Blended Learning Model in a Distance Learning System to Increase 4C Competence (Creativity, Critical Thinking, Collaboration, and Communication)

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Abstract. The purpose of this study is to develop a learning model based on Blended Learning in the concept of Distance Learning in order to be able to improve students' 4C competencies. The research conducted is a type of research quasi-experimental (quasi-experimental). Research instruments include: questionnaires, observation guidelines, validation sheets, FGD instruments, tests, and documentation. The research subjects involved 57 sudents in second semester who were taking Basic Natural Sciences courses. The model trial used a one group pretest-posttest design. Test the effectiveness of the developed model using the t test. Improvement of 4C Skills Competence using the Gain Score test. The results showed that there was an effect of the blended learning model in the distance learning system on increasing 4C competencies (Creativity, Critical Thinking, Collaboration, and Communication). The N-Gain test is 0.6 (medium category) which means that there is an increase in 4C competence before and after being given the blended learning model. The data shows that the average value for the pretest results is 63.14 and the average posttest score is 82.65. The novelty of this research is the application of various online platforms such as Google Classroom, Google Slides, Google Meet, Kahoot, online educandy games, and youtube in supporting the blended learning model.

Keywords: Blended Learning, Distance Learning, 4C Skills, Google Classroom, Google Meet, Google Slides

INTRODUCTION

The Covid-19 pandemic, which has plagued almost the entire world, has had a profound impact on the education sector. Government policies are regarding social restrictions (social distancing), maintaining physical distance (physical distancing), closing schools, and changing the learning process from offline to online, causing confusion for various parties. Disruption of the learning process in offline mode certainly affects educators and students from the psychological aspect to the decline in the quality of skills (Aji, 2020) and (Gonzalez *et al.*, 2020). The lack of student involvement during the learning process, the absence of social interaction like normal conditions, and the lack of competition make motivation weak. Even the latest research states that many students spend their free time playing games instead of studying (Pokhrel and Chhetri, 2021). This saturation and low motivation must immediately get a response and improvement.

In response to this, universities as the front line in the level of education must still be

able to produce graduates and quality human resources in any situation. As an initial stage in this research, an analysis of the 4C competencies of students as prospective teachers was carried out, especially at STKIP PGRI Nganjuk Indonesia during the Covid-19 pandemic. The results of the pretest test carried out on a sample of 150 students, obtained on the aspects of critical thinking skills show that each indicator can only be achieved by each student an average of 58%, creative thinking skills reach 44%, communication skills reach 52%, and collaboration skills reach 38%. The test results on the 4C ability also show that from 150 samples taken at random, only 48 students managed to achieve the specified indicators or only 32%. The data shows the low 4C competence of students during this pandemic.

An interesting topic studied in this research is the Basic Natural Sciences course. This course discusses theories about nature and its technological developments as well as solutions to global environmental problems. The issue of this global problem is even very worrying plus the emergence of the Corona Virus in 2020. If we look at the problem of pollution caused by waste alone, the data from the Ministry of Environment and Forestry in 2018 states the amount of waste has reached 65.2 million tons per year (Nambiar, Harwood and Mendham, 2018). Therefore, it is the duty of the current generation to take this problem more seriously. At the education level, solutions related to environmental problems can be implemented in a real and more applicable manner, and in the maximum form possible to protect nature.

The learning model applied in this research is blended learning. This model is applied as an effort to overcome the new normal in the field of education. The data shows that universities apply the concept of learning with a session system. That is, students are made a session when entering lectures. In practice, 1 week students are applied offline method then the next week is done online. Therefore, the blended learning model is appropriate to be applied as a solution. Blended learning is a flexible model that allows students to access materials anytime and anywhere (Fitri and Zahari, 2019). Students can study first before taking offline classes. So that the initial knowledge possessed by students can be used as a basis for face-to-face learning in (Romadhon, Rahmah and Wirani, 2019).

The novelty offered in this study lies in the use of media as a tool in delivering blended learning models that are adapted to the character of students. The media used with the help of the Google application are Google Classroom, Google Meet, and Google Slides. The advantages of this media besides being easy to use is that it allows for feedback, discussion, and evaluation. Through this media, lecturers can assess assignments, store teaching materials, provide feedback, and share assignments in one application(Beaumont, 2018). Lecturers and students don't have to worry about files being lost because they're all stored on Google Drive (Sholikh, Suliswaro and Maruto, 2019).

METHOD

The type of research used is a quasi-experimental because it is carried out only in one group without a comparison group. The research design used was a one group pretest-posttest design. The design of this study was carried out by measuring the results before treatment (pretest) and after treatment (posttest). The research was conducted on students at STKIP PGRI Nganjuk in the Science Education and Mathematics Education study programs. The subject of the research is Basic Natural Sciences. The time of the study was carried out within a period of 1 semester (6 months). The research subjects involved 57 students in the second semester who were taken by purposing sampling. The subjects used in the research are Basic Natural Sciences. Research instruments include: questionnaires, observation guidelines, validation sheets, FGD instruments, tests, and documentation. Sampling used purposive sampling. Test the effectiveness of the developed model using the t test. Improving the 4Cs Skills Competence used the Gain Score test.

RESULTS AND DISCUSSION

Results

In this study, the implementation of learning is by applying the Blended Learning model. This model was chosen in an effort to overcome the distance learning mode as a result of the Covid-19 pandemic which requires the learning process to be carried out online in the new normal era. Over time, the government began to implement a combination of online and face-to-face learning, although not yet in full.

The results of the study show that this model is able to provide learning facilities such as (1) students are more free to study subject matter independently which is available online, (2) between students and lecturers can communicate and discuss whenever and wherever, (3) learning activities outside face to face For example, there are problems for students that can be easily controlled by lecturers, (4) lecturers can add material quickly through LMS, (5) lecturers can conduct online tests, quizzes, and feedback, (6) during face-to-face learning students become more prepared because they have received previous directions online. Research supported (Mulyanto, Sadono and Koeswanti, 2020) which state that the blended learning model facilitates learning activities both in the classroom and outside the classroom with the help of technology. Communication is still well established, discussions can still be applied, and learning evaluations can also be carried out.

The technology used in this blended learning model utilizes Google Classroom, Google Meet, and Google Slides media. These three platforms can be applied using Android phones, making it easier for lecturers and students. In the face-to-face process, lecturers use Google Meet, while in making assignments, announcements, sending materials, and exams, they can use Google Classroom (Rahayu and Pahlevi, 2021). To support lecturer presentations using Google Meet, Google Slides is used. The advantage of Google Slides is that it is cloud-based. Every time it is created, the presentation will be saved automatically so you don't have to worry about losing files. In addition, it is also equipped with various features to add templates, backgrounds, images, video links, website links, and can be integrated with Google Classroom. Even in this study, lecturers have integrated Google Slides with Kahoot to create interactive quizzes. In addition, lecturers have also implemented interactive games such as Educandy to make learning more interesting. Like the research of (Maharani and Kartini, 2019) that the implementation of Google Classroom in supporting distance learning received a positive response from students. This technology is effective in supporting the learning process. Supported by research by (Wang and Tahir, 2020) that Kahoot as a learning platform can be used to create game-based quizzes that can make students more motivated in learning.

Google Slides online presentation is like Microsoft PowerPoint. This application is free, can be created and opened anywhere, and without the need for installation. The function of Google Slides is to create online presentations by adding various interesting features. With a drive storage capacity of up to 15 GB, both teachers and students can store documents more freely. This feature can also be combined with other features such as Google Classroom, Online Quiz, Online videos, and various other platforms. Even Google Slides supports both Android and iOS mobile devices, so that the learning process can be done easily through distance. Furthermore, the results of the research data can be seen in Table 1, Table 2, and Table 3 below.

Table 1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pairs 1	Pretest	63.14	57	8.182	1.084
	Posttest	82.65	57	8,329	1.103

Table 1 is the result of Paired Samples Statistics data processing. The data shows that the average value for the pretest results is 63.14 and the average posttest score is 82.65. The number of samples used is 57 students. Descriptively it can be concluded that the posttest value is greater than the pretest value so that there is an average difference between the two.

Table 2. Paired Samples Correlations

		N	Correlation	Sig.
Pairs 1	Pretest & Posttest	57	.998	.000

Based on Table 2, it is known that the correlation coefficient (Correlation) is 0.998 with a significance of 0.000. Because the value of Sig. 0.000 < 0.05 probability it can be said that there is a relationship between the pretest and posttest variables.

Table 3. Paired Samples Test

| | | | | 95% Confidence Interval of the Difference | | | | |
		Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
	mean							
Pairs 1	Pretest - Posttest	-19.509	.504	.067	-19643	-19.375	-292.026	56	.000

Based on Table 3, it is known that the value of Sig. of 0.000 < 0.05. Then H0 is rejected and Ha is accepted. So it can be concluded that there is a difference in the average pretest and posttest learning outcomes. This means that there is an effect of the blended learning model in the distance learning system on increasing the 4C competence (Creativity, Critical Tinking, Collaboration, and Communication).
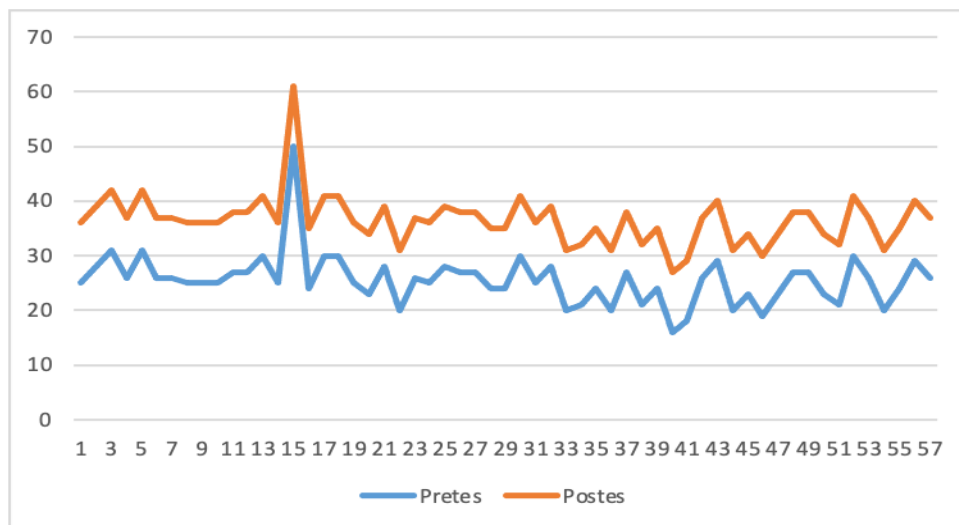
Discussion

Figure 1. Results of the 4C Competency Assessment of Creativity Aspects Before and After Treatment

Based on Figure 1, it is found that there is a significant increase in the aspect of the student's creativity. Creativity is an ability to develop, implement, and convey new ideas to others. In this character, the students have the ability to develop, implement, and convey new ideas to others, be open and responsive to new and different perspectives. In practice, the students are able to learn lecture material as well as be creative in creating projects to make online presentations using Google Slides. Many new ideas can be created by students in conveying the material and are poured in the form of a Slide Presentation. Another benefit that can be obtained is that students are able to adapt to new situations in the concept of blended learning by utilizing existing media. Currently, lecturers must be able to create conditions that can develop student creativity, create new ideas, and

appropriate strategies (Kembara, Rozak and Hadian, 2019).

Students will be able to develop their creativity if they have the opportunity to think divergently. Students must be accustomed to getting out of their comfort zone with new ways of thinking that are more creative and efficient. A learning process that provides full opportunities for students or is student center needs to be implemented. This opportunity can be in the form of conveying new ideas and solutions, submitting conjectures or hypotheses for each problem. These skills must be honed from an early age and need to be optimized in the learning process in classes (Sipayung, Sani and Bunawan, 2018).

Creativity has been seen as one of the important skills that must be mastered and is the key to effective learning in the 21st century. Creativity is a meaningful skill in all life spans (Erdoğan, 2019). Creation is an important skill for the students because it has a direct relationship with increasing knowledge and skill content. These skills can be applied in a learning environment that encourages students to actively ask questions, be open to new ideas, and learn from mistakes. These skills can be developed through continuous practice. So in this research, lecturers always give assignments in the form of projects that are able to make students active and creative (Yustina, Syafii and Vebrianto, 2020).
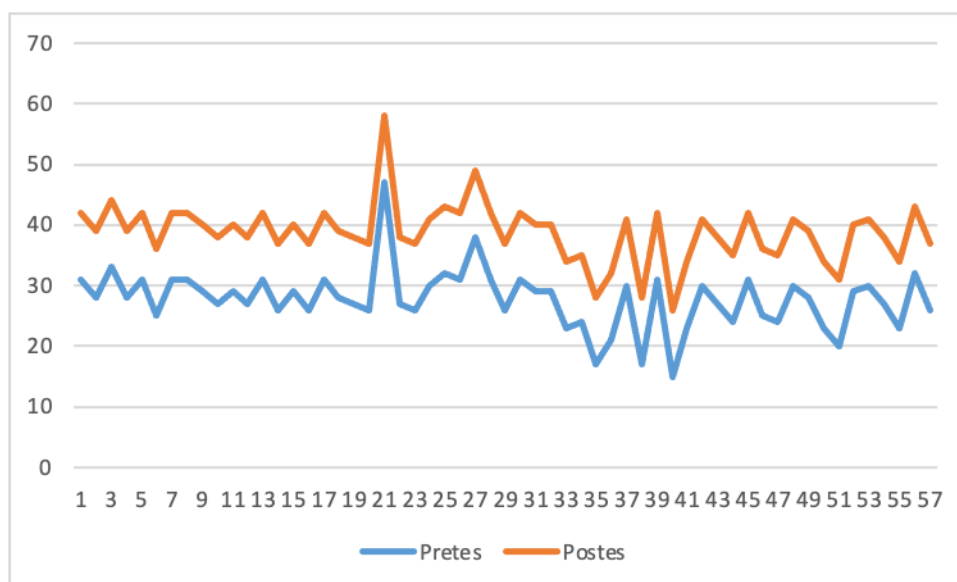

Figure 2. Results of 4C Competency Assessment Aspects of Critical Thinking Before and After Treatment

Based on Figure 2, it is found that there is an increase in the students' thinking abilities. In the assessment process, students are trained to solve problems with types of high-level thinking questions ranging from types C4 to C6. The evaluation results show that the blended learning model applied is able to provide students with the flexibility to improve their analytical skills, the ability to provide alternative answers, and the ability to distinguish information in greater depth (Triana, Anggraito and Ridlo, 2020). Critical thinking is an ability to compile, express, analyze, and solve problems at hand. In this character, the students strive to provide reasonable reasoning in understanding and making complex choices, understanding the interconnections between systems. The students

also use their abilities to try to solve the problems they face independently, students also have the ability to compile, express, analyze, and solve problems.

Research (Siska *et al.*, 2019) stated that the use of blended learning in the learning process can affect the students' critical thinking skills. The students become more motivated to explore any information that has been provided by the lecturer. Judging from the online implementation, the students are able to learn anytime and anywhere. Even independently, the students can express every idea they have more freely. Judging from offline learning activities, the students become better to convey their ideas because they already have the provisions and materials that have been studied previously.

Crisis thinking is currently one of the life skills that need to be improved through the teaching process (Zubaidah, 2016). Through the ability to think, a person will be able to observe and find a way out of all the problems encountered in his life. Therefore, in the period of the industrial revolution 4.0, thinking skills are fundamental skills that need to be possessed by every graduate at every level of teaching. Critical thinking skill is one of the higher order thinking skills. With high-level thinking skills, students can absorb knowledge and demonstrate their performances, the students will become efficient communicators, critical and active thinkers, competent problem solvers, and an expert in their careers (Živković, 2016).
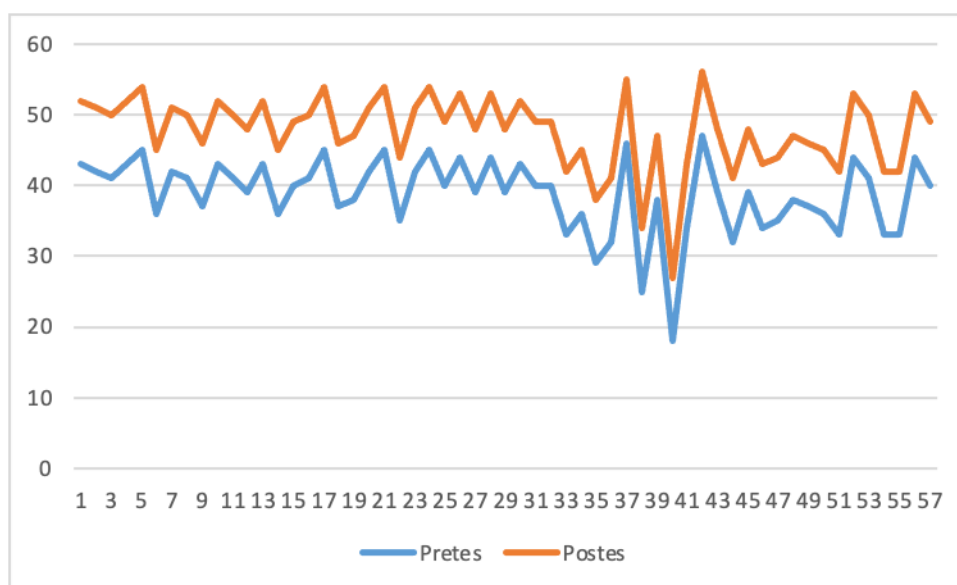

Figure 3. Results of 4C Competency Assessment Collaboration Aspects Before and After Treatment

Collaboration is an effort made by several people or groups to achieve a common goal. Based on Figure 3, it is found that there is a significant improvement in the aspect of student collaboration after being given a blended learning model. In this era of the Covid-19 pandemic, the blended learning model is very appropriate in supporting the concept of distance and face-to-face learning. The two complement each other. In this model, the lecturer can give instructions to the students to study the material through the media used and also give group assignments. In this way, the student collaboration abilities will be formed as an effort to find solutions to problems that have been given by the lecturer through relevant sources. This effort (Erdoğan, 2019). In the collaboration aspect, thr students demonstrate their ability in group collaboration and leadership, adapt to various roles and responsibilities, work productively with others, put empathy in place, respect different perspectives.

Judging from the learning aspect, blended learning is able to provide opportunities for success in providing distance learning model solutions. The technology integration applied is able to involve the students to participate actively and minimize differences between individuals. In practice, the students are trained to learn to consult in each learning session, respect the opinions of others, develop critical and rational thinking, foster cooperation, and create healthy competition (Harahap, Nasution and Manurung, 2019); (Zain, 2018).

Cooperation is a learning trend in the 21st century that shifts the concept of teacher-centered learning to student-centered. The collaborative learning environment challenges the students to express and generate some original ideas based on reflection. Students can discuss conveying new ideas to several friends, seek clarification of the hypotheses that have been made, and participate in critically analyzing to gain new understanding in depth. Collaborative learning leads to increased metacognition, renewal in formulating ideas, and discussion with higher levels of thinking. This gives the students the opportunity to learn from each other to watch over each other, to spot mistakes and learn how to fix them (Brown, 2015).
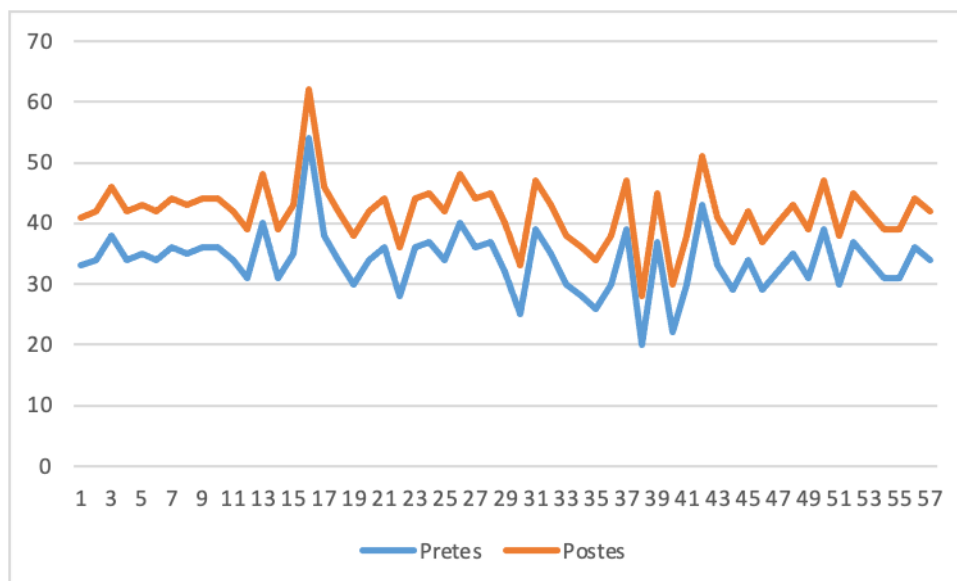
Figure 4. Results of 4C Competency Assessment Communication Aspects Before and After Treatment

Based on Figure 4, it can be seen that there is an increase in aspects of student communication during the learning process which is carried out by applying the blended learning model. Communication is the sending and receiving of messages or news from two or more people so that the intended message can be understood. In this character, the students are required to understand, manage, and create communication effective and efficient in various forms and contents orally, in writing, and in multimedia. The students are given the opportunity to use their abilities to express their ideas, both during discussions with their friends and when solving problems during learning activities.

The importance of the communication aspect in the learning process is as a process of transmitting information, ideas, emotions, and skills by using symbols, sentences, pictures, graphics, or numbers. In another sense, communication is concluded as a skill that involves listening, observing, speaking, asking, analytical and judging activities to convey messages or the meaning of one information to others through various media (Legowo *et al.*, 2019). The power of communication includes the knowledge of the information given and the power of expressing ideas or ideas efficiently. Communication skills refer to the personal power to speak clearly, use spoken or recorded language, verbal or non-verbal and work together efficiently. Verbal communication is related to the content or content of the information said, while non-verbal

communication is related to the expression of information (Arsad, Osman and Soh, 2011).

Using communication skills takes time and practice. Therefore, communication skills can be trained continuously, either explicitly or embedded in education and materials. Activities of reading, listening and paying attention as a stimulant activity that are really important in practicing communication skills. Specific skills that are closely related to communication skills are converting information and solving problems through language. In addition, the power of the students in viewing, analyzing and synthesizing information in communication is no less important.

This blended learning model focuses on aspects of interaction between students and the material, students and teachers, students and other students. So that this model can provide guidance and direction to students to achieve effective, innovative and creative learning goals (Cahyani *et al.*, 2021). This blended learning learning was created by considering several things such as material, competence, philosophical, social, and psychological aspects. This blended learning model is based on a blend of blended learning, student character, and 4C competencies (Creativity, Critical Tinking, Collaboration, and Communication). The media used to support learning are Google Classroom, Google Meet, and Google Slides. So that the novelty of this learning is the use of blended learning models, the use of supporting media, and 4C variables. In blended learning learning media the role of the media is very important,

because this learning media is a method that combines several teaching techniques such as face-to-face (TM), offline, and online (Yustina, Syafii and Vebrianto, 2020).

CONCLUSIONS AND SUGGESTIONS

In accordance with the discussion, it can be concluded that (1) there is an effect of the blended learning model in the distance learning system on increasing 4C competencies (Creativity, Critical Thinking, Collaboration, and Communication), (2) in supporting distance learning using the blended learning model applied to various online platforms such as Google Classroom, Google Slides, Google Meet, Kahoot, online educandy games, and youtube so that learning becomes more interesting for the students, (3) The data shows that the average value for the posttest results is greater than the pretest value, which means that there is an increase in 4C competence for students after being given treatment.

In further research, the blended learning model can be integrated with other, more varied media. The development of new technology in learning should be applied to students to improve their skills.

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