
LESSON STUDY: A QUALITATIVE ANALYSIS USING NVIVO IN CLIMATE CHANGE COURSE

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Abstract :

The research aims to analyze lesson study learning in climate change courses on student collaboration skills during group learning. The approach used is qualitative with the type of case study. The subjects in this study were physics education students who took climate change courses consisting of 16 students, including 13 female students and 3 male students. Data collection techniques used in the study by means of documentation and observation when learning with lesson study takes place. Documentation data was obtained during the learning process in the form of recordings of discussions of each group that participated in learning in the climate change course. The results showed that the collaboration skills of students varied between groups, influenced by group members and the ability to work together between members. Analysis with TBLA assisted by NVivo through coding and identifying the main themes, from the problems given to discuss related to the issue of climate change and modern agriculture. The results of the analysis based on learners' discussions showed a deep understanding of climate change and suggested solutions, such as vertical farming innovations, to overcome the challenges related to increasingly narrow agricultural land. This study provides insights into lesson study in improving learners' awareness of climate change issues and learners' collaboration skills. Lesson study, with its collaboration-based approach, enables learners to actively discuss, evaluate and understand the impacts of climate change in a real context.

Keywords: Change Climate, Lesson Study, NVivo, Sklils Collaboration

Abstrak:

Penelitian bertujuan untuk menganalisis pembelajaran *lesson study* pada mata kuliah perubahan iklim terhadap keterampilan kolaborasi mahasiswa pada saat pembelajaran secara berkelompok. Pendekatan yang digunakan adalah kualitatif dengan jenis studi kasus. Subjek dalam penelitian ini adalah mahasiswa pendidikan fisika yang menempuh matakuliah perubahan iklim yang terdiri atas 16 mahasiswa, yang diantaranya 13 mahasiswi dan 3 mahasiswa. Teknik pengumpulan data yang digunakan dalam penelitian dengan cara dokumentasi dan observasi pada saat pembelajaran dengan *lesson study* berlangsung. Data dokumentasi diperoleh pada saat pembelajaran berlangsung berupa rekaman diskusi setiap kelompok yang mengikuti pembelajaran pada mata kuliah perubahan iklim. Hasil penelitian menunjukkan bahwa keterampilan kolaborasi peserta didik bervariasi antar kelompok, dipengaruhi oleh anggota kelompok dan kemampuan kerja sama antar anggota. Analisis dengan TBLA berbantuan NVivo melalui pengkodean dan identifikasi tema utama, dari permasalahan yang diberikan untuk didiskusikan terkait isu perubahan iklim dan pertanian modern. Hasil analisis berdasarkan diskusi peserta didik menunjukkan pemahaman yang mendalam terkait perubahan iklim dan menyarankan solusi, seperti inovasi pertanian vertikal, untuk mengatasi tantangan terkait lahan pertanian yang semakin sempit. Studi ini memberikan wawasan pembelajaran dengan *lesson study* dalam meningkatkan kesadaran peserta didik terhadap isu perubahan iklim dan keterampilan kolaborasi peserta didik. *Lesson study*, dengan pendekatannya yang berbasis kolaborasi, memungkinkan peserta didik untuk secara aktif mendiskusikan, mengevaluasi, dan memahami dampak perubahan iklim dalam konteks nyata.

Kata kunci: Lesson Study, Keterampilan Kolaborasi, NVivo, Perubahan Iklim.

INTRODUCTION

Learning is a knowledge transfer system that involves various components in the world of education, including educators, students, materials, as well as methods and media used in the teaching process (Kurniawati, 2021). The learning process itself is a series of activities designed with the aim of achieving a better quality of education, which begins with analyzing every factor that can affect the effectiveness and results of learning (Junaedi, 2019). Therefore, it is important to understand the dynamics between the various elements involved in the process so that learning can run optimally. Learning is also not just a transfer of knowledge, but more than that, it is an educational activity that allows meaningful interaction between educators and learners, where both play a role in creating a conducive learning atmosphere and increasing understanding (Fitrianti, 2018). In this context, one of the disciplines that is very important to analyze is Physics, because this science not only explains the natural phenomena that occur around us, but also plays a role in helping learners to understand global issues that can affect their lives, such as climate change, renewable energy, and rapidly developing technology.

Physics is a branch of natural science that investigates the properties and phenomena of the universe and how matter and energy interact with each other (Pratiwi et al., 2019). Physics learning is science learning which in its activities includes processes, scientific attitudes and products. Physics learning is an educational process that aims to provide students with an understanding of natural phenomena and the basic principles that govern the universe (Erlinawati et al., 2019). One of the studies in physics learning, especially in universities today, is climate change. Universities at the Jambi University Physics Education Study Program design various courses to equip in the education process, one of which is the climate change course. Climate change is an unavoidable disruptive change that affects the temperature and weather patterns in an area (Listiningrum & Magistra, 2023). One of the sectors affected by climate change is the agricultural sector (Priyanto, 2021). In facing global challenges such as climate change, which is one of the main studies in physics learning, it is necessary to develop 21st century skills, one of which is collaboration skills, which can increase the effectiveness of learning and the competitiveness of students.

Collaboration skills for students are a design to develop group cooperation in the learning process which will later be used as a reference to be able to compete, the existence of effective collaboration will create competitiveness for students (Firman et al., 2023). Collaboration can build effective communication skills by placing them on the interpersonal part of learners (Saenab et al., 2017). In addition, collaboration skills are skills that must be possessed by learners to be able to work together and tolerate effectively with team members to reach a common agreement (Mu'arifah et al., 2023). To improve learning activities, both the focus and collaboration skills of learners and teachers, innovation in learning is needed, both in terms of models, media, strategies, techniques and approaches, and learning methods. Innovation in learning, including the development of collaboration skills, can be realized through strategic approaches such as lesson study, which involves the collaboration of educators in planning, implementing, and evaluating the learning process systematically.

Lesson study is a model of professional development of educators through collaborative and sustainable learning assessment based on the principles of collegiality and mutual learning to improve learning quality and build a learning community (Prianggita et al., 2022). Lesson study is a coaching effort to improve the learning process by a group of educators working together in planning, implementing, observing, and reporting the results (Susanti et al., 2022). Lesson study consists of three stages known as plan- do- see which includes the process of lesson planning, implementation, observation and reflection (Sairo, 2021). Research Rizki et al (2022) explained that the use of TBLA in lesson study helps in identifying student interaction patterns that contribute to a better understanding of the material. However, in previous studies that have been conducted, the lesson study stages were carried out by researchers as a whole which requires more focus and action. Therefore, in the research conducted, the implementation of learning with lesson study only focuses on when the learning process takes place or known as open class to get the opportunity for researchers to deeply observe learning activities, including students' collaboration skills, which are analyzed using TBLA techniques and NVivo software to obtain more structured and in-depth data. Based on the existing background, the research conducted aims to analyze learning with lesson study, especially during the learning process or open class with the research subject of physics education students at Jambi University Class of 2021 who are taking climate change courses.

METHODS

The method used in this research is a qualitative method. Qualitative research is an approach to exploring and understanding the meanings that individuals or groups associate with social or human problems (Creswell & Creswell, 2018). According to Creswell (2007) types of qualitative research include narrative research, phenomenological research, grounded theory, ethnography, case studies. The type of research used is a case study, which is designed to analyze in detail and in depth the phenomena that occur in a specific context, because the case is limited by time and activity and researchers collect detailed information using various data collection procedures. In this research, the case study focused on analyzing the lesson study learning process in the classroom in the Climate Change course. The research was conducted at Jambi University, Physics Education Study Program during the even semester of the 2023/2024 academic year. The subjects in the research that has been carried out are Physics Education students class of 2021 who are taking the Climate Change course, totaling 16 students with details of 13 female students and 3 male students

The research was conducted in several stages of lesson study, namely stages I, II, and III. In the research conducted, the researcher acted as an observer and was involved during the learning process, for planning and reflection carried out by educators. Data collection techniques in the study by means of observation and documentation when the learning process takes place by dividing students into several groups according to the predetermined planning, then in each group a sound recording device is placed with the help of a smartphone. After the learning process is complete, the documentation data is then collected from each group to be processed with the TBLA technique.

TBLA is an analytical technique of lesson study to analyze the situation in learning (Susanti et al., 2021). TBLA is a research data analysis technique using a transcript of conversation results (Wanni et al., 2021). The TBLA model provides analysis for learning inputs through learning dialog transcripts. This developed learning analytics system focuses on student responses during classroom learning (Aprian et al., 2020). The data that has gone through the TBLA stage is then analyzed again with the help of NVivo software. NVivo software is a tool that can connect between phenomena that become research issues (Yulianto & Wijaya, 2022). NVivo can separate data sourced from informants and those sourced from researchers and secondary sources (books, research reports, historical documents, journal articles, website content, online news, conference proceedings, memos, field notes, bibliographic annotations, and even researchers' daily journals stored in NVivo) (Endah et al., 2020). Data analysis is carried out with the help of NVivo software by inputting data from TBLA results to map and categorize thematic codes that appear, so as to provide a deeper understanding of collaboration skills and interactions between students in lesson study learning in the Climate Change course.

RESULTS AND DISCUSSION

The research that has been carried out is to follow the learning process that has been carried out in the climate change course in the Physics Education Study Program at Jambi University. Participants in this study were students of the Physics Education Study Program where in the process of collecting data students were divided into 3 groups, each group consisting of 5-6 members. This study aims to analyze the lesson study learning process, where students' discussion activities are recorded and analyzed using the Transcript Based Lesson Analysis (TBLA) technique to see students' collaboration skills during the classroom learning process.

After recording students' discussion activities, the next step is to transcribe the voice recordings using the TBLA technique, which is then analyzed with the help of NVivo software. Nvivo software shows many features that can be used to analyze the data that has been collected from the learning process that has been carried out in the form of TBLA, one of the Nvivo features is the word frequent query which functions to assist researchers in terms of collecting the words most frequently expressed by research subjects. In addition, there is a word tree feature that functions to interpret the words that appear most often from the word frequency query feature, to analyze the collaboration skills of students during the learning process with lesson study using the nodes feature through coding carried out.

Analysis Word Frequency Query

The results of the analysis using the word frequency query feature in NVivo show that the word "agriculture" has the highest frequency of 0.87%, followed by the words "climate", "design", and

“hectares”. The word “agriculture” became dominant because student discussions focused on the impact of climate change on the agricultural sector and the importance of innovation to overcome these challenges. Where from the words that often appear, it shows that the discussions carried out by students in each group are in accordance with the predetermined theme. Where in the concept of learning that has been done discussing climate change and the consequences of climate change, which is shown in Figure 1 below.



Figure 1. Word Frequency Query

In Figure 1, the word agriculture is the word with the most frequent frequency appearing in students' discussions. Based on further analysis conducted, the word agriculture often appears because in the topic of discussion about agricultural innovation that can be done by utilizing a narrow land area. In discussions conducted by learners in their respective groups, the word agriculture that often appears relates to issues or problems discussed related to climate change, regions and technological adaptation in the agricultural system. Thus, the results of this analysis not only illustrate the focus of the problem in the learners' discussion, but also reflect the level of understanding of the relationship between climate change and the agricultural sector.

Analysis Word Tree

The feature that can be done to analyze data in Nvivo is the next text search query. This feature is used to analyze and interpret words from the word cloud that has been presented previously. In this study, we want to understand the use of the word “agriculture” which is a word that appears frequently, which is presented in the form of a word tree feature.

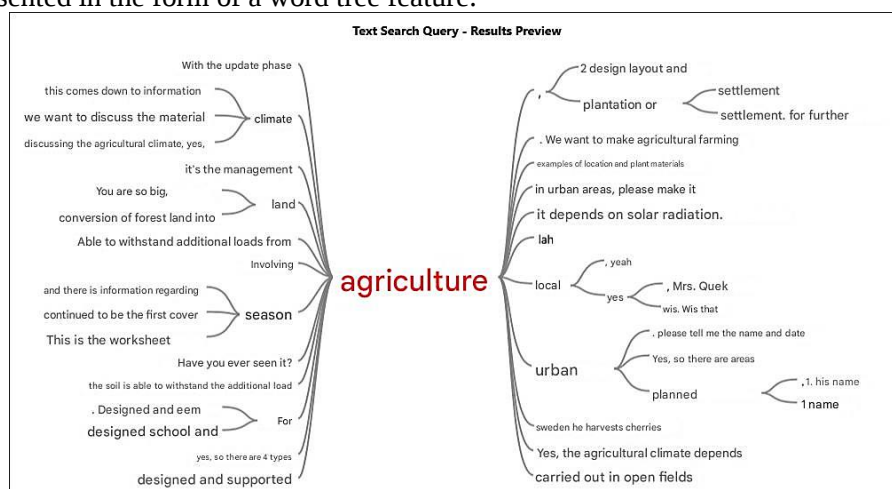


Figure 2. Word Tree from the use of the word “agriculture”

Exploration of the word tree feature showed that from the discussions in the learning process, climate change can have an impact on the agricultural sector. Further analysis with the word tree feature

revealed that learners discussed the relationship between climate change and the agricultural sector in a variety of contexts, including:

1. **Impacts of Climate Change:** learners explain how changes in weather patterns, such as increased temperatures and rainfall uncertainty, impact agricultural productivity.
2. **Agricultural Land Challenges:** learners highlight the problem of reduced agricultural land due to urbanization and population pressure, which is further exacerbated by climate change.
3. **Innovative Solutions:** One of the proposed solutions is the use of vertical farming technology, which is considered capable of optimizing limited land to support food security.

The results of the word tree analysis that students in their discussion explained in the agricultural sector need attention and innovation in dealing with climate change. Erratic climate change due to global warming has been widely felt today. That this climate change has an impact on the climate sector, agriculture and urban climate (Samidjo & Suharto, 2024). Thus, there is a need for protection, action and awareness. More than just mentioning the link between climate change and agriculture, the Word Tree analysis shows that learners also questioned, compared and elaborated solutions to the identified problem as described above in the discussion in groups of learners discussing the impact of climate change, the challenges of farming due to climate change, and the innovative solutions provided.

The word tree feature also shows how learners relate the importance of innovation in agriculture to environmental sustainability. Learners realize that modern agriculture must take into account environmental impacts, such as waste management and water conservation, to reduce the carbon footprint. Learners are led to be able to analyze and make innovations in the agricultural sector to deal with existing problems, especially in climate change by using and utilizing the land that is available. One of the innovations that learners need to analyze is to use vertical farming as an innovation in the agricultural sector.

Analysis Coding

In addition to visualization purposes, word clouds and word trees are also very useful in labeling and coding to see students' collaboration skills, which are then made in the form of theme categories on the Nvivo nodes menu. The learning process with lesson study based on the TBLA results and analysis on the NVivo nodes feature shows effectiveness in increasing learners' awareness of climate change issues through group learning. Learners not only understand the concept of climate change in theory, but are also able to relate it to practical issues such as food security and agricultural sustainability. Through group discussions, learners realize the importance of technological innovations, such as vertical farming, in facing the challenges of climate change. Analyzing the collaboration skills of learners in the learning process that has been carried out from the TBLA results by coding according to the indicators of collaboration skills for each group. From the existing data, the coding results are displayed in the form of bar charts in Figure 3, Figure 4 and Figure 5.

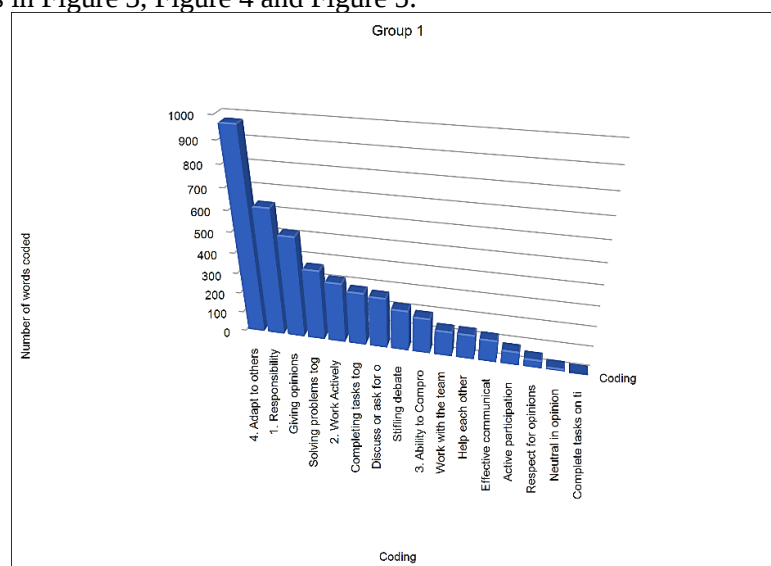


Figure 3. Coding Results Group 1

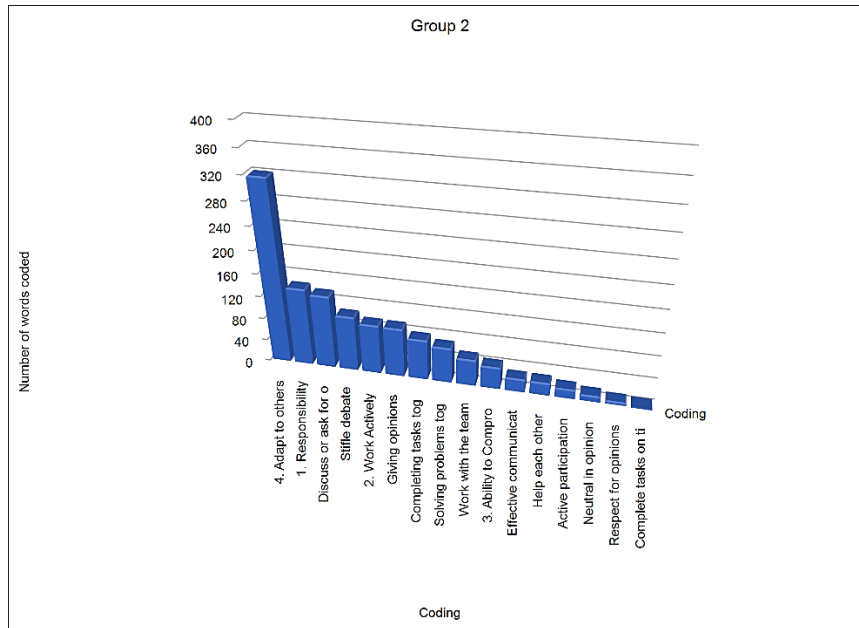


Figure 4. Coding Results Group 2

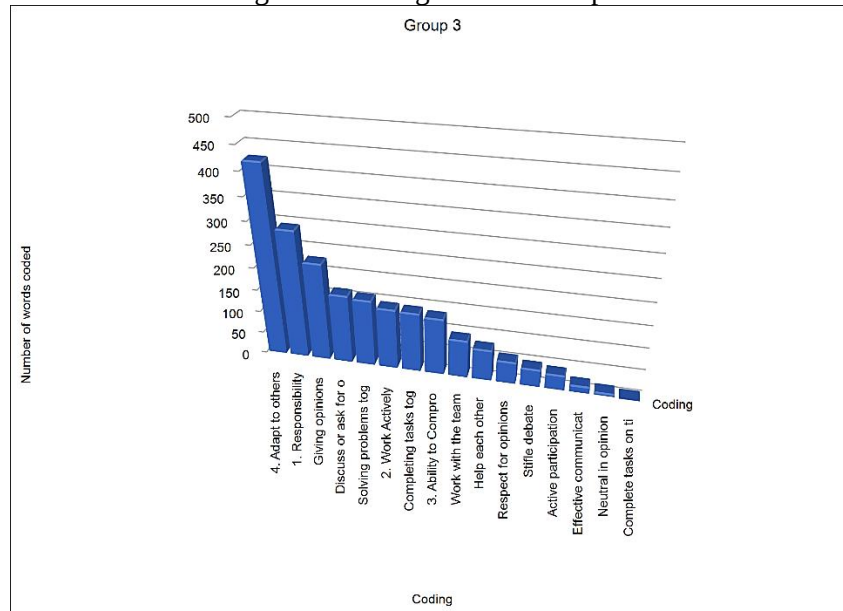


Figure 5. Coding Results Group 3

Coding has been done to see the collaboration skills of each group, starting from group 1, 2 and 3. Each group has a different level of collaboration. The data that was coded using NVivo showed that Group 1 had the highest collaboration skills compared to Group 2 and Group 3. Group 1 showed the ability to discuss in depth, share ideas openly, and reach a mutual agreement which is explained as follows:

1. Group 1: learners in this group are able to utilize individual strengths to achieve group goals. Collaboration skills in this group are high, because in the group the team members are close friends and have strong cooperation dynamics and in the discussion process each group member in conveying ideas does not feel awkward, so the collaboration skills are high. Their discussions included in-depth analysis of the relationship between climate change and agricultural innovation, such as how to maximize the use of limited land with modern technology.
2. Group 2: The collaboration of this group was quite good, although there were some communication barriers. Most learners tend to focus on their own ideas without trying to harmonize ideas with other members.

3. Group 3: This group showed the least collaboration. This was due to the lack of good group dynamics and the dominance of certain members in the discussion, which hindered the active involvement of other members.

The results of the analysis of the learning process with lesson study in the climate change course showed variations in collaboration skills between groups. Based on the analysis using NVivo software, the collaboration skills of each group are influenced by several factors, including the dynamics of friends in the group and the individual's ability to work together as a team. Collaboration skills, according to Dewi et al (2020), collaboration is the ability to exchange thoughts or ideas with equals, where each group member is expected to contribute actively in the discussion process. In fact, although there were differences in the level of collaboration skills between groups, each group showed optimal effort in maintaining the direction of the discussion according to the theme determined by the educator.

The findings are in line with Listiani et al (2024) in theory (Dillenbroug 1999) explains collaborative learning as a process where two or more people interact with each other to solve a problem, complete a task, or learn new ideas, to generate new knowledge. In the context of this research, group discussion serves as an interactive platform for learners to develop an understanding of climate change issues. Through the interaction that occurs, learners not only passively receive information but also actively exchange ideas, criticize each other's thoughts, and develop concepts together.

In the learning process analyzed, the discussions that took place between students did not deviate from the theme that had been agreed upon by the teaching team. This is reflected in the data collected, which shows that despite the different ways of collaborating between group members, each group was able to maintain the harmony of the discussion with the existing theme. In fact, some groups showed good synergy, with each member actively expressing ideas and participating in solving problems according to the context of the material being taught. This process illustrates how collaboration skills in lesson study depend not only on individual interactions, but also on how the group can manage differences and focus attention on the learning objectives that have been set.

Thus, although the collaboration skills between groups varied, the results still showed that all groups tried to carry out the discussion process constructively, in accordance with the larger learning objectives in this lesson study course. This finding also reflects the importance of peer support and skills in adapting to team dynamics to produce effective and productive discussions.

CONCLUSION AND SUGGESTION

This research uses a qualitative case study approach in the Climate Change course, focusing on the learning process with lesson study. The results showed that collaboration skills between groups showed significant variations. Each group has different dynamics and ways of collaborating, which are influenced by various factors, including the ability of individuals to work together, the division of roles of group members, as well as interaction patterns during discussions. Further analysis showed that the most dominant factor was the effectiveness of communication within the group, which influenced the extent to which members could harmonize ideas and reach a common agreement. Nonetheless, all groups endeavored to maintain the focus of the discussion in line with the learning objectives. Variations in each group's collaboration skills had an impact on learning outcomes, with groups with higher collaboration skills showing more understanding of the learning objectives and solving the problems faster. Meanwhile, groups with low collaboration skills will have more difficulty in coordinating and solving the given problem topics in a timely manner, because the discussion is only dominated by certain members. To improve collaboration skills with lesson study learning in the future, it is suggested that the learning process includes more systematic reflective guidance, more structured application of discussion facilitation techniques, and integration of communication and cooperation exercises in lesson study learning. In addition, educators can provide regular feedback and implement role rotation in the group so that each member has the opportunity to actively contribute and improve collaboration skills. Analysis using the Transcript-Based Lesson Analysis (TBLA) technique and NVivo software allows in-depth identification of these collaboration skills, as well as providing a broader understanding of how the collaboration process plays a role in improving the quality of learning in lesson study. The findings confirm the importance of good management of collaboration skills in supporting the effectiveness of lesson study learning.

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