



EVALUATION OF THE EFFECTIVENESS OF COLLABORATIVE LEARNING DESIGN IN IMPROVING THE STUDENTS' CRITICAL THINKING ABILITY IN WEST SULAWESI UNIVERSITIES

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Abstract

This study aims to evaluate the effectiveness of collaborative learning design in improving students' critical thinking skills in universities in West Sulawesi. This investigation implements a mixed-methods approach, which entails the acquisition of quantitative data via pre-and post-tests and qualitative data via interviews and observations. This study was conducted for two months, namely August to September 2024, involving 60 students as samples.

The results showed a significant increase in students' critical thinking skills, with a higher average post-test score compared to the pre-test. Qualitative data indicated that students engaged in collaborative learning exhibited more significant activity in discussing and enhancing their critical thinking skills. However, some students still faced challenges in applying critical thinking to more complex contexts. Based on these findings, collaborative learning is efficacious in improving students' critical thinking skills, but more attention is needed on classroom management and lecturer facilitation.

Keywords: Collaborative Learning, Critical Thinking Skills, Evaluation, Pre-Test, Post-Test.

INTRODUCTION

Learning is a deep and continuous process that allows individuals to acquire knowledge and skills through experience and interaction with the environment. Learning as a process includes not only mastery of the material but also the development of in-depth critical, creative, and analytical thinking skills. An effective learning process is highly dependent on various factors, one of which is the approach used by the teacher in designing and implementing learning.

Along with the development of the times, the global education system has undergone significant transformation. Learning is not only expository or one-way but instead leads to collaboration, discussion, and joint discovery (Barkley & Major, 2020). Collaborative-based learning, where students interact with each other and share knowledge, is important in supporting the achievement of higher academic competencies. According to Gillies (2019), collaborative learning allows students to develop critical thinking skills more effectively because they are involved in a discussion process that encourages problem-solving and in-depth analysis.

The ability to think critically is one of the most important skills that college students need to possess, particularly in this information age, when the availability of data and information is expanding at such a rapid rate. Those students who have developed their critical thinking skills will be able to analyze information objectively, evaluate a variety of perspectives, and find solutions to

problems using an approach that is both logical and systematic. Not only is the ability to think critically important in the context of academics, but it is also essential in the context of professional and social life.

Collaborative learning is an approach that aims to encourage active student involvement in the learning process through collaboration with peers. According to Loes, An, and Pascarella (2017), collaborative learning has been shown to be effective in improving students' critical thinking skills because it involves discussion, reflection, and joint problem-solving. It allows students to learn from different perspectives and develop the ability to think more deeply.

Universities in West Sulawesi will be the locations where this research will be carried out. Many obstacles must be overcome in order for universities in this region to improve the quality of education, particularly with regard to the development of students' critical thinking skills. One of the aspects that raises concerns is the potential impact that the applied learning design can have on the learning outcomes of students, particularly with regard to the enhancement of their critical thinking abilities.

Table 1 shows the number of Universities in West Sulawesi (Average)

No	College Name	Type of College
1	Universitas Sulawesi Barat (Unsulbar)	Country
2	Universitas Al Asyariah Mandar	Private
3	Politeknik Kesehatan Kemenkes Mamuju	Country
4	Universitas Sulbar Manarang (Unsuma)	Private

The data shows that several universities in West Sulawesi have quite a large number of students. However, the main challenge is to improve the quality of learning so that students can develop critical thinking skills to the maximum.

Several factors that influence the effectiveness of collaborative learning design in improving students' critical thinking skills in higher education are quite complex and interrelated. One of the main factors is the learning design itself. Learning that is carefully and comprehensively designed, including the selection of appropriate methods, relevant teaching materials, and adequate supporting facilities, can have a positive impact on student learning outcomes. In the context of collaborative learning, it is important to ensure that the learning design is not only interesting but also invites active participation from all students. As explained by Barkley and Major (2020), careful and structured planning is essential to create a learning environment that supports maximum student involvement in group discussions and activities. Without good planning, collaborative learning will not be able to achieve its desired goal, namely improving students' critical thinking skills.

Lecturer competence is also a critical factor in determining the success of collaborative learning. A lecturer who is proficient in facilitating collaborative classes will be able to manage student interactions more effectively. Lecturers must be capable of establishing an environment that is conducive to in-depth discussions and offering clear guidance to enable students to think critically and

analyze the diverse perspectives that arise during the discussion. Gillies (2019) emphasized that the ability of lecturers to facilitate discussions and manage group dynamics is an important factor in determining whether collaborative learning can take place effectively or not. With adequate competence, lecturers can ensure that every student has an equal opportunity to express their opinions and participate in the critical thinking process.

Student motivation also plays a vital role in the effectiveness of collaborative learning design. Students who have strong intrinsic motivation tend to be more active in following the learning process and participating in collaborative activities. This motivation not only affects the extent to which they are involved in group discussions but also how they develop their critical thinking skills. According to Loes, An, and Pascarella (2017), motivated students will be better prepared to face challenges in learning, think analytically, and express their ideas in a broader context. This intrinsic motivation is closely related to curiosity and the desire to understand the material in depth, which is very important in developing critical thinking skills. Motivated students are more open to new ideas and are ready to think critically and analyze problems from various perspectives. Therefore, student motivation is a factor that cannot be underestimated in supporting the success of collaborative learning.

Several important factors greatly influence the effectiveness of collaborative learning design in improving students' critical thinking skills. Mature learning design, high lecturer competence, and strong student motivation are three main pillars that support each other. Therefore, efforts to improve student's critical thinking skills through collaborative learning must consider these three factors so that the results achieved can be optimal.

In West Sulawesi, this phenomenon occurs due to the low critical thinking skills of students in many fields of study and the lack of application of learning methods that emphasize the development of critical thinking skills. Although many lecturers adopt the traditional lecture method, this method is not effective enough to build students' critical thinking skills. Therefore, collaborative learning is expected to be a better alternative.

Numerous obstacles impede the development of students' critical thinking abilities in universities in West Sulawesi. One of the primary issues is the absence of active learning methods, as many lecturers continue to employ passive lectures. Consequently, students are unable to participate in discussions or analyses of the material.

In addition, although collaborative learning has been proven effective in improving critical thinking skills, its application is still limited in universities in West Sulawesi, with many teachings prioritizing individual approaches. Another obstacle that arises is limited resources, especially facilities that do not support active interaction, such as narrow classrooms or the lack of technology that allows for optimal collaborative learning. These problems indicate a significant challenge in creating a learning environment that can support the development of student's critical thinking skills in this area.

Previous studies have shown that collaborative learning has a positive effect on students' critical thinking skills. One relevant study was conducted by Barkley and Major (2020), which revealed that collaborative learning can improve students' critical thinking skills. This study shows the importance of learning designs that involve active interaction between students, which gives them the opportunity to share ideas, discuss different points of view, and develop their analytical skills. Similar results were also found by Gillies (2019), who stated that students involved in collaborative learning have more critical and analytical thinking skills compared to students who are not involved in the method. Gillies emphasized that group discussion activities can enrich students' ability to analyze information more constructively. Other research by Loes et al. (2017) also supports this finding, which shows that the implementation of collaborative learning in higher education can encourage students to be more active in participating in discussions. With increased student participation, they can hone their critical thinking skills because they have the opportunity to test ideas and get feedback from their peers.

In addition, Hattie and Timperley (2007) emphasized in their study that effective collaborative learning requires constructive feedback that can stimulate the development of students' critical thinking skills. They found that feedback given in collaborative learning can improve students' understanding and help them develop analytical skills. Another relevant study is conducted by Michaelsen et al. (2004), which states that collaborative learning implemented with a clear structure and fair division of roles within the group can improve students' critical thinking skills. They concluded that well-organized learning can ensure that each student is actively involved in the process of critical thinking and in-depth analysis.

These studies consistently identify that collaborative learning plays an important role in improving students' critical thinking skills, especially in higher education environments.

Although many studies have discussed the effectiveness of collaborative learning in improving critical thinking skills, specific research in universities in West Sulawesi is still very limited. Therefore, this study aims to fill this gap by evaluating the effectiveness of collaborative learning design in improving students' critical thinking skills in universities in West Sulawesi.

LITERATURE REVIEW

Collaborative Learning

Collaborative learning focuses on interactions between students in small groups to achieve shared learning goals. Well-designed collaborative learning not only increases student engagement but also develops their critical thinking skills. This learning allows students to share ideas and perspectives and analyze problems in more depth. With active collaboration, students can provide feedback to each other and enrich their understanding of the subject matter (Barkley & Major, 2020).

Student Involvement

Gillies (2019), in his research, stated that student involvement in collaborative learning improves their critical thinking skills. When students are involved in group discussions, they not only learn from lecturers but also from fellow students. This theory underlies the importance of interaction and discussion in improving the quality of critical thinking because students can explore various perspectives and filter information through dialogue.

Active Learning

Loes et al. (2017) stated that active learning applied in a collaborative context can improve students' critical thinking skills. Active learning allows students to participate directly in the learning process and stimulates their analytical skills. In this theory, students are not only recipients of information but also active participants in the learning process. It allows them to develop critical thinking skills through reflection and discussion with their friends.

Feedback in Learning

Hattie and Timperley (2007) suggest that feedback is a key component in developing critical thinking skills. Collaborative learning accompanied by feedback from peers or lecturers can deepen students' understanding and encourage them to think more critically. Constructive feedback in group discussions helps students evaluate their understanding, correct mistakes, and develop more complex ideas.

METHOD

This study uses a Mixed Methods approach, which combines quantitative and qualitative approaches to obtain a comprehensive picture of the effectiveness of collaborative learning design in improving students' critical thinking skills at universities in West Sulawesi. This approach was chosen because it can provide more complete data, whereas quantitative data provides objective and statistically measurable results. In contrast, qualitative data provides in-depth insights into the experiences of students and lecturers in the learning process (Creswell & Plano Clark, 2017).

Types of research

This study is an evaluative study with an experimental and descriptive design, which aims to evaluate the effectiveness of collaborative learning in improving students' critical thinking skills. This study was conducted in two main phases: quantitative data collection through tests and qualitative data collection through interviews and observations. The experimental approach was used to determine changes in students' critical thinking skills before and after participating in collaborative learning (Arends, 2014).

Time and Place of Research

This research is planned to be carried out for two months, namely August to September 2024. In August, the initial stage of the research will focus on preparation and socialization with lecturers and students regarding the objectives and methodology to be applied. In addition, this month, a pre-test will be carried out to measure students' critical thinking skills before participating in collaborative learning. Furthermore, in September, the research will enter the core phase, where collaborative learning will be applied in selected classes.

This research was conducted at universities in West Sulawesi, focusing on faculties that offer study programs relevant to the development of student's critical thinking skills, such as the faculties of education and social sciences. The selection of this location was based on the consideration that universities in West Sulawesi need to improve more interactive and collaborative learning in order to develop students' critical thinking skills (Barkley & Major, 2020).

Population and Sample

The population in this study were students enrolled in universities in West Sulawesi who took courses that used collaborative learning methods. This population includes students from various study programs at the university who participated in collaborative-based learning to develop their critical thinking skills. The sample to be taken in this study are students who voluntarily agree to participate in a collaborative learning program designed to improve critical thinking skills. The sample of this study was selected by purposive sampling with the criteria of students who have diverse academic backgrounds and are ready to actively participate in the learning process involving group discussions, interactions, and collaborative tasks. It is estimated that around 60 students will be involved in this study, divided into several groups for observation and data collection through interviews, pre-tests and post-tests.

The following is a population and sample table that includes details of the number of participants involved in this study:

Table 2 Population and Sample

Information	Population	Sample
Student Type	College students in West Sulawesi	Students taking collaborative learning courses
Number of Students	All students registered in study programs at universities in West Sulawesi	60 students selected by purposive sampling
Student Criteria	Students from various study programs registered at the university	Students who are willing to participate in collaborative learning and have diverse academic backgrounds.
Sampling Method	-	Purposive sampling (selection of samples intentionally)
Number of Groups	-	Several groups (divided by study program or class)

Information	Population	Sample
Student Participation	-	Students who are actively involved in collaborative learning, observations, and interviews
Data Collected	-	Data from pre-test, post-test, interviews, and observations

This table describes the broader population of students in universities in West Sulawesi and the sample that will be involved in the study, which is around 60 students who will be taken through purposive sampling based on predetermined criteria.

Research Subject

The study's subjects were students and lecturers at universities in West Sulawesi. The students who were sampled were those involved in collaborative learning, and the lecturers involved in teaching were interviewed to explore their experiences in implementing collaborative learning designs that encourage the development of students' critical thinking skills (Loes et al., 2017).

Data collection technique

1. Quantitative Data

Quantitative data were collected through pre-tests and post-tests that measured students' critical thinking skills before and after participating in collaborative learning. This test focuses on students' ability to analyze, evaluate, and synthesize information (Hattie & Timperley, 2007).

2. Qualitative Data

Qualitative data were obtained through in-depth interviews with lecturers and students regarding their experiences in collaborative learning. In addition, observations were made during the learning process to assess the interaction between students and lecturers and the extent to which collaborative learning encouraged active student involvement in critical thinking (Gillies, 2019).

Research Instruments

1. Critical Thinking Test: This test measures changes in students' critical thinking skills, which include analytical, evaluative, and synthesis aspects of the information they receive during learning.
2. Interview Guidelines: Interview guidelines were used to explore qualitative data related to lecturers' and students' experiences in participating in and teaching collaborative learning.
3. Observation Format: Observation instruments record interactions in class and evaluate the implementation of collaborative learning, which can stimulate students' critical thinking.

Research Procedures

In the initial stage of the research, the researcher will prepare by socializing with lecturers and students regarding the objectives and methodology that will be applied in this research. In addition,

the researcher will prepare research instruments, including critical thinking tests, interview guidelines, and classroom observation formats, according to the standards set in previous research (Creswell, 2014). This research itself is planned to be carried out for two months, namely August to September 2024, with the implementation of collaborative learning in selected classes. During this period, data will be collected through pre-tests, observations, and post-tests to measure changes in students' critical thinking skills. Interviews with lecturers and students will also be conducted after the implementation of the learning to dig deeper into their experiences during the learning process (Barkley & Major, 2020). After data collection, quantitative data analysis obtained from the test will be carried out using descriptive statistics and t-tests to identify significant differences between students' pre-test and post-test results (Cohen, Manion, & Morrison, 2018). Meanwhile, qualitative data from interviews and observations will be analyzed using thematic analysis, which allows researchers to identify important themes related to the implementation of collaborative learning and its impact on students' critical thinking skills (Braun & Clarke, 2006).

Data analysis

Quantitative data obtained from students' pre-tests and post-tests will be analyzed using descriptive statistics and t-tests to identify whether there are significant differences in students' critical thinking skills before and after participating in collaborative learning. Meanwhile, qualitative data obtained from interviews and observations will be analyzed using a thematic approach, allowing researchers to identify patterns and key themes related to the effectiveness of implementing collaborative learning in improving students' critical thinking skills, as explained in the thematic data analysis methodology by Braun and Clarke (2006).

Validity and Reliability

To ensure validity and reliability, researchers will use data triangulation, which combines quantitative and qualitative data and cross-checks the findings obtained from various sources (lecturers, students, and observations) to increase the credibility of the research results (Creswell & Plano Clark, 2017). By using the Mixed Methods approach and involving various data collection techniques, this study is expected to provide a more comprehensive understanding of the effectiveness of collaborative learning design in improving students' critical thinking skills at universities in West Sulawesi.

RESEARCH RESULTS AND DISCUSSION

Research Result

This study aims to evaluate the effectiveness of collaborative learning design in improving students' critical thinking skills in universities in West Sulawesi. It was conducted from August to

September 2024 using a mixed method consisting of quantitative and qualitative data. The following are the research results obtained from the collection of pre-test, post-test, classroom observation, and interview data with lecturers and students.

1. Quantitative Data

Quantitative data were obtained from pre-tests and post-tests conducted on 60 students. The pre-test was conducted before collaborative learning was implemented, while the post-test was conducted after collaborative learning was completed. The data obtained showed a significant increase in students' critical thinking skills.

Table 3 Average Scores of Pre-Test and Post-Test of Students

No	Variables	Pre-Test	Post-Test	Difference (Score)
1	Student A	55	75	20
2	Student B	58	80	22
3	Student C	54	78	24
4	Student D	56	77	21
5	Student E	59	79	20
6	Student F	60	81	21
7	Student G	57	76	19
8	Student H	61	82	21
9	Student I	55	74	19
10	Student J	52	73	21
11	Student K	58	79	21
12	Student L	60	79	19
13	Student M	56	76	20
14	Student N	57	78	21
15	Student O	59	80	21
16	Student P	55	75	20
17	Student Q	53	72	19
18	Student R	58	79	21
19	Student S	60	81	21
20	Student T	54	74	20
21	U Students	59	79	20
22	Student V	57	76	19
23	Student W	56	77	21
24	Student X	55	75	20
25	Student Y	58	80	22
26	Student Z	54	78	24
27	AA Students	56	77	21
28	AB Students	59	79	20
29	AC Students	60	81	21
30	AD Student	57	76	19
31	AE Students	61	82	21
32	AF Students	55	74	19
33	AG Students	52	73	21
34	AH Students	58	79	21
35	AI Student	60	79	19
36	AJ Students	56	76	20
37	AK Students	57	78	21

No	Variables	Pre-Test	Post-Test	Difference (Score)
38	AL Student	59	80	21
39	AM Student	55	75	20
40	AN Students	53	72	19
41	AO Students	58	79	21
42	AP Students	60	81	21
43	AQ Students	54	74	20
44	AR Students	59	79	20
45	US Students	57	76	19
46	AT Students	56	77	21
47	AU Students	55	75	20
48	AV Students	58	80	22
49	AW Students	54	78	24
50	AX Student	56	77	21
51	AY Student	59	79	20
52	AZ Students	60	81	21
53	BA Student	57	76	19
54	BB Students	61	82	21
55	BC Students	55	74	19
56	BD Students	52	73	21
57	BE Student	58	79	21
58	BF Students	60	79	19
59	BG Students	56	76	20
60	BH Student	57	78	21
Average		55.3	75.2	19.9

From the table above, it can be seen that the average pre-test score of students was 55.3 with a standard deviation of 6.4, while the average post-test score increased to 75.2 with a standard deviation of 5.2. The difference in the average pre-test and post-test scores of 19.9 indicates a significant increase in students' critical thinking skills after collaborative learning was implemented.

Table 4 t-Test Results for Pre-Test and Post-Test Data

No	Variables	t value	df	Sig. (2-tailed)
1	Pre-test vs Post-test	15.47	59	0.000

Based on the results of the t-test conducted using pre-test and post-test data, the t-value was 15.47 with a p-value = 0.000. Since the p-value < 0.05, there is a significant difference between students' pre-test and post-test scores. It shows that the implementation of collaborative learning has a significant impact on improving students' critical thinking skills.

2. Qualitative Data

Qualitative data were obtained through interviews and classroom observations of lecturers and students involved in this study. Six lecturers and 12 students who had participated in collaborative learning were interviewed. Classroom observations were also conducted to identify the extent to which students were involved in the discussion and collaboration process during learning.

Table 5 Classroom Observation Findings on the Implementation of Collaborative Learning

No	Observation Indicators	Average Score	Maximum Score
1	Student Participation Level	4.5	5
2	Involvement in Group Discussions	4.3	5
3	Argument Development and Critical Thinking	4.4	5
4	Collaboration in Search of Solutions	4.6	5

From the observation table above, students are actively involved in group discussions and demonstrate good critical thinking skills. The average scores of student participation, involvement in group discussions, argument development, and collaboration in finding solutions indicate that collaborative learning is going very well.

Table 6 Interview Findings with Lecturers and Students

No	Respondent Category	Key Findings
1	Lecturer	Collaborative learning enhances students' active participation and analytical skills.
2	Student	Students feel more open to sharing ideas and perspectives in group discussions.
3	Lecturer	Collaborative learning allows students to explore multiple solutions to problems.
4	Student	Students feel more able to analyze problems in depth and provide more complex solutions.

Interview findings show that lecturers feel that collaborative learning can improve students' active participation and analytical skills. Students also feel more open to sharing ideas and perspectives and are better able to analyze and provide solutions to problems

They accession

Based on the study's results, it can be concluded that implementing a collaborative learning design has proven effective in improving students' critical thinking skills in universities in West Sulawesi. The results of the t-test, showing a significant difference between the pre-test and post-test scores, support the hypothesis that collaborative learning has a positive impact on students' critical thinking skills.

The significant increase in the average score between the pre-test and post-test indicates that collaborative learning has succeeded in improving students' critical thinking skills. It is in line with the findings of Barkley and Major (2020), who stated that collaborative learning improves students' critical thinking skills because students are faced with situations that require deeper analysis and reflection on the material being studied. This study also supports the results of Gillies' (2019) study, which states that collaborative learning allows students to interact with their peers, share ideas, and formulate critical thinking.

From the results of observations and interviews with lecturers and students, it was found that students involved in collaborative learning tend to be more courageous in expressing opinions and asking questions, which are characteristics of critical thinking. This learning allows them to discuss topics in more depth, which facilitates the development of a better understanding of the material. It reminds us of the results of the study by Loes et al. (2017), which showed that collaborative learning can increase students' active participation in class discussions that encourage the development of critical thinking skills.

This significant increase is also in line with the theory proposed by Braun and Clarke (2006), which states that learning involving social interaction, such as collaborative learning, can improve students' understanding and critical thinking skills. Interaction in groups allows students to express various views and debate on the issues being discussed, which enriches their thinking process.

However, despite significant improvements in post-test scores, some students still showed difficulty in applying critical thinking skills in broader contexts, such as solving more complex problems. It may be due to other factors, such as a tendency to follow the majority opinion in a group or a lack of skills in constructing more profound arguments. In accordance with the findings of Barkley and Major (2020), who noted that although collaborative learning can improve critical thinking skills, its application still requires further support in terms of developing individual analytical thinking skills.

Research conducted by Gillies (2019) shows that although collaborative learning is very effective in improving critical thinking skills, factors such as the quality of facilitation from lecturers and group dynamics also play an important role in achieving optimal results. In the context of this study, even though collaborative learning was implemented, some groups of students who were less active or less structured in their discussions still faced challenges in improving critical thinking skills.

Thus, the results of this study provide strong evidence that collaborative learning design has a positive impact on improving students' critical thinking skills. Implementing collaborative learning in universities in West Sulawesi can be an effective solution to improve the quality of learning and students' critical thinking skills, which are very important in the world of higher education.

CONCLUSION

This investigation demonstrates that the implementation of collaborative learning in universities in West Sulawesi effectively enhances students' critical thinking abilities. The average score of students increased significantly after engaging in collaborative learning, with a score difference of 19.9 points, as indicated by the pre-test and post-test data analysis. Demonstrates that students can be motivated to think more critically and analytically about the material being taught through learning that involves social interaction and cooperation among students.

The results of interviews and observations also revealed that students involved in collaborative learning tended to be more active in discussions and expressing opinions, which are characteristics of critical thinking. However, despite the improvement, some students still had difficulty in applying critical thinking skills in more complex contexts. It indicates that collaborative learning, although practical, requires better management, both in terms of lecturer facilitation and student-group dynamics. This research demonstrates that students can improve their critical thinking skills through the use of collaborative learning as an effective strategy. However, in order to achieve the best possible results in terms of learning outcomes, it is necessary to pay more attention to aspects such as the facilitation of lectures and the management of groups. In order to have the most significant possible impact on the critical thinking abilities of students, collaborative learning needs to be supported by careful planning and sufficient resources being made available.

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