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# Blended Learning Model in Improving 4C Abilities of Information System Students

**Ratih Purwasih[1*], Rahimullaily[2], Ade Irma Suryani[3]**
[1,2,3] Prodi Sistem Informasi, STMIK Indonesia Padang, Kota Padang, Indonesia
*e-mail: ratihpurwasih@stmikindonesia.ac.id

## Abstract

Blended learning in this study combined face-to-face online learning and independent learning such as interactive media and zoom meeting application. This study aims to obtain the comparison of implementation blended learning in improving 4C abilities (critical thinking, creative, communication, and collaboration) system information students in English debate activity before and after the treatment. Furthermore, preliminary data from the subjects of this study before blended learning treatment showed an average value of < 55, and this value was categorized as "less". Therefore, this research is a type of quantitative research using pre-experimental research method. The data were calculated by using SPSS. Research results indicated an increase in the students' 4C abilities after implementing the blended learning model. The average increase of creativity was 43.79%, with an estimated increase is 39.89%. Critical thinking was 45.08%, with an estimate of 47.78%. Collaboration had 38.26%, with an estimate of 43.03%. At the same time, communication reached 38.32% with an estimation of 43.40%. Based on these results, the highest 4C increase was in critical thinking abilities compared to other abilities.

**Keywords:** 4C, Blended Learning, Information System Students

## 1. Introduction

The 21st century is a globalization and internationalization era and human being will face global competition and problems (Rosidin et al., 2019; Sutarto & Jaedun, 2018). The challenges of the 21st century require one to have some skills that must be mastered in order that students are able to survive in global communication. Hence, students need to be prepared to master these skills which is known as the 21st century skills (Salsabilla et al., 2020; E. Wahyuni, 2020). The 21st century skills are classified into three categories: learning and innovation skills, literacy skills, and life skills (Rahmatika et al., 2020). Learning and innovation skills refer to the mental processes required to adapt and improve upon a modern work environment. Literacy skills, sometimes called IMT skills (information literacy, media literacy, and technology literacy) concern with how individuals can discern facts, publishing outlets, and the technology behind them. Life skills focus on the intangible elements of every individual's everyday life that include both personal and professional qualities (Nurtanto et al., 2020; Saputro et al., 2020).

In this research, the focus was on learning and innovation skills that are popularly called the 4Cs. The 4Cs are the 21st century learning and innovation skills that students should master in their classrooms to be prepared for life after high school (Afandi et al., 2019). The 4Cs consist of communication, collaboration, critical thinking, and creativity (Elizabeth & Zulida, 2012; Firdausy et al., 2018). They are also portable skills individuals can transfer from one assignment to other assignments and from one job to another job. Based on the results of some current studies, National Education Association concluded that the 4Cs need to be fully integrated into learning and teaching to produce citizens and employees adequately prepared for the 21st century (Levin-Goldberg, 2012). For this reason, these four skills are needed to prepare students for their future because they have been increasingly acknowledged as the competence that differentiates students who are prepared for more and more complex life and work environments in the 21st century, and those who are not

*Corresponding author.

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(Pardede, 2020). More specifically, by having 4C skills, students are expected to be able to think critically to solve problems that occur around students through creativity and innovation. By collaborating, work becomes more effective and efficient to do and with effective communication there is no misunderstanding with other people (Triana et al., 2020).

Similarly, higher education institutions are also demanded to produce graduates who are able to compete in the industrial era 4.0. Thus, college students are expected to master the 21st century skills, especially the 4Cs. In order to educate the generation of students who will face the challenges of the 21st century, universities need to provide students with the skills, knowledge, and attitudes to work effectively in our increasingly interdependent world (Pentury et al., 2020). It is obvious that not only learners, but also teachers need to acquire 21st century competencies as well as become competent in supporting the 21st century learning. Thus, teachers and lecturers need to prepare new pedagogical approaches that assist the students to develop their 4C skills (Pentury et al., 2020).

Researchers and education practitioners highlight the importance of 4Cs in education. The 4C skills need to be fully integrated into classrooms, schools, and districts around the country to produce citizens and employees adequately prepared for the 21st century (van Laar et al., 2020). Meanwhile, in the classroom, improving 4C skills can increase the attributes of inspiration, motivation, imagination and necessity (Pentury et al., 2020). By improving the students' 4C skills, many opportunities for productive learning outcomes occur, especially in English. They add that as students receive consistent and regular practice in these creative and productive activities, language fluency grows and improves. Moreover, implementing a 4Cs-based approach in English courses significantly aided students and teachers in a way that led to an increase in academic performance and literacy (Radifan & Dewanti, 2020). In addition, by mastering 4C abilities (communication, collaboration, critical thinking, and creativity), students must hone skills and improve learning to be able to overcome global challenges, such as critical thinking skills, the ability to communicate effectively, innovate and solve problems through negotiation and collaboration (Kembara et al., 2019).

Considering the importance of 4C skills in education, teachers and lecturers have designed any teaching methods and strategies that possibly help students to develop their 4C skills (Erdogan, 2019; Pardede, 2020). Along with development of technology in the industrial revolution 4.0, lecturers and teachers are required to change the teaching system, initially 100% face-to-face into blended learning which combine the traditional face-to-face learning and online learning (e-learning). This new concept is known as blended learning. As a new concept in learning, the material delivery in blended learning can be done before class and online (Salsabilla et al., 2020). There are many experts define Blended Learning in several ways. Blended learning refers to a mixing of different learning environments (Marsh, 2012). The phrase has some specific meanings based upon the context in which blended learning is used. Blended Learning model will give students and teachers or instructors a potential environment to learn and teach more effectively. Therefore, blended learning model used in teaching and learning assumes the continuous use of face-to-face teaching and learning as a fundamental aspect of the learning experience by using the integration of the internet and other teaching and learning technologies into studies undertaken both in and out of classroom (Mubarok, 2015).

Blended learning is a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, pace or path (Ibrahim et al., 2018; Mubarok, 2015). Blended learning can also be defined as the combination of face-to-face learning and classroom learning. Blended Learning as the integration of face to face and online learning to help enhance the classroom experience and extend learning through the innovative use of information and communications technology (Marsh, 2012; Thai et al., 2017). Blended strategies enhance students engagement and learning through online activities to the course curriculum, and improve effectiveness and efficiencies by reducing. Therefore, today Blended learning can refer to any combination of different methods of learning, different learning environment, different learning style. In other words, the effective implementation of Blended learning is

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essentially all about making the most of the learning opportunities and tools available to achieve the optimal learning environment.

Furthermore, blended learning assumes the continued use of face-to-face teaching as a basic building block of the learning experience, enriched and enhanced by the integration of the internet and other teaching and learning technologies into studies undertaken both in and out of the classroom (Alqahtani & Rajkhan, 2020; Marsh, 2012). This integration should happen with the mediation and support of the teacher and, as with any materials used, should reflect and work toward the learning aims and needs of all learners (Mubarok, 2015; Shen & Ho, 2020). Blended learning-based learning will make it easier for students to access knowledge by using various learning modes that serve as stimuli. Students hold independent control over time, place, sequence and speed of learning. Blended learning-based education will also improve soft skills (skills utilizing information technology) for students. The advantage that can be obtained through learning is mainly to provide learning resources for students to provide opportunities to develop each student to achieve abilities in hard skills and soft skills (Mubarok, 2015; Shen & Ho, 2020).

Studies on the effect of blended learning on students' ability revealed satisfied results. There is a difference in learning motivation of the students taught using Blended learning compared to those taught by using conventional learning (Sjukur, 2013). He found that students who were taught by blended learning possessed higher learning motivation than those who were taught by using conventional learning. Besides, blended learning model could enhance students' achievement in learning solid physics in physics department (S. Wahyuni et al., 2019). Then, the improvement of students' critical thinking and communication skills with blended learning was more significant than students who learnt through conventional learning (Trisnowati & Firmadani, 2020). Overall, most studies confirm that blended learning increased both the teachers' competences and the students' ability in any field (Makmur, 2017; Mubarok, 2015; Singer & Stoicescu, 2011; S. Wahyuni et al., 2019; Wannapiroon, 2014).

Previously, the research revealed that the students' English skills at STMIK Indonesia varied starting from low to medium and high (Purwasih & Rahimmulaily, 2019). However, the category of low and medium got a quite high percentage. Meanwhile, the results of the study showed that the level of difficulty of Indonesian STMIK students in English communication is categorized as quite problematic, with a percentage of 69%. Therefore, the lecturers needed to find solutions to these problems (Purwasih & Rahimmulaily, 2019). Based on these findings and the fact found at STMIK Indonesia, the researchers intended to conduct a study on the implementation of blended learning to improve students' 4C abilities in English debate activities at STMIK Indonesia. Blended learning was chosen as the method in this research since in this method, students did not only study through the explanation from their teacher in the classroom but also they discovered their learning by themselves and communicating and discussing with their friends. Besides, students could learn online via laptop, tablet PCs or I-Pad. This implied that blended learning allowed students to study independently, to build their knowledge via online, and to clarify teacher's explanation via online. Thus, the purpose of this research was to reveal the implementation of blended learning to improve 4C abilities of Information System students at STMIK Indonesia, Padang.

## 2. Method

This research applied a quantitative approach with pre-experimental research in order to determine the effect of a treatment on the research subject without a comparison class (control) and to describe the improvement of students' 4C abilities in English debate activities. The design of this research was One Group Pre-test Post-test Design (Agung, 2014; Sugiyono, 2014). The research was conducted on 10 students majoring in Information System at STMIK Indonesia. They were cadres of the campus debate team. At the same time, the research object was the 4C skills, including critical thinking, creative, communication, and collaborative), which were observed during the English debates using blended learning. The stages of this research were elaborated as follow.

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The research began with designing research instruments, which was in the form of an assessment rubric given to two debate judges to assess the students' 4C skills before conducting English debate activities by using blended learning. This rubric aimed to make it easier for researchers to obtain valid initial data to measure differences in the students' 4C skills before and after implementing blended learning method through debate activities. After preparing the instruments, the research was continued to the field overview. At this stage, blended learning was implemented to the students for 16 meetings in three methods: face-to-face, blended learning using zoom meeting, and independent online practice using Google Classroom. During the implementation, the students were divided into two groups: the government group (agree with motions) and the opposition group (reject with motions) Then, students' performances were assessed by two judges via zoom meeting. The assessment was conducted by using an assessment rubric following the modified national debate rating scale based on the 4C abilities assessment.

After evaluating the students' performance in the debate, the scores of students' performance were analyzed statistically. The scores were recapitulated and processed by using SPSS application. First, the data normality was measured to determine whether data were normally distributed. Kolmogorov-Smirnov was operated for the normality test. If the significance value was greater than 5% (0.05), the data was normally distributed. After the data were normally distributed, the analysis was continued to the variance homogeneity test aiming to test whether the two data groups have homogeneous variances. In this research, the variance homogeneity test was carried out by the Levene Test using SPSS. The data were homogeneous if the significance value was greater than 5% (0.05).

Next, the researchers conducted the descriptive statistical analysis to provide a brief description or to show a summary of data from each of the 4C abilities studied to determine the difference in the level of 4C ability before and after treatment as measured by the mean value, standard deviation, variance, minimum, maximum, and graphs. Then, the hypotheses of the research were examined in order to determine whether there was a difference of the students' 4C abilities before and after implementing blended learning for the debate activities. The statistical tests used in this research were paired t-test because the number of samples was not more than 30 students. The provisions of the paired-t test analysis were if the significance value was greater than 5% (0.05), $H_0$ would be accepted. In other words, there was no significant difference of the students' 4C skills before and after the treatment. Conversely, if the significance value was less than 5% (0.05), $H_a$ would be accepted. In other words, there was a significant difference of the students' 4C skills before and after the treatment.

## 3. Result and Discussion

### Results

As mentioned previously, the students' performance on the debate activities was assessed by two judges (the English lecturer at STMIK Indonesia and a professional debate judge) via zoom meeting. The debate activities were conducted twice: before having the practice with blended learning and after the practice by implementing blended learning. Before coming to the results of the study, the researchers tested the normality and homogeneity of the data in order for the data to be analyzed. The statistical analysis revealed that the data were normally distributed and came from homogeneous data. After completing the normality and homogeneity tests, the researchers proceeded the data analysis to see to what extend blended learning improved the students' 4C abilities in English debate activities. The detailed results of students' 4C abilities (critical thinking, creative, collaborative, and communicative) before and after implementing blended learning are described below.

### Critical Thinking Ability

The first 4C skill was critical thinking. Critical thinking is seen from the competence of students in finding the right source of problems and solutions on the topic of debate (Astuti,

2019). Figure 1 displayed the score of students' critical thinking ability before and after the treatment.

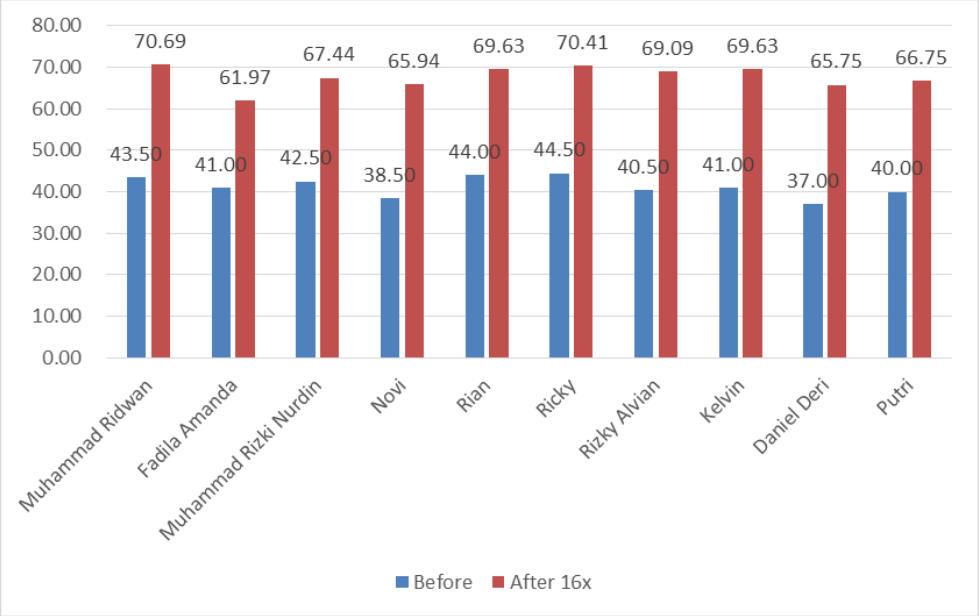


**Figure 1.** Critical Thinking Score before and after the Treatment

Based on Figure 1, it can be seen that there was an increase in the average score of students' critical thinking before and after the implementation on blended learning in the debate activities. The average score before the treatment was 41.25 and it increased to 67.73 after the implementation of blended learning. Besides, the increase also occurred at the lowest value before, namely 37.00 to 61.97, and the highest value before, namely 44.50 to 70.69. The increase in critical thinking did not occur in just one student but was followed by all students.

**Creative Ability**

The second skill was creative skill referring to the ability to find many possible answers to a problem, where the emphasis is on the quantity, efficiency, and diversity of answers. Figure 2 described the score of students' creative ability before and after the treatment.

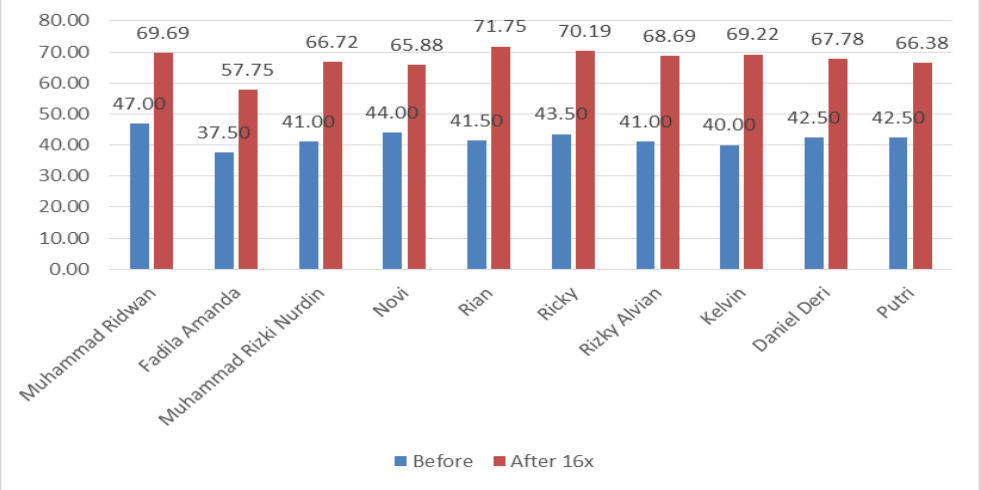


**Figure 2.** Creative Ability Score before and after the Treatment

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Figure 2 showed that there was an increase in the average score of students' creative skill before and after the implementation of blended learning which was seen from the average score before the treatment for 42.05 and increased to 67.40 after the treatment. The increase also occurred at the lowest value before the treatment from 37.50 to 57.75, and the highest value before the treatment from 47.00 to 71.75. Similar to the score of critical thinking, the increase of creative ability did not occur in just one student but was followed by all students.

**Collaboration Ability**

The students' collaboration ability was seen from their ability to work together effectively in teams to achieve common goals. Figure 3 described the score of students' collaboration ability before and after the treatment.

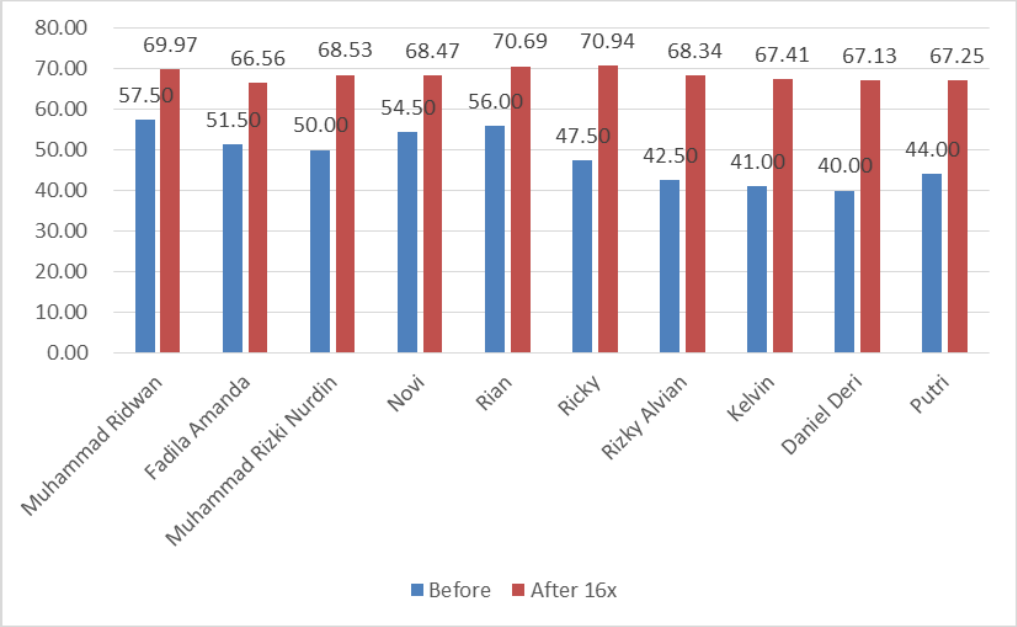


**Figure 3.** Collaboration Ability Score before and after the Treatment

Figure 3 showed that there was an increase in the average score of students' collaboration skill before and after the implementation of blended learning which was seen from the average score before the treatment for 48.55 and increased to 68.53 after the treatment. The increase also occurred at the lowest value before the treatment from 40.00 to 66.56, and the highest value before the treatment from 57.50 to 70.94. Similar to the score of critical thinking and creative abilities, the increase of collaboration ability did not occur in just one student but was followed by all students.

**Communication Ability**

The last 4C skill was the ability to communicate which was seen from the students' competence in expressing thoughts and ideas of new knowledge or information that they have orally and in writing. Figure 4 described the score of students' communication ability before and after the treatment.

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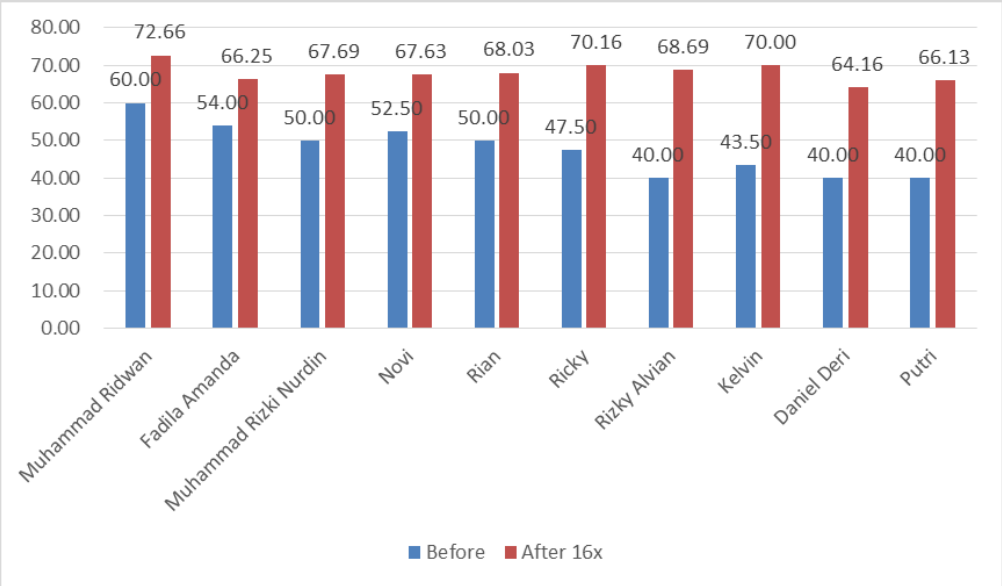


**Figure 4.** Increased Communication Capability per Cadre

Figure 4 showed that there was an increase in the average score of students' communication skill before and after the implementation of blended learning which was seen from the average score before the treatment for 40.00 to 64.16, and the highest value before, namely 60.00 to 72.66.

**Hypotheses Testing**

The next step of analysis was carrying out paired-t test to find out whether there was a significant difference of the students' 4C abilities before and after the implementation of blended learning in English debate activities. The result of the test was described in Table 1.

**Table 1.**Paired-T Test Results

| 4C ability | | sig. |
|---|---|---|
| Critical thinking | pair After – before | 0.000 |
| Creative | pair After – before | 0.000 |
| Collaboration | pair After – before | 0.000 |
| Communication | pair After – before | 0.000 |

Table 1 shows that the significant value of paired-t test for the students' 4C abilities was 0.000 < 0.05. Thus, there was a significant difference in the average score of students' 4C abilities before and after implementing blended learning.

**The Results of Research Analysis**

Based on the results of the analysis process, it was asserted that there was an increase in the students' 4C skills in English debate activities after 16 treatments with blended learning. It indicated that the effect of online debate learning treatment on the students' 4C skills was at the 95% confidence level. The detailed results of the 4C capabilities are shown in Table 2.

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**Table 2.** Average Improvement of 4C Components

| 4C | Mean Before | Mean After | Mean of increase After Treatment (%) | Estimation Mean of increase after Treatment (%) | Standard Deviation of Increase (%) |
|---|---|---|---|---|---|
| Critical Thinking | 41.25 | 67.73 | 45.087 | 42.3925-47.7815 | 3.77 |
| Creative | 42.05 | 67.40 | 43.792 | 39.8970-47.68670 | 5.44 |
| Collaboration | 48.45 | 68.53 | 38.262 | 33.4902-43.0338 | 6.67 |
| Communication | 47.75 | 68.14 | 38.321 | 33.2344-43.4076 | 7.11 |

Table 2 showed that the average increase of the students' critical thinking skill after the treatments was 45.087% with an estimate from 42,393% to 47,782% while the average increase of the students' creative skill after the treatments was 43.7920%, with an estimate of 39.8970% to 47.68670%. Then, Table 2 also demonstrated that the average increase of the students' collaborative skill after the treatments was 38.26%, with an estimate from 33.49% to 43.03%. At last, the average increase of the students' communicative skill after the treatments was 38.32%, with an estimate ranging from 33.23% to 43.41%. Furthermore, by looking at the average score of the increase after the treatment displayed in Table 2, it was revealed that this treatment further improved the students' critical thinking ability more significantly if compared to other abilities because it got the highest percentage of 45.0870%. Besides, the standard deviation of critical thinking skill was smaller than others, so that the data spread evenly more closely around the average.

## Discussion

The result of this study revealed that blended learning improved the students' 4C abilities in English debate activities. This was supported by findings in this research showing that the average score of the students' 4C abilities increased after getting the treatment for 16 meetings through blended learning. This result confirms that blended learning model facilitate students to improve their 4C skills especially in debate activity. Similarly, the result of this study is in line with the results of studies (Syaifudin, 2017; E. Wahyuni, 2020). They found that students' learning experience and performance are improved when online resources are integrated with traditional forms of course delivery, such as face-to-face lecturers and tutorials or known as blended learning. This is due to the fact that online learning offers all the time learning, where the learning can be accessed wherever and whenever the students want to access. The online learning has no time and place limitation as long as they connect with the internet access. This condition leads the students to have more time to learn English more than only in the classroom. When the students do not remember certain part of the material they can directly access, read, and learn. As a result, the students are exposed to unlimited time learning that make it possible for them to increase their ability, especially the 4C abilities.

Findings of this research is also supported by previous study who assert that the availability of online-based learning can provide facilities for students to examine data and evidence based on supporting theories so that they are scientific, compare different perspectives on phenomena or issues- science issues, analyze and synthesize data to form conclusions, and argue according to data collected based on facts (S. Wahyuni et al., 2019). Students who have the skills to ask and argue based on facts can construct explanations to generate new knowledge, in which new knowledge can be a new theory, a new way of collecting data, or a new way of interpreting the data in order to improve the critical thinking skills of scientific.

As mentioned in the previous part, the 4C abilities consist of critical thinking ability, creativity ability, collaboration ability, and communication ability. All of the abilities were integrated in order to prepare the students to face the challenges in the global communication, in this case, to prepare the students to have good English ability so that they

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would be ready to join the work atmosphere in the industrial revolution 4.0 later on. In fact, among those 4C abilities, there are two key competencies: creativity and collaboration. Those competencies have been regarded as key concepts in ELT in the ELT Journal of Oxford University (Radifan, 2020). However, the result of this research found a different thing in which the critical thinking ability got the highest improvement, followed by creative ability, while collaboration ability got the lowest improvement.

In the other hand, the contribution of blended learning to the students' collaboration and communication ability (van Laar et al., 2020). He asserts that blended learning has made collaboration easier. Actually, it takes collaboration step farther, making types of collaboration possible that weren't before technology. As the world goes more interconnected, collaboration will become a more and more essential skill that it already is which is why it makes the list of the 4Cs for 21st Century skills. Moreover, using technology in learning (blended learning) has provided with more convenient ways to communicate, but sometimes the various ways can become overwhelming. Without effective communication, there's no way to get anything done inside the classroom or anywhere, which is why this is an essential 21st Century skill (Chiruguru, 2020).

Furthermore, the researchers observed the students' 4C abilities as a whole because in English debate activities students needed to activate their 4C abilities in order to be able to master it. 4C abilities can be seen in debate practice (Krisnawati, 2019). For example, critical thinking is seen from the competence of students in finding the right source of problems and solutions on the topic of debate. Creative is seen from the competence of students using new approaches to solve problems and innovation. Communication is seen from the competence of students to express thoughts and ideas orally. Collaboration is seen from the competence of students to work effectively in teams to achieve common goals. Many other studies also confirm that implementing blended learning has successfully increased the students' 4C abilities. Those studies found that there was a significant difference of the students' 4C abilities after implementing blended learning in many fields (Hasanah, & Malik, 2020; Hawi Sudira, 2019; Resien, Sitompul, & Situmorang, 2020; Syaifudin, 2017; Tarunasena, 2017a; Triana, D., Anggraito, Y. U., & Ridlo, 2020). Overall, the implementation of blended learning resulted in satisfied effect to improve the students' 4C abilities.

## 4. Conclusions and Suggestions

The results of this study revealed that blended learning model improved the students'' 4C abilities. The results of data analysis showed that the improvement of students' critical thinking ability was the highest among the 4C abilities, followed by creative ability, and communication ability, while collaboration skills were the lowest-improved skills among all. Thus, Blended Learning Model could be applied to enhance students' 4C skills, especially in learning English Communication in the Industrial Era 4.0. However, this study was still limited to the use of zoom application in conducting blended learning. Besides, the study also involved small number of participants. Thus, it is suggested for next researchers who want to conduct a study of blended learning to involve more participants and to utilize more various applications in order to obtain a more comprehensive result.

## 5. Acknowledgements

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