Project Based Learning: An Integrated Approach to Enhance Student's Competencies in Stock Trading Simulation

Rayna Kartika,1* Annisaa Rahman1

1 *Faculty of Economics, Universitas Andalas*
Corresponding author. Email: raynakartika@eb.unand.ac.id

ABSTRACT

This study aims to describe how project-based learning can enhance students' competencies to learn about stock trading. As students' competencies in finance, especially in portfolio, is one of the expected learning outcomes at the accounting department, Universitas Andalas, students must be able to implement their knowledge and skills in stock trading. Stock trading focuses on short-term planning and mechanism. Before starting to conduct stock trading, students have been equipped with fundamental and technical analysis which is the basic concept of investment. Therefore, this research is aimed to prove and to elaborate on the details on how project-based learning can improve students' insights and knowledge, especially in stock trading. To prove this, project-based learning in stock trading simulation is set up into 3 meetings to discuss the process and the mechanism, and then 2 meetings are used for reporting, evaluating, and giving some feedback and suggestion from the lecturer. By focusing 5 meetings in stock trading or 33% from all meetings, project-based learning will enhance students' knowledge and capacity to implement stock trading in real life.

Keywords: Project-Based Learning, Stock Trading Simulation, Competencies, Portfolio and Investment, Fundamental, Technical Analysis.

1. BACKGROUND

The industrial revolution 5.0 acquires students to have adequate abilities not only in knowledge but also in soft skills, including technology. Rasheed et al. (2020) stated that technology becomes an important factor in doing long-distance learning. Zydney (2020) adds that blended synchronous environments offer benefits to learners in terms of flexibility, but there are technological and pedagogical challenges in implementing this approach.

The key challenges for students are self-regulation and learning technology utilisation, while the key challenge for a teacher is the use of technology for teaching. To equip students with the ability of knowledge and soft skills, students are encouraged to study not only on campus but also by themselves or known as self-paced study. With these methods, students will have adequate knowledge and soft skill when they graduate from campus.

The optimalisation of features in technology and delivery material in online learning occurs between teachers and students. Online design education should be integrated with various educational values and functional features in a systematic manner and requires designing learning evaluation protocol as part of learning activities and communicative forms within online-based learning sites (Park, 2011).

Project-based learning is assumed as a suitable method to assist students' understanding because it has been set up for real conditions. As a simulation of real work conditions, problem-based learning can be achieved by students and teachers in an effective and efficient way by allocating the class meeting and real-work assignment into the learning method. Some expected learning outcomes of the course program emphasize project-based learning in class, which is believed will improve students and teachers' interaction in the class. The course subject Portfolio Theory and Investment Analysis requires students' understanding in learning the concept of accounting and finance; therefore, students' understanding in conducting stock trading account will be valued by 1). Buy, sell and share, 2). Optimise the portfolio.

Portfolio Theory and Investment Analysis is a course subject in the Accounting department at Universitas Andalas. The subject contains the theory and calculation of portfolio's risks and returns; thus, it will make the learning method more complicated since the teacher has to explain the finance concept in theory and the calculation. Stock trading implementation is one of the expected learning outcomes that students must achieve after taking this course subject.

The structure of this paper is as follows. First, the author will describe the literature on the urgency of project-based learning. Then, the author will identify how project-based learning is conducted in the class by dividing students into groups and the teacher will explain the real project which will be conducted by students. The next step is to let students work collaboratively within group to do the real project, which is stock trading. After that, there will be sessions to discuss the results, give feedback, and do some evaluation regarding stock trading simulation.

1.1. Student Grading Systems

Faculty of Economics, Universitas Andalas has used summative and formative assessment for the grading system. Summative and Formative in the grading system should be combined during the teaching and learning process due to several reasons. Teachers cannot only rely on mid-term grades and final-term grades. Teachers should grade the learning process, including the combination of summative and formative, and create a positive and pleasant atmosphere in the class. This learning method has become an alternative solution for students to boost their moods and interests.

In addition, Qu and Zhang (2013) have argued that summative and formative assessments have different forms and different functions. Houston et al. (2017) argued that summative assessment practices were broadly criticised as distanced from the learning process. Recently discussions have refocused on the potential complementary characteristics of formative and summative purposes of the assessment since the assessment was repositioned as a communication process about learning. Through a variety of frequent assessment events, the judgment of student performance is accompanied with rich feedback. To see how the grading system will contribute to the learning process, we can look at the following table:

Table 1. Students Grading System

No	Component	Weight
1.	**Summative Assessment**	

a.	Mid Term Exam	25%
b.	Final Exam	30%
c.	Group Assignments	18%
d.	Discussion Participation	12%
2.	**Formative Assessment**	
a.	Interpersonal skills dimension	5%
b.	Interpersonal soft skills attribute	5%
c.	Attitude	5%
Total		100%

1.2. Grading Distribution

The grading distribution for students in the previous year indicated that students had a good understanding of the subject. 97% of students got good grades greater than B. The composition is 17% of students got the score of A, 29% of students got A-, and 43% and 8% of students got B+ and B, respectively. The chart shows this:
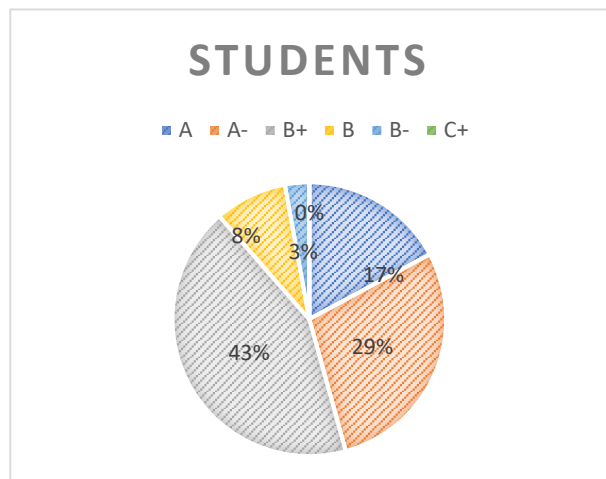

Figure 1. Grading Distribution

This year, when the Covid-19 pandemic occurs, it is hoped that the online learning systems will not decrease students' understanding of the course material. The teacher only needs to handle and find the solution how to boost students' moods so they will study collaboratively in assignments and independently for exams and quizzes. According to Williams and Williams (2011), there are five key ingredients impacting student motivation, namely, students, teachers, content, method/process, and environment. If these five key ingredients are fulfilled and carried out properly with their responsibilities, the harmony of the learning process can be achieved in the online learning class.

1.3. Research Objectives

The objective of this research is to find out the extent of project-based learning in assisting students' competencies in implementing stock trading simulation. In addition, this research also aims to describe the details of the process in project-based learning.

2. OUTCOME TARGETED STRATEGY

Project-based learning is a student-centred instructional approach used to promote active and deep learning by involving students in investigating real-world issues in a collaborative environment (Yam & Rossini, 2010). Moreover, project-based learning also provides good insights into the valuation process and the field work involved. Group exercises help motivate students and make the subject matter more interesting.

Conducting project-based learning may require more strategies due to several reasons. Bell (2010) states that students drive their own learning through inquiry, as well as working collaboratively to research and create project that reflects their knowledge. By having project-based learning method, the class will be lively since the involvement of students is greater than 80%. The teacher will give feedback on the project they have conducted in weeks 11-13 and presented in weeks 14-15.

The outcome from the targeted strategy is the mechanism of project-based learning to achieve students' competencies in stock trading simulation, including the steps, the roles of students and teachers, and the evaluation. Each part will be described accordingly with the situation in the class and the real workloads of students to enhance their competencies in finance. The other outcomes are to describe the competencies obtained by students by conducting project-based learning in stock trading simulation in the class.

3. METHODS

The paper uses a qualitative design where the author will elaborate on the mechanism of project-based learning conducted in the class. Students of Portfolio Theory and Investment Analysis class will be examined in one semester during the process of pre-project-based learning, project-based learning, and post-project-based learning.

In this research, the author will collect as much information to provide the mechanism of project-based learning. The action that will be developed later on needs to be adjusted in the semester learning plan. The semester learning plan will show some information on how project-based learning is conducted.

Based on the research objectives that have been set up previously, the mechanism of project-based learning can

assist the students' competencies have been outlined as follows:

1. Pre-project-based learning
2. Project-based learning
3. Post-project-based learning

Students are delighted to have project-based learning in the class. It is proven by the acceleration of students' understanding of this course subject. Moreover, students will face real-world issues since stock trading is predicted to be students' skill when they have taken this course subject.

Since the learning system during this semester is conducted is hybrid, where online learning mode is still greater than 80% and offline learning is conducted when it is needed only, the teacher can create the hybrid learning process more effectively and efficiently. The teacher has more time to discuss and work together with students to find out the difficulties and constraints during project-based learning.

From the indicators given the authors will analyse the literature review in the journal, which discusses these elements in order to adjust the Outcome-Based Education (OBE) semester learning plan for distance learning. These indicators will also be implemented in order to answer the proposed research questions.

4. RESULT AND DISCUSSION

4.1. The Steps Of Project-Based Learning

1. Pre-Project-Based Learning

There are sixteen meetings of learning in one semester at the Faculty of Economics, Universitas Andalas. The author starts to divide the meetings into pre-project-based learning, project-based learning, and post-project-based learning. The reasons to conduct the meeting divisions are as follows; 1). To ease and assist students in doing project-based learning, 2). To obtain the knowledge of stock trading, 3). To get a better understanding of the concept of portfolio theory and investment analysis.

The steps of pre-project-based learning are distributed in several meetings. The details of the process of pre-project-based learning are as follows:

Meeting 1-3 discuss the nature of investment. Since students are relatively new to portfolio theory and analysis investment, they need to be introduced to investment concepts and theory in order to familiarize themselves with investment and how to conduct stock trading. Thus, three meetings will be allocated for the theory and concept of basic investment.

Meetings 4-5 discuss the stock and bond analysis and strategies. During these meetings, students are encouraged to learn more about stock and bond analysis and strategies. To optimise portfolio which consists of bond and stocks, students need to build optimal portfolio in order to obtain higher returns. Therefore, the theory, including analysis and strategies in bonds and stocks, will equip students to understand stock trading.

Meetings 6-7 discuss fundamental analysis. The fundamental analysis is the core of portfolio concept to build and optimise the portfolio diversification. In these meetings, students have already obtained clues and mechanisms of project-based learning from week 11 to 13. This fundamental analysis will help students in making decisions related to the stock trading simulation.

Meeting 8 is the mid-term exam. The assessment in the mid-term exam will test students related to the material that has been given to students, including the basic concept of investment, bond and stock analysis and strategies, and fundamental analysis. The theory of this investment will affect project-based learning which will determine the decision as investors to buy and sell stocks.

Meetings 9-10 discuss technical analysis. Stock trading focuses on short-term planning, which will give students freedom and self-valuation to buy or sell promising stocks in the future. By learning and understanding the concept of technical analysis, it is assumed that students will have more knowledge on when to buy and sell stocks. Students will be able to decide easily when is the best time to buy and sell stocks.

During the pre-project-based learning, the online learning mode is conducted. The teacher is using LMS, the Universitas Andalas platform, which is called iLearn. The other media can be used besides iLearn, is zoom meeting and google meet as synchronous learning. According to Gettoufi (2011), Blackboard is the most developed and most expensive LMS. It is equipped with five systems. They are learning, community, portfolio, content and outcomes. Some researchers have already identified the learning media during Covid-19 in 2021. It is found that online pedagogical tools enable students to write, share, answer, discuss, and rate multiple-choice questions with little to no input from the instructor—they have better learning outcomes and improved perceptions (Nguyen, 2015).

Having said that online learning is effective and efficient for both teachers and students, technology plays significant and crucial factors, especially in the preparation of pre-project-based learning. Network, infrastructure, media, and humans are the factors that can assist the process of online learning to become more effective and efficient. Lagging and buffering in internet working, unsupported media to access online learning, and human illiteracy in utilising media are the main reasons why online learning is not effective and efficient.

2. Project-Based Learning

To conduct project-based learning, starting in meeting 11-13, some preparations need to be carried out by the teacher and students. The explanation of steps in project-based learning will be discussed as follows;

The teacher will explain what students do in the first meeting of the project-based learning. The instruction is as follows;

a) Students need to form groups consisting of 2-3 students.

b) Each group with a leader in it, needs to make an account of stock trading in Indo Premier Online Trading (IPOT) with the deposit Rp.100.000,- for each account

c) The period of online stock trading will be 15 working days. Therefore, within 15 days (3 weeks), students need to make decision whether to buy or to sell the stocks.

d) Each group can spend at once their deposit (100.000,- rupiahs) to buy stocks or they can spend it gradually.

e) For every transaction, the group needs to make a report whether they buy or sell stocks. The group also needs to record the gain or loss they obtain during the transaction.

f) When the transaction of buying and selling stocks is finished, the group must be ready to have a presentation and report their findings and experience during the project.

Project-based learning emphasizes the implementation of the student's knowledge and competencies when they have already learnt the concept and theory at the pre-project-based learning stage. Students will feel that they have already faced the real-world issue and problems, especially in stock trading. How they handle and make decisions related into stock trading will assist their competencies and soft skills as well.

3. Post-Project-Based Learning

After the project-based learning has been conducted by students collaboratively during week 11-13, the post-project-based learning needs to be taken into account. The post-project-based learning is done in the week 14 and 15. These 2 weeks are used to do presentations of each group. There are 6 groups in the class, so in meeting 14, the first three groups will do presentations for about 30 minutes describing their buying and selling stock for 15 working days, while the next three groups present in the following week.

Besides presentation, each group must submit a report which shows financial transactions during buying and selling stock for trading. This report can be one of the assessments on the extent of students' knowledge and concept of portfolio theory and investment which have been achieved by students. The template of the report has been provided in order to obtain the same assessment of the students.

Evaluation by giving feedback to each group also needs to be done. In this case, the teacher will ask several questions to test students' understanding, and also the teacher evaluates the transaction which has been done during the project. It is also expected that the insights from the teacher will enrich students' understanding, especially in investment and stock trading.

4.2. Improvement of Students' Competencies Using Project-Based Learning

Since the mode of learning in 2021 is predominantly online, project-based learning also has challenges in implementing it either in pre-project-based learning, project-based learning, or post-project-based learning. One of the considerations in conducting project-based learning is the acceptance of students using online media. Several research studies have been conducted, especially on online learning. Park (2011) mentions that there are three components for online learning via virtual learning environment (VLE), including an interactive delivery structure, communication channels, and learning evaluation.

In addition, Zamari et al. (2012) conduct research that focuses on students' perceptions on the issue of online learning. In addition, Wei et al. (2017) also cite that the relationships among students' self-reported use of interactive functions and students' actual use logs directly influence students' online learning performance, such as online discussion scores, exam scores, and group project scores. The main issues are the frequency of website visits, choice, recommendation, the problem students faced, their opinion on the effectiveness of this task, and student initiative to access the website.

The difficulties and challenges of utilising online media in the learning process, according to Song et al. (2004) are technical problems, a perceived lack of sense of community, time constraints, and the difficulty in understanding the objectives of the online courses. This could also be a barrier in conducting project-based learning.

However, to minimise the constraint of project-based learning through online learning, there are some steps that need to be taken, such as; a synchronous meeting, using Zoom, Google Meet, and Microsoft Team, and asynchronous meetings, using video, audio, and other materials. The pre-project-based learning, project-based learning, and post-project-based learning have significant effects in assisting students' competencies. The competencies obtained by students can be described as follows;

Knowledge. Students can obtain theory and materials from many sources such as books, journals, the internet, blogs, and video tutorials. Having project-based learning in their learning semester plan can encourage students to apply the theory and concept they have got previously into practice. Therefore, the knowledge will have added value since it is also used in the real world.

Soft skills. To implement stock trading simulation, students need to equip themselves with soft skills in computer and technology since everything can be carried out through clicks. If students have good ability with computers and technology, students are easier to compete in finding jobs.

Working collaboratively in a team. When students do project-based learning in a team, it means that students are ready to work collaboratively with other members. Students who are able to work in a team, tend to be outgoing and open-minded.

Based on the information gathered from the literature review, the semester learning plan will be revised accordingly to online distance learning with the use of technology development in materials delivery. It is hoped that the semester learning plan will be implemented in the online learning mode after considering several factors that have been mentioned and explored previously.

5. CONCLUSION

The conclusion that can be withdrawn from this research is as follows;

In implementing project-based learning in the course subject: Portfolio Theory and Investment Analysis, there are three steps to take in order to succeed. They are pre-project-based learning (Week 1-10), project-based learning (Week 11-13), and post-project-based learning (Week 14-15).

Implementing project-based learning will benefit students, such as knowledge, soft skills, and the ability to work collaboratively with other students. These values have assisted students' competencies not only in this subject but also in other subjects.

AUTHORS' CONTRIBUTIONS

The author has contributed equally to this research. The first author manages the semester learning plan and focuses on the indicators which have been set up in this research, while the second author also focuses on learning development, especially in the technology tools.

Both authors create animated videos to help students understand the course subject better and to boost students' moods in online learning.

ACKNOWLEDGMENTS

REFERENCES

[1] Bell, Stephanie, Project-Based Learning for The 21st Century: Skills for The Future. The Clearing House: A Journal of Educational Strategies, Issues, and Ideas, Vol. 83 Issue 2, 2010. DOI: https://doi.org/10.1080/00098650903505415

[2] Gettoufi, Bechir, The Effectiveness and Efficiency of E-Learning Tools, October 2011 DOI: https://doi.org/10.13140/2.14319.8246

[3] Houston, Don and Thompson, James N., Blending Formative and Summative Assessment in a Capstone Subject: It's Not Your Tools, It's How You Use Them. Joural of University Teaching and Learning Practice, 14 (3). 2017.

[4] Islam, Syaiful., Baharun, Hasan., Muali, Chusnul., Ghufron, Mohd Idil., Mushfi, Ei Iq., Wijaya, Muslim., and Marzuki, Ismail., To Boost Student's Motivation and Achievement through Blended Learning. Journal of Physics: Conference Series, Volume 114. 2018.

[5] Nguyen, Tuan, The Effectiveness of Online learning: Beyond No Significant Difference and Future Horizons. Journal of Online Learning and Teaching, Vol. 11 No. 2. June 2015.

[6] Park, Ji Yong, Design Education Online: learning delivery and Evaluation. The International Journal of Art & Design Education, 2011, pp. 53–113. DOI: https://doi.org/10.1111/j.1476.8070.2011.01689.x

[7] Pastushenko, Olena., Hruska, Tomas., and Zendulka, Jeroslav., Increasing Student's Motivation by Using Virtual Learning Environments based on Gamification mechanics: Implementation and Evaluation of Gamified assignments for Students., TEEM18. Proceedings of the Sixth International Conference on Technology Ecosystems for Enhancing Multiculturality, October 2018. DOI: https://doi.org/10.1145/3284179.3284310

[8] Qu, Wenji., and Zhang, Chunling., Journal of language Teaching and Research. Vol 4 No 2. Pp 335-339. March 2013.Academy Publisher Manufactured in Finland. DOI: https://doi.org/10.4304/jtr.4.2.335.339

[9] Rasheed, Abu Bakar Rasheed, Kansin, Amirudin, and Abdullah, Nor Aniza. Teacher Challenges, The Use of Technology for Teaching. Computers & Education, volume 144, January 2020

[10] Song, Liyan., Singleton, Ernise S., Hill, Jannete R., Koh, Myung Hwa., Improving Online Learning: Student's perceptions of Useful and Challenging Characteristics. The Internet and Higher Education vol. 7. Issue 1, 1st Quarter 2004. Elsevier.

[11] Wei, Huei- Chuan., Peng, Hsinyi., and Chou, Chien. Can More Interactively Inprove Learning Achievement in an Online Course Management Systems on their Learning Achievement. Journal Computers and Education. 2015 Vol 83. DOI: https://doi.org/10.1109/2.161279

[12] Williams, Kaylene C & Williams, Caroline C. Five Keys Ingredients for Improving Motivation Research in Higher Education Journal. Vol. 11. https://aabri.com/manuscripts/11834.pdf

[13] Yan, L. H. S., and Rossini, Peter. Implementing a Project-Based Learning Approach in An Introductory Property Course. 16th Pacific Rim Real Estate Society Conference., 2010.

[14] Zamari,., Zarlina Mohammad., Adnal, Airi Haimi Mohammad., Yusof, Sheem Liza Idris Johana., Student's Perception of Using Online Language Learning Materials. Procedia- Social and Behavioral Sciences, 2012. Vol. 67. DOI: http://doi.org/10.1016/j.sbspro.2012.11.367

[13] Zydney, Janet Mannheimer., Warner, Zachary. And Angelone, Laurem, Learning through Experience, Using Design-based Research to Redesign Protocols for Blended Synchronous Learning Environment. Computers and Education, Vol. 143, January 2020.