



Students' Perception of a Blended Project Based-Learning to Promote Critical Thinking

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Abstract. With the increasing demand for critical thinking ability in the 21st century, teachers in higher education are seeking innovative strategies to cultivate this essential skill. Blended learning has gained significant attention and making it essential to adapt project-based learning. This purpose of the study was to find out students' perception of the blended project-based learning concerning its design and its influence on their critical thinking. Adopting the mixed method, the study used questionnaire and interview as the instruments for data collection. The analysis of the data revealed that students generally held positive perception of the learning environment, and they believed that blended project-based learning environment could help promote their critical thinking.

Keywords: Blended learning, Project-based learning, Critical thinking skill.

1 Introduction

We are living in the age of the industrial revolution 4.0 and society 5.0, when everything is connected to the internet and knowledge can be easily accessed without being restricted by time, place, or space. The learning process is now more participatory since in the past, education consisted of broadcasting or broadcasting activities, with teachers serving as informational sources and students serving as the recipients of messages. Online learning materials substantially assist today's learners and are easily accessible, so teachers are not the sole providers of information. The formats range from those that are text-based and packaged as e-books or journals to those that are audio-visual and packaged as YouTube videos and many other educational materials. This can be used by creating a learning model that combines in-person and online learning activities, sometimes known as a blended learning instructional paradigm.

To succeed in the workplace, one must have critical thinking abilities [1]. They contend that pupils succeed more and perform better when they exercise critical thought. Therefore, when students enter the workforce, critical thinking abilities are crucial. When forced to choose what to believe or do, critical thinking is introspective thinking that is well-reasoned. Examples of critical thinking abilities include, but are not limited to: Comparing and contrasting, categorizing, reviewing, explaining causes,

making sequences or sequences, identifying reliable sources, reviewing tiny portions and the whole, making predictions, and so forth.

Critical thinking has 4 characteristics, namely (1) aims to achieve a critical assessment of what we will receive or what we will do with logical reasons, (2) use standard assessments as a result of critical thinking and making decisions, (3) apply various strategies that are structured and provide reasons for determining and implementing standards, (4) seeking and gathering reliable information to be used as evidence that can support an assessment.

In developing critical thinking skills, there have been many efforts made by teachers to design, implement, and conduct learning assessments that are relevant to the demands of critical thinking skills. These efforts include optimizing student-centered learning to create a flexible classroom atmosphere, including using a blended learning and project-based learning.

Blended learning combines, integrates, and incorporates a variety of technological platforms (formal and informal, real and virtual, individual and group learning, face-to-face and remote learning) in a way that is pedagogically balanced, adaptive, and seeks to most effectively satisfy the educational needs of participants in the educational process [2].

According to a study that employed a quasi-experimental methodology with a population of all Indonesian Teknokrat University students, blended learning is helpful in enhancing students' grasp of concepts [3]. The study discovered that when considered from the perspective of students' conceptual understanding, the application of learning in blended learning is beneficial [3].

Institutional-based research is required to direct colleges, universities, and polytechnics in strategically disseminating blended learning [4]. Based on the Diffusion of Innovation (DoI) theory and an institutional framework for adopting blended learning that includes a mature implementation stage, a model was developed to better understand the characteristics and related aspects influencing institutions' administrative preparedness to implement blended learning initiatives. [4]. During the COVID-19 pandemic, the Department of Civil, Environmental, and Mechanical Engineering (DICAM) of the University of Trento in Italy developed, tested, and implemented a simple but effective technical and logistical concept for the realization of blended teaching of mathematics and its applications in theoretical mechanics [5]. According to the concept, traditional lectures with a blackboard and fewer students in person would be held in a classroom. At the same time, the lectures would be streamed in high definition, low bandwidth online to the remaining students who are unable to attend [5]. Through online surveys, both professors and students quantitatively evaluated the effectiveness of the implemented concept [5].

Project Based Learning (PBL) is an educational approach that involves students working on a project or solving a real-world problem to gain knowledge and skills [6]. It is a student-centered method that encourages participation, critical thinking, active learning, and problem-solving abilities [7].

Research has shown that students who engage in Project Based Learning experience improved learning outcomes. For example, a study on the implementation of PBL in research methodology lectures found that student learning outcomes increased

significantly after using the PBL model [6]. Another study on English for Specific Purposes (ESP) found that PBL was effective in improving students' learning outcomes and communication skills [7]. PBL has been found to increase student motivation and engagement in the learning process. A study conducted in an elementary school found that the use of PBL improved students' motivation and learning achievement in science lessons [8]. PBL provides students with a sense of ownership and relevance as they work on projects that are meaningful and connected to real-world contexts.

Also PBL emphasizes collaboration and communication among students. Through working on projects, students learn to work in teams, share ideas, and communicate effectively. This helps develop important skills for the workplace and fosters a sense of community and cooperation among students [9]. PBL gives students the chance to use their knowledge and abilities in practical settings. By working on authentic projects, students can see the practical relevance of what they are learning and develop a deeper understanding of the subject matter [10].

Overall, Project Based Learning has been shown to be an effective approach in improving student learning outcomes, motivation, collaboration, and application of knowledge. It provides students with opportunities to develop critical thinking, problem-solving, and communication skills that are essential for success in the 21st century.

However, detailed investigations into the components of blended project-based learning were great importance. Thus, the purpose of the study was to investigate students' perception after the implementation of blended project-based learning model. The main research questions were as follows:

1. What are students' perception of blended project-based learning model to promote critical thinking skill?

2 Method

2.1 Design

This study used a case study approach by [11] to investigate blended project-based learning model through students' perceptions in a half -semester long course. Quantitative data were collected at the end of the course and students' perception of the pedagogical approach were obtained through questionnaire. The quantitative data in the questionnaire were analyzed using SPSS software to address the research question of how students perceive the blended project-based learning model.

2.2 Participants

The study was conducted at the university in Surabaya. Participants were undergraduate students (N=68) who took the instructional media course. All participants were majoring in Educational Technology Department.

2.3 Blended Project Based-Learning Model

Creating an instructional media is a core course for the university' undergraduate students majoring in educational technology department. The course aims to equip students with the skills necessary for conducting higher-order thinking activities. Blended Project Based-Learning model used is aligned with the learning objectives of developing students' 21st-century skills such as critical thinking.

SINTAKS BLENDED PROJECT-BASED LEARNING

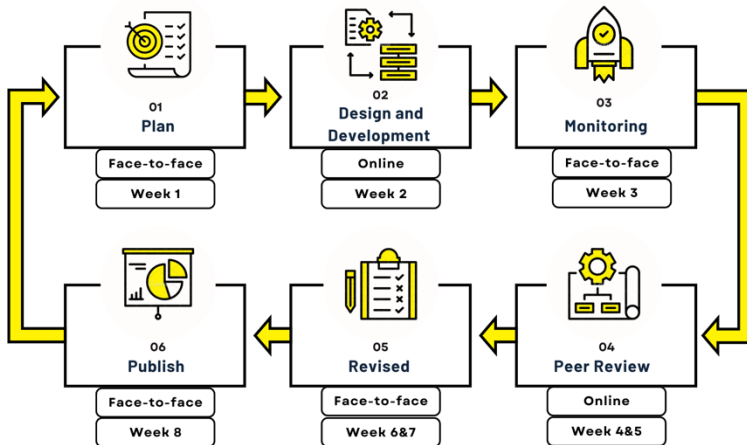


Fig. 1. Blended Project-Based Learning Model for Critical Thinking Skill

2.4 Instruments

In this study, instrument was adopted by Lu (2021). The tool was used to obtain data about how the students felt about the learning environment. The questionnaire's main goal was to determine how students felt about blended project-based learning.

2.5 Data Analysis

The quantitative data from Likert-scale questions and the scoring questions in the questionnaire were computed and analysed using SPSS. Descriptive statistics were run for students' opinion of the implementation a CBL model through percentages, mean, and standard deviation.

3 Result And Discussion

According to students' self-report of students' perception subscale for pedagogical design, the mean of the item revealed overall student perceived high agreement with the pedagogical design. Specifically, many agreed that the structure of the environ-

ment helps students focus on critical thinking practices (mean=4.72, SD=0.73), learning activities are planned carefully to support critical thinking ability (mean=4.41, SD=0.76), and the organization of each lesson is easy to follow, see table 1.

Table 1. Students’ self-report of the blended Project-based Learning Scale.

Item	Mean	SD
Pedagogical Design:		
- The learning objectives are clearly stated in each lesson.	4.04	0.41
- The organization of each lesson is easy to follow.	4.16	0.80
- The structure of the environment helps me focus on critical thinking practices.	4.72	0.73
- Expectations of assignments are clearly stated.	4.30	0.64
- Activities are planned carefully to support critical thinking ability	4.41	0.76
- The content of the course worked well in a blended project-based learning environment.	3.98	1.00
- The presentation of the course content was clear.	4.00	0.63
Social Design:		
- I communicate with other students	3.98	0.81
- I can ask my teacher what I do not understand.	4.09	0.71
- I can ask other students what I do not understand.	4.00	0.62
- Other students respond promptly to my requests for help.	3.91	0.43
- The teachers give me quick comments on my work.	3.87	1.00
- My classmates and I regularly evaluate each other’s work.	4.00	1.00
- I was supported by a positive attitude from my teacher and my classmates.	4.50	0.92
	4.20	0.71
Technical Design:		
-I can access the learning activities at times convenient to me		
-The online material is available at locations suitable for me	4.33	0.87
-I am allowed to work at my own speed to achieve my learning objectives	3.78	0.51
-I decided how much I want to learn in a given period	4.00	0.39
-I decide when I want to learn	4.62	0.52
-Using blended project-based learning allowed me to explore the interest of my own	4.55	0.75

According to students’ self-report of students’ perception subscale for social design, the mean of the item revealed overall student perceived high agreement with the social design. Specifically, many agreed that students were supported by a positive attitude from the teacher and classmates (mean=4.50, SD=0.92) and can ask other students what they do not understand (mean=4.00, SD=0.62), see table 1.

According to students’ self-report of students’ perception subscale for social design, the mean of the item revealed overall student perceived high agreement with the technical design. Specifically, many agreed that they decide when they want to learn

(mean=4.62, SD=0.52) and using blended project-based learning allowed to them to explore the interest of their own, see table 1.

This finding in accordance with the several studies. The study aims to analyze the This conclusion is consistent with a number of investigations. The purpose of the study is to compare and contrast students who were taught using a blended project-based learning approach and those who were taught traditionally. According to the findings, integrated project-based learning is more effective at teaching critical thinking abilities than traditional methods [13]. Another study conducted by [14], sought to assess the effectiveness of blended project-based learning in fostering students' original thought. According to the findings, students who received blended project-based learning instruction scored higher on creative thinking tests than students who received traditional instruction.

These findings could be explained by the study's results of [15]. They may help to explain these findings. They claimed that creating a learning environment with elements that foster the growth of critical thinking could have a big impact on encouraging the development of critical thinking.

4 Conclusions

The finding suggest that the majority of the students held positive perception of blended project-based learning model, especially to facilitate critical thinking practices. Given the limitation of this study, future studies should be conducted in experimental design. An analysis of the teachers' perspectives on experiences of the blended project-based learning also merits future investigation.

References

1. B. Trilling and C. Fadel, 21st century skills: learning for life in our times, no. 10. San francisco: John Wiley and Sons, 2009.
2. I. S. Mintii, "Blended learning: definition, concept, and relevance," *Educational Dimension*, vol. 8, pp. 85–111, Apr. 2023, doi: 10.31812/ed.539.
3. M. Ulfa and N. D. Puspaningtyas, "THE EFFECTIVENESS OF BLENDED LEARNING USING A LEARNING SYSTEM IN NETWORK (SPADA) IN UNDERSTANDING OF MATHEMATICAL CONCEPT," *Jurnal Matematika dan Pembelajaran*, vol. 8, no. 1, 2020.
4. A. Bokolo et al., "A managerial perspective on institutions' administration readiness to diffuse blended learning in higher education: Concept and evidence," *Journal of Research on Technology in Education*, vol. 52, no. 1, pp. 37–64, Jan. 2020, doi: 10.1080/15391523.2019.1675203.
5. S. Busto, M. Dumbser, and E. Gaburro, "A Simple but Efficient Concept of Blended Teaching of Mathematics for Engineering Students during the COVID-19 Pandemic," *Educ Sci (Basel)*, vol. 11, no. 2, p. 56, Feb. 2021, doi: 10.3390/educsci11020056.

6. L. A. Fitriyah, N. Hayati, and N. A. Berlianti, "Hasil Belajar Mahasiswa Melalui Project Based Learning Pada Matakuliah Metodologi Penelitian di Era Pandemi Covid-19," *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, vol. 6, no. 1, p. 54, Apr. 2022, doi: 10.20961/jdc.v6i1.58887.
7. Y. L. Goodianti and I. Fitriyaningsih, "Project Based Learning untuk Meningkatkan Hasil Belajar English for Specific Purposes: Sebuah Penelitian Tindakan," *Ideguru: Jurnal Karya Ilmiah Guru*, vol. 8, no. 2, pp. 288–296, Feb. 2023, doi: 10.51169/ideguru.v8i2.531.
8. W. WAHYUNI, "IMPLEMENTASI MODEL PROJECT BASED LEARNING UNTUK MENINGKATKAN MOTIVASI DAN PRESTASI BELAJAR PADA SISWA KELAS IV SD N 2 SABDODADI," *ACTION : Jurnal Inovasi Penelitian Tindakan Kelas dan Sekolah*, vol. 2, no. 3, pp. 342–348, Aug. 2022, doi: 10.51878/action.v2i3.1445.
9. S. R. Wicaksono and R. Setiawan, "Collaborative Project Based Learning Implementation During Covid-19 Outbreak," *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, vol. 7, no. 2, p. 61, Feb. 2022, doi: 10.17977/jptpp.v7i2.15189.
10. B. Soeryono, "PENINGKATAN KEMAMPUAN MENELITI DAN MENYUSUN LAPORAN PENELITIAN MELALUI PROJECT BASED LEARNING (PjBL) TANAM PADA MATERI PERTUMBUHAN DAN PERKEMBANGAN," *Jurnal Guru Dikmen dan Dikus*, vol. 2, no. 2, pp. 38–53, Sep. 2020, doi: 10.47239/jgdd.v1i2.54.
11. J. W. Creswell and T. C. Guetterman, *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*, Sixth. New Jersey: Pearson Education, 2019.
12. D. Lu, "Students' Perceptions of a Blended Learning Environment to Promote Critical Thinking," *Front Psychol*, vol. 12, Jun. 2021, doi: 10.3389/fpsyg.2021.696845.
13. Husamah, "Thinking skills for environmental sustainability perspective of new students of biology education department through blended project based learning model," *Jurnal Pendidikan IPA Indonesia*, vol. 4, no. 2, 2015, doi: 10.15294/jpii.v4i2.3878.
14. R. Mursid, A. H. Saragih, and R. Hartono, "The Effect of the Blended Project-based Learning Model and Creative Thinking Ability on Engineering Students' Learning Outcomes," *International Journal of Education in Mathematics, Science and Technology*, vol. 10, no. 1, pp. 218–235, Dec. 2021, doi: 10.46328/ijemst.2244.
15. T.-L. Chou, J.-J. Wu, and C.-C. Tsai, "Research Trends and Features of Critical Thinking Studies in E-Learning Environments: A Review," *Journal of Educational Computing Research*, vol. 57, no. 4, pp. 1038–1077, Jul. 2019, doi: 10.1177/0735633118774350.

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