



The Using of Padlet on Students' Communication and Collaboration Skill in Immune System Material

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Abstract

Several 21st century skills such as students' communication and collaboration skills are also not well honed during the pandemic learning. Another problem that arises in learning, especially Biology, is the characteristics of each Biology material that has complex concepts and problems. This causes students to often find it difficult to understand Biology material. The immune system material that discusses the working mechanisms in the body makes it more difficult for students to learn and causes students to experience misconceptions. This study aims to measure students' communication and collaboration skills on the Immune System material assisted by the Padlet website. Padlet is commonly referred as an online whiteboard that allows educators and students to convey and share ideas/concepts and thoughts in the form of text, photos or videos in real time. This study is a pre-experimental study with a one-shot case study research design. The sample was taken using the purposive sampling method, so that 36 respondents were taken from high school students in grade XI (Phase F). The data collection techniques for this study were observation, questionnaires and documentation. The results of the analysis of students' communication skills obtained an average of 81.24%, and collaboration skills obtained an average of 76.69%. Based on these results, it can be concluded that Padlet effective improving students' communication skills and collaboration in learning Biology on the Immune System material which is included in the high category.

How to Cite

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INTRODUCTION

Learning after the pandemic has changed the direction of learning that is usually done offline to utilizing more digital platforms (Donham et al., 2022; Zhang & Wasie, 2023). Several educators have utilized the use of e-learning such as podcasts, video conferencing, and PowerPoint voice-overs to improve students' communication skills and learning outcomes (Krasodomska & Godawska, 2021; Opdecam & Everaert, 2019). In addition, Chiablaem (2021) revealed that the use of a combination of applications on Google Apps for Education (GAFE) can also improve students' communication skills. According to Irafahmi et al. (2021), the use of e-learning can improve students' communication skills so that they become active in virtual classes, dare to express their ideas, and experience increased motivation in learning. A good online learning process is learning that still prioritizes two-way interactions that occur between teachers and students. One website that can bridge these activities is Padlet (Deni & Zainal, 2018). This is supported by research conducted by Sanuhung et al. (2022) which revealed that the use of Padlet in learning can also help students to run presentations and also actively discuss.

In line with this, Ramachandiran et al. (2018) also revealed that learning using the Padlet site is very enjoyable, and can improve social skills and virtual communication in themselves. Suriyanisa et al. (2024) also implemented the use of a Padlet-based cooperative learning model at SMA Negeri 1 Pontianak. The results of the study showed a significant increase in indicators of student cooperation skills after implementing the model, especially in terms of understanding group goals, participation in leadership, effective work procedures, and communication skills. Thus, this study contributes to the development of students' social skills and creates a more collaborative and inclusive learning environment. Besides, Padlet perceived to be more beneficial to learning and easier to use. It makes the students to be better in understanding the subject content (Mehta et al., 2021).

Padlet is a synchronous online learning platform because educators and students are present at the same time. Padlet is commonly referred to as an online whiteboard that allows educators and students to convey and share ideas/concepts and thoughts in the form of text, photos or videos in real time (Ahmad et al., 2022; Beltrán-Martín, 2019; Rohmatika et al., 2020). With the use of this website, it is hoped that stu-

dents can understand learning like face-to-face/offline learning. Nowadays, Padlet was being used in a wider application. Many educators used the Padlet to increase their class performance and engagement (Megat Mohd. Zainuddin et al., 2020; Subramaniam & Fadzil, 2021; Mahendro et al., 2023; Syarofah et al., 2024). The improvement of students engagement, easy access to source materials, increased availability of peers and educators, and enhancing interaction and collaboration among students can contribute to better learning outcomes (Sukendro et al., 2020; Balouchi & Samad, 2021). However, Padlet has not been widely used in Biology learning, especially in immune system material.

In the education curriculum currently implemented in Indonesia, immune system material is included in Biology learning delivered to phase F students (grade XI). The immune system material studied by phase F students includes components in the immune response, interactions between antigens and antibodies, and various types of immunity. Immune system material has the characteristics of complex understanding and reasoning in discussing the working mechanisms in the body (Siregar et al., 2022), making it difficult for students to learn and causing students to experience misconceptions (Alfiraída, 2018; Lieu et al., 2018; Ulfa et al., 2023).

Learning the Immune System material is also often referred to as interdisciplinary learning because it requires students to integrate the knowledge gained from previous introductory material in various fields, including cell biology, biochemistry, anatomy, and genetics (Stranford et al., 2020; Teng et al., 2021; Tomasi et al., 2021). Due to its interdisciplinary characteristics, students often find it difficult to understand all these topics, remember their details, and use them in different contexts (Siani et al., 2024). In addition, the knowledge or material about the immune system given to phase F students is also expected to be a provision for students in increasing awareness of their respective health, considering that currently we are still very close to the Covid-19 virus and exposure to other viruses and pathogens. Based on research conducted by Nai (2024), there is a significant positive relationship between health awareness and attitudes related to the pandemic with balanced nutritional behavior during the pandemic.

This shows that knowledge about the immune system (body defense) is also very necessary as a provision for maintaining health. Therefore, additional learning media are needed to assist the learning process in the immune system

material. This is what underlies the author's research into the implementation of Padlet on students' communication and collaboration skills on the immune system material.

METHOD

Research Design

This research is pre-eksperimental design with one-shot case study research design. According to Arikunto (2013), one-shot case study design is that the researcher only carries out the treatment once which is thought to have had an effect, then a post-test is held. This research uses data collection techniques through questionnaires, observation and documentation. The type of sampling used is purposive sampling. The sample used was 36 respondents taken from class XI high school students (Phase F). The measurement scale uses a Likert scale. Meanwhile, the data analysis techniques used in this research are descriptive quantitative data analysis techniques.

Data Analysis Technique

Quantitative research data analysis was carried out after data from all respondents was collected. The data analysis used in this research is descriptive quantitative statistics. Researchers used a questionnaire as a data collection tool, then the research results were converted into numerical data which was further developed using descriptive analysis. The aim is to be more specific so as to provide a clear description of using the Padlet website on students' communication and collaboration skills.

The data obtained from the questionnaire results were converted into 5 scales scoring because they used a 5-point odd Likert scale. The percentage of score interpretation criteria according to the Likert Scale is calculated mathematically using the rating scale equation according to Sugiyono (2019) as follows.

$$\text{Criteria percentage} = \frac{\text{Score obtained}}{\text{Ideal score}} \times 100\%$$

The division of the score interpretation criteria category is obtained by dividing the percentage number range according to the Likert scale. If the expected research result condition is 100%, then the range value is divided into 5 categories according to the odd-choice Likert scale. The following is a table of the range of criteria categories for each variable.

Table 1. Criteria Category of Each Variable

Perceptntage interval	Category
81% - 100%	Very high
61% - 80%	High
41% - 60%	Adequate
21% - 40%	Low
< 21%	Very low

RESULT AND DISCUSSION

Result

The results of research on using the Padlet website to improve students' communication and collaboration skills were carried out by distributing self-assessment questionnaires to 36 students in the sample class. Student communication skills are measured by four indicators which includes: able to convey ideas well; dare to speak; use of articulation when speaking; and able to respond well. Data tabulation of collaboration skills indicators were stated on Table 2.

Table 2. Analysis of Student Communication Skills in Padlet Web-Assisted Biology Learning

No	Indicator	Percentage	Category
1	Able to convey ideas well	79.51%	High
2	Dare to speak	83.26%	Very High
3	Use of speaking articulation	80.21%	High
4	Able to respond well	81.98%	Very high
	Average indicators of communication skills	81.24%	Very High

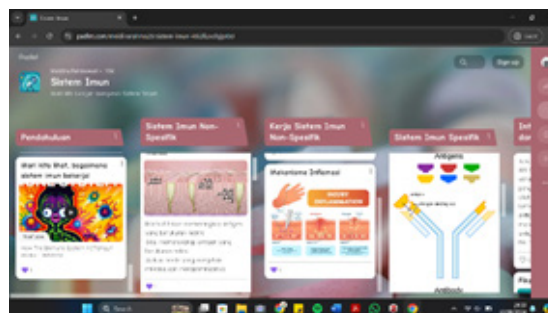
Whereas, students' collaboration skills are measured based on 12 indicators which include: problem solving and feedback; research and information sharing; listen, ask, and discuss; quality of work; work productively; compromise to the group; focus on tasks and participation/participation; shared responsibility: all members contribute, provide guidance; respect opinions; time management; readiness; and monitoring group effectiveness. Data tabulation of collaboration skills indicators were stated on Table 3.

Table 3. Analysis of Student Collaboration Skills in Padlet Web-Assisted Biology Learning

No	Indicator	Percentage	Category
1	Problem solving and feedback	80.00%	High
2	Research and share information	75.97%	High
3	Listen, ask and discuss	70.65%	High
4	Quality of work	85.56%	Very high
5	Work productively	74.05%	High
6	Compromise to the group	72.22%	High
7	Focus on tasks and participation/participation	83.26%	Very high
8	Shared responsibility	84.11%	Very high
9	Value opinions	82.78%	Very high
10	Time Management	64.17%	High
11	Readiness	73.89%	High
12	Monitoring group effectiveness	73.61%	High
	Average indicators of collaboration skills	76.69%	High

Discussion

Based on Table 1, the average result of students' communication skills indicators is 81.34%, which is in the very high category. The four indicators measured also show the high to very high category. This can be seen from the first indicator, namely being able to convey ideas well. Even though this indicator has the lowest percentage compared to other indicators, namely 79.51%, this percentage is still classified as high. In the Biology learning process on the Immune System material assisted with Padlet, students are able to convey their ideas or thoughts well (Bakar & Hashim, 2022). This is supported by the availability of Immune System material on the Padlet website which is quite complete and varied as seen in Figure 1.

**Figure 1.** Padlet display

Furthermore, for the indicators of courage to speak and clear articulation of pronunciation, the percentage of high and very high categories was obtained. This is also supported by observational data which shows that students tend to be braver in making presentations in front of the class after working on the LKPD they did on the Padlet website. Students are able to present the results of discussions with their group of friends with high self-confidence and with clear articulation. When discussions or questions and answers occur, students can also respond well. This can be seen from the fourth communication skills indicator which shows a percentage of 81.24% which is in the very high category. This is in line with research conducted by Alastal et al. (2022), Febriyanti et al. (2023), and Kobayashi (2024) who revealed that using Padlet as a learning medium can improve communication skills, speaking abilities, and deductive thinking skills. Padlet also help the students to get timely help from other students and the instructors, be motivated by participating in discussions and seeing others' progress, organize and brainstorm project ideas, and summarize and present the students' work (Park et al., 2023).

Furthermore, based on Table 2, the average data on collaboration skills is 76.69%, which is classified as high. This average was obtained from a tabulation of questionnaires that had been distributed to students regarding their responses regarding learning Biology on the Immune System material with the help of the Padlet web. Indicators of collaboration skills that are classified in the very high category are quality of work, focus on tasks and participation/participation, shared responsibility, and respect for opinions. This shows that with Biology learning assisted by the Padlet web, students are able to produce quality discussion results by focusing on their respective roles in the group. Students are also highly committed to completing the available assignments (LKPD) with a full sense of responsibility, but still respecting the opinions of their group fri-

ends. This is supported by research conducted by Suriyanisa et al. (2024) which revealed that there was a significant increase in indicators of students' collaboration skills after implementing the Padlet-based jigsaw model, especially in terms of understanding group goals, participation in leadership, and communication skills. This can also be seen from observation data which shows that each student plays an active role in discussions to solve problems in the LKPD. The students can also post comments or responses on the Padlet board, that is crucial to promote students engagement and peer-interaction in online environments, allowing the students to ask question, and collaborate on assignments (Purba et al., 2024; Solikhah, 2023; Wahidin et al., 2024). Thus, the students' collaboration skills was observed during the learning process using Padlet (Deni & Zainal, 2018; Rashid et al., 2019).



Figure 2. Students discussing in their group

Furthermore, indicators of collaboration skills that show high category results include: problem solving and feedback; research and information sharing; listen, ask, and discuss; work productively; compromise to the group; time management; readiness; and monitoring group effectiveness. The time management indicator has the lowest percentage compared to the eight indicators in the high category, namely 64.17%. This can occur due to various factors such as students losing track of time because they are too enthusiastic when discussing with a group of friends, distractions from using gadgets and internet networks, and students' lack of focus during learning (Pang et al., 2018).

CONCLUSION

The use of the Padlet website effectively improve students' collaboration skills in learning Biology and Immune System material with an average of 76.69% and is classified in the high category . The mean for collaboration skills is one of the lowest compared to other variables, due to

the possibility of external distraction factors resulting in differences in percentages.

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