Implementation of Blended Learning Models during the Pandemic: A Perception of Prospective Teachers

Robert Harry Soesanto, Jessica Elfani Bermuli, Billy Mumu
Universitas Pelita Harapan, Tangerang, Banten, Indonesia
robert.soesanto@uph.edu

ABSTRACT
The COVID-19 pandemic has made the entire life order change substantially, including the education area. The atmosphere of face-to-face learning must undergo a transition in the form of online learning, by utilizing technology and various interaction media during learning, including tertiary education. Blended learning model is one model that can be used in this emergency situation. This study aims to look at students' perceptions, to what extent of the blended learning carried out by optimizing LMS Moodle and video conferencing as learning tools. Participants in this study were taken purposively and involved 78 students from three study programs, namely Biology, Mathematics, and Social Sciences Education, who were enrolled and participated in Ecology, Integral Calculus, and Geography courses. The instruments are COLLES questionnaires and open-ended questions to investigate deeper at the perceptions expressed by students. Research methods are used in the form of mixed methods to produce an in-depth interpretation of student perception. Quantitative data analysis is carried out with a one-way ANOVA conducted using SPSS 20. Qualitative analysis is carried out descriptively related to the response given by students in writing. This research found indications related to lecturers' ability to design discussion problems to stimulate student involvement during learning.

Keywords: Blended Learning, Prospective Teachers, Pandemic, Tertiary Education.

INTRODUCTION
Today, the world cannot be separated from the need for the use of the internet in various aspects of human life. The connection of communication and information from various corners of the world through existing technological devices makes many changes in human life which is then tailored to their respective needs. No exception in the world of education, the internet is not only a means to get information but an important tool to do the practice of learning itself. The Internet plays an important role in providing learning that is considered more in accordance with the demands of the existing era where the internet makes the mobilization of information can be done quickly without the obstacles of space and time as well as
learning experiences that can be conducted anywhere and anytime. Even Dryli and Kinnaman (1996) in (Dogruer, Eyyam, & Menevis, 2011) explained that the utilization of the internet helps learners to be able to develop critical and creative thinking, cooperation skills, and problem solving. For this reason, the use of the internet makes the learning system must be made in such a way using methods that can support teachers and learners to interact optimally without removing the essence of the teaching and learning process itself.

One method that has developed and been used is blended learning (BL). BL itself is a learning that combines face-to-face encounters and the use of technology (Wichadee, 2017). This combination can involve the use of web-based communication, video, audio that can be done in a synchronous and asynchronous manner as well as by conducting face-to-face learning interactions (Fadillah, Nopitasari, & Pradja, 2020) or in other words that this learning allows learners to be able to learn face-to-face in class or indirectly outside the classroom by utilizing various existing media or platforms such as Zoom, Microsoft Teams, Google Meet, and others. Based on this fact, it can be seen that BL emphasizes learning practices where interaction and learning experiences can be done directly or indirectly with the online system (Agustina, 2021).

The application of BL is not new thing, in line with the development of the use of the digital world today, especially at the level of tertiary education institutions that are starting to implement distance learning models. BL creates a seamless learning environment as in terms of space and time so that it can be tailored to the needs of the learning itself. Therefore, BL is believed to be one of the most effective learning models used because it provides a flexible, timely, and sustainable learning experience so that teachers can organize the provision of materials, tasks, discussions, and other activities in a more varied and effective way. On the other hand, with the context of application to universities, students are expected to be able to improve their learning outcomes through learning variations that provide space for them to explore unlimited resources, develop critical thinking and analytical resources, collaborate with study colleagues, and conduct guided practices from lecturers rather than with learning that only focuses on listening to lecturers in the classroom (Rasheed, Kamsin, & Abdullah, 2020).

BL is one of the learning models that are commonly used and developed in the education unit. BL is presented as a learning model that combines face-to-face systems and online (in-network) learning that can be accessed by everyone, in all places, and without time restrictions (Rachman, Sukrawan, & Rohendi, 2019). BL applied to several universities shows that the learning system that occurs, is a combination of face-to-face in the classroom (traditionally face-to-face) and teaching that occurs online (Wright, 2017). BL is also a combination of face-to-face learning and e-learning or online learning (Wardani, 2018). Thus, it can be concluded that the BL learning model is a learning model that combines face-to-face
learning directly between learners and educators in the classroom with online learning.

During the Covid-19 pandemic that occurred since the beginning of 2020, the world began to initiate a program of activities from home such as studying from home to working from home. The most widely performed learning model today is BL. However, the BL model applied to the current learning process is more visible than the BL concept itself. BL learning model used during the Covid-19 pandemic shows the existence of technology as a medium for learning and providing learning resources provided online and offline (Syafii & Vebrianto, 2020). Correspondingly, the BL learning model is described as a learning model that combines face-to-face learning through specific online platforms and non-face-to-face learning using the LMS (Learning Management System) (Fadillah, Nopitasari, & Pradja, 2020).

BL is a learning model that integrates forms of face-to-face learning and self-learning at non-face-to-face times. The BL model implemented during the Covid-19 pandemic has been modified, namely face-to-face learning that uses applications for video conferencing such as Zoom and Google Meet while non-face-to-face using certain applications so that students can still access learning (Setyowati, Sukmawan, & El-Sulukkiyah, 2021). Thus, the BL learning model applied is a combination of online face-to-face learning that uses certain video conferencing applications and non-face-to-face learning that uses a specific LMS.

Graham (2004) explained about the emergence of the BL learning model, it was said that learning only occurred face-to-face in the classroom. Figure 1 shows the predictions given by Graham about technology and learning that can complement each other in a learning so that technology can be an intermediary medium for interaction from learners and educators which is referred to as the BL learning model.

![Figure 1 - Progressive convergence of blended learning system development](image-url)
Practically, the implementation of BL is not easy considering the endemic situation of Covid-19 makes many educational institutions, one of which is the Faculty of Education, Universitas Pelita Harapan, run BL with some adjustments made due to limitations in the face-to-face process directly in the classroom. The face-to-face process is replaced by a virtual face-to-face process through platforms such as Zoom and Microsoft Teams. This process is combined with the use of LMS Moodle for online learning activities that can be performed in synchronous or asynchronous. With this adjustment, students can still interact directly with lecturers online and do distance learning activities without removing the essence of the teaching and learning process and making learning itself can still be done.

Some previous studies have shown that the application of BL can improve learning outcomes as well as student confidence. In specific research related to the application of BL in mathematics learning, mathematical disposition also shows strength in the confidence aspect. Self-confidence gets the highest results because during learning, teachers ask students a lot, so it requires confidence in answering questions asked by teachers. Overall, the mathematical disposition of students is in the medium category which means that a strong tendency to be able to perform mathematical activities so as to solve mathematical problems effectively and efficiently in BL tends to be moderate.

Based on the results of the study, it was found that there was an influence from the application of BL both in terms of learning outcomes and also how BL affected a strong tendency to do the courses studied. For this reason, this study will attempt to see how the application of BL to prospective teacher students by viewing at the implementation of three different study programs represented by content courses. In detail, this study attempt to look at students’ perceptions of the extent of BL application by optimizing LMS Moodle and video conferencing as learning tools for students.

**METHOD**

This study took participants purposively and involved 78 students spread across three different study programs, namely Biology Education, Mathematics Education, and Social Sciences Education. These students are active students who take content courses in each study program, namely Ecology, Integral Calculus, and Geography, respectively. In connection with the pandemic conditions that require students to carry out online learning, lecture activities are designed using the BL model by utilizing the platform in the form of LMS Moodle as an asynchronous activity facility and video conference in the form of Microsoft Teams for synchronous activities. All activities are written in the outline course and have been communicated to students at the inaugural lecture meeting by each lecturer.

Researchers used instruments in the form of COLLES (Constructivist On-Line Learning Environment Survey) questionnaires adapted at LMS Moodle. The
questionnaire is designed to open up space for learners to be able to provide reflection related to learning delivery through online learning. The questionnaire consisted of 26 questions in English, with 4 Likert scales. The researcher held a joint discussion with two colleagues and one lecturer from English Education for the purposes of translation into Indonesian. After the translation process is completed, researchers validate through the help of an expert to ensure the translation results are in accordance with the context and do not cause misinterpretation of meaning. This is conducted to ensure the absence of bias when the translation process is carried out. The last validation stage is related to the validation of the contents of the questionnaire, which is carried out through the help of three experts to ensure the conformity of the question items with the purpose of the research.

After all these processes were completed, the question points were duplicated into two parts, where one part was to see students' perceptions related to learning activities at LMS Moodle and the other part to see student perceptions at the time of learning using video conferences. Researchers distributed the questionnaire to the LMS Moodle to be filled out by students at the 15th meeting before final exam and have been given clear instructions to avoid student errors in answering questions in the context of learning activities. In addition, students were also given four open questions to investigate the responses of their Likert perception. This open-ended question provides a space for students to describe their experiences during BL. The four open questions are: (1) at what moment in BL are you most engaged as a learner; (2) at what moment in BL are you most distanced as a learner, (3) what action from peers in BL you find most affirming or helpful, and (4) what action from peers in BL you find most puzzling or confusing.

Some of the variables involved in this study are courses variable, treatment variable in the form of applying BL, and dependent variable in the form of student perception. Table 1 shows the research design in the form of 3 x 1 factorials that will be tested quantitatively in relation to the student study program and the application of BL.

<table>
<thead>
<tr>
<th>Variable of Treatment (B)</th>
<th>Courses (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ecology (Biology Education)</td>
</tr>
<tr>
<td></td>
<td>Integral Calculus (Mathematics Education)</td>
</tr>
<tr>
<td></td>
<td>Geography (Social Science Education)</td>
</tr>
<tr>
<td>Blended Learning</td>
<td>A1B</td>
</tr>
<tr>
<td></td>
<td>A2B</td>
</tr>
<tr>
<td></td>
<td>A3B</td>
</tr>
</tbody>
</table>

This study will look at students' perceptions of the extent of the implementation of BL by optimizing LMS Moodle and video conferencing as learning
tools for students. The method used is mixed methods, where data analysis will be carried out quantitatively and qualitatively to get an in-depth interpretation of the perception given by students. On the quantitative aspect, researchers used a one-way ANOVA to see the effect of the difference, which was done using the help of SPSS 20. If there is a significant difference, it will be followed by a post-hoc test using the Bonferroni test to see its significance. In the qualitative aspect, it is conducted descriptively related to the perception given by students in response to open questions.

**RESULTS AND DISCUSSION**

The results of the normality test using Kolmogorov-Smirnov showed that the COLLES questionnaire scores given to students showed Sig scores > 0.05, with courses details: Ecology (Sig. = 0.744), Integral Calculus (Sig. = 0.251), and Geography (Sig. = 0.947). These mean that all three scores are normally distributed. While the results of the homogeneity test using Bartlett showed that Sig. = 0.862 (> 0.05) so that the assumption of homogeneity is fulfilled. Thus, quantitative statistical tests can be proceeded to the one-way ANOVA test to see the significance of the effect. The results of statistical testing are indicated by Table 2, where it can be seen that Sig. = 0.025 (< 0.05). This gives the understanding that there is a difference in effectiveness from the application of BL felt by the three students in the three study programs.

<table>
<thead>
<tr>
<th>Table 2 - One-way ANOVA Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of squares</td>
</tr>
<tr>
<td>Between Groups</td>
</tr>
<tr>
<td>Within Groups</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

The significance needs to be elaborated further, so that a post-hoc test is carried out using the Bonferroni test. The purpose is to be able to see the differences between the three content courses taught in three different study programs, related to the application of BL carried out by lecturers. The results of the Bonferroni test are displayed in Table 3 below:

<table>
<thead>
<tr>
<th>Table 3 - Bonferroni Test as a Post-hoc Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Differences</td>
</tr>
<tr>
<td>Ecology</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Integral Calculus</td>
</tr>
</tbody>
</table>
Referring to Table 3, it can be viewed that there is a significant difference (Sig. = 0.020 < 0.05) to the application of BL in the Integral Calculus course taught in the Mathematics Education study program, compared to Ecology taught in the Biology Education study program. The average difference indicates a mean difference of 11,346, and a positive sign gives the interpretation that the Ecology course feels the benefits of applying BL more meaningful than Integral Calculus. For the Integral Calculus course when compared to Geography, there is no significant difference regarding the implementation of BL (Sig. = 1,000 > 0.05). However, when looked from the negative sign on the mean differences, the application of BL in Geography courses is slightly more meaningful than Integral Calculus. Furthermore, when compared between Ecology and Geography courses, there is Sig. = 0.501 (> 0.05), which means that there is no significant difference with respect to the application of BL. However, when viewed at the mean difference, there is a mean difference of 7,232 and positive signs indicate that the application of BL is slightly superior to ecology rather than geography courses. So, if sorted from the most meaningful related to the application of BL, then the sequence is obtained, namely: Ecology (Biology Education), Geography (Social Science Education), and Integral Calculus (Mathematics Education).

The quantitative findings were then elaborated through four open-ended questions given in conjunction with the COLLES questionnaire. Here, the researcher will describe each student's response to the four questions.

Q1: At what moment in BL are you most engaged as a learner?

The majority of students in the Ecology course admitted that they felt involved when working on various discussion activities in the forum provided through LMS Moodle. Students can brainstorm and share ideas with each other, so that there is a written discussion process that is conducive to the topic of the course. At the video conference session, students reported that they were moved to evoke the atmosphere of Q&A through essential questions given by lecturers. In fact, lecturers creatively also maximize the use of media such as Kahoot to activate student engagement during synchronous sessions.

The same thing was also reported by students from Social Science Education while attending Geography courses. Question and answer activities provided by lecturers during video conference sessions and through LMS Moodle, stimulate them to be actively involved in it. In fact, Geography lecturers provide reading materials that must be accessed and studied by students before starting lectures. This certainly makes students have an initial picture of the topic to be discussed, so that the discussion process can be more conducive. In addition, lecturers also present group presentation activities, where students are challenged to actively ask questions and prepare to answer questions from other students.

Different responses are given to students from Mathematics Education who study the Integral Calculus course. They state that asynchronous moments become the moments with the most significant levels of engagement. Students through the
discussion forum provided at LMS Moodle, maximize the facility to share answers to calculus questions given. They also provide corrections and feedback on the calculation process posted by other students. On the contrary, video conferencing sessions in a synchronous manner are minimally visible student involvement. This will be explained in the second question in response from the student.

Q2: At what moment in BL are you most distanced as a learner?

Unique findings found that precisely in video conferencing sessions, students tend to be passive learners who only focus on waiting and listening to lecturer explanations and responses from colleagues. However, this is only experienced by a small percentage of students. In general, students are more involved during the activities presented in BL. There are also those who emphasize the stability aspect of the internet network as a trigger for students to be less than optimal during BL.

This passive learner problem is also experienced by a small percentage of students who study Geography. There are students who do not respond when listening to lecturer explanations or group presentations. Other findings related to the stability of the internet network and the health condition of students were also reported as factors that made them less involved in BL sessions. There are even intrusions that come from family members, which makes them have to miss valuable moments during BL sessions.

The moment where students feel less involved in integral calculus learning, occurs during a video conference session. The majority of college students reported that they lacked confidence during synchronous sessions. This is triggered by a loss of focus when listening to the lecturer’s explanation, as well as network constraints that make the explanation become incomplete. There are also students who claim that in the early topics of calculus, they still understand well. But when they have stepped on a complicated topic, they are reluctant to try to respond to the given problem. They prefer to discuss it in the LMS Moodle discussion forum together with other students.

Q3: What action from peers in BL do you find most affirming or helpful?

Students from Biology Education claim to get new insights when there is action from peers in the form of feedback on the tasks that have been made. Lecturers designed an assignment collection forum at LMS Moodle by opening up space for other students to provide feedback and feedback, thus providing precious knowledge for students who do the task. This is reflected in the reports of the majority of students when studying Ecology.

Not much different from Ecology, action form peers that make students feel helpful is when peers provide aspirations, thoughts, and insights to lecture materials and presentations. All of these things help students to dig deeper into the topics described. In fact, students also claim to get learning related to the use of technology media from peers, so as to provide innovation for them when they want to make presentations.

The real action of peers that is very helpful is when they share solutions in discussing problems and help provide clues to difficult calculus problems. This was felt by the majority of students while participating in the LMS Moodle forum. Students engage in written interaction, where they have space to compare the
Q4: What action from peers in BL do you find most puzzling or confusing?
In studying Ecology, students highlight more about peers’ attitudes, and the most popular is the attitude of paying less attention to the instructions given by lecturers. This triggers peers to repeatedly ask questions and ensure instructions from lecturers. In fact, there are also peers who give answers that do not match the questions asked by lecturers. This relates to the level of focus and concentration of students during learning.

Similar findings are also found in Geography lectures. Students said they were disturbed when in preparation for the group presentation, they instead spent their time by gossiping others. There are also those who give a poor response during the work on group tasks. During the presentation session, students also regretted that there were questions that were difficult to understand or even outside the context of their presentation material.

In the learning of Integral Calculus, students claim to fret when there are peers who provide a way of unsystematic workmanship. Even when there are peers who give answers in the form of handwriting that is difficult to read clearly, causing a variety of interpretations and assumptions. Other disturbances are also experienced in the form of spam messages in discussion forums. When there are other students who have managed to post the correct work process, many of them spam with “thank you” expressions.

**Discussion**
Based on the resulting findings, there are patterns of responses given by students. From the existing patterns, there are indications in the form of BL presentations that need to be a concern among lecturers, especially in delivering good learning environment during pandemic period. Lecturers need to provide a comfortable, relaxing BL atmosphere, and stimulate students' confidence in participating through response (Adedoyin & Soykan, 2020; Irfan, Kusumaningrum, Yulia, & Widodo, 2020). In response to open-ended questions, there were indications of lack of engagement during the BL Integral Calculus course, more due to the provision of too complex problems in video conference sessions. It is also expressed by a number of studies on mathematics learning that the complexity of the problem is one factor considered in activating student involvement (Mulenga & Marbán, 2020; Olango, 2016). The complexity of the problem can be used as a discussion when students interact with peers, but it should be adjusted when dealing directly with students, because it has an impact on students' anxiety and confidence (Fatmi, Muhammad, Muliana, & Nasrah, 2021; Muhazir & Retnawati, 2020).

Discussions are a fairly essential part of helping students' engagement during BL implementation (Lowenthal & Moore, 2020; Warren, Reilly, Herdan, & Lin, 2020). Seen in the Ecology and Geography course, discussion activities provide
positive value in helping students interact related to the topics discussed. But of course, it was found that there was a potential for students who lack of focus, causing disruption during BL. This disorder is also one of the findings in several previous studies (Adedoyin & Soykan, 2020; Soesanto & Dirgartoro, 2021). Therefore, the distance separation factor during BL can be overcome by the ability of educators to bring a conducive discussion as one of pedagogical strategy (Gaol & Hutagalung, 2020). Through this, it is hoped that learning loss can also be minimized and social relationships between students and educators can be established to the maximum.

CONCLUSION
The application of blended learning is not a panacea for learning during a pandemic. Many factors must be considered to build a conducive learning environment, in the midst of this distance separation. Educators need to really think about learning strategies and mature activities in them, so that students can feel the benefits of implementing BL. In video conference sessions, educators need to be skilled in presenting various problems that can provoke student involvement. The complexity of the problem is also a concern that should not be ignored, because it can reduce students' confidence to respond, and have an impact on their involvement in BL. As a steppingstone for further study, researchers will attempt to maximize the features contained in LMS Moodle to maximize the implementation of BL. In addition, there is a need to develop educator competencies towards mastery of technology in learning.

ACKNOWLEDGEMENT
The authors want to express gratitude for Universitas Pelita Harapan who has assisted us in funding our research with research number: P-22-FIP/XII/2021

REFERENCES


Grobogan: CV Sarnu Untung.