The benefits and challenges of online project-based learning: Students and lecturer's perceptions

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Abstract: Project-based learning (PBL) has been found to bring many benefits to learning. However, only some studies identified the challenges of using PBL in an online class. This study investigated the benefits and challenges of online PBL according to students and the lecturers's perceptions using a qualitative case study design to investigate the case at Universitas Jambi. The data were collected by distributing an open-ended questionnaire in Google Forms to 45 students (The exchange students who took an Organizational Culture class at Universitas Jambi) who joined the exchange students' program of Merdeka Belajar Kampus Merdeka curriculum and conducting a semi-structured interview with the lecturers. The study finds 17 benefits of using project-based learning in an online class and 6 challenges encountered by the students and the lecturers during the class.The findings also show that the challenges stemmed from the drawback of online learning: distance limitations, and technical problems. The limitation of online learning is related to the cooperative learning activities that need the cooperation of the students both in peers or groups.

Keywords: *project-based learning, online learning, benefits, and challenges of PBL*

INTRODUCTION

Online learning has become a 'new-normal' thing in education since the worldwide pandemic, Covid-19 existed. Online learning is happening because any face-to-face class was prohibited from reducing virus transmission; as a result, online learning became an emergency solution (Murphy, 2020; Yulianti & Mukminin, 2021). Even though the government has loosened the health protocols nowadays, some instructors especially in universities still prefer to do online learning through virtual meetings (Coman, Țîru, Meseșan-Schmitz, Stanciu, & Bularca, 2020). They still prefer online learning because of its flexibility, as the class can be taken anywhere and anytime (Rawashdeh, Mohammed, Arab, Al, Alara, & Al-Rawashdeh, 2021). However, long-time virtual meetings can somehow result in some problems. Most students tend to be bored, fatigued, and less active during online classes (Dhawan, 2020). It might happen because classroom interactions occur only through screens (Pelikan *et al.*, 2021)

Regarding virtual meetings fatigue, teachers or instructors should be innovative in choosing an instructional or teaching method to make students stay engaged. An instructional or teaching method with a paradigm of students-centered learning is well suited to engage students (Shin, 2018; Wospakrik, Sundari, & Musharyanti, 2020), especially in online learning that requires students to be more independent (Amin, Widiastuti, & Sumarni, 2022; Kim, 2021). In recent years, various teaching methods have been experimented with to find more

effective teaching and learning that embed a student-centered paradigm (Shin, 2018). One is the project-based learning (Kim, 2021; Shin, 2018).

Project-based learning is a learning model that allows students to learn through real-world problems (Markula & Aksela, 2022). It is an instructional model that has been proven to be effective because students play an active role in the learning process. It can develop students' problem-solving ability, creativity, motivation, and communication skills (Baillie & Fitzgerald, 2000; Lee, Huh, & Reigeluth, 2015; Sari, 2018). The model can also help build classroom engagement and improve students' participation (Amin *et al*., 2022; Sari, 2018; Shin, 2018; Silva, Bispo, Rodriguez, & Vasquez, 2018). This model is applicable and effective to prevent some online learning challenges that include students' less engagement and less participation in classroom (Bhakti *et al*., 2021; Le, 2018). Thus, project-based learning is anticipated to be one of the solutions to online learning.

This study initially occurred to prove the effectiveness of project-based learning in an online Organizational Culture class. However, it was found that not all of the students found the method beneficial. Indeed, the challenges of using online project-based learning have not been many researched. Therefore, this study investigated the benefits and challenges of using online project-based learning based on students and the lecturer's perceptions. This study is expected to enrich the literature on online project-based learning for future studies and provide solutions for academics to reduce some drawbacks of online project-based learning. The study aimed to answer the research questions: what are the benefits of using project-based learning in online learning? And what are the challenges of using project-based learning in online learning?

This study investigated 45 students at a Private University on Java Island who took an exchange students program at Universitas Jambi and a lecturer of an Organizational Culture class that the students enrolled in. The Faculty of Economics and Business at Universitas Jambi has been promoted to apply the project-based learning method both in offline and online classes. The class as the site of this study is the first online project-based learning class that the faculty employed for exchange students.

Online learning or 'e-learning' simply can be defined as education that takes place over the Internet (Dhawan, 2020). It is a remote learning process that is more flexible for teachers and students to take classes anywhere as long as there are adequate internet signals (Coman *et al*., 2020). Online learning, which is related to electronic devices and the internet, has been used at higher education levels for a long time ago (Dhawan, 2020; Rawashdeh *et al*., 2021). It used to be mixed with 'face-to-face' class meetings which are also known as 'blended learning' (Zhonggen, 2015).

Online learning has become more favorable since the pandemic (Rawashdeh *et al*., 2021). Because of the global COVID-19 pandemic, the government issued health protocols that demanded students minimize face-to-face meetings. It made all universities worldwide aware of modern technology (Dhawan, 2020). The teaching and learning process has been run online for these two years. The changing process made universities turn the offline mode into online mode pedagogy, which needs more preparation for online curricula, supported devices, and available internet access for students and teachers (Singh & Thurman, 2019).

Besides the pandemic issues, most lecturers prefer online learning because of its advantages. Online learning can promote learners' autonomy because online learning environments help learners spend more time learning independently when instructors only

serve as guides or facilitator (Joshua, Obille, John, & Shuaibu, 2016). It is also efficient in terms of time management because learning objectives can be achieved in the shortest time as online learning can be taken anytime (Huang & Chiu, 2015). The lecturers can immediately change the class schedule when they need to (Raspopovic, Cvetanovic, Medan, & Ljubojevic, 2017). Moreover, online learning is more flexible with a much-reduced need for travel to the class (Chang, 2016). Furthermore, online learning allows learners to learn more about lecturer materials because they can record the online class on their devices (Coman *et al*., 2020). In addition, online learning can be useful for a learner who is shy or reluctant to talk during a face-to-face class as they can talk through computer screens or at least by leaving some comments.

Online learning, however, also has some drawbacks. Technical problems such as login problems, audio or video problems, downloading errors, and lost internet signals can happen during online learning (Dhawan, 2020). Moreover, online learning can be boring for some students, especially when the online learning material is too theoretical (Parkes, Stein, & Reading, 2015). Students also might get bored because there are no such essential personal interactions between each student and between students and teachers (Rawashdeh *et al*., 2021). Therefore, lecturers should focus on making students stay engaged during online classes. A good online class is better to be creative, interactive, student-centered, and group-based (Dhawan, 2020). For this reason, lecturers should find the most engaging method for learners in online learning.

Project-based learning has gained popularity in the education field (Harmer & Stokes, 2014; Lehmann, Christensen, Du, & Thrane, 2008). It was originally used for medical education to increase motivation, develop problem-solving abilities, and encourage learners' independent learning. By this time, PBL has been conducted in institutions worldwide. A review of the literature also confirms its use across a breadth of disciplines in differing national contexts, including Media and Business Studies, Geography, Environmental Science, Economics, Education, and Information Technology and Sustainability (Harmer & Stokes, 2014). It has been implemented in many fields, especially in higher education.

As project-based learning has been used in institutions worldwide, it has a variety of definitions given by scholars and researchers. Adams (2018) defined project-based learning as a learning strategy with a project delivery format that focuses on how students learn by working on a project. Harmer and Stokes (2014) opined that project-based learning is an instructional approach with real tasks and learning activities that are challenging for students to solve. Bell (2010) stated that project-based learning is a student-centered approach that requires students to play a part in a real project under the instructors' supervision. The approach requires students to design their own inquiries, plan their learning, organize their research, implement a multitude of learning strategies, and evaluate their projects that have real-world applications beyond the classroom (Bell, 2010). Those activities give students an opportunity to work autonomously most of the time and make realistic products or presentations (Pelikan *et al*., 2021). Bell (2010) also mentioned that PBL is an approach in which teachers act as facilitators. Teachers in PBL, manage each process (Bell, 2010). In other words, using the method means that teachers allow students to learn by constructing new ideas or concepts based on their current or prior knowledge.

The frequent use of project-based learning might happen because of its many advantages. Previous studies found that positive outcomes of project-based learning include

enhancing creative thinking processes, increasing motivation, developing communication skills, improving problem-solving skills, fostering student learning attitudes, and making students more active in the learning (Shin, 2018). Lee *et al* (2015) also found that PBL enables students to find practical and complex problems by themselves, plan solutions, and perform collaborative research to solve problems. The method can contribute to the development of students' creativity, internal motivation and interest, responsibility, communication skills with others, social skills, cooperation, problem-solving ability, critical thinking, and self-directed learning ability (Bhakti *et al*., 2021; Issa & Khataibeh, 2021; Lee *et al*., 2015). Furthermore, Le (2018) also mentioned that the benefit of project-based learning involves students' academic achievement, students understanding of the subject matter, and students' positive attitudes toward learning. In conclusion, project-based learning, which has been widely used, has many advantages related to student achievement, engagement, creativity, problem-solving skills, and other skills due to the project-based learning processes.

Online project-based learning occurs amid the Covid-19 pandemic, where almost all learning activities run online. Most classes have become remote, and online classes are more dominant even after the corona period than offline classes (Selvaraj, Radhin, KA, Benson, & Mathew, 2021). Online project-based learning becomes one of the hot issues with the rapid growth of online learning in the era of COVID-19 (Hira & Anderson, 2021).

The method with the benefits that have been mentioned before, indeed, can reduce some problems in online learning. Bell (2010) mentioned that project-based learning is a good method to prevent students from simply attending the online class by just listening to the lecture and memorization. To continue instruction without losing students' engagement in an online class, instructors can adopt project-based learning that includes strategic and active engagement of students in opportunities to learn through doing (Veluvali & Surisetti, 2021). Project-based learning can also train learners thinking skills by completing various tasks, solving various problems, and producing things contained in project-based learning activities (Novitasari, Wiyanarti, & Jupri, 2018). Learners can improve their creativity and critical thinking skills because the method allows them to learn about and reflect on real-world problems through well-designed projects and self-evaluation (Wijayati, Sumarni, & Supanti, 2019). Moreover, using project-based learning in an online class will improve learners' technical skills as they train to use technology to create and manage the project, search for supporting information, and present the project in the online platform class (UNESCO, 2019; Yuliansyah & Ayu, 2021).

There are several differences between project-based learning in general and online project-based learning, such as the means used in carrying out tasks, the form of assignments that need to be completed, and evaluation tools to review the goals that have been carried out by students (Bhakti *et al*., 2021). However, the essence of project-based learning will remain, the differences in format and form. To conclude, despite the differences between online and offline learning, the benefits of learning online or offline practically could be the same. Therefore, project-based learning can be a good option in the period of the prevailing online class.

Teachers or instructors should acknowledge project-based learning features before implementing the method. Project-based learning has several essential features that are needed to be presented to experience the benefits of the method.

First, as active learning, project-based learning should involve a lot of activities, including designing students' own inquiries, planning their learning, organizing their research, implementing a multitude of learning strategies, and evaluating their projects (Baghoussi & El Ouchdi, 2019; Yuliansyah & Ayu, 2021). *Second*, the project or the topic should be 'real-world problems' meaning that it involves real-world questions, poses solutions to real-world problems, and designs real-world products (Bell, 2010; Hanney & Savin-Baden, 2013). *Third*, project-based learning enacted teachers' role as "a guide on the side", meaning that teachers work as a facilitator in which they supervise learners' whole process of conducting the project, requiring additional training, support, and resources (Harmer & Stokes, 2014). *Fourth*, project-based learning is an emphasis on interdisciplinary (Hanney & Savin-Baden, 2013; Otake *et al*., 2009) meaning that to finish a project, students need knowledge as well as skills from across disciplines. *Fifth,* project-based learning involves cooperative learning because activities in this method revolve around a complex series of interactions between team members over time and draws on communication, planning and teamwork, surveys, and research (Hanney & Savin-Baden, 2013; Harmer & Stokes, 2014). *Sixth*, project-based learning includes well preparation before the project where teachers and learners must involve to be clear about the goals so that the project is planned and completed effectively (Almulla, 2020). *Seventh*, planning and organizing the project is followed. In this state, teachers and students should develop an outline that explains the project's essential elements and expectations (Bell, 2010). *Finally*, teachers complete and evaluate the project, and they should have an adequate assessment of the project. Understanding the essential features above is crucial because it can help instructors to implement the method optimally.

In the new normal era, online project-based learning can be done more straightforwardly. Students and teachers conduct online or distance learning, but the achievements and goals of quality education are still formed (Bhakti *et al*., 2021). Although learning activities in the new normal era are online, to avoid some obstacles, it is necessary to design online project-based learning more accessible and straightforward but does not reduce the goals and benefits of learning. Thera are some steps of online project-based learning design in the new normal era can be followed (Kim, 2021; Veluvali & Surisetti, 2021): starting with essential questions: find a current topic, for instance, COVID-19 (using Google Classroom, WhatsApp); designing a project (using Google Classroom, or teacher and student share an idea with a picture using WhatsApp); create a schedule (using WhatsApp group for planning the project) and the teacher will write down the schedule; monitoring the students and the progress of the project (Google Classroom, Google Documents, WhatsApp, Zoom, etc.); assessing the outcome: project can be a video, picture, or an online paper (Zoom, YouTube, Google Classroom, WhatsApp); evaluating the experience: discussion and using quizzes for the evaluation section (Zoom, Kahoot, Google form, WhatsApp).

METHOD

This study employed a case study design to investigate the benefits and challenges of online project-based learning. The researchers chose a case study design because it can obtain a thick description and discover deep insights into participants (Creswell, 2012; Merriam, 2009). It is in line with this study's aim to deeply explore and discover a case of how the project-based learning method is implemented online in an Organizational Class at Universitas Jambi. The case is compelling to be explored as the class consisted of exchange

students who had first experience with online project-based learning. As this study aims to seek students' and lecturers' perceptions, the design will be well-suited.

This study was taken in an Organizational Culture class. The class has sixteen meetings that occurred for almost six months. The lecturer explained the lesson plan, lecture rules, assessments, and class procedure at the first meeting. The lecture delivered the course materials on Organizational Culture from the second until the fifth meetings. After giving the course material, the lecturer asked the students to make nine project groups. The students were asked to make a paper with topics about types of organizational culture, bright sides of organizational culture, dark sides of organizational culture, and changes in organizational culture. The students were free to choose the topic by themselves. In detail, each group should choose a company or institution or any organization they want to research and find the company's organizational culture phenomena. Then, they presented their projects and discussed them with their peers. The projects that the groups made were about clan culture in a local clothing brand, foreign culture in a fast-food restaurant, hierarchy in a company from Japan, feminism in an institution, nepotism in an institution in Indonesia, open communication in an Indonesian company, and so on.

The participants of this study were 45 exchange students from a Private University on Java Island who took an Organizational Culture Class at the Faculty of Economics and Business, Jambi University. The student exchange was one of the programs of *Merdeka Belajar Kampus Merdeka* curriculum. The class occurred online because of the exchange program, as the students were in a different city. They were purposively selected because the online class used project-based learning as the learning method that is the potential to be researched. This study also sought for the lecturer's perception to understand more about the benefits and challenges of implementing online project-based learning from the lecturer's perspective. All the participants agreed to involve in this study remaining their identities as pseudonyms.

The data were collected by distributing questionnaires to the students and interviewing one lecturer who taught the Organizational Culture subject. The questionnaires were distributed by using online Google Forms in the last meeting of the class. The open-ended questionnaire contains ten questions including the students' profile, their perceptions of the class with online project-based learning, and their views about the benefits and challenges of the learning method. After that, the researchers did a semi-structured interview with the lecturer for approximately 2 hours at the last meeting of the class. The interview involved questions that consisted of the class description, and the benefits and challenges of using online project-based learning. The data were analyzed involving some stages according to Creswell's (2012) guidelines: identifying the data, classifying the data, building descriptions, interpreting findings, finding validation, and presenting the findings related to the research questions.

FINDINGS AND DISCUSSION

This study investigated the benefits and challenges of using online project-based learning in an Organizational Culture class. All the students in this study admitted that the class was their first time experiencing the project-based learning method. The data demonstrate that 90% of students enjoyed and were happy with the online PBL class, while 10% of them stated that they did not. Most of them found the benefit of the method. However, some of

them thought the method was not helpful for them, indeed, they found some challenges through the method. The benefits and the challenges of online project-based learning are elaborated below.

The benefits of online project-based learning based on the students' perceptions. The study found 17 benefits of online project-based learning based on students' perceptions. Table 1 presented the data and the frequency of how many of the students mentioned them.

The data showed that 16.9% of all the benefits that the students found in online project-based learning was, project-based learning made them more active in the online class. "Become more active" or "Make the students active in the class" were the most frequent answers from the students when they were asked about the benefit of the method. One of the students also mentioned, "We become more active in the class because we need to do many things like discussing, presenting, and preparing our final project" [Student 1].

Students become more active in class through online project-based learning is also found in other related studies: the method made active students' participation and engagement

Table 1
The benefits of online project-based learning according to the students

Statement	n	%
1. Students become more active in the class.	12	16.9
2. Students were easier to understand the course material.	12	16.9
3. Increasing knowledge, insights, and new information from many fields.	11	15.4
4. Students become more independent in learning.	7	9.8
5. Developing students' teamwork skills.	5	7.4
6. Students learn to be disciplined, on time, and responsible.	4	5.6
7. Improving public speaking skills and giving and accepting opinions.	3	4.2
8. Improving critical and logical thinking skills.	3	4.2
9. Students learn to be creative.	3	4.2
10. Students become more focused to learn because of the final project.	2	2.8
11. Students learn to find and filter valid and accurate information.	2	2.8
12. Developing students' problem-solving skills.	2	2.8
13. Students learn to do research which involves investigating, collecting, analyzing, and presenting data.	1	1.4
14. Students can understand the connection between the theories and real-world problems.	1	1.4
15. Increasing learning motivation.	1	1.4
16. All students have direct interactions and conversations with the lecturer.	1	1.4
17. Having a new learning experience.	1	1.4
	71	100

(Amin *et al*., 2022; Sari, 2018; Shin, 2018; Silva *et al*., 2018). It is proved that the method can be the answer to students' less classroom participation.

The data also showed that students were easier to understand the course material through online project-based learning (16.9%). Ther is a similar benefit of project-based learning that is helpful for students' understanding of the subject matter. It turned out that the method also works in the online environment (Rohmah, Waluya, Rochmad, & Wardono 2020; Le, 2018).

The next benefit is increasing knowledge, insights, and new information from many fields. Other studies rarely mentioned this benefit in an explicit way. It might be because project-based learning itself has the essential features that will automatically make the students gain the benefit as project-based learning emphasizes interdisciplinary that made students need knowledge from across disciplines to finish their project (Hanney & Savin-Baden, 2013; Otake *et al*., 2009). Thus, inevitably, students will increase their knowledge or insights from other fields.

The students also found the method was beneficial to make them more independent in learning (9.8%). A student mentioned, "I become more independent in learning because I need to find and learn the additional material in my spare time to finish my final project" [Student 2].

Whether they like it or not, the students will develop their autonomous skills to finish their projects. This benefit, students becoming more independent through project-based learning, is also marked as beneficial in other related studies (Amin *et al*., 2022; Bell, 2010; Kim, 2021).

The students also mentioned that online project-based learning developed their teamwork skills (7.4%). It is obvious because the learning method demanded the students to work in groups which made the students potentially develop their teamwork skills. It is in line with related studies that found a similar benefit (Le, 2018; Lee *et al*., 2015).

The 5.6% of the online project-based learning benefits that the students found is they learn to be disciplined, on time, and responsible. Tasks and projects within the lecturer's deadline have taught them discipline. They would miss their presentation and lose their performance score if they did not finish their project on time. One of the students mentioned' "I believe that all of us become disciplined because of the deadline. We need to finish our projects on time, and it made each of us responsible for our own tasks" [Student 3]. Improving students' disciplines and responsibility as one of the project-based learning advantages was also in line with Novitasari *et al*. 's study (2018).

The next benefits which have equal percentages of times that the students mentioned (4.2%) are: improving public speaking skills, and giving and accepting opinions; enhancing critical and logical thinking skills; and learning to be creative. These three findings were nothing new in other related studies. Almost all of the related studies mentioned that project-based learning improves: public speaking and communication skills (Kurniawati, Susanto, & Munir, 2019; Shin, 2018); critical thinking skills (Issa & Khataibeh, 2021; Silva *et al*., 2018)connecting students' experiences with school life and stimulating serious thinking as students gain new knowledge. So that, this study aimed at investigating the impact of a teaching strategy adopting project-based learning on improving the critical thinking among upper basic Stage Students from male and female Science teachers' perspectives. The researcher used the descriptive-analytical method, through a questionnaire which applied to (111; and creativity (Bhakti *et al*., 2021; Lee *et al*., 2015; Sari, 2018).

The other benefits with similar percentages (2.8%) are: students becoming more focused to learn, students learning to find and filter valid and accurate information, and developing

students' problem-solving skills. Two students said that project-based learning helped them to be more focused to learn because the final project that they should be finished. This benefit is still in line with how the PBL made the students active in learning as they become more focused and willing to participate.

Ttwo students mentioned that the PBL help them to learn how to find and filter valid information. It has been not mentioned in other related studies. However, this benefit is still related to how PBL improves students' critical and logical thinking skills (4.2%). Since the method help the students to think critically and logically, thus, they managed to filter or choose valid and accurate information for their project. Then, the other two students also mentioned that PBL developed their problem-solving skills. It is still quite related to how PBL improves their critical thinking, indirectly improving their problem-solving skills. The advantage of project-based learning in improving students' problem-solving skills is also found in many related studies (Chiang & Lee, 2016; Jaenudin, Kurniasih, & Amalia, 2020; Lee *et al.*, 2015; Novitasari *et al.*, 2018)

The last five benefits that were only mentioned by one of five different students are (1.4%): students learn to do research which involves investigating, collecting, analyzing, and presenting data, students can understand the connection between the theories and the real world problems, increasing students' learning motivation, students have the opportunity to directly interact with the lecturer, and having a new learning experience. These five benefits are the least that was mentioned by five different students. Of the five benefits, the most benefits that have been mentioned in most related studies are relating the theories and real-world problems (Bell, 2010; Zaeriyah, 2022) and increasing learning motivation (Barlian, Nurbani, & Wijayanto, 2022; Chiang & Lee, 2016; Shin, 2018). Surprisingly, only two students mentioned them. It could be because other students did not realize it or other students certainly did not feel the benefits. All in all, the findings showed that project-based learning surely has many benefits for students.

The challenges of using project-based learning based on the students' perceptions. The students not only mentioned the benefits that they got from the online project-based learning but also the challenges. Although almost all of them found the method beneficial, they admitted that they also found some challenges in using the learning method. The study found 6 major challenges of using online project-based learning according to the students. Table 2 presented the challenges.

Table 2
The challenges of using online project-based learning according to the students

Statement	n	%
1. Working in group issues.	15	33.4
2. Online learning environment.	12	26.7
3. Finding additional material independently.	13	28.9
4. Less intensive consultation with the lecturer.	1	2.2
5. Difficulty in choosing an interesting topic.	1	2.2
6. Project deadline issue.	3	6.6
	45	100

The most frequent challenge that the students mentioned was working in group issues (33.4%). Some of the students said that it was difficult to work in a group because some of their peers seemed reluctant to socialize. "It was difficult because some friends did not really interactive and were reluctant to socialize when we discussed the project" [Student 4]. "There were some friends who were not really communicative when we were discussing our project" [Student 5]. Some students even stated that there was a student who did not work on his or her group tasks properly, "A student in my group did not even do the tasks" [Student 6].

The working group issues might happen because the discussion was held online through virtual meetings. The students took the discussion and group tasks remotely which led to the discussion not running so well. The distance limits also made the lecturer difficult to get them together to work.

On the other hand, two students mentioned that working in groups was challenging because of their personal problems. "I don't prefer working in groups because sometimes it's hard to work with many friends who did not finish their tasks" [Student 7]. "I think it was unfair when I've done many tasks while the others didn't. That is why I don't like to work in a group sometimes. Well, it depends on the teammates" [Student 8].

Working group issues in online project-based learning is also found in Amissah's study (2019) which mentioned the instructor's difficulty in grouping the student well because they were remote and separated. The working group issues might be overcome by having an explicit assessment. For instance, the teacher can assign the students to assess their peers or ask the head of each group to make a detailed report of the tasks partition for each group member. It could be done to make sure that all students finish their work well and contribute to the group.

The second challenge mentioned was the online learning environment (27.6%). As mentioned, the remote distance in online learning might lead to uncommunicative discussions. Some students also mentioned directly how the online learning environment (27.6%) became one of the challenges of online project-based learning. Most of them, who mentioned the online learning environment as a challenge, stated that the internet connection was the problem. "Sometimes the trouble was the internet connection" [Student 9]. Moreover, three students mentioned that sometimes the situation at their house also disturbs their online learning. "When it was too noisy at my home that made it difficult to focus on following the course" [Student 10].

Online learning with such technical issues and students' problems in their households were also found in several studies (Amissah, 2019; Dhawan, 2020; Rawashdeh *et al.*, 2021) that made online learning itself could be a challenge. Overcoming this inevitable problem needs good preparation from the students. For instance, they should prepare another backup device with internet credits to follow the class and move to a more supportive and quiet area if their house was too noisy.

Third, the students mentioned finding additional material for their project (28.9%) was challenging. They need to find proper and valid information to supply their final project by themselves since the lecturer gave few theories or material. Some students mentioned, "Finding additional material for our project was because the lecturer did not spoil us with many theories. We should find them by ourselves" [Student 11]. "The lecturer did not give us more theories that we need to find more" [Student 12]. Moreover, two students stated

that finding and choosing valid and trusted information on the internet was challenging. As they stated, "It was challenging to find valid and trusted sources" [Student 13]. "There's so much information on the internet that I should filter" [Student 14].

This challenge is actually one of the essential features in project-based learning that encourages students to do lots of activities, including researching and finding relevant sources from across disciplines for their project (Baghoussi & El Ouchdi, 2019; Hanney & Savin-Baden, 2013; Otake *et al.*, 2009; Yuliansyah & Ayu, 2021). It is good when the students encounter those activities and some of them found it as a challenge. Thus, the students are expected to overcome the challenge that made them unconsciously increase their critical thinking and problem-solving skills and promote their autonomous learning. In other words, this challenge is a good challenge for the students since it is a part of the process of achieving the goal of project-based learning.

Fourth, one student found less intensive consultation with the lecturer (2.2%) as a challenge to finish her project. "I did not have any intensive time to discuss the project with the lecturer. I only can talk about it during class with limited time. I think it would be better if we can consult more with the lecturer" [Student 14]

This challenge has yet to be discussed in other studies. Although this challenge was only mentioned by one student, it could be worth consideration. Additional consultation with the lecturer might help the students to finish their projects better. They also might have their project published in a journal with the lecturer's guidance. However, because the class was held online, and the students were exchange students from different cities, a deep consultation with the lecturer might be difficult to occur.

Fifth, a student mentioned that finding an interesting topic (2.2%) for the final project was difficult. It was quite difficult to choose an interesting and suitable topic for the project" [Student 15]. Since only one student mentioned it as a challenge, others might find it relatively easy. The students worked in groups to find and choose the topic of their project, which made the tasks should be easy as they worked in a team. It was proved because each group could finish and did not complain about choosing a topic. However, the lecturer could still give some examples of the topic as references. Moreover, this challenge is still related to the previous one, finding additional material, which requires critical thinking skills. They should think critically to choose an interesting and relevant topic for their project.

Last, three students mentioned the project deadline (6.6%) as a challenge. They stated that the time of finishing the project was brief and the deadline time needed to be longer. However, considering the class time, it should be enough for the students to finish the project in one semester. The deadline issue might happen if the students did not collaborate well on a project plan.

The benefits and challenges of online project-based learning according to the lecturer. This study also investigated the benefits and challenges of online project-based learning based on the lecturer's perceptions. The lecturer mentioned three benefits of online project-based learning: students can understand the connection between the theories and real-world problems; students become more active in the class; and improving students' soft skills (communicating, problem-solving, critical thinking, analyzing, creativity). On the other hand, the lecturer also found that the project-based learning class was quite challenging because it was held online. She mentioned, "The challenge for implementing this method was the online learning situation itself. We had our limits. The distance, the time, the internet

connection, and the technical problems. Maybe it would be more effective if the method occurred in an offline class. The discussions or the presentation might be more alive" [The Lecturer].

The lecturer mentioned three benefits that were also mentioned by the students. It means that the students and the lecturer share similar benefits of project-based learning in online classes. On the other hand, the lecturer opined that the online learning environment is a challenge to implementing this method. The online learning environment (26.7%) was also a challenge the students faced in the online project-based learning class. However, despite some drawbacks of online learning, the method itself was running well as the students mentioned more benefits than challenges. The problem in online learning seems inevitable, but it can be overcome by being well-prepared before the class. Indeed, students and lecturers should consider these aspects in the online learning (Ananga & Biney, 2021; Hadiyanto, Failasofah, Armiwati, Abrar, & Thabran, 2021): facilitation for online learning, supported technology for effective class activities, having skills of operating online learning application, and the lecturer's attention of the student's readiness and problems in online learnins.

CONCLUSION

Similar to other related studies, this study found several benefits of project-based learning in an online class. The benefits found in this study are mostly found in related studies about project-based learning. It is proven that project-based learning is beneficial, although it occurs in an online learning environment. On the other hand, this study also found some challenges in using online project-based learning. The findings showed that the challenges stemmed from the drawback of online learning: distance limitations, and technical problems. The limitation of online learning made students have some problems in group work. Several students complained about their peers who did not cooperate or socialize and even did not do their group tasks.

For this reason, this study suggested that lecturers or instructors who intend to apply this model consider different kinds of assessments, including peer assessment. An assessment form or a rubric score for students' engagement is also needed. In addition, the lecturer could ask each student to make a report about their contribution to their group project. Moreover, if possible, the lecturer could give an additional consultation session for each group outside the class via WhatsApp group, Zoom, or Google Meet at least once. All of the suggestion aims to ensure that the project will be properly done and every student do their assignment for the final group project. In conclusion, the study has proven that project-based learning can work well in the online class and bring many benefits to the students and the lecturer. However, some challenges in the learning process still need to be considered especially by the lecturer as the facilitator.

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