Profile of Communication Skills of Students in Groups with the Application of Blended Learning using Project-Based Learning Model

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A B S T R A C T

Communication is one of the important 21st-century skills provided to students. In Indonesia, communication skills in education are still considered less trained, especially in the conditions of the past Covid-19 pandemic. Learning using blended learning is one way that can be used to provide this skill, especially in the transition conditions from online to offline learning as it is today. This study aims to analyze the profile of communication skills of high school students using the blended learning model Project Based Learning (PjBL) on ecological concepts. The study also analyzed the results of projects that students have worked on during learning. This study uses the descriptive method. The study was conducted on 31 students in one class X science from one of the private high schools in the city of Bandung using the purposive sampling method. Data was collected with non-test instruments in the form of observation sheets and project assessments. Verbal communication is measured through observation sheets at the time of presentation of the project work. The ability of written communication is based on assessment in media and technology. Results showed that the average student's verbal communication skills were 86% (very high category), and the average written communication score was 85% (high category). The product results from the project show an average value of 74% (high category). All students are generally interested in blended learning using the PjBL model.

A R T I C L E   I N F O

1. INTRODUCTION

The Covid-19 pandemic has changed many things in various fields, one of which is the field of education (Sahu, 2020). Although currently, Covid-19 cases have decreased, learning cannot be carried out directly fully by the circular letter of the Ministry of Education and Culture No. 5470 / E2 / PB.03.00 / 2021 concerning limited face-to-face learning. One of the limited learning methods that can be an alternative solution during this pandemic is blended learning. Blended learning combines two approaches online and traditional / face-to-face. In addition, the application of blended learning is also following the learning needs of the 21st century, which utilizes technological developments (Husamah, 2015). In implementing blended learning, face-to-face (offline) and online earning need to be carefully selected and complemented each other. According to Sari (2021) there are four concepts in blended learning, that is 1) blended learning, which is a learning that combines various technologies to achieve educational goals; 2) blended learning is an integration of learning approaches that are expected to achieve a learning goal with the help of technology or without technology; 3) blended learning integrates various learning technologies such as videos and so on; 4) blended learning combines technology and tasks to make a better impact in learning.

In supporting 21st-century education, students need four skills: critical thinking and problem-solving, collaboration, creativity, and communication (Pablo *et al*., 2022). McGinn (1998) stated that future challenges will become more complex, so the UNESCO (United Nations of Educational, Scientific, and Cultural Organization) commission recommends 4 pillars as a foundation of education, that is learning to obtain various information (learning to know), learning to do something like suggesting ideas (learning to do), learning to recognize oneself and adapt to the environment (Learning to be) and living together in society so that they can compete, cooperate and respect others healthily (learning to live together. To realize the four pillars of educational foundation, students need to be provided with four aspects of the skills they need, namely critical thinking and problem-solving, collaboration, creativity, and communication (Andayani, 2018). Arnesti and Hamid (2015) said that it plays a very important role in everyday life because communication is an important medium of self-development to establish social contacts. Through communication, somebody grows, learn, find themselves, and understand each other. Good communication between the two parties will facilitate cooperation to achieve goals. Usually, communication that occurs in class groups is dominated by smart students, so it is necessary to have the role of the teacher to manage and condition learning so that students can work together in teams effectively and communicate well (Redhana, 2019).

Verbal and written communication skills are important in the 21st century (Gustiani *et al.,* 2017). In Indonesia, communication skills in education in Indonesia are still very lacking, and this is supported by the statement of Suciari *et al.* (2021) that it is difficult for students to give an opinion in class. Well-established communication skills will make it easier to achieve learning goals and be useful as a provision for future work (Maghfiroh *et al.,* 2016). Kamaruzzaman (2016) argues that in line with technological developments, the way students communicate changes, but communication must be maintained so the message can be well received. According to Kuntarto (2017) technology has provided social media such as WhatsApp and youtube as online media, making it easier for users to communicate interfaces and participate with others. One of the learning models used to support 21st-century education is the project-based learning model (PjBL). Project-based learning (PJBL) is learning by producing a work (Saenab *et al.,* 2019). The benefits of learning PjBL include students actively participating and being required to work collaboratively, increasing a sense of

responsibility to the group, and training students to communicate in the classroom (Yokhebed, 2019). The syntax of project-based learning in this study refers to The George Lucas Educational Foundation, that is (1) Determination of fundamental questions; (2) Develop project planning; (3) Develop a schedule; (4) Monitoring students and project progress; (5) Assessment of results and (6) Evaluation of experience.

The project-based learning model using an application of blended learning is expected to be an alternative to providing student communication skills. Students get direction from the teacher in person and online through zoom meetings. In this study, the project to be made refers to ecological concepts with basic competency (KD or Kompetensi dasar no 4.10). Presents work that shows the interaction between ecosystem components (food webs, biogeochemical cycles) where students create projects in the form of designs and design results from aquaponics. This activity is carried out in groups, and students can choose the materials used. Using project-based learning models that are carried out in groups is useful in training the ability to communicate and express opinions.

Based on the background described above, the problem in this study is: " How the profile of students' communication skills in groups with the application of blended learning using the PjBL model on ecological concepts?". The research questions are:

(i)   How are the student's oral communication skills and indicators after the application of blended learning using the PjBL model on ecological concepts?

(ii)   How are students' writing communication skills and indicators after the application of blended learning using the PjBL model on ecological concepts?

(iii)   What are the results of student project assessment after the application of blended learning using the PjBL model on ecological concepts?.

2. METHODS

This study uses the descriptive method. The dependent variables in this study are the communication skills of high school students on ecological concepts, with independent variables in the form of applying blended learning using a project-based learning model. Students observed communication skills are verbal and written communication skills. The research instrument uses communication skills observation sheets and project assessment rubrics. The student observation sheet contains 4 verbal and written communication skills indicators that refer to the indicators according to the partnership for 21st Century learning with some adjustments that some experts have judged. The project assessment rubric is adjusted to the indicators of communication skills consisting of 4 aspects. Meanwhile, the student response questionnaire contains 16 statements with a checklist format of "yes" or "no" answer choices that experts have judged. To determine the level of the student's communication skills and the product's value, the following formula is used Tiong & Bakar (2022) obtained from the student's score on the student's communication skills sheet. Some of the percentage of values that have been obtained are categorized into five categories according to Tiong & Bakar (2022) **Table 1.** Indicates the value category of a student's communication skills.

Table 1. Student communication skills value categories.

Percentage (%)	Category
80-100	Very High
66-79	High
56-65	Moderate
40-55	Low
0-39	Very Low

3. RESULTS AND DISCUSSION

3.1. Students' Verbal Communication Skills and Indicators with Applying PjBL Blended Learning to Ecological Concepts

Verbal communication skills are seen in blended learning using a project-based learning model based on 4 indicators according to the Partnership for 21st Century Learning with some adjustments. These four indicators were selected based on the ability to observe student activities when learning online using Zoom meetings. The syntax used in this study is project-based learning syntax, according to The George Lucas Educational Foundation.

The data from this study were obtained from three research instruments: the verbal communication skills observation sheet, the writing communication skills observation sheet, and the project assessment results. In addition, there is also a student response questionnaire in the form of a self-assessment. In the findings and discussion section, researchers describe the results of the analysis of oral and written communication skills from data obtained based on individual and group assessments. The following elaborates on the value of verbal and written communication skills individually and in groups.

On verbal communication skills, the elaboration of individual data results is carried out on indicators of conveying arguments and ideas and communicating for various purposes. Meanwhile, elaborating group data results based on indicators concludes information and communication using media and technology.
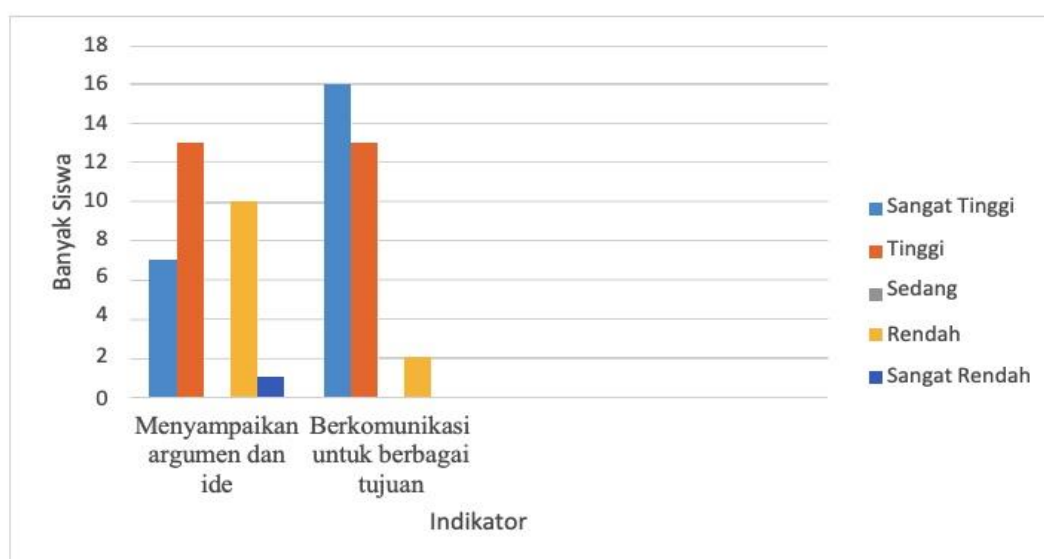
3.1.1. Verbal communication skills based on individual assessment

Verbal communication skills are individually assessed on indicators of conveying arguments and ideas and communicating for various purposes. Assessment is carried out when students convey an idea or opinion during a discussion in a breakout room at a Zoom meeting and when students inform the project design results in front of the class. **Figure 1** show the result of individual students' communication skills based on 2 defined indicators. While **Table 2** shows the values and categories of students' communication abilities per individual. Based on **Figure 1** and **Table 2**, it can be seen that overall the communication skills of individual students, on average, have a high category with the indicators specified above. This shows that students, through blended learning with the PjBL model, are skilled in communicating orally in conveying arguments and communicating for various purposes (presenting design results in front of the class). This is in line with the research of Nugroho *et al.* (2019) that the application of project-based learning (PjBL) can improve students' communication skills. This is because project learning is synonymous with science-based learning, where students involved in the project will choose topics, determine approaches, conduct experiments, draw conclusions, and inform the results of the project being worked on. The data results show that the indicator communicates for various purposes; conveying the design results is the highest indicator, with a percentage of 86% (very high). The project-based learning model can help students present their tasks well because they are directly involved in designing the project (Tiong & Bakar, 2022). In addition, presenting the project results will give students the skills to speak in front of the class (Putra & Sakti, 2022).

3.1.2. Verbal communication skills based on group assessment

Verbal communication skills in groups are assessed on indicators of inferring information and communicating using media and technology. This assessment is carried out at meeting 4 when students infer information from presentations delivered by other groups and when

students use PowerPoint as a facility to support presentations. **Table 3** is the result of an assessment of students' verbal communication skills in groups.

Figure 1. Results of individual student communication skills are based on 2 specified indicators.

Table 2. Results of the individual assessment of verbal communication skills.

Indicators	Very High	High	Moderate	Low	Very Low	Average	Category
Presenting arguments and ideas	7	13	0	10	1	71%	High
Communicate for a variety of purposes	16	13	0	2	0	86%	Very High

Table 3. Results of the assessment of verbal communication skills in groups.

No.	Indicators	Percentage of Students' Verbal Communication Skills					Grade Average	Category
		Groups						
		1	2	3	4	5		
1.	Conclude the information	100%	75%	75%	75%	75%	80%	Very High
2.	Using media and technology	100%	75%	50%	100%	75%	80%	Very High
	Average	80%						Very High

The average results in **Table 3** show that the percentage of the average value on both indicators has the same percentage value of 80% with a high category. This shows that each group given blended learning with the PjBL model has been skilled in communicating verbally, inferring information, and utilizing technology.

Based on **Table 3**, it can also be seen that the percentage of indicator values inferring information is 80% with very high categories. This indicates that students have been able to conclude information very well through blended learning using a project-based learning model, in line with Lumbantobing's research (2021), that the project-based learning model train students to be able to infer information because, in the PjBL stage, students need to conclude the results of the projects they have made.

From **Table 3**, it can also be seen that the percentage of the average value on the indicator using this medium and technology is 80%, with a very high category. This indicates that the student's communication skills are very high. Communication skills using media and technology are also very much needed to support future work. This is in line with the research of Maghfiroh *et al.* (2016), which states that in the 21st century, communication technology is indispensable for future success.

3.2. Students' Writing Communication Skills and Indicators with Applying PJBL Blended Learning to Ecological Concepts

Written communication skills are seen from blended learning using a project-based learning model on ecological concepts, especially aquaponics. Observers assess written communication skills based on the results of filling in student worksheets (LKPD). Assessments are carried out individually or in groups.

3.2.1. Written communication skills based on individual assessment

Written communication skills that can be assessed individually are indicators of conveying arguments and ideas in student worksheets (LKPD). This is because every student in the group has the same opportunity to give aquaponics titles and determine the title to be chosen in aquaponics along with related reasons. **Table 4** is the result of an assessment of an individual's written communication skills. **Table 4** shows that the value of the indicator presenting arguments and ideas is 71%, with a high category. This shows that with the PjBL model blended learning, students can convey arguments and ideas appropriately but need to be retrained so that students have more courage to argue well with easy-to-understand delivery. This aligns with Anggara's statement (2017) that the project-based learning model increases student courage and trains students to convey ideas to others.

Six students get a 100% percentage score with a very high category. This shows that these students are skilled in presenting arguments and ideas in writing. The students have also met all the criteria in providing ideas and giving reasons for the title they will specify. Sadikin & Hamidah (2020) stated that online learning could eliminate awkwardness, making students dare to express themselves by asking questions and expressing ideas freely.

Table 4. Results of individual assessment of writing communication skills.

Indicator	Very High	High	Moderate	Low	Very Low	Average	Category
Presenting arguments and ideas	6	14	0	11	0	71%	High

3.2.2. Written Communication Skills Based on Individual Assessment

Table 5 shows that it can be seen that the percentage values on some indicators are not so different. The indicators compiled by P21 are related to demonstrating good communication skills. The indicator with the highest percentage value is the indicator of communicating using media and technology, which is 85%, with a very high category. This indicates that students are very good at communicating using media and technology in communicating well, in line with Maghfiroh *et al*. (2016), which state that in the 21st century, communication technology is indispensable for future success. Andayani (2018) also supports that technology supports 21st-century skills.

The indicator of communicating for various purposes has a percentage of 75% with high categories. This is in line with Maudi's (2016) statement that project-based learning models can help students to express ideas in the form of reports. Then the indicator concludes the information has a percentage of 80% with a very high category. This indicates that students have been able to deduce information well through blended learning using a project-based learning model, in line with Lumbantobing's research (2021) that the project-based learning model trains students to be able to infer information. In the PjBL stage, students need to conclude the results of the projects they have made. This shows that based on group assessments, students are skilled in communicating writing but need to be trained and re-provisioned to meet all criteria.

Table 5. Results of assessment of written communication skills by group.

| No. | Indicators | Percentage of communication writing skills students Groups | | | | | Average of class | Category |
		1	2	3	4	5		
1.	Communicate for a variety of purposes	75%	75%	50%	100%	75%	75%	High
2.	Conclude the information	100%	75%	75%	75%	75%	80%	Very High
3.	Using media and technology	75%	100%	75%	100%	75%	85%	Very High

3.3. PjBL Product Assessment

Project-based learning (PjBL) is a learning model that applies a concept to a useful product. In applying the PjBL model, students design/produce a project through designs and real products. In this study, the resulting product was a simple aquaponics project called "budikdamber," where simple aquaponics is an application of ecological concepts. The rubric used in the product assessment adjusted to communication skills indicators (Tiong & Bakar, 2022). Product assessment is carried out by observers with determination through discussions in Zoom meetings using a scale of 1-4. **Table 6** shows that the average percentage value of all aspects of the product valuation is 74% or is in the high category. This shows that students can produce a project following the design in the LKPD.

Table 6. Product assessment of project results.

Groups	Suitability of Tools and Materials	Evidence of Implementation Documentation at LKPD	Project Design Suitability	The successful
Group 1	100%	75%	100%	75%
Group 2	100%	100%	75%	50%
Group 3	25%	25%	25%	25%
Group 4	100%	100%	100%	75%
Group 5	100%	75%	75%	50%
Average	85%	75%	75%	50%
Category	Very High	High	High	Moderate
Overall Average	**74%**			

The highest aspect value is in the aspect of suitability of tools and materials, with a value of 85% which is categorized as very high. All groups except group 3 have prepared tools and materials designed in the LKPD. Meanwhile, group 3 only prepares materials in the form of charcoal, fish in the pond, and fish pellets, even though in this project design, plant variables are needed to determine whether the project objectives are achieved. The obstacle expressed by group 3 is that in the project work, there is a misunderstanding of capturing messages in-group members. This shows that poor communication between students will affect their learning outcomes, in line with Ulya's research (2016), which says that the difficulty of opening communication with others can be caused by low empathy towards others, and effective communication, namely when a message has been well received by communicants so that there is no misperception due to misunderstandings.

Other aspects of product assessment that fall into the high category are the evidence aspect of documentation and project results. Based on **Table 6**, documentation has an average grade point of 74%, with a high category in proof of implementation. This shows that almost all students have submitted documentation evidence following the orders on the LKPD. Students also consult with teachers via WhatsApp so that the project design is more targeted. According to Redhana (2019), the role of teachers is needed in conditioning learning so that students can work together in teams effectively and communicate well.

The aspect with the lowest score is the project's success, with an average percentage value of 55%, categorized as moderate. From the three days of observation, it did not occur in the growth of plant and fish variables. Most of the fish and plants died. This is because there is a discrepancy in the design of the project according to the design that is, the water put in the bucket is allowed to stand for a day so that the pH and temperature are by the environment. the actor of the project's inability is the size of the fish used by the students in the form of plant seeds and fish seeds that are very small so that the adaptability of fish is more difficult, especially in water conditions that have not adapted to their environment.

4. CONCLUSION

Based on the research that has been carried out regarding the profile of student communication skills in groups with the application of blended learning using the PjBL model on ecological concepts, it can be concluded that students' communication skills in groups by applying blended learning model project-based learning have a value with a high category, both orally and in writing. This is supported by the average percentage of the highest scores on oral communication skills, 86% on communicating for various purposes, then the highest percentage on written communication skills, 85% on utilizing media and technology. It can also be concluded that students have been able to produce products from a project that they do with satisfactory results, with a score of 74%, or are in a high category. In general, it can be concluded that learning using blended learning with the application of the PJBL model is appropriate for use in the Limited Face-to-Face Learning (PTMT) policy period.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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