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Student's View to the Use of Collaborative Application for Project-based Learning

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ABSTRACT
Teaching and learning by online meetings in the pandemic era are challenging. Some students argued that online meeting learning is boring because they felt exhaustive when involved in such a learning approach. On the Other hand, some lectures opined that examination in online learning is not fulfilled their satisfaction compared to the conventional test, that is, in classroom assessment. However, there is research that project-based learning is promising to be used as the best alternative for assessing students' performance for some applied courses. Project-based learning encourages the student to be active in learning processes. For example, they could find material for the project references and promote collaborative works. However, to provide maximum monitoring of coordinated task completion, many applications could be used for these purposes. Hence, we surveyed to measure the student opinion on using collaborative applications for project coordination in project-based learning. Students were asked to try several collaborative applications such as Basecamp, Trello, and Asana for their project, and then they should respond to the questionnaires. The survey invited 80 students from two classes with different subjects, i.e., a network application development course and research methodology. The result gave evidence that such application is sufficient to support the student for completion of project-based learning.

Keywords: *Students' View, Collaborative Application, Project-Based Learning, Assessment.*

1. INTRODUCTION

Maintaining student motivation in the teaching and learning process is challenging for teachers. It is well known that In traditional teaching-learning, the educator exposes the learning subject by explaining the topic and relevant theory followed by a demonstration that applies the concept to solve particular issues [1]. The cycle is usually completed by assessing the students' ability to undertake similar questions in their exams. In a pandemic, such traditional teaching-learning is not suitable due to difficulties measuring student performance, especially for a course that students should provide a product. However, there is some research that the project-based approach is promising for encouraging the student to be actively engaged in learning [2].

Project-based learning (PBL) is a learning model that uses projects as the core of learning. This learning model is an innovative learning model that involves project work. Students can work independently to build learning and accumulate it into real products [3]. According to the Buck Institute for Education, the PBL model is a systematic teaching method that involves students learning knowledge and skills through a structured process, objective and thorough experience designed to produce products [4]. Project-based methodology reinforces students' natural desire to learn, which all too often is limited at school because of the difficulty of relating that desire to the requirements of the curriculum; puts forward knowing based on issues or needs formulated by the students themselves; helps to integrate knowledge practically and produces relevant and meaningful learning [5].

This paper aims to measure the students' view of using the project management application as a collaborative platform to complete project-based learning. The survey involved two classes of students. The study revealed that using such applications in a project-based course encourages students to finish the project. Hence, they can complete the courses successfully.

2. LITERATURE REVIEW

2.1. Application of Project Management

Project management software is an application of coordination tools. By definition, project management software is a standard set of automated tools and techniques used in project management (PM) for project planning, execution, management, and closure and collecting, aggregating, and distributing project information [6]. The purpose of project management software is to consider how technology platforms can facilitate projects in virtual teamwork to overcome geographic constraints [7]. The main functions of project management software are planning and controlling projects, generating reports, facilitating collaboration, enabling easy information gathering and sharing. These functions focus on two application areas: supporting the role of individual project managers in the project planning/organizing process and teams supporting team communication and collaboration [8]. The benefit of web-based project management software – platforms is that they can be accessed from any type of computer without installing software.

Project management software features are divided into four main functional categories: communication, knowledge sharing, electronic calendar, and project management. The ideal requirements for project management software are free, easy to use, steep learning curve, support real-time collaboration, support for project management [9]. The project management software platform uses a client-server architecture where all data related to collaboration is stored on the server. The advantage of the client-server architecture is that the data is considered more secure because the data stored in the server storage is maintained. Project management applications include collaborative applications with various features and functions. Collaboration procedures involve sharing knowledge and information, organizing activities, developing understanding, and socialization and influence [9]. The success of using project management software depends on the quality of the data, usability, and functionality of the software [6]. Managing relationships is very important and needs to be considered in using project management software [10].

2.2. Project-based Learning (PBL)

PBL is a constructivist pedagogy that intends to bring about immersive learning by enabling learners to use an inquiry-based approach to engage with problems and questions that are rich, real, and relevant to the topic being studied [11]. PBL is rooted in constructivist learning and discovery-based methods, which rely on the inquiry process and students' ability to design solutions based on their individuality. In project-based learning, students are the center of learning who learn actively to improve their competence [12].

PBL model is a learning model that emphasizes students to understand concepts, principles, investigations, decisions, and represent products. This model is an appropriate learning method used in various disciplines because it can improve thinking skills [13].

PBL model was developed based on the level of development of students' thinking on student learning activities stopover according to their skills, comfort, and learning interests. This model provides opportunities for students to determine their projects to be carried out in compiling questions to be answered, choosing topics to be researched, and determining research activities to be carried out. The teacher's role in learning is to act as a facilitator, provide material and work experience, encourage students to discuss and solve problems, and ensure students remain enthusiastic during the project [14].

There are two dimensions of PBL. The first dimension of PBL is applied when technology is used to help complete a given task. Some examples of activities in this category are using technology either for production or presentation. The second dimension, slightly different from the first dimension, is applied when the technology itself is part of the content of learning materials, such as technology-based subjects, including programming and networking. As 21st-century learning leverages the speed of technology and its application in teaching and learning, the third dimension is often referred to as technology in teaching and learning to facilitate education for teachers and students [15].

3. METHOD

3.1. Research Questions and Significance

The survey conducted in this study assesses the students' perspective of using the collaborative application in learning that applying project-based approach. Hence, it is necessary to measure the participants' views by two research questions.

What is the participants' knowledge of established collaborative applications in the market, and what purposes do they use them? The research questions are intended to gauge the participants' knowledge and experience of using the collaborative application.

How do they opine that such application could be used for coordination of project for completing the project-based application? The research question is to quantify the participants' consideration in using the

application for communication and coordination when doing the project in project-based courses.

3.2. Participants

The survey involved 80 participants consisting of two groups of students. The first group is the student who took the course on application network technology. The class encouraged students to pull together on web development. The second group is the student taking the class of research methodology promoted students to collaborate in article writing. The survey was conducted online via Google Form due to the pandemic situation. However, although the questionnaire is distributed online, its process can be completed within one week. In addition, due to incomplete answers, one of the participant's responses was rejected. Overall, 79 completed responses were collected.

3.3. Material

The survey provided a set of questionnaires. It consisted of close-ended questions with a Likert scale and simple open-ended questions to measure the data group.

• Demographic data

The questions for demographic data were to gather the information participants, including age, gender, computer and cell phone ownership, and the use of these devices. These data were necessary as primary participants' information to match the research participants' criteria.

• The behavior of using internet dan related devices

This question was compulsory to measure the participants' behavior according to using technology and devices. The questions were a concern to know the most use of smartphones weekly, the purpose of using the devices to support their daily life and spending a quota of the Internet in a week. Participants were asked to give opinions about the problem of using the Internet for learning from home (LFH) during the pandemic. Participants were also asked to respond to the questions concerning the use of devices on a five-point scale from “the least significant reason” to “the most significant reason.

Table 1. Internet Quota Spent for a Month.

Internet Quota	Male	Female	Percentage
10-20 GB	20	7	34.18%
20-30 GB	13	10	29.11%
> 30 GB	18	18	45.57%

• Student knowledge of using the collaborative application

This question was to know the participants' knowledge about the application in the market categorized as collaborative application. The questionnaire consisted of

• Students view the use of the collaborative application in for learning

This set of simple open-ended questions was to collect participants' opinions if they could use collaborative applications for learning. They asked to give an outlook on whether the collaborative application can be used in project-based learning or not, the opinion of the kind of collaborative application appropriated to be used as a learning approach, and the view of the application features that can be utilized for learning purposes.

3.4. Procedure

Participants from two classes of courses gathered a different time. The first class was asked to fill the survey online with mandatory instruction. It means that participants should fill the questionnaire as evidence of their presence in the meeting. So that all lecture participants fill out the survey without being missed. In contrast, the second class requested to fill the survey form without any mandatory instruction. Hence about 90% of participants responded to the questions. However, each participant was asked to install a collaborative project application such as Asana, Trello, or Basecamp to introduce the collaborative application.

4. FINDINGS AND DISCUSSION

4.1 Demographic Data

The first question was regarding the demographic data. The data shows that gender statistic participants were 62% males and 38% females. The range of participants' age was between 20 and 22 years old, with a mean of 21.13 years and a standard deviation of 0.88.

Table 2. Most application used daily.

SNS Use	Male		Female		Man-Whitney U Test	
	Md	SD	Md	SD	Z	p
WhatsApp	9.00	1.51	9.00	1.92	0.76	0.23
Telegram	6.00	2.58	6.00	2.72	1.19	0.12
Line	5.00	2.98	6.00	3.15	0.69	0.25
Facebook	5.00	2.87	4.00	2.35	3.74	0.00
Other application	5.00	3.18	5.00	3.16	0.21	0.42

4.2 The behavior of using internet dan related devices

Table 3. Application for learning amid pandemic.

The way of learning from home (LFH)	Male		Female		Man-Whitney U Test	
	Md	SD	Md	SD	Z	p
Messaging	8.00	1.86	8.00	1.65	1.11	0.13
Web-based	8.00	1.59	8.00	1.52	1.06	0.15
Video	8.00	2.09	8.00	2.05	1.08	0.14
Other application	6.00	2.83	6.00	2.86	0.27	0.39

Table 4. Participants' knowledge of collaborative application.

Knowledge of collaborative application	Male		Female		Man-Whitney U Test	
	Md	SD	Md	SD	Z	p
Slack	4.00	0.72	5.00	0.69	1.06	0.14
Basecamp	4.00	0.82	4.50	0.81	1.07	0.14
Trello	4.00	0.77	5.00	0.69	1.86	0.03
Others	4.00	0.93	4.00	0.84	0.55	0.29

The participants' response to the internet quota spent for a month can be seen in Table 1. About 34.18% of participants (M=20, F=7) spent 10-20 GB per month, and 29.11 % (M=13, F=10) spent 20-30 GB, and 45.57% of participants (M=18, F=18) spent the internet quota more than 30 GB. Regarding the use of smartphones for daily life, Table 2 shows the collected data of the frequently used application. WhatsApp was the most popular application for daily life, and there is no difference between males and females (Z = 0.76, p=0,23). It was followed by Telegram (Z=1,19, p=0.12). However, even though Facebook, as the mature SNS and popular application in Indonesia, was not so popular among participants, it can be analysed that most participants were not so intense to use this app even though. The finding reveals that for the current trends, applications for texting such as WhatsApp, Telegram, and Line are more popular in daily life than other social media like Facebook, Twitter, or Instagram.

4.3 Student view of using a collaborative application

Regarding the students' view of using a collaborative application in learning, Table 3 shows the result of the preliminary questionnaire to measure learning from home (LFH). Messaging was the popular platform for learning among participants. There was no significant difference between males and females (Z=1.11, p=0.13). It is followed by web-based applications such as Learning Management System (LMS). There also were no significant differences between males and females (Z=1.06, p=0.15). Video platform including the video posted on YouTube is the next platform for learning in pandemic situations chosen by teacher and student. It was

also not so different between males and females to use such a platform (Z=1.08, SD=0.14). However, there were other ways to establish learning in the LFH approach, such as Google Classroom, Edmodo, and Twitter (z=0.27, SD 0.39).

Table 5. Reason of using collaborative application for learning.

Participants view of using the collaborative application for learning	Male	Female		Man-Whitney U Test	
	Md	SD	Md	SD	Z	p
Easy to learn together	1.00	2.54	3.00	3.05	2.35	0.01
Easy to ask more	1.00	2.29	3.00	2.97	2.60	0.00
Easy to communicate with all participants	1.00	2.72	3.00	3.00	2.15	0.02
Learning while playing (fun learning)	1.00	3.00	5.00	3.32	2.74	0.00
Others	4.00	1.52	4.00	1.17	1.80	0.04

4.4 Knowledge of collaborative application

Regarding the student knowledge of the collaborative platform, Table 4 shows the result. Slack sat in first ranking without differences between males and females Z=1.07, SD=0.14), followed by Basecamp (Z=1.07, p=0.14). However, there was a significant difference between males and females to rate Trello as the popular collaborative application (Z=1.86, p=0.03). There were various alternative collaborative applications known by the participants, for example, Asana. For the questionnaire on the potency of collaborative application in learning, most participants agreed that such a collaborative application is suitable for the learning approach. As shown in Table 5, they argued that the collaborative application would facilitate students to engage in learning because it is easy to learn together. There is a difference between males' and females' opinions (Z=2.35, p=0.01). It is followed by the feature of easy to ask more (Z=2.60, SD=0.0), easy to communicate with all participants (Z=2.15, p=0.02), and learning while playing (Z=2.74, 0.00).

4.5 Discussion

PBL is a promising approach amid pandemic, especially for an applied course that students requested to produce the actual outcome, such as a course of software development. The PBL encourages the student to collaboratively working to achieve the learning goals. Hence, examining the participants' view of a collaborative application for learning such courses is necessary. Study findings reveal that most of the courses held amid pandemics still use the traditional approach, although there were some technology adoptions. For example, they used messaging applications to deliver the course material and measure student learning progress. However, using the collaborative application is promising for some courses that promoted students to do the project in a group. The study showed that most of the participants agreed that using the collaborative application in these courses would have some benefits. For instance, students can learn together with ease, can ask more from others when facing some problems, and can have the feature enjoyment of learning approach. As shown in Table 5, they argued that the collaborative application would facilitate students to engage in learning because it is easy to learn together. There is a difference between males' and females' opinions (Z=2.35, p=0.01). It is followed by the feature of easy to ask more (Z=2.60, SD=0.0), easy to communicate with all participants (Z=2.15, p=0.02), and learning while playing (Z=2.74, 0.00).

5. CONCLUSION

Project management application, for example, Basecamp, Trello, Asana, and Slack are the collaborative application that have potency to be used for learning, especially in PBL approach. The research findings revealed that the student who took PBL course agreed that such application was suitable for supporting them to complete the outcome of the course. Hence, these applications should be utilized in project-based courses.

To extend the study of using project management application in project-based courses, we plan to develop similar application integrated with the LMS. This system will also utilize code repository application such as GitLab for maintaining student project in software development.

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