

Blended Synchronous Learning and Students' Critical Thinking Ability: Lesson from Covid-19

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Abstract: The Covid-19 pandemic has been a primary issue and the educational sector has responded to this issue by providing various alternative learning activities to provide the indifference essence as in the normal situation. In more specific, this study aims to examine the implementation of blended synchronous learning based and its impact on students' critical thinking in economics. This study applied mixed methods, quasi-experimentally by using non-equivalent control group design research to determine the different changes during the experimental period. The findings of the study indicate that, in addition to diminish tedium in the classroom, blended synchronous learning outraces the conventional learning and can explain an increasing in critical thinking abilities of students. Additionally, this study demonstrates the remarkable different between threatened students and control group in the term of critical thinking from the perspective of SOLO taxonomy.

Keywords: *blended synchronous learning, critical thinking ability, blended learning, learning management system*

INTRODUCTION

The Covid-19 pandemic has been a global challenge, and it has impacted numerous sectors, including education (Nicola et al., 2020). Since implementing social or psychological distancing policy, it has braved a shift in educational activities from conventional to various distance learning activities (Bao, 2020). In the beginning, in Indonesia, this shifting faced several problems such as internet accessibility and the lack of understanding of distance learning (Anggraeni & Sole, 2018; Siron et al., 2020). From the positive perspectives, this movement has forced both learners and educators to elaborate on technology in the learning activities that are missing in the normal situation (Almaiah et al., 2020).

In addition to involving learning technology, educators need to design a learning environment that allows students to obtain the same benefits and successfully learning goals (Toquero, 2020). At the same time, the challenge in the learning activities during the Covid-19 pandemic is that the educators not only delivers the learning materials but also need to create students' critical thinking abilities. The fundamental reason is that in this fourth industrial era, the prime quality of human resources required to have several abilities, including critical

thinking skills, be skilled person, good communication skill, and be able to learn throughout life (Tharakan, 2020; Van Laar et al. (2017).

The growing body of literature believes that critical thinking is the demanding element for students, and it has become the foremost topic in the contemporary education revolution worldwide (Shavelson et al., 2019). Critical thinking ability is acquaintance with decision-making behavior for many purpose activities (D'Allesio et al., 2019; Kitsantas et al., 2019). In more detail, Wechsler et al. (2018) noted that critical thinking abilities cover four main components, including interpretation, explanation, analysis, and self-regulated. Siburian et al. (2019) added that critical thinking skill is also linked with cognitive thinking abilities that covering of logical thinking and problem-solving activities.

Critical thinking skills are closely linked with economics subjects. Economics is a study of choice where every single individual (household, firms, government) needs to make a rational decision (Mankiw, 2020). Since the individual facing a scarcity (i.e., time, money), it will drive to a trade-off – where for each decision they take, it sacrifices other opportunities. Critical thinking ability enables students to promote better decisions in economic activities. Critical thinking is imperative in an effort to solve problems, make decisions, analyze assumptions (Smith, 2003; Desai et al., 2016). Producing critical thinking skills will greatly assist someone in developing a career in any field of work, including the development of economic opportunities (Moningstar et al., 2017).

In a normal situation, various learning activities can be applied by educators in improving students' critical thinking skills. For instance, Narmaditya et al. (2018) raised attention on problem-based learning as its role in stimulating economics students' thinking skills. They pointed out that problem-based learning drives students to be more active during the learning process, and it enables students to construct their knowledge on given economics topic. Additionally, Sason et al. (2018) have implemented a project-based learning and found that the learning method is more attractive for both learners and educators. The finding of their study also confirmed an effectiveness of project-based learning in gaining students' critical thinking skills.

During the Covid-19 pandemic, scholars have attempted to implement methods that can provide the same benefits as well as increasing critical thinking abilities (Ariawan & Malang, 2020; Akib & Muhsin, 2020; Nadeak et al., 2020). One of the learning methods that predicted suitable for use is the blended learning method (Nortvid et al., 2020). Blended learning is a mixed learning pattern between classroom learning activities (face to face) and online (webinars, LMS) (Rafiola et al., 2020; Borba et al., 2016). However, during this Covid-19 pandemic, the online method used was the use of synchronous and asynchronous multimedia.

The studies' application of blended learning has been examined and gained attention among scholars. For example, Dziuban et al. (2018) conducted a study on students' perceptions and experiences during blended-learning process. Meanwhile, a large number of studies, such as, Ceylan and Cesici (2017); Harahap et al. (2019) focused on implementing blended learning in the term of conventional learning activity and the use of learning technology. Therefore, this study provides two main contributions. First, this is the first study in Indonesia that elaborates on a new blended learning scheme using synchronous model using

live virtual meetings and asynchronous adopting several interactive contents. Second, this study presents an insight into the ongoing literature either the implementation of blended learning or how to enhance students' critical thinking skills.

METHODS

This study applied a mixed method approach to gain a deeper understanding and analysis of both quantitative and qualitative data in a single phase, then combining the results to achieve an overall (Creswell, 2017). a quasi-experimental using non-equivalent control group design research to determine the different changes during the experimental period. The detail of this study is that the subject of the study is divide into two: experimental and control groups (see Table 1). First, both groups have treated a pre-test at the beginning of the study and post-test at the end of the study. The blended synchronous learning applied in this study involved live synchronous with web-based learning and learning management system "Sipejar", while the control group applied solely with conventional, lecturer-based learning, face-to-face using virtual live (e.g., Zoom Meeting, Google Meet). To calculate the result of this study, we provided a pre-test in the beginning of period and distributed a post-test in the end of session.

Table 1. Experimental Design Non-Equivalent Control Group Design

Group	Pre-test	Treatment	Post-test
Experiment	O ₁	X ₁	O ₂
Control	O ₃	X ₂	O ₄

This study was conducted in the economic students in the first year of study in a state university in East Java of Indonesia that consisting of 33 students for the experimental group and 34 students for the control group. We determined those sample of study considering the cumulative achievement by students. This study was conducted in the subject of microeconomics related to supply and demand employing instruments from council for economic education. The instruments applied in the study were tests and questionnaires developed under the criteria of critical thinking consisting of numerous multiple-choice that incorporates high order questions category and involves some essay questions that adopted critical thinking criteria from (Asyari et al., 2016; Narmaditya et al., 2018). The detail of indicator students' critical thinking consists of ability in proposing a solution, providing an argument, giving relevant explanation, elaborating with various perspectives, organizing principles and ideas, presenting in a concise and coherence language. To assess students critical thinking abilities, we also involved SOLO Taxonomy (structure of observed learning outcomes) including, pre-structural, uni-structural, multi-structural, relational and extended abstract in the end of learning period for both classes.

The question has been tested for validity using the Person Correlation Test and the reliability test by employing the Cronbach's Alpha method. The questionnaire is given when completing the entire learning process to ascertain

the effect of blended synchronous learning on students' critical thinking abilities. Analysis of the results categories of students' ability to think critically can be tested with the N-Gain test using equations:

$$N - gain (g) = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}} \dots\dots\dots (1)$$

The results of the N-gain value were tested for normality by parametric statistical tests through the SPSS program with the Kolmogorov-Smirnov test. If the normality test results obtained Asymp. Sig value > 0.05 these values can be said to be normally distributed. Different tests can be done with the condition if the sample is normally distributed and homogeneous, using the Independent Sample T-test, where H0 is accepted, then the Asymp. Value. Sig. (2-tailed) > 0.05. The difference test was conducted to determine whether or not there were average differences between the experimental group and the control group on students' critical thinking skills.

RESULTS & DISCUSSION

In the experimental group, learning process is performed using blended synchronous learning employing web-learning and learning management system (Sipejar). Learning is conducted equally in three meetings both live meeting with web-learning and e-learning using technology. Within the learning control group, it solely implemented using face-to-face with web conference meeting. The summarizing of students' critical thinking skills test results is provided in Table 2.

Table 2. Recapitulation of Average *N-gain* of Critical Thinking

	Total Students	Average Value of		N-gain	Criteria
		pre-test	post-test		
Experiment	33	49.67	81.12	0.64	moderate
Control	34	48.28	70.56	0.43	moderate

Table 2 illustrates the experimental group an increase in the average from pre-test to post-test of 31.45 with N-gain value of 0.64 included in the moderate category. Whereas the control class intimate with a mean increase from pre-test to post-test of 22.28 with an N-gain value of 0.43 enclosed in the medium category. Based on the results of the N-Gain test are often aforesaid that the critical thinking ability of the experimental group students is moderate. However, within the control group, the critical thinking ability of students is insufficient criteria. The N-Gain test results were tested for normality by using the parametric statistical test with the Kolmogorov-Smirnov test. The test value obtained by Asymp. Sig (2-tailed) > 0.05, which is 0.913, then the sample can be declared normally distributed. Then Levene's test was obtained significance of 0.212, which means sig > 0.05; it can be concluded that the two data groups have the same variant called homogeneous. T-test was conducted to determine whether there were differences in the critical thinking skills of students in the experimental and control classes.

Based on the independent sample T-test that is T-value > T-Table (7.264 > 0.2027) and significance (0.000 < 0.05), it can be concluded that H₀ is rejected, then there is a significant difference in students' critical thinking skills in the experimental class with the control class. This is in accordance with the hypothesis that has been provided previously. The results showed that learning by using blended synchronous learning is efficient, particularly for economics students. It could be seen from the enthusiasm and of students in conducting question and answer in discussion forums on the web conference platform.

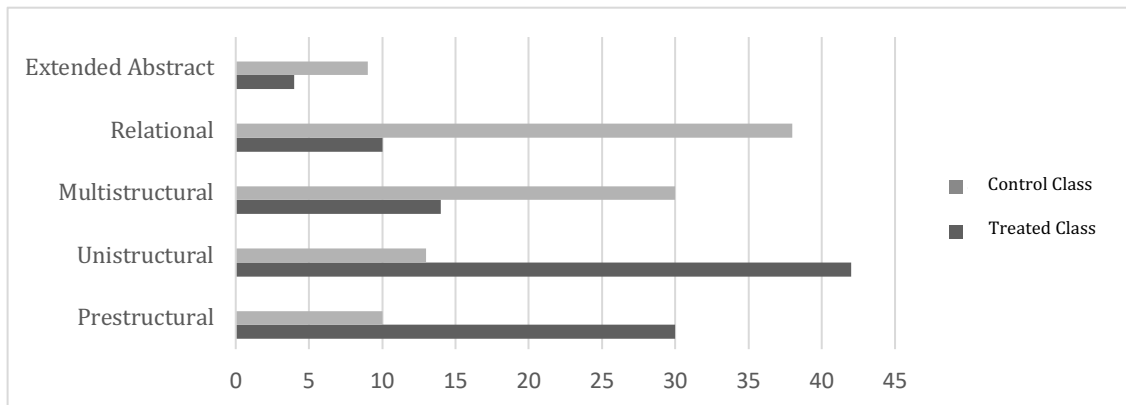


Figure 1. The Critical Thinking Domain of Students

Figure 1 illustrates the divergent of students' critical thinking ability between treated class and control class. The treated group is provided in grey color, while control group is presented in black color. The data was gained by comparing the post-test results in both groups. From the figure, it can be known that the different results between these two. For the control group, in general, it is dominated by pre-structural and uni-structural, whilst only small percentage in the degree of multi-structural, relational and extended abstract. In contrast, the critical thinking ability for treated students allocates with high percentage in multi-structural, relational and extended abstract. However, we also found a minor percentage of students remain categorized in the pre-structural and uni-structural.

Blended synchronous learning was proven more effective in improving critical thinking skills instead of conventional learning solely using web-learning. Blended synchronous learning can explain students' critical ability outside lesson hours to explore the material separately. Students could follow the online learning on web-online learning using a laptop, personal computer, or smartphone. Additionally, it was conjointly ready to increase interaction related to learning between peers outside classroom online meeting. This was well-trieed from the increase in group learning and discussion among peers outside of school to find out along in learning management system. The most straightforward side of combining online classroom study and learning management system was to create mastery of ideas students redoubled thanks to the material obtained from numerous sources. Consequently, the flexibility of students in the online classroom can be increased.

A prior study by Akkoyunlu and Soylu (2008) found that blended learning improved the provision and development of more theoretical material to students. Students received positive feedbacks and greatly appreciated the learning process

by using blended learning. Take approaching to inspect at researches in the past, Cheng et al. (1996) have designed the critical teaching for a natural science course in elementary schools. The method typically began with student discussion under the guidance of critical thinking teaching; then, they created creation by teams; finally, they presented group works along with class discussion. As a result, students from the experimental group presented better creative thinking skills than students from the control group. However, there is no significant improvement found in the aspects of critical thinking skills. This showed that students have difficulty improving their critical thinking skills if learning is only done with discussion or indirect guidance from the teacher. Instead, direct teaching and practice related to thinking skills are needed to help students transfer these skills to more practical and independent learning, which makes them can improve their critical thinking skills at the same time.

The application of blended synchronous learning model is often used as a strategy for organizing learning, the delivery of learning, and the quality of teaching because blended learning can accommodate rapid technological development without having to leave face-to-face learning (Maryam, 2018) The material in economic learning is indivisible from theories that cause students to feel bored. Therefore, utilizing the internet allows students to freely access material that is understood, such as videos and images. Blended synchronous learning can be used as one of the variations in learning. As a result of using this learning strategy, students will actively participate and think critically about learning determination issues.

CONCLUSION

In general, the implementation of blended synchronous learning using live meeting and learning management system has provided better performance instead of conventional learning solely using live synchronous meeting. The quantitative data results showed that students' critical skills have gained after blended synchronous learning implemented compared to control class. Additionally, the qualitative data confirmed that the blended synchronous learning has escalated students' critical thinking and diminish tedium in the fully online classroom learning. Also, this study suggest a significant different from the perspectives of SOLO taxonomy between threatened and control group. Considering some obstacles of this study, future research is suggested to elaborate the topic which perceived difficult by students, particularly in economics and social sciences.

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