THE EFFECTIVENESS OF PROJECT-BASED LEARNING WITH THE BLENDED LEARNING SYSTEM TO IMPROVE 21ST CENTURY SKILLS DURING THE COVID-19 PANDEMIC

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Abstract
This research is a classroom action research to provide an overview regarding the use of a project-based learning model with a blended learning system during the new normal period of COVID-19. The design model used is the Kurt Lewin model which consists of four stages, namely 1). Planning, 2). Action, 3). Observations, and 4). Reflection. The study population was all students of class XII SMAN 3 Mataram with a sample of 102 students who were divided into three classes. All research samples are taught with a project-based learning model with a blended learning system. Based on the research that has been done, it is known that the project-based learning model with the blended learning system can be applied in the learning process to improve 21st-century skills during the COVID-19 pandemic.

Keywords: Project-Based Learning, Blended Learning, 21st Century Skills, The COVID-19 Pandemic

1. INTRODUCTION
The Corona Virus Disease 2019 (COVID-19) pandemic has now become one of the global challenges that have led to the emergence of multidimensional problems in the political, ideological, religious, cultural, and academic fields. Medical personnel and public health workers are at the forefront, working hard to control and reduce the spread of the disease [1,2]. Various policy formulas have been implemented to suppress the spike in the spread of the virus, including Large-Scale Social Restrictions and recommendations to carry out four habits, namely washing hands, wearing masks, maintaining physical distancing, and avoiding crowds.

Various agencies, especially government agencies, have implemented work from home programs. The Ministry of Education has also implemented the learning from home program since March 16, 2020 [3]. However, all efforts have not been able to make the curve of the spread of COVID-19 in Indonesia smooth. So that the government began to implement new habit adaptations, better known as new normal, in early June 2020.

Education is a primary need that cannot be abandoned no matter what conditions occur. Following the mandate of the Constitution that the purpose of education is to educate public life. The essence of education is learning is not just schooling [4]. Schools as educational institutions that have various platforms and all of them have been held in Indonesia. It's just that the community views the school as a building containing teachers and students in it. Learning is a process of interaction between students and educators and learning resources in a learning environment [5]. A positive spirit must be cultivated in all components involved in the world of education.

Therefore education must continue, regardless of the conditions and problems faced by our country. Then the question arises, how to organize education in the new normal era? Meanwhile, the return to school policy is widely opposed because it is considered to have created new clusters with...
COVID-19. Meanwhile, learning at home is a tough challenge, both for students, parents, and educators. What is the appropriate learning model to be applied during a pandemic?

2. METHOD

This research is a type of classroom action research that focuses on implementing actions to improve the quality or solve learning problems faced by teachers and students. The study population was all students of class XII SMAN 3 Mataram with a sample of 102 students who were divided into three classes. The classroom action research model design used was the Kurt Lewin model. This design consists of four components, namely 1). Planning, 2). Action, 3). Observations, and 4). Reflection [6]. While the model used in the learning process is project-based learning with a blended learning system.

3. RESULT AND DISCUSSION

3.1 Education in Indonesia during the Pandemic

The national exam which was supposed to take place in April 2020 for high school students was canceled, even though it had taken place for vocational students. Even though preparations for the national exam have been carried out since a year earlier. The exam then changed its theme to "life test", not only for students but for all Indonesian citizens and even the whole world. Society must face all the tests that come suddenly, including in the world of education. Distance learning through online methods or also known as online learning is the most likely to be implemented. However, not as beautiful as imagined, various problems accompany this online learning.

Education during the pandemic is widely recognized by various parties, ranging from teachers, students, and parents. Until there was the phrase "should have studied online instead I got annoyed". That online learning is a tough trial for parents, especially at the basic level, which inevitably forces parents to accompany their children to study. As a result of the lack of teaching management skills possessed by parents, plus not all material is controlled by the parents of students, it causes parents to become emotional when teaching their children, and even several cases of domestic violence have occurred online.

The government has been actively involved in providing solutions to problems. The first is to give freedom to schools to review the learning targets to be achieved so that they are rationally aligned with the new situations and conditions in the new normal. This is stated in Kepmendikbud Number 719/P/2020 concerning guidelines for implementing the curriculum in educational units in special conditions [7]. The decision contains specific Basic Competencies during a pandemic which is the result of the simplification of regular basic competencies. In this pandemic special competency emphasizes basic competencies that are considered essential for learners to learn. These essential basic competencies have been reviewed by experts, who seek to make these competencies relevant to new situations and conditions in the learning of the new normal era.

However, simply simplifying Basic Competencies is not sufficient as capital to provide good education to students. Learning must be designed with multiliterate pedagogical planning and have a variety of competencies. Mastery of competencies including mastery of Information, Communication, and Technology (ICT) properly, access to information and delivery of information to the public, have good critical thinking skills, can turn problems into opportunities, and have good problem-solving skills [8].

This pandemic could be a turning point for the education system. Will it get worse? Or can be a fulcrum to turn things around. If students are provided with problem-solving based education, then students will have provisions in life skills education, including the fulfillment of 21st-century skills that must be possessed by students, namely 1) creativity; 2) critical thinking; 3) collaboration; and 4) communication [9]. Therefore, project-based learning is one of the appropriate methods to be implemented during a pandemic by bringing out the creativity and character of students.
3.2. Project-Based Learning

Project-based learning is a method that trains students in finding practical solutions to specific problems through the process of conducting research [10]. By getting students used to studying various problems can practice high-level skills in students [11]. The position of the teacher in the project-based learning model is as a facilitator who helps students find various information needed to answer existing problems [12].

Project-based learning is a method for preparing multidisciplinary groups of learners. Approach with project-based model creates more critical thinking, problem-solving, independent learning, adaptability, communication, and interpersonal skills [13,14,15]. These skills are in line with 21st-century skills that must be possessed by students to have life skills. Project-based learning is a learning model that begins with a problem and leads to the final product produced by students through cooperation and active participation in the learning process to form students as a whole. The syntax of project-based learning is: (1) Asking questions that come from surrounding phenomena, (2) Designing stages in project completion, (3) Arranging project implementation schedules, (4) Collecting, analyzing, and interpreting data using mathematics, information, computer technology, and computational thinking, (5) preparation of project reports and presentations, (6) evaluation of project processes and results [16].

3.3. Implementation of Project-Based Learning with the Blended Learning System

Learning using a project-based model was also carried out when the SARS outbreak hit in 2008. The schools in Hawaii have implemented project-based learning. Project-based learning models can improve students’ overall knowledge [17]. This experience enhances the value of multidisciplinary group processes. SMAN 3 Mataram is a school in the province of West Nusa Tenggara that has implemented a project-based learning model in various activities and subjects. One of the projects that students have carried out is making hand sanitizers (Figure 1) using natural materials or creating campaigns for the importance of using masks in public places, then students are asked to socialize through social media.

![Figure 1. Making hand-sanitizer from natural materials](image)

Implementation of project-based learning can be done in all subjects. In the field of chemistry studies at SMAN 3 Mataram, one of which studies the basic competencies of 3.1 class XII on the Colligative Properties of Solutions material. In this material, students learn the concept of the colligative nature of the solution in a fun way, namely through the “Ice Cream Making Project” (Figure 2).
Figure 2. Implementation of Project Based Learning in the form of an Ice Cream Making Project [18]

In the "Ice Cream Making Project" students are challenged with their curiosity regarding "How do you make ice cream?" and "What is the relationship between making ice cream and the colligative properties of the solution?". This is the starting point of effective project-based learning. This triggers a series of questions and critical thinking leading to problem-solving. Project-based learning begins with questions followed by investigative solutions, in which students find out using technology so that their curiosity can be answered. Furthermore, students create new knowledge as information is collected and understood. In the learning process, students can still discuss with their supervisor and work in groups that can be carried out online or in meetings with due regard to the COVID-19 protocol. From the projects that have been implemented, students gain discoveries and experiences and reflect on newly acquired knowledge.

Moving the school system to a distance learning environment is not only a technical issue. This is both a pedagogical and an instructional challenge. Technology is an important tool in supporting the learning adaptation process. A successful attempt to move schools beyond traditional classrooms and buildings requires close collaboration between teaching, content, and technology teams associated with the 21st Century [19]. Learning must be able to answer the challenges of the 21st century, one of which is information literacy and ICT (Information, Communication, and Technology) literacy. To develop students' information literacy and ICT skills, it is necessary to integrate ICT into the learning process [20,21].

A teacher is required to have Pedagogical Content Knowledge (PCK), which is a teacher's mastery of learning material and how to teach certain material content to improve student understanding [22]. During the pandemic, PCK ability was deemed insufficient to support the learning process, so it needed to be upgraded to TPACK (Technological, Pedagogical, and Content Knowledge) by combining technology to support a teacher's ability to master the material and transfer knowledge to students [23]. TPACK is the ideal capacity that a teacher must have in a pandemic era. Lack of understanding of technology will impede the transfer of knowledge from teachers to students.

Technology-based learning by utilizing internet media is effective learning during the COVID-19 pandemic [24]. Various Learning Management Systems (LMS), both paid and free, can be selected in implementing learning. Each of them has advantages and disadvantages. Examples of LMS platforms commonly used by educators include Google Classroom, Schoology, Moodle, Microsoft Teams, and so on. All of these platforms have menus for sending learning materials, as well as menus for sending assignments to students in the form of documents, PDFs, images, videos, or in form of links. Most platforms have menus for managing classes, exchanging information, and even providing feedback and grades on the work of students. The best distance learning system is a combination of online learning and offline learning activities called Blended Learning (BL), which is a learning strategy that combines face-to-face learning and learning using online learning resources [25]. The advantages of the blended learning system are as follows: providing individual learning experiences, supporting and encouraging independence, increasing teacher involvement in learning, and providing flexible learning, anytime and anywhere [26,27,28]. The blended learning strategy was significantly more effective in improving
students' learning achievement and science process skills compared to conventional learning. According to Firdaus, there is a significant increase in the cognitive and psychomotor domains as well as motivation and student learning outcomes after learning using the blended learning model [29].

The implication of the project-based learning model with the blended learning system at SMAN 3 Mataram is the use of Google Classroom as a Learning Management System (LMS) media. Teachers and students communicate through the media google classroom and WhatsApp group. The teacher distributes materials, student worksheets, and assignments through the LMS [30]. The LMS was chosen because of its ease of use. Besides, the features provided are quite complete. In the material of the colligative nature of the solution, after the students carry out the "ice cream making project", the students make documentation in the form of making videos and upload the videos that the students have made to the YouTube channel owned by the student. This activity is the 5th stage in the syntax of a project-based learning model, where students convey their understanding through presentations. It is expected that besides being able to find solutions to the problems being studied, students can also provide an overview to others through the resulting product in the form of a video.

4. CONCLUSION

The results of the implementation of the project-based learning model with the Blended Learning system on the colligative nature of the solution through the project of making ice cream can increase students' interest in learning chemistry. Through this learning model, students will get meaningful and fun learning. So that the goal of having life skills and 21st Century skills can be fulfilled. Teachers as educators will also be ready because they have Technological, Pedagogical, and Content Knowledge (TPACK) abilities. If mastery of the material is good and technology is also well mastered, then the learning interaction will also take place well and interestingly. So, the quality of learning will be good and educational goals can be achieved.

References


