Application of Project Based Learning Methods in Distance Learning During the Pandemic

Soeryanto, State University of Surabaya, Indonesia
Rachmad Syarifudin Hidayatullah, State University of Surabaya, Indonesia
Suparji, State University of Surabaya, Indonesia
I Wayan Susila, State University of Surabaya, Indonesia
Bambang Suprianto, State University of Surabaya, Indonesia
I Gusti Putu Asto Buditjahjanto, State University of Surabaya, Indonesia

The Southeast Asian Conference on Education 2023
Official Conference Proceedings

Abstract
To prevent the spread of Covid-19 in the university world, one of the methods is online learning, which is carried out using a smartphone or laptop. However, in online learning, lecturers must be innovative so that learning objectives are achieved, obstacles in online learning include internet signal disturbances, sleepiness, boredom, and health problems such as the senses of sight and hearing. To reduce these effects, researchers apply project-based learning models to learning models. on line. In its application, researchers use syntax, namely a) Determining issues, b) Communicating, c) Mentoring and discussion d) Dissemination. The purpose of this study is to analyze the application of the Project Based Learning model to online learning in the Mechanical Engineering Department. The results showed that 22 (69%) students were very competent in measuring workpieces using calipers and micrometers, 10 (31%) students were competent in measuring workpieces using measuring instruments and calipers, and of the 32 students all had criteria according to learning objectives. In addition, the positive impact of this learning model a) Makes students study independently, b) Eliminates boredom, c) Reduces sleepiness, d) Reduces eye and ear pain due to too long listening to smartphones and laptops e) Reducing the cost of consuming the internet, to carry out learning online using Project-based learning must be supported by learning facilities and student learning motivation.

Keywords: Project Based Learning, Online, Pandemic, Learning Outcomes, Motivation

Introduction

In 2019 the Covid 19 pandemic spread throughout the world and changed patterns of socializing, studying, and working (Velavan & Meyer, 2020). Almost all life support sectors were affected, such as socio-cultural, economic, and education (Orfan & Elmyar, 2020). Covid 19 first spread in the city of Wuhan, China, this virus infects the human respiratory system, the characteristics of infected people start from fever, dizziness, vomiting, and pain all over the body, dry cough, and after a few days usually shortness of breath resulting in reduced oxygen stupor and can eventually lead to death (Li et al., 2020). The Covid-19 virus is very contagious, this virus can be transmitted through liquids, physical contact, and air if you are in a closed room.

As a result of the COVID-19 Pandemic, it is recommended that a health protocol be issued by WHO to limit people gathering in large numbers so that learning activities are carried out using distance education or in Indonesia, it is called Distance Learning (PJJ)/online method. PJJ learning is learning where students and lecturers cannot meet face-to-face in one actual room. The pandemic in 2019 resulted in global education switching to online education (Al Lily et al., 2020), in a pandemic condition it is necessary to have a different approach to learning activities (Sujarwo et al., 2022), a sudden transition from offline learning on campus or school to online learning has brought a significantly increased workload for lecturers, students, and education stakeholders because they work not only to stream content and teaching materials into online areas but also have to be proficient enough to run the required software programs (Allen et al., 2020). In this activity, lecturers and students meet face to face in a virtual space using internet devices and social media, such as WhatsApp groups (WAG), media meetings such as zoom, meet, google class, etc. This activity is also called online learning (Herliandry et al., 2020).

Compliance problems in online implementation can be seen in human resources, infrastructure availability, and implementation techniques to gain knowledge. According to Sanjaya, learning facilities are everything that supports an easy learning system. Meanwhile, according to Daryanto, infrastructure can be interpreted as something that is not directly used to achieve goals in education, for example, areas or places, college buildings, sports fields, cash, and so on (Daryanto, 2011). Online learning is inseparable from the use of technology. Technological facilities that assist the implementation of online learning are the use of educational control information systems.

Changes in the implementation of learning from real face-to-face learning to virtual face-to-face learning or online learning certainly have an impact on learning outcomes. students, lecturer, and student psychology, learning approach methods (Handarini, 2020; Renfrew et al., 2021). In online learning, learning facilities such as specifications for smartphones, laptops, and internet networks greatly affect the learning process, because some smartphones and laptops do not support the software used in learning. The ability of lecturers and students to use IT (Information) devices also plays an important role in online learning activities, because almost all learning activities are carried out using IT devices including delivering material by lecturers and assignments and exams that must be carried out by students.

Considering that facilities and infrastructure are the elements that influence the success of a teaching and learning system, the need for and use of learning facilities must be in accordance with the learning objectives. Online learning is inseparable from elements that support the learning process. Every element of higher education, including lecturers,

technicians, and students, experiences unexpected adjustments that must adapt to the latest conditions, so the readiness of the facilities and infrastructure used needs to be considered with the aim of supporting the learning process.

The condition of the learning environment also greatly influences online learning, online learning allows lecturers and students to carry out activities anywhere and anytime as long as there is support for learning facilities, and as long as these lecturers and students are in their respective homes. Besides that, motivational learning activities greatly affect learning objectives, many researchers have conducted research on the influence of motivation in the world of educational psychology by conducting lecturers and students, motivation is part of the psychology of lecturers and students, and many factors influence the psychology of lecturers and students in online learning One of them is the boredom experienced by students while participating in learning.

Learning motivation is any effort from within that recognizes learning activities and establishes certain continuity and offers a way for learning activities to achieve the desired goals. Success motivation is a person's effort and belief to identify learning goals with certain success requirements and have the ability to overcome all obstacles that limit goal marketing. In addition, the definition of success motivation can also be expressed as motivation intended to pursue achievement, namely to expand or reveal potential (Purwanto, 2014).

In fact, students feel bored when they have to listen to the teacher explaining material during online learning, sometimes students turn off the video and do other activities besides listening to the lecturer's explanation, such as washing, sleeping, traveling, helping parents, doing other course assignments, and other activities. other. So that students don't get bored, lecturers need to innovate learning approaches, innovative learning media.

One of the innovations carried out is to develop a Project Based Learning learning model, a Project Based Learning learning model is a mastery method that gives freedom to students to plan learning activities, carry out tasks privately or collaboratively, and ultimately produce work products that can be known by others (Mahendra, 2017). Currently, the government recommends universities through IKU (university performance indicators) to implement Project-Based Learning and Problem-Based Learning (Nizam, 2021). Problem Based Learning or Problem Based Learning can grow students' thinking to be more active, inspiring, and innovative (Barak & Yuan, 2021). The Project Based Learning model is an approach that provides benefits for increasing student achievement in tertiary institutions (Guo et al., 2020), besides that Project Based Learning can foster a collaborative nature, develop individual knowledge among students and improve higher-order thinking skills, and abilities for collaboration (Abu Hussain et al., 2014), (Pan et al., 2021), apart from that Project Based Learning also trains students to hone students' collaboration (collaboration) skills in project work, (Chounta et al., 2017) Project Based Learning as learning that uses the Project as a medium in the learning process to achieve attitude, knowledge and skill competencies. The emphasis on learning lies in student activities that produce products with the skills to learn, analyze, create, to present learning products based on real experiences. The product in question is the result of a project in the form of goods or services in the form of designs, schemes, writings, works of art, works of technology/crafts, and others. Through the implementation of Project-Based Learning, students will practice planning, carrying out activities according to plan, and displaying or reporting the results of activities (Logan et al., 2021).

Project-based learning (PjBL) is a form of active student-focused teaching characterized by student autonomy, constructive inquiry, goal setting, collaboration, verbal exchange, and reflection on real-world practice. it has been explored in different contexts and unique stages of higher education, from elementary school to higher education (Kokotsaki et al., 2016) PjBL has learning features that emphasize how students are able to develop critical thinking skills. This allows them to be creative individuals and able to work collaboratively.

Syntax Project-Based Learning (Mulyasa, 2014), 1). Prepare project questions or assignments, 2), Devise a project plan, 3). produce a schedule as a concrete step of a project, 4). Monitoring project activities and progress, meanwhile (Soleh, 2021) Project-Based Learning Syntax, namely 1) Fundamental questions, 2) Design a product plan, 3) Arrange production schedule, 4) Monitor project activities and progress, 5) Test the results, and 6) Evaluation of learning experiences.

While the syntax that we developed for the project-based learning model is 1) Defining issues, 2) Communicating 3) Mentoring and discussion, and 4) dissemination. In Class measuring tools are carried out online with the Project Based Learning model. Before carrying out Project Based Learning the lecturer gives pretest questions to students, with the aim of knowing the initial competence of students before attending lectures, at the end of learning the lecturer gives posttest questions. Project Based Learning is applied to measuring tools for knowledge courses on the topic of measuring workpieces using calipers and micrometers, material tracking was carried out 6 times face to face.

Products from Project Based Learning are videos on the use of calipers and micrometers which are collected on Google Drive. From the description above, researchers will conduct research on the effectiveness of bold learning using the Project Based Learning model using a 4-step syntax. The purpose of this study was to obtain information about the effectiveness of applying the Project Based Learning model with the dare learning method in the measuring instrument knowledge course in the Mechanical Engineering Department.

Methods

Research Design

The design of this research is a type of descriptive qualitative research, qualitative research is a type of research that explores and realizes the meaning of several individuals or groups of them originating from social problems (Creswell, 2016). Qualitative description or (descriptive study) is research that seeks to explore or clarify a symptom, phenomenon, or social reality that is currently happening, this research seeks to explain a number of variables associated with the problem and unit studied, this research additionally aims to find expertise in broad to the object of research in a certain period (Samsu, 2017). In this study the use of project-based learning methods was applied to the knowledge measuring instrument course, distance learning was used in this activity due to the Covid-19 pandemic. In distance learning, Google Meet was used to carry out learning, between lecturers and students in their own homes.

Sample and Population

Qualitative research no longer uses the term population but uses the term social situation, especially social situation, social situation has 3 components, namely: location, people, and

activities of three factors that interact synergistically. In this study, the object of research is online learning activities using the Project Based Learning model in the 2021 A measuring instrument knowledge class which is held every Tuesday from 10.20 WIB to 11.40 WIB.

In this type of qualitative research, purposive sampling and snowball sampling are often used. Purposive sampling is a technique for selecting a sample of data sources using certain considerations, purposive sampling will make it easier for researchers to explore the social object/situation being studied, while snowball sampling is a sampling technique that starts with a small number of samples. becomes more because the data obtained is deemed unsatisfactory (Sugiyono, 2010). In this study, the sample chosen was class A 2021 who took lectures on measuring instrument knowledge. Data collection techniques in Project Based Learning research use tests (pretest and posttest), observation, and interviews. The research instruments used were test sheets, observations, interview scripts, laptops, and internet networks.

Analysys Data Techinques

The method approach of knowing the validity of the data requires technical checking. The implementation of inspection techniques is based on certain standards. The process technique builds the validity of the data required by the inspection technique. Implementation of inspection techniques on a number of certain criteria. There are four criteria used, namely the degree of trust (credibility), dependability, certainty (confirmability), and transferability (Prof. DR. Lexy J. Moleong, 2018).

This research is a qualitative research, data analysis techniques are applied using qualitative data analysis which includes process and meaning. In addition, this study also uses descriptive analysis techniques that function to describe research data. the process of data analysis was carried out during and after data collection. The data analysis process adopted and developed an interactive pattern developed by Milles and Hiberman (Sugiyono, 2009), namely: data reduction, data presentation, conclusion drawing.

Result and Discussion

Phase	Lecturer's activity	Students' Activity
Determine Issue	1. The lecturer determines the issues that will be made into topics for students to work on. The lecturer determines the project to be worked on by students, the determination of the project is referred to from the learning objectives 2. The lecturer determines the purpose of selecting issues. Here the lecturer determines the purpose of selecting projects to be worked on by students, the project to be worked on by students is to make a video recording of workpiece measurements using calipers and micrometers, videos made by students must be clear and good and able to display process activity measurement that is easily understood by the reviewer	

Communication	1. The lecturer socializes the issues and objectives of selecting these issues to students. After the lecturer determines the issue, the lecturer socializes the project that students will work on through a meeting using the Google Meet application. 2. The lecturer explains the project targets to be achieved. The lecturer explains the target that will be achieved if students do this assignment well according to the soup set by the lecturer. 3. Together with the teacher students discuss the project schedule. When the lecturer meets with students in the meeting room the lecturer discusses how long it will take students to complete the project that has been determined by the lecturer. 4. The lecturer explains the project implementation rules (report rules, etc.) The lecturer explains the procedure for implementing reports and assessments of the projects that will be carried out by students.	1. Students ask questions about issues that have been determined by the lecturer. 2. Students ask about the schedule and targets to be achieved 3. Students ask about reporting mechanisms and report formats
Mentoring and Discussion	1. Lecturers provide guidance to students, and groups and conduct small and brief discussions regarding the findings of difficulties experienced by students, monitoring and discussion activities are carried out in WhatsApp groups and in online rooms using Google Meet.	1. Students carry out project work 2. Students Compile reports 3. Students consult the lecturer
Determination	1. The lecturer assesses the products that have been done. 2. The lecturer assesses the student's denomination.	1. Students report the final project results that have been carried out by uploading the project results on the link provided 2. Students report project work activities through presentations

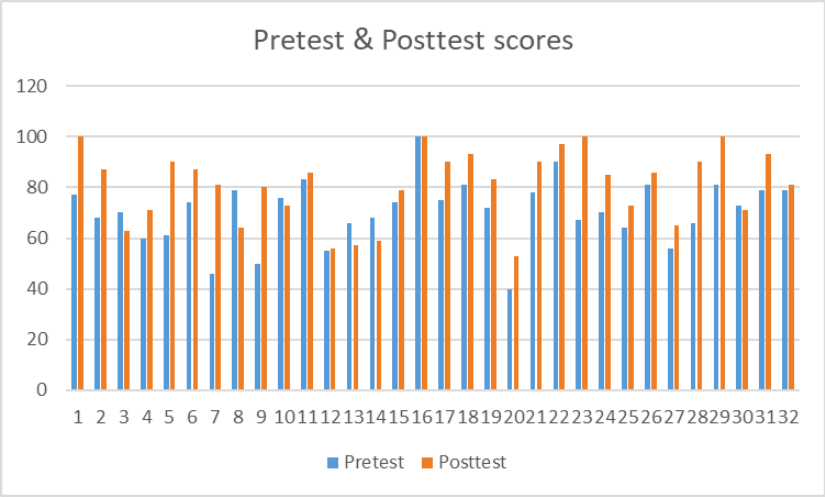

Figure 1: Pre-Test and Post-Test Graph

The graph above shows the number of students who took the pre-test and post-test exams, namely 32 students. From the table above, we can see that students with codes 3, 8, 10, 13, 14, and 30 experienced a decrease in the value of the post-test results, a decrease in value for code 3 from 70 to 63, code 8 from 79 to 64, code 10 from 76 to 73, code 13 from 66 to 57, code 14 from 68 to 59, code 30 from 73 to 71 if the percentage of the average post-test score is 6 students is 11%, while apart from the 6 students, 26 other students experienced an increase in grades after completing the post-test scores, the average increase in grades in percentage terms was 17 percent. After conducting in-depth interviews with 6 students who experienced a decrease in grades, they experienced problems while carrying out the post-test, the obstacles they experienced were internet signal disturbances and a less conducive environment. From these two disorders, students are less focused and less concentrated.

Since the pandemic started, many human activities have been shifted online (Donthu & Gustafsson, 2020). Some research shows that students may perform differently in various modalities, and some may even perform better in an online learning environment (Cole et al., 2017), students value active learning strategies more in an online learning environment, students generally have a good perception of online learning even though they have reservations around technology proficiency (Koohang et al., 2016), the challenges identified widely with e-learning are accessibility, affordability, flexibility, learning pedagogy and Education policy (Pokhrel & Chhetri, 2021) online learning at basically is the use of technology for information dissemination (Tajik, Farnaz; Vahedi, 2021), online exams can reduce the potential for cheating (Moralista & F. Oducado, 2020). Despite the fact that many studies find students have positive attitudes towards online learning (Muflih et al., 2021), students feel comfortable taking good exams online and face-to-face mode, that online exams are stress-free and feel comfortable at home (Alghamdi & Ali, 2021).

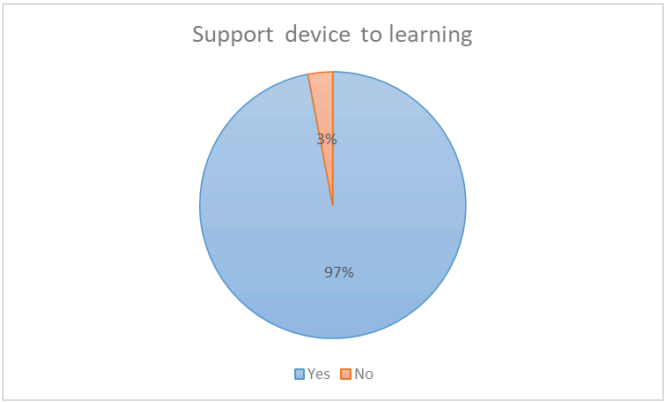

Figure 2: Number of Students Who Have Device to Support Learning

The pie chart above shows that out of 32 students 97% of students have support devices that support online lectures while 3% of students do not have support devices that support them. The definition of having support devices in this study is that students have smartphones and laptops that have specifications: 1) can support online meetings, 2) support for downloading office data quickly, 3) support for making videos quickly, 4) support for editing videos quickly, 5) support for opening, uploading Google Drive data quickly, 6) being able to access Google form and work on google form questions quickly. From the data 3% of students who filled out the observation sheet did not support after in-depth interviews, on average they defined their device doesn't support as their device could not operate quickly for the 6 categories as above, but we can confirm that out of 32 students have smart devices phones, laptops, and internet networks.

Technology in online learning will benefit all parties and support learning objectives and improve the learning process pembelajaran (Haryana et al., 2022; Kustyarini et al., 2020). One of the main challenges faced by tertiary institutions is to ensure the holistic development of students both in terms of achieving generic attributes and developing competencies, namely, creativity, thinking, teamwork, communication and collaboration, and independence. To address this challenge, new technological transformations in education have led to the use of additional instructional tools, such as project-based learning (Alt & Raichel, 2022), With the development of modern technology, it is beneficial to create a smart learning environment so that students can become smart learners by smart space tools and smart pedagogy (Budhrani et al., 2018), mobile devices and technologies help learners expand their learning space and time, objects, and opportunities to enhance their cognition, engagement, and interaction (Hwang & Fu, 2020).

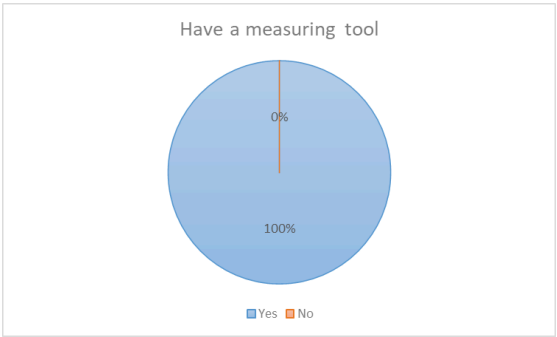

Figure 3: Number of Students Have Measuring Tool

The pie chart above shows that out of 32 students 100% have a caliper and micrometer measuring instruments. A good learning process requires complete tools as media in the process (Fayez et al., 2021). The existence of media as a learning tool for students makes it easier for them to explore so they can understand the material being taught (Kustyarini et al., 2020).

Figure 4: Students Motivation Chart

The pie chart above shows that 97% of the 32 students have the motivation to study, while 3% do not have the motivation to learn slides and micrometers, these students do not have motivation because they don't really want to enter the Mechanical Engineering department, these students go to school only because they are forced by parents.

Mental health problems can significantly interfere with students' academic success and social interactions (Wyatt et al., 2017), thereby affecting their future careers and personal lives. Students who have good mental health can face learning barriers due to environmental factors (Cheng et al., 2023) (Katzman & Stanton, 2020). When students feel they can control their emotions, positive results can encourage increased interest in further learning (Moors et al., 2013). The socially driven intention is a major factor to be considered in an online learning environment (Chaker et al., 2022). Students with good mental health show significantly greater perceived learning outcomes than their peers (Wei et al., 2023). Various researchers warn of the negative impact of COVID-19 on mental health around the world, such as stress; worry; depression, or post-traumatic stress disorder, which may result from long periods of confinement; uncertainty; fear of infection; moral pressure; solitude; grief; and economic crises (Kim & Park, 2021).

Interview Result Data (Depth Interview)

The Depth interview was conducted on Friday, October 15th 2021, at 13:30 WIB using Google Meet media, the number of respondents was 32 respondents with 4 categories, before conducting the Depth interview the researcher asked students for permission to conduct the Depth interview, and convey the purpose of conducting the Depth interview. In this activity, the respondents were 2021 A students in the measuring instrument knowledge course.

The implementation of the dept interview went smoothly, the respondents were asked questions according to the planned script left-hand grid. From the results of interviews with observers, several data findings were obtained, including:

a. Learning with the Project Based Learning Model is effective because it allows students to develop themselves.
b. The application of the Project Based Learning model in online learning is influenced by signals, internet quota, IT mastery skills, and devices owned by students.

c. The negative side of applying the Project Based Learning model is that students have to provide measuring instruments independenutly through purchasing or borrowing.
d. Students feel bored, bored, and hurt their eyes and ears if they stare at the screen of their smartphone or laptop for too long and listen to sounds through their hands-free.
e. The environment around students also determines learning activities.

The Influence of Project Based Learning Learning Model on Online Learning in Measuring Instrument Knowledge Course

Table 1: Studens Score

ID	Post-Test Score	Project Score	Detimination Score	Final Score
student 1	100	94	80	91.33
student 2	87	86	70	81.00
student 3	63	88	79	76.67
student 4	71	80	78	76.33
student 5	90	85	80	85.00
student 6	87	90	90	89.00
student 7	81	88	80	83.00
student 8	64	98	75	79.00
student 9	80	87	80	82.33
student 10	73	80	85	79.33
student 11	86	87	80	84.33
student 12	56	88	75	73.00
student 13	57	78	75	70.00
student 14	59	80	75	71.33
student 15	79	88	80	82.33
student 16	100	100	85	95.00
student 17	90	97	84	90.33
student 18	93	98	76	89.00
student 19	83	90	89	87.33
student 20	53	87	87	75.67
student 21	90	89	80	86.33
student 22	97	88	80	88.33
student 23	100	90	80	90.00
student 24	85	80	86	83.67
student 25	73	85	80	79.33
student 26	86	85	86	85.67
student 27	65	80	80	75.00
student 28	90	86	80	85.33
student 29	100	80	80	86.67
student 30	71	80	76	75.67
student 31	93	80	75	82.67
student 32	81	80	80	80.33
Average	80.72	86.63	80.19	82.51

In the knowledge course, the learning achievement measurement tool that has been determined is that students can measure work objects using calipers and micrometers, the lowest standard value determined is 60, and for students who get scores below 60 (D) the student said to be incompetent, the following are the value criteria for student A: 80-100 (very competent), B; 70-79 (competent), C 60-69 (quite competent), D 50-59 (not competent), from the data above 22 students enter at the very competent level, while 10 students enter at the competency level.

From observational data and in-depth interviews, it was obtained data that the facility factor is very supportive in online learning activities with a project-based learning model, the data obtained by students 97% who take part in this study are supported by devices, and 100% have smartphone and laptop devices, besides that students, 100% of those who attend lectures have vernier caliper and micrometer measuring media. The role of learning media is very important in this lecture. Measuring instrument courses are courses that have credits weighted, in this course even though they are theoretically written, to achieve the learning objectives, namely students can measure workpieces using calipers and micrometers, students apart from mastering theoretical competence students must be able to have practical competence measurement. Therefore, in the Project Based Learning model, the facility factor is very important because, if students have smartphones and laptops, students can attend lectures well, students can attend online meetings, take online exams, make videos, and learn the theory of using sliding calipers. Meanwhile, the facilities for measuring calipers and micrometers are very important because if every student can provide a measuring instrument for calipers and micrometers at their home, students can routinely learn and practice using calipers and micrometers at home until they are very competent in using these measuring instruments.

The use of the project-based learning model in online lectures has positive impacts such as:

- Making students study independently
- Eliminate boredom
- Reducing sleepiness
- Reducing eye pain caused by listening to smartphones and laptops for too long
- Reducing internet consumption costs

In addition to learning media factors, motivational factors are very important for achieving learning objectives in this course, learning motivation comes from within themselves (Mustadi et al., 2022), which seems to be an important factor in determining success. Material and personal needs (input dimension, out of 32 students 3% said they did not have motivation while 97% claimed they had motivation, 3% admitted they did not have motivation because the major they chose did not suit their wishes, they went to college because their parents forced them. However, although he was not motivated that the final score of the student was included in the very competent criteria, this was because before he took this course he had prior knowledge about the use of calipers and micrometers, so this learning did not contribute to his competence. The role of motivation in achieving goals is very important (Furnham et al., 1999) and Tang & Sampson (2017) said that motivation is very important in learning.

Conclusion

The application of the Project Based Learning learning model to online learning is very effective in achieving learning objectives, this is evidenced by 22 (69%) students who are

very competent in measuring workpieces using calipers and micrometers, 10 (31) students have the competence to measure workpieces using tools measuring and caliper, all of 32 students have criteria according to learning objectives. The syntax for the project-based learning model developed is a) Defining issues, b) Communicating, c) Mentoring and discussion d) Dissemination, which has positive impacts such as a) Making students study independently, b) Eliminating boredom, c) Reducing sleepiness, d) Reducing eye pain due to too long listening to smartphones and laptops e) Reducing the cost of consuming the internet, to carry out online learning using Project-based learning with this syntax must be supported by learning facilities and student learning motivation (Mathew et al., 2019).

Acknowledgement

Alhamdulillah, thanks to the presence of Allah SWT, because of the grace of Allah the researcher can finish this article. On this occasion, the researcher would like to thank those who have supported and assisted in the preparation of this research.

References

Abu Hussain, J., Essawi, M., & Tilchin, O. (2014). Accountability for Project-Based Collaborative Learning. *International Journal of Higher Education*, *3*(1). https://doi.org/10.5430/ijhe.v3n1p127

Al Lily, A. E., Ismail, A. F., Abunasser, F. M., & Alhajhoj Alqahtani, R. H. (2020). Distance education as a response to pandemics: Coronavirus and Arab culture. *Technology in Society*, *63*, 101317. https://doi.org/10.1016/j.techsoc.2020.101317

Alghamdi, S., & Ali, M. (2021). Pharmacy Students' Perceptions and Attitudes towards Online Education during COVID-19 Lockdown in Saudi Arabia. *Pharmacy*, *9*(4), 169. https://doi.org/10.3390/pharmacy9040169

Allen, J., Mahamed, F., & Williams, K. (2020). Disparities in Education: E-Learning and COVID-19, Who Matters? *Child & Youth Services*, *41*(3), 208–210. https://doi.org/10.1080/0145935X.2020.1834125

Alt, D., & Raichel, N. (2022). Problem-based learning, self- and peer assessment in higher education: towards advancing lifelong learning skills. *Research Papers in Education*, *37*(3), 370–394. https://doi.org/10.1080/02671522.2020.1849371

Barak, M., & Yuan, S. (2021). A cultural perspective to project-based learning and the cultivation of innovative thinking. *Thinking Skills and Creativity*, *39*, 100766. https://doi.org/10.1016/j.tsc.2020.100766

Budhrani, K., Ji, Y., & Lim, J. H. (2018). Unpacking conceptual elements of smart learning in the Korean scholarly discourse. *Smart Learning Environments*, *5*(1), 23. https://doi.org/10.1186/s40561-018-0069-7

Chaker, R., Bouchet, F., & Bachelet, R. (2022). How do online learning intentions lead to learning outcomes? The mediating effect of the autotelic dimension of flow in a MOOC. *Computers in Human Behavior*, *134*, 107306. https://doi.org/10.1016/j.chb.2022.107306

Cheng, S., Huang, J.-C., & Hebert, W. (2023). Profiles of vocational college students' achievement emotions in online learning environments: Antecedents and outcomes. *Computers in Human Behavior*, *138*, 107452. https://doi.org/10.1016/j.chb.2022.107452

Chounta, I.-A., Manske, S., & Hoppe, H. U. (2017). Correction to: "From Making to Learning": introducing Dev Camps as an educational paradigm for Re-inventing Project-based Learning. *International Journal of Educational Technology in Higher Education*, *14*(1), 41. https://doi.org/10.1186/s41239-017-0079-5

Cole, A. W., Anderson, C., Bunton, T., Cherney, M. R., Cronin Fisher, V., Draeger, Jr., R., Featherston, M., Motel, L., Nicolini, K. M., Peck, B., & Allen, M. (2017). Student Predisposition to Instructor Feedback and Perceptions of Teaching Presence Predict Motivation Toward Online Courses. *Online Learning*, *21*(4). https://doi.org/10.24059/olj.v21i4.966

Creswell, J. W. (2016). *Research Design Pendekatan Kualitatif, Kuantitatif, dan Mixed*. Pustaka Pelajar.

Daryanto, H. M. (2011). *Administrasi Pendidikan*. Rineka Cipta.

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117*, 284–289. https://doi.org/10.1016/j.jbusres.2020.06.008

Fayez, A. N., Ghabban, F. M., & Ameerbakhsh, O. (2021). Advantages and Challenges of Smart Learning in Higher Education Institutions in Saudi Arabia. *Creative Education*, *12*(05), 974–982. https://doi.org/10.4236/ce.2021.125071

Furnham, A., Forde, L., & Ferrari, K. (1999). Personality and work motivation. *Personality and Individual Differences*, *26*(6), 1035–1043. https://doi.org/10.1016/S0191-8869(98)00202-5

Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, *102*, 101586. https://doi.org/10.1016/j.ijer.2020.101586

Handarini, O. (2020). Pembelajaran Daring Sebagai Upaya Study From Home(SFH) Selama Pandemi Covid 19. *Jurnal Pendidikan Administrasi Perkantoran(JPAP)*, *8 Nomor 3.*, 496–503.

Haryana, M. R. A., Warsono, S., Achjari, D., & Nahartyo, E. (2022). Virtual reality learning media with innovative learning materials to enhance individual learning outcomes based on cognitive load theory. *The International Journal of Management Education*, *20*(3), 100657. https://doi.org/10.1016/j.ijme.2022.100657

Herliandry, L. D., Nurhasanah, N., Suban, M. E., & Kuswanto, H. (2020). Pembelajaran Pada Masa Pandemi Covid-19. *JTP - Jurnal Teknologi Pendidikan*, *22*(1), 65–70. https://doi.org/10.21009/jtp.v22i1.15286

Hwang, G. J., & Fu, Q. K. (2020). Advancement and research trends of smart learning environments in the mobile era. *International Journal of Mobile Learning and Organisation*, *14*(1), 114. https://doi.org/10.1504/IJMLO.2020.103911

Katzman, N. F., & Stanton, M. P. (2020). The Integration of Social Emotional Learning and Cultural Education into Online Distance Learning Curricula: Now Imperative during the COVID-19 Pandemic. *Creative Education*, *11*(09), 1561–1571. https://doi.org/10.4236/ce.2020.119114

Kim, S.-H., & Park, S. (2021). Influence of learning flow and distance e-learning satisfaction on learning outcomes and the moderated mediation effect of social-evaluative anxiety in nursing college students during the COVID-19 pandemic: A cross-sectional study. *Nurse Education in Practice*, *56*, 103197. https://doi.org/10.1016/j.nepr.2021.103197

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, *19*(3), 267–277. https://doi.org/10.1177/1365480216659733

Koohang, A., Paliszkiewicz, J., Klein, D., & Horn Nord, J. (2016). The importance of active learning elements in the design of online courses. *Online Journal of Applied Knowledge Management*, *4*(2), 17–28. https://doi.org/10.36965/OJAKM.2016.4(2)17-28

Kustyarini, K., Utami, S., & Koesmijati, E. (2020). THE IMPORTANCE OF INTERACTIVE LEARNING MEDIA IN A NEW CIVILIZATION ERA. *European Journal of Open Education and E-Learning Studies*, *5*(2). https://doi.org/10.46827/ejoe.v5i2.3298

Li, J., Gao, R., Wu, G., Wu, X., Liu, Z., Wang, H., Huang, Y., Pan, Z., Chen, J., & Wu, X. (2020). Clinical characteristics of emergency surgery patients infected with coronavirus disease 2019 (COVID-19) pneumonia in Wuhan, China. *Surgery*, *168*(3), 398–403. https://doi.org/10.1016/j.surg.2020.05.007

Logan, R. M., Johnson, C. E., & Worsham, J. W. (2021). Development of an e-learning module to facilitate student learning and outcomes. *Teaching and Learning in Nursing*, *16*(2), 139–142. https://doi.org/10.1016/j.teln.2020.10.007

Mahendra, I. W. E. (2017). PROJECT BASED LEARNING BERMUATAN ETNOMATEMATIKA DALAM PEMBELAJAR MATEMATIKA. *JPI (Jurnal Pendidikan Indonesia)*, *6*(1). https://doi.org/10.23887/jpi-undiksha.v6i1.9257

Mathew, J., Joy, J., & George, S. C. (2019). Potential applications of nanotechnology in transportation: A review. *Journal of King Saud University - Science*, *31*(4), 586–594. https://doi.org/10.1016/j.jksus.2018.03.015

Moors, A., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal Theories of Emotion: State of the Art and Future Development. *Emotion Review*, *5*(2), 119–124. https://doi.org/10.1177/1754073912468165

Moralista, R. B., & F. Oducado, R. M. (2020). Faculty Perception toward Online Education in a State College in the Philippines during the Coronavirus Disease 19 (COVID-19) Pandemic. *Universal Journal of Educational Research*, *8*(10), 4736–4742. https://doi.org/10.13189/ujer.2020.081044

Muflih, S., Abuhammad, S., Al-Azzam, S., Alzoubi, K. H., Muflih, M., & Karasneh, R. (2021). Online learning for undergraduate health professional education during COVID-19: Jordanian medical students' attitudes and perceptions. *Heliyon*, *7*(9), e08031. https://doi.org/10.1016/j.heliyon.2021.e08031

Mustadi, A., Sayekti, O. M., Rochmah, E. N., Zubaidah, E., Sugiarsih, S., & Schulze, K. M. (2022). Pancalis: Android-based leaning media for early reading in new normal. *Jurnal Cakrawala Pendidikan*, *41*(1). https://doi.org/10.21831/cp.v41i1.45883

Nizam. (2021). *Panduan Indikator Kinerja Utama Perguruan Tinggi Negeri*. Directorat Jendral Pendidikan Tinggi.

Orfan, S. N., & Elmyar, A. H. (2020). PUBLIC KNOWLEDGE, PRACTICES AND ATTITUDES TOWARDS COVID-19 IN AFGHANISTAN. *Public Health of Indonesia*, *6*(4), 104–115. https://doi.org/10.36685/phi.v6i4.356

Pan, G., Shankararaman, V., Koh, K., & Gan, S. (2021). Students' evaluation of teaching in the project-based learning programme: An instrument and a development process. *The International Journal of Management Education*, *19*(2), 100501. https://doi.org/10.1016/j.ijme.2021.100501

Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, *8*(1), 133–141. https://doi.org/10.1177/2347631120983481

Prof. DR. Lexy J. Moleong, M. A. (2018). *Metodologi penelitian kualitatif* (30th ed.). PT Remaja Rosdakarya.

Purwanto. (2014). *Evaluasi Hasil belajar*. Pustaka Belajar.

Renfrew, M. J., Bradshaw, G., Burnett, A., Byrom, A., Entwistle, F., King, K., Olayiwola, W., & Thomas, G. (2021). Sustaining quality education and practice learning in a pandemic and beyond: 'I have never learnt as much in my life, as quickly, ever.' *Midwifery*, *94*, 102915. https://doi.org/10.1016/j.midw.2020.102915

Samsu. (2017). *Metode Penelitian (Teori dan Aplikasi Penelitian Kualitatif, Kuantitatif, Mixed Methods, serta Research & Development)* (Rusmini (ed.); 1st ed.). PUSAKA JAMBI.

Sugiyono. (2010). *Metode Penelitian Kuantitatif, Kualitatif Dan R&D* (11th ed.). Alfabeta.

Sujarwo, S., Kusumawardani, E., & Nurmalasari, Y. (2022). Does the motivation and parents involvement affected by distance learning media during pandemic covid 19? *Jurnal Cakrawala Pendidikan*, *41*(2), 481–493. https://doi.org/10.21831/cp.v41i2.46265

Tajik, Farnaz; Vahedi, M. (2021). Quarantine and Education: An Assessment of Iranian Formal Education during the COVID-19 Outbreak and School Closures. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, *17*(1), 159–175.

Tang, L., & Sampson, H. (2017). Improving training outcomes: the significance of motivation when learning about new shipboard technology. *Journal of Vocational Education & Training*, 1–15. https://doi.org/10.1080/13636820.2017.1392997

Velavan, T. P., & Meyer, C. G. (2020). The COVID-19 epidemic. *Tropical Medicine & International Health*, *25*(3), 278–280. https://doi.org/10.1111/tmi.13383

Wei, X., Saab, N., & Admiraal, W. (2023). Do learners share the same perceived learning outcomes in MOOCs? Identifying the role of motivation, perceived learning support, learning engagement, and self-regulated learning strategies. *The Internet and Higher Education*, *56*, 100880. https://doi.org/10.1016/j.iheduc.2022.100880

Wyatt, T. J., Oswalt, S. B., & Ochoa, Y. (2017). Mental Health and Academic Success of First-Year College Students. *International Journal of Higher Education*, *6*(3), 178. https://doi.org/10.5430/ijhe.v6n3p178

Contact email: rachmadhidayatullah@unesa.ac.id