ANALYSIS OF DISTANCE LEARNING ACTIVITIES TO TEACH COLLABORATION ABILITY OF UNDERGRADUATE STUDENTS OF MATHEMATICS EDUCATION STUDY PROGRAM[(*)]

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Abstrak: Pembelajaran jarak jauh adalah pembelajaran yang dilakukan secara terpisah antara peserta didik dengan pendidik, pembelajaran yang dilakukan didesain menggunakan alat komunikasi atau media manajemen belajar untuk mendukung pembelajaran. Pada abad ke – 21 ini terdapat kemampuan-kemampuan yang harus dikuasai oleh seseorang yang disebut Kompetensi Abad 21 yang salah satunya adalah kemampuan kolaborasi. Tujuan dari penelitian ini adalah mendeskripsikan aktivitas pembelajaran jarak jauh untuk membelajarkan kemampuan kolaborasi mahasiswa dan mendeskripsikan pengaruh aktivitas pembelajaran pada pembelajaran jarak jauh dalam mengembangkan kemampuan kolaborasi. Jenis penelitian ini adalah deskriptif kualitatif dengan metode kajian literatur yang dilengkapi data lapangan. Hasil penelitian menunjukkan ada beberapa hal yang perlu diperhatikan dalamn merancang aktivitas pembelajaran jarak jauh untuk membelajarkan kemampuan kolaborasi mahasiswa, yaitu 1) membagi mahasiswa menjadi beberapa kelompok, 2) digunakan media yang mendukung mahasiswa untuk memberikan tanggapan, gagasan, komentar dan sebagainya baik berupa forum *video conference* maupun *LMS*, 3) instruksi tentang aktivitas umpan balik, dan 4) budaya yang dibangun dalam aktivitas pembelajaran. Diperoleh juga indikator kemampuan kolaborasi yaitu 1) kerjasama dan saling ketergantungan untuk mencapai tujuan bersama seperti kerjasama dalam kelompok, berdiskusi, berkontribusi aktif, dan fleksibel, 2) bertanggung jawab atas dasar belajar dan perilaku masing-masing seperti bertanggung jawab dalam pekerjaan dan bekerja secara produktif, dan 3) terjadinya pelaksanaan suatu aktivitas kerja yang kohesif seperti dapat beradaptasi, berkomunikasi dengan baik, dan menghargai sesama. Selain itu, terdapat kelebihan dan kekurangan dari rancangan aktivitas pembelajaran jarak jauh ini.

Kata kunci : *Pembelajaran jarak jauh, Kompetensi abad 21, Kolaborasi*

Abstract: Distance learning is learning that is carried out separately between students and educators, the learning carried out is designed using communication tools or learning management media to support learning. In the 21st century, there are abilities that must be mastered by someone called 21st Century Competencies, one of which is the ability to collaborate. The purpose of this study is to describe distance learning activities to teach student collaboration skills and describe the influence of learning activities on distance learning in developing collaboration skills. This type of research is descriptive qualitative with a literature review method equipped with field data. The results showed that there are several things that need to be considered in designing distance learning activities to teach students' collaboration skills, namely 1) dividing students into groups,

2) using media that supports students to provide responses, ideas, comments and so on in the form of video conference forums and *LMS*, 3) instructions on feedback activities, and 4) the culture built in learning activities. Indicators of collaboration ability are also obtained, namely 1) cooperation and interdependence to achieve common goals such as cooperation in groups, discussion, active contribution, and flexibility, 2) being responsible for the basis of learning and behavior of each such as being responsible for work and working productively, and 3) the implementation of a cohesive work activity such as being able to adapt, communicate well, and respect for others. In addition, there are advantages and disadvantages of this design of distance learning activities.

Keywords: *Distance Learning, 21st Century Competencies, Collaboration*

INTRODUCTION

Distance learning is an institution-based formal education where study groups are separated and interactive telecommunications systems are used to connect learners, resources and instructors (Simonson et al., 2019). According to Abidin (Abidin et al., 2020), distance learning is a learner who is planned in another place or outside his place of teaching and when the learning process does not occur face-to-face directly between the teacher and learner, so that learning emphasizes independent learning and uses special techniques in designing materials and special methodologies for communication through media such as computers, telephones, television and so on. Then, according to Law No. 20 of 2003 concerning the National Education System Article 1 (Yuangga & Sunarsi, 2020) states that distance education is an education whose students are separated from educators and learning is carried out using various learning resources through telecommunications, information and other media. Based on some of the opinions above, it can be concluded that distance learning is learning that is carried out separately between students and educators (not face-to-face in person), where learning is carried out independently by students and the learning carried out is designed using communication tools or learning management media such as Whatsapp, Zoom, Moodle, and so on to support learning both synchronously and asynchronously. Based on this, the concept of distance learning has begun to be developed before the COVID-19 pandemic which began at the tertiary level. This is stated in Law No. 12 of 2012 with the aim of providing Higher Education services to groups of people who cannot attend regular face-to-face education and expanding access and facilitating Higher Education and learning services.

On the other hand, along with the times, in the 21st century there are competencies that must be mastered by students from an early age. P21 (Partnership for 21st Century Learning) develops a learning framework in the 21st century that requires students to have skills, knowledge and abilities in the fields of technology, media and information, learning skills and innovation as well as life and career skills (Wijaya et al., 2016). Within the framework, there are four abilities commonly referred to as 21st century

competencies, which students must master in learning, namely critical thinking, communication, collaboration, and creativity. Triling and Fadel (Wijaya et al., 2016)describe that critical thinking and overcoming problems are students able to use reason for various situations, use system thinking methods, make decisions and overcome problems; communication and collaboration, namely students are able to communicate clearly and collaborate with other group members; creativity and innovation, namely students are able to think creatively, work creatively and create new innovations. Even though distance learning is growing and exists at every level of education, educators still have to make sure students master these four abilities. The importance of mastering and developing these four abilities, so that students can become superior and qualified human beings.

One of the important 21st century competencies is collaboration. P21 (Roekel, 2010) defines collaboration as the ability to work effectively and respectfully with diverse teams, exercise flexibility and willingness to assist in making the necessary compromises to achieve common goals, and responsibility for joint work and respect for the individual contributions made by each member of the group. Roekel (2010) explains that collaboration is important because a large group of diverse individuals will produce better estimates and collaboration can create knowledge for many people. Based on this, learning that supports collaboration will have a good impact on student learning, because through collaboration, students will get a variety of knowledge from the results of collaboration. There are several studies that examine the application of collaborative learning models to distance learning. In a study conducted by Farah (Fauziah, 2021) found that collaborative learning carried out in the experimental group was in the category of quite effective, namely 63.7%. Then research conducted by Thompson and Ku (Thompson & Ku, 2006), found that there was ineffective communication, conflicts between group members, and negative attitudes that posed challenges in collaborating online, but more collaborative groups produced better quality projects and had a more positive attitude towards online learning. Based on this, it can be seen that collaboration is a challenge in distance learning.

Based on the importance of the current ability of collaboration and development of distance learning, this study will discuss distance learning activities to teach student collaboration skills and describe the influence of learning activities on distance learning in developing collaboration skills.

RESEARCH METHOD

This research is a type of qualitative descriptive research. Qualitative descriptive is a type of research that gives an idea of an object that is observed on the basis of qualitatively visible facts as they are. The main source of data in the study is words. In addition, the source of this research data is the result of a literature review supported by interviews with lecturers and surveys with students of the

Mathematics Education Study Program, one of the private universities in Yogyakarta who are the subjects of this study.

The data collection methods in this study are literature review, direct interview methods and survey methods. Interviews were conducted to explore information related to distance learning activities to improve student collaboration skills. Then a survey was conducted to collect information from students regarding the response and effects of distance learning activities to improve student collaboration skills. The instruments used in this study are interview guidelines and questionnaires where the instruments have been declared valid by validators.

RESULTS AND DISCUSSION

According to (Simonson et al., 2015) there are four characteristics of distance learning. First, distance learning is carried out by accredited institutions equivalent to institutions that offer traditional face-to-face learning and not independent learning or learning in a nonacademic learning environment. Secondly, learners and teachers are separated geographically and perhaps even time so accessibility and convenience are essential in distance learning. Third, interactive telecommunications connects students with each other and also connects students with teachers. Whatever the medium, interaction is also very important in distance learning as learning in general, the relationship between students and teachers no longer depends on the physical but on the sophistication of communication technology. Fourth, like other education, distance learning also creates a learning community consisting of students, teachers, and learning resources such as books, modules, videos, and others. Garrison and Shale (Simonson et al., 2015) stated the criteria in determining the characteristics of the distance learning process. First, distance learning implicitly suggests that the educational communication created between teachers and students does not occur in physical proximity. Second, distance learning should involve two-way communication between teachers and students in order to support and facilitate the learning process. Third, distance learning uses media to mediate the need for two-way communication.

In teaching collaboration skills, it is necessary to design the right activities. according to (Nurhayati et al., 2019) learning is carried out in groups with the aim of training cooperation between students in solving a problem. In addition, collaboration skills according to (Zubaidah, 2018)include giving and receiving feedback from colleagues or fellow group members to perform the same task, so in designing learning activities it is necessary to facilitate students to provide feedback to fellow friends, especially group members. Media is also needed in teaching collaboration skills in distance learning, this is in accordance with the characteristics of Distance Learning according to (Simonson et al., 2015) above.

Indicators of collaboration ability according to Suryani (Sunardi et al., 2017) are 1) each member works together to achieve common goals and interdependence, 2) individuals are responsible for each other's learning and behavior, 3) Classes or groups are encouraged towards the implementation of cohesive group work activities. In addition, Trilling and Fadel (Mariamah et al., n.d.), there are five indicators of collaboration ability, namely cooperation in groups, adjusting to group friends, being responsible for group work, discussing in making decisions, and communicating well in groups. . Then Greenstein (Hidayat et al., 2021) also revealed that the indicators that indicate the ability of collaboration are to actively contribute, work productively, show flexibility and compromise, show responsibility and show respect. Based on these three opinions, it can be concluded that the indicators of collaboration ability are 1) Cooperation and interdependence to achieve common goals such as cooperation in groups, discussion, active contribution, and flexibility, 2) being responsible for each other's learning and behaviors such as being responsible for work and working productively, and 3) implementing cohesive work activities such as being able to adapt, communicate well, and value others.

To support a literature review of distance learning activities in teaching collaboration skills, we analyzed distance learning activities designed by lecturers and their impact on students' collaboration ability based on indicators of collaboration ability. Based on the results of interviews with lecturers at one of the private universities, it was found that learning activities designed online require collaboration skills from students to carry out some learning activities or assignments given. The learning media used depends on the type of activity and task being designed. For example, each small group provided a forum on ZOOM such as a breakout room to facilitate student discussions. In addition, you can use the Learning Management System (LMS) to provide a place for students to share work, share ideas, comments, criticisms and suggestions with each other as well as a place to collect assignments. The encouragement of cooperation between students in groups leads students to use media that help collaboration such as google documents that can be accessed simultaneously. Then, the learning activities that are designed require some attention so that the learning activities can run well. First, the activities carried out are to divide students into small groups and it is also offered that in each small group there is a group leader to organize activities and tasks in the group to solve problems or projects. Furthermore there is an emphasis given to students verbally that the contribution between students is equal or evenly distributed. Then the second is peer-to-peer feedback activity. This feedback activity facilitates students to be able to convey ideas, correct, observe, make comments, and assess fellow students. Research conducted by Ching & Hsu (Purwadi, 2020) revealed that peer feedback has a positive impact on student learning and can increase active participation in distance learning because of the freedom to express ideas and ideas they have. Purwadi (2020) found that accustoming students to dare to think critically can develop cognitive

skills to be able to think at a higher level. From these two explicit instructions for collaborating, it slowly disappears so that students do not rely on instructions from lecturers. The culture applied in distance learning is to support the development of collaboration, that is, a culture of learning and a culture of mutual respect.

1. A learning culture is a learning culture that invites feedback givers to realize that the results are still learning outcomes. Likewise, for recipients of input, they are invited to realize that the comments, values, suggestions or criticisms given are the result of learning from judging or correcting things that are lacking.

2. A culture of mutual respect is a culture of respect that invites feedback givers to realize that the work done requires a long process and requires thought, time and effort. Similarly, the recipient of the feedback is invited to realize that the comments, values, suggestions and criticisms given are the efforts of the feedback giver to correct, observe, comment and assess the shortcomings contained in his work.

In addition to the learning activities carried out, the interview also explained the assessment carried out by the lecturer in assessing learning activities that require cooperation. First, the assessment of contributions between peers. This assessment is delivered at the beginning of the lesson with the aim that students are motivated to contribute well in each group. This assessment contains a range of scores (1 to 5) to rate each friend in a group. For example, in one group there are three students A, B, and C, then A will assess B and C, as well as students B and C. Through this kind of assessment, it will be seen how much contribution each student has in each group. Although there are some cases where students are reported to lecturers for not making any contribution to the group. The effort that can be made by the lecturer is to ask the student directly concerned about the reason for not making any contribution in the group and this is a consideration for the lecturer to the members of the group concerned. Second, assessment in the form of frequency in classical discussions. At the beginning of learning, lecturers will provide multiple-choice questions that are conceptual and tricky. This trap question is given so that students do not lean towards one of the correct answers. So that several groups of students are formed who answer different questions. Then the activity carried out is that the lecturer asks one of the student's answer representatives to give an idea, then other students who have different answers are welcome to respond or comment on the answer. Activities like this assess the frequency of student participation in a given activity. Third, the assessment of the analysis of social networks. Social network analysis is a way of assessing activities by visualizing the interactions that occur, for example student A comments on student B, student B comments on student C, this interaction gets a link or network. If this is visualized to all students, a picture will be obtained in the form of webs that visualize the relationship. Through this

visualization, you will see a circle that represents a student, the larger the circle, the student is the most active student. The results of this analysis are also presented and explained to students which ones give the most responses, receive responses and so on. This will give an indication that it is the student who gets the most responses, so that the topic or discussion given attracts the attention of the student. As for students who responded a lot, it was indicated that the student was active in discussion activities.

In the interview it was also mentioned that there are collaborative activities that are easier to do online than offline. For example, when students present their answers online, it will be easier because students can directly share their answers through the screen sharing feature. In terms of time, sharing answers is more efficient online than offline. In this activity, it was also found that one of the learning activities that can be done offline and online is the presentation of student answers. Then, there are learning activities that cannot be done online, but can be done offline, which is to monitor the contribution of each student in a small group. Not all students can contribute for reasons that are often given by students with signal constraints, lecturers cannot be sure of the truth of these reasons. What lecturers can do is observe the consistency of student reasons. On the other hand, offline monitoring can be easily done as it is enough to go around visiting each group and checking the answers. if the same or similar errors are found in each group, the lecturer can easily give a classical explanation for the mistakes made.

Furthermore, to find out the effectiveness of the lecture activities designed, a questionnaire was distributed to students who took courses taught by the lecturer. There were 34 students who were respondents. From the common questions regarding online learning that students do, several things were found. The most widely used media is WhatsApp which is 94.1% and after that uses Moodle with 64.7% statement; some of the other media students mentioned were zoom, google classroom, and desmos. In accessing online lectures, as many as 94.1% of students stated that they used laptops, all students stated that they also accessed online lectures using mobile phones. And in accessing online lectures, 11.4% of students stated that they experienced difficulties due to network constraints. In lectures, students are divided into groups which usually consist of 2-5 students. In large groups sometimes consist of 6-8 students. Students also stated that after being divided into groups, the lecturer will visit each group. Some of the difficulties experienced by students, the first is difficulty in communicating, this is characterized by the presence of group friends who are passive or do not respond when group discussions are running either via Whatsapp or via zoom. Second, students experience difficulties in the internet network which is sometimes constrained. Third, students sometimes find it more difficult to understand the material being studied so that they have difficulty in finding solutions in groups. Some students also feel that when studying offline, students can be more free to chat and joke and can coordinate in groups

better. However, most students also stated that the advantage of online lectures is that online lectures are more effective in terms of time and place. Students feel that online lectures become less tense and dare to express ideas in class. Students also state that they can learn new technologies through online lectures. In addition, online lectures are considered effective because they require students to be active, activities in online lectures are also considered to still make it easier for students to discuss, students can study in groups or through other groups.

The specific questions are based on the three indicators of collaboration capabilities used. The results obtained show that all three indicators of collaboration ability are met. The first indicators are cooperation and interdependence to achieve common goals such as cooperation in groups; Discuss; actively contribute; and flexibility is met, this is shown from the percentage of students' ability to work together and express opinions in groups is 100%, but 8.8% of students stated that they did not work in groups and felt that they could only work with a few groups. member. In decision making, all students stated that decisions are taken jointly and not unilaterally with a 100% percentage of answers. The second indicator is responsibility on the basis of learning and behavior of each such as being responsible for working and working productively. All students stated offering to divide assignments into groups with a 100% statement percentage, but 5.2% of students said they did not work on assigned assignments in groups. However, most students work on assignments that have been shared in groups. In presenting ideas in groups, most students stated that they conveyed the idea of completing the task, which was 97.1%. The third indicator is the implementation of cohesive work activities such as being able to adapt, communicate well, and respect others. The fulfillment of these indicators is shown by the results of the questionnaire which states that all students state that they accept every opinion submitted. All students also stated that they could accept and appreciate the work of each group member. Most students also felt adaptable to group members although 5.9% of students stated they were unable to adapt.

Based on the above results, it was found that distance learning can develop student collaboration skills. Distance learning activities should be designed by requiring cooperation from students, namely 1) dividing students into groups either through direct instruction delivered or formed from the given answer choices, 2) using media that supports students to provide responses, ideas, comments and so on. both in the form of video conference forums and LMS, 3) instructions for feedback activities, and 4) culture built in learning activities such as learning culture and mutual respect culture. It was also conveyed by students that they were divided into groups with members between 2-5 people for small groups or 6-8 people for large groups, and in lectures adequate technology was used to support learning activities such as using Whatsapp, Moodle, Google classes, and Desmos.

The assessment of cooperation that can be carried out also depends on the activities or tasks given, namely the assessment of contributions between colleagues, the assessment of the frequency of classical discussions, and the assessment of social network analysis. In assessing the contribution of peers, it can help lecturers to know that there are unbalanced student contributions. This is also conveyed by students, that students experience some communication problems because there are group members who are passive or do not respond when discussing. The opinion of this student is in accordance with what is conveyed by the lecturer regarding peer assessment related to the contribution of his group of friends.

Advantages and disadvantages of distance learning activities that require cooperation in learning activities and assignments. The advantage of this activity is the efficiency of learning time. If learning activities can run well, learning time will be more efficient than offline. the shortcomings experienced are aspects of supervision of the contributions of students in the group. According to the results of lecturer interviews and student questionnaires, it was found that signal problems are one of the most frequently conveyed reasons and it is difficult to ascertain the truth. This causes the contribution of students to be uneven. It is also conveyed by students that they are experiencing internet network difficulties.

CONCLUSIONS AND SUGGESTIONS

Based on the results and discussion above, it can be concluded that there are several things that need to be considered in designing learning activities to teach student collaboration skills, namely 1) dividing students into groups either through instructions directly delivered or formed from the selection of answers given, 2) media that supports students to provide responses, ideas, comments and so on both in the form of video conference forums and so on. LMS, 3) instruction on feedback activities, and 4) cultures built into learning activities such as culture of learning and culture of mutual respect. These four things are found to be able to help teach students collaborative abilities as measured by three indicators, namely, 1) cooperation and interdependence to achieve common goals such as cooperation in groups, discussion, active contribution, and flexibility, 2) being responsible for the basis of learning and behavior of each such as being responsible for work and working productively, and 3) the implementation of a cohesive work activity as can adapt, communicate well, and value others. In addition, the assessment that can be done depends on the activity or task given, some assessments that can be given are the assessment of contributions between peers, an assessment in the form of frequency in classical discussions, and an assessment of social network analysis.

The effectiveness of learning activities to teach student collaboration skills can be seen from the advantages and disadvantages shown. The advantage of this learning activity is that the time and place

of learning becomes more efficient. The disadvantage of this activity is the lack of supervision aspects that lecturers can carry out regarding the correctness of the reasons for network constraints.

ACKNOWLEDGMENTS

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