions and answers, exploring knowledge independently, experimentation, investigation, collaboration or collaboration in one group discussion, exploration, assessment, interpretation to presentation of learning outcomes. Project Based Learning approach was developed based on the philosophy of constructivism in learning. Project Based Learning is a learning approach that can give students the freedom to plan learning activities.

carry out projects collaboratively in solving problems, and ultimately produce work products that can be presented to others that can be used as recommendations in solving problems. In implementing project-based learning, students work on an open problem or project. Learning is student-centered with the teacher as a facilitator. Students usually work in groups for long periods of time, seek various information resources and create authentic products which are ultimately used as recommendations in problem solving. 4C can be integrated into science learning, so that science learning can be a potential means to form a generation that is able to face the challenges of the 21st century. The PjBL model is one model that is able to bridge the achievement of the 4Cs in science learning. In PjBL, students go through a broader process of inquiry to respond to complex questions, problems, or challenges. This model has the following syntax: Start with the essential question, Design a plan for the project, Create a schedule, Monitor the students and the progress of the project, Assess the outcome, and Evaluate the experience. To guide teachers in planning, organizing, and evaluating projects that lead to the achievement of 4Cs Skills, each stage must consider three aspects, namely design, develop, and determine. Start with the essential question, Design a plan for the project, Create a schedule, Monitor the students and the progress of the project, Assess the outcome, and Evaluate the experience. To guide teachers in planning, organizing, and evaluating projects that lead to the achievement of 4Cs Skills, each stage must consider three aspects, namely design, develop, and determine. Start with the essential question, Design a plan for the project, Create a schedule, Monitor the students and the progress of the project, Assess the outcome, and Evaluate the experience. To guide teachers in planning, organizing, and evaluating projects that lead to the achievement of the 4Cs Skills, each stage must consider three aspects, namely design, develop, and determine.

In the early stages, teachers should design projects that lead to the emergence of the 4C's opportunities. After that, build students' skills for a project by providing an understanding of how each aspect of the 4C's characteristics and providing the steps to achieve it. In the end, the teacher determines the outcome of the project work by assessing how well the students have learned the 4Cs with a balanced approach.

CONCLUSION

Based on several studies show project-based learning is possible in the formation and development of meaningful learning. Teacher skills are needed in designing project-based learning that is relevant to national education goals. Project-based learning design enhances students' 21st Century skills.

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