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Project-Based Learning and Problem-Based Learning: Challenges and Opportunities for Collaborative Classroom Management

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Abstract

This research examines the application of Project Based Learning (PjBL) and Problem Based Learning (PBL) in facilitating Collaborative Classroom Management one of the universities in Indonesia. The purpose of this study is to identify the challenges and opportunities that arise in these approaches to facilitate the implementation of classroom management as well as how students engage in collaborative learning. The research design used is qualitative with a case study approach. Data collection techniques are through interviews with students and lecturers, as well as classroom observations. The research informants numbered 20 people including the principal, lecturers, students and teaching staff. And the data analysis technique uses an interactive model including data reduction, data presentation, and drawing conclusions or verification. The results showed that both PjBL and PBL have the potential to improve collaborative classroom management, but some challenges such as inadequate resources, time constraints and diverse student abilities need to be addressed. Nonetheless, these approaches also offer opportunities for students to develop critical thinking, problem solving and communication skills. This study concludes that a well-structured implementation of PjBL and PBL, coupled with continuous support from lecturers can significantly improve collaborative classroom management.

INTRODUCTION

Project-Based Learning and Problem-Based Learning are innovative approaches to education, as they not only emphasize active student involvement but also foster skills such as collaboration, problem-solving and creativity (Azis et al., 2022; Puspa et al., 2023). On the other hand, this method is faced with challenges such as group dynamics and the need for effective classroom management strategies where there will be a diversity of student abilities and

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characters. In addition to the challenges, this method also creates great opportunities to build an inclusive and adaptive learning culture, where students can learn from real experiences and support each other in teamwork (Hussein, 2021; Vaithianathan et al., 2024).

Project-based learning (PjBL) and problem-based learning (PBL) are increasingly relevant in the modern era (Sukackė et al., 2022). This is because this approach emphasizes the collaboration skills of students as an educational output that is highly needed in today's workforce. Studies show that the implementation of PjBL and PBL successfully improves students' critical thinking and communication skills, but often requires additional training and active classroom management to manage effective group dynamics (Firda & Sunarti, 2022; Song et al., 2024). From this it can be concluded that with the right classroom management strategies, project-based learning and problem-based learning can be effective tools for creating collaborative and meaningful learning experiences.

Research related to project-based learning and problem-based learning on the challenges and opportunities of collaborative classroom management has been conducted by many previous researchers Kamaruddin et al., (2024) in his research explained that project-based learning (PjBL) has the potential to facilitate multidisciplinary problem-solving skills among students in higher education. Not only that, in other studies such as Saputri & Maura, (2024) mentioned that the PjBL model has been proven effective in creating an interactive learning process and supporting academic and non-academic outcomes. This proves that the application of the PjBL method provides benefits not only for students in improving learning outcomes but also helps teachers/lecturers in facilitating the learning process.

Roberts et al., (2022) explained about problem-based learning that PBL method offers significant benefits for developing critical thinking, problem solving, and collaboration skills in various educational contexts. In the world of work the need for teamwork is needed as a performance support, but on the other hand each individual also needs to improve their thinking skills. The need for PBL methods as part of the learning process is very helpful in developing students' abilities as part of educational output. Then A. Aboulfotoh, (2020) in his study said that researchers recommend the use of PBL to develop classroom management skills among university students and teachers in Egypt.

From some of these studies outline contains a limited context, not specific to the focus of research that discusses PjBL and PBL in collaborative classroom management. Therefore, this research comes with information to fill the gaps in the literature that are still unexplored by previous studies, such as developing the integration of digital technology and adaptive strategies in collaborative classroom management, utilizing technology to address the challenges of complex group dynamics, and optimizing educators' knowledge mastery to create an inclusive and flexible learning environment.

From the explanation above, a common thread can be drawn regarding the main problems that are often encountered, including how teachers/lecturers manage group dynamics in collaborative learning, what strategies are effective to ensure student participation, then how to utilize technology to support this process. Therefore, it is expected that the research objectives of this study will be able to answer this by identifying challenges and opportunities in collaborative classroom management using project-based learning and problem-based learning methods. According to the researcher, the challenges in collaborative classroom management can be overcome with innovative strategic approaches, such as clear planning, technology utilization and training for

educators. Thus, this approach not only increases student engagement but also helps lecturers manage complex classroom dynamics. The purpose of this study is to identify the challenges and opportunities that arise in these approaches to facilitate the implementation of classroom management as well as how students engage in collaborative learning. The similarity in this research with previous research is that they both study Project-Based Learning and Problem-Based Learning methods. while the difference is that there has been no assessment of opportunities for collaboration between the two.

METHODS

The research object to be taken in this study is located one of the universities in Indonesia. There are several strong reasons as the basis why this educational institution is the choice of research object. First, there is relevance one of the universities in Indonesia which is in accordance with the focus of the researcher's study, namely project-based learning and problem-based learning. In addition, this university also has a study program that actively implements innovative learning approaches so that it is suitable for studying the application of collaborative classroom management. Secondly, the one of the universities in Indonesia is known as an educational institution that has diverse student characteristics, both in terms of academic and socio-cultural backgrounds. This will provide a rich dimension of information that will allow researchers to explore and provide more in-depth and contextual findings. Furthermore, the openness of the university to cooperate in the research and the availability of the lecturers and students to participate in this study. Thus, this location is very suitable to answer the research focus on project-based learning and problem-based learning in collaborative classroom management (Dahri & Mallisza, 2024; Dermawan et al., 2025; Lestari et al., 2021; Mustafidah et al., 2025; Rahayu et al., 2022; Rahmiati et al., 2023; Syafril et al., 2021; Wurdinger et al., 2007; Zulfa et al., 2024).

The research method used is qualitative because it allows researchers to deeply understand the complexities of PjBL and PBL in a collaborative classroom context, uncover the challenges and opportunities unique to each situation, develop a richer understanding of the experiences of lecturers and students and build relevant and contextualized theory. Through in-depth interviews, observations and document studies, the researcher will explore the perspectives of various parties including lecturers, students, heads of study programs and teaching staff. Furthermore, the data obtained will be analyzed and identified regarding the factors that support or hinder the successful implementation of PjBL and PBL methods, as well as formulating collaborative classroom management recommendations that can improve the quality of learning at the university.

Table 1. Research informants

No	Source of Informants	Gender	
		Male	Female
1	Head of Study Program	1	-
2	Lecturer	4	3
3	Student	3	5
4	Teaching Staff	2	2

The type of this research is a case study using a post-positivistic paradigm. This is because this paradigm allows researchers to identify various factors that influence each other, both objectively and subjectively (Murdiyanto, 2020; Yuliani, 2022). Then for data collection techniques using depth interviews,

participatory observation and document studies. In-depth interviews were conducted to gather information about the implementation of PjBL and PBL methods one of the universities in Indonesia and also to find out the strategies that will be carried out to face challenges and how to take advantage of opportunities to support the implementation of collaborative classroom management. Participatory observation was conducted to observe the learning implementation process and understand the dynamics that occur in the program (Hasan, 2022). Documentation is used to collect data relevant to the research related to.

The data analysis technique that will be used is a three-model interactive analysis which includes the process of data reduction, data presentation, and conclusion drawing or verification (Nursapiah & Sazali, 2020). Then the data validity checking technique uses method triangulation which involves comparing the data obtained, source triangulation which is done by verifying information from various parties and theoretical triangulation to examine findings based on relevant theoretical perspectives. The purpose of the approach taken as an auxiliary to this research is to generate a comprehensive understanding of the application of project-based learning and problem-based learning models and their contribution to collaborative classroom management in higher education settings.

RESULT AND DISCUSSION

Optimizing the Role of Lecturers in Improving the Effectiveness of Collaborative Classroom Management

Collaborative classroom implementation in higher education is increasingly being implemented (Lee et al., 2021). This is because this approach encourages cooperative interaction and provides a stimulus for the development of students' critical thinking. However, the success of this collaborative class cannot run without the active role of students and the ability of lecturers to manage class dynamics. Optimizing the role of lecturers is the main key to increasing the effectiveness of collaborative classes. The involvement of lecturers as facilitators not only directs the course of the discussion, but also creates effective classroom management strategies so as to create an inclusive learning environment. In addition, lecturers also need to support student cooperation to encourage motivation and active participation of their students. On the other hand, this research also reveals that significant challenges arise that often complicate the collaborative classroom management process such as the lack of time for learning and managing group dynamics. This was revealed through an interview with one of the lecturers in his interview revealed:

> *We are often faced with students who have very diverse academic abilities and characters. However, by implementing training programs as well as personalized mentoring, the effectiveness of the class is slowly increasing. The challenge is to provide sufficient time for learning and adjusting the teaching methods (informant 1)*

The interview results show that the main problems often faced by lecturers are group dynamics and limited learning time. The diversity of student backgrounds and the ability of student academic levels creates increasingly complex group dynamics (Alam & Mohanty, 2023). It is often found that some students dominate in active involvement in learning while others are passive. Time constraints are also a challenge for lecturers. Where schedules are tight and time is often insufficient to explore topics in depth.

The signing of the Integrity Pact and Lecturer Coaching for the 2024-2025 Academic Year shows the institution's efforts to improve the abilities and

performance skills of lecturers through training and coaching. Training on classroom management strategies is needed to assist lecturers in planning and organizing to overcome obstacles that arise (Koimah & Zahra, 2024). This finding underscores that the effectiveness of collaborative classroom management depends not only on lecturers' skills but also on adequate support systems at the institutional level.

The findings of this study highlight that the effectiveness of collaborative classes is strongly influenced by the role of lecturers as facilitators and the support system provided by the institution. Complex classroom dynamics due to differences in academic backgrounds and student characters require lecturers to have adaptive classroom management skills. This finding is in line with Saleem et al., (2021) which emphasizes the importance of social interaction in the learning process and the role of educators in guiding students to build understanding independently. In the context of a collaborative classroom, the role of the lecturer is not only as a material provider, but also as a facilitator who creates an inclusive learning environment.

In addition, this research also confirms that time limitation is one of the main challenges in collaborative learning. This is in line with Puspitaloka & Yatim, (2024) which states that the effectiveness of collaboration-based learning is highly dependent on a mature learning design, including effective time management strategies. Lack of time often leads to an imbalance of participation, where more active students dominate the discussion while others become passive (Alam & Mohanty, 2023). Therefore, institutional support through training on classroom management strategies is a key factor in optimizing collaborative classes. This training enables lecturers to develop more flexible methods in addressing group dynamics as well as managing time effectively. Thus, optimal implementation of collaborative classrooms requires a synergy between lecturer skills and ongoing institutional support.

Group Dynamics and Collaboration Challenges in PjBl and PBL

Research on the application of project-based learning (PjBL) and problem-based learning (PBL) often presents unique findings. One of the main finding points is the importance of managing interactions between students in groups. Group dynamics are often an obstacle given the differences in character, academic ability, and diverse learning styles. Where problems arise such as the lack of participation of certain group members giving rise to the dominance of certain individuals, the difficulty of reaching consensus in solving project tasks or problems, as well as interpersonal conflicts that hinder the cooperation process. In an interview with several students, they admitted that they often found one group member who was passive so that the task became difficult for other group members. In the interview findings to students are as follows:

> *Sometimes there are group members who are less active when given group assignments by the lecturer, so that the task becomes difficult for other group members and the completion of the task takes longer (informant 2)*

Another student added that the emergence of conflict in a group occurs due to a lack of communication skills in conveying ideas, especially when there is dominance from certain members. Therefore, to overcome these challenges, lecturers need to manage the classroom management process by providing clear roles, facilitating student communication, and creating an inclusive environment. This confirms that good management of group dynamics is crucial in ensuring the success of PjBL and PBL-based learning. As expressed in the interview, namely:

The biggest challenge I encountered was the imbalance of participation in the group.

> *There were students who dominated too much, while others tended to be passive. To overcome this, I started implementing a role rotation system in each task. That way, every group member gets an equal opportunity to contribute in various roles, such as being a discussion leader or a recorder of results. In addition, I also facilitated group reflection meetings where students could openly discuss their problems and find solutions together. I found that this approach helped to reduce conflict and improve cooperation (informant 3)*

In addition to the efforts made by lecturers in overcoming group dynamics in project-based learning and problem-based learning. There are other efforts that researchers found made by institutions to improve the quality of education, namely by exchanging ideas through Benchmarking activities. One of them is about the representation of learning innovations developed such as the integration of project-based learning in teaching Arabic and the application of digital applications to improve students' ability to understand grammar and conversation rules.

From the findings and interviews, it shows that the management of group dynamics requires special strategies to be managed by lecturers, such as establishing clear group rules, rotating roles in a group so that each member has the same contribution in completing tasks and regular guidance by lecturers. Not only that, the support and facilitation provided by the institution is also very necessary to improve the quality of education quality. From this it can be concluded that lecturers have an important role in managing group dynamics. The importance of classroom management by lecturers such as planning, organizing, managing and supervising learning activities will be very helpful to create effective strategies in supporting the success of project-based learning and problem-based learning methods.

The findings of this study confirm that the success of project-based learning (PjBL) and problem-based learning (PBL) is highly dependent on effective management of group dynamics by lecturers. The main challenges that arise are the imbalance of student participation in the group, the dominance of certain individuals, and interpersonal conflicts due to differences in character and communication styles. In this context, (Shimizu et al., 2022) social interdependence theory explains that cooperation in groups will be successful if there is positive dependence between members, as well as individual and group responsibility in completing tasks. For this reason, strategies such as role rotation and group reflection facilitation applied by lecturers are effective solutions to increase participation and reduce conflict.

In addition Lee et al., (2021); Li et al., (2024) supports the importance of lecturers' role in guiding students to be more active in collaboration-based learning. Lecturers not only act as facilitators, but also as class managers who organize interactions, provide direction, and ensure that each student has an equal opportunity to contribute. This is in line with Alblooshi et al., (2020) research which emphasizes that successful cooperative learning requires clear group rules and fairly distributed roles.

Furthermore, institutional support through benchmarking is also a key factor in improving learning effectiveness. Benchmarking institutions can adopt learning innovations from other institutions, such as the use of digital technology to support PjBL and PBL. Thus, the combination of classroom management skills by lecturers and supportive institutional policies can create a more effective and inclusive learning environment.

Opportunities for Technological Innovation in Supporting Collaborative Classroom Management

In today's digital era, technological innovation plays a significant role in

supporting collaborative classroom management. Adaptation to the rapid changes in technology is also very necessary. The use of technology not only facilitates communication but also facilitates coordination between students and allows lecturers to easily supervise the learning process. Lecturers must have a willing attitude to learn technology in an increasingly fast and sophisticated era (Paliwal & Singh, 2021; Yuliani, 2022). Various digital platforms such as Google Classroom, Microsoft Teams and real-time collaboration applications have become important tools in organizing group work, monitoring individual contributions, and providing immediate feedback. However, behind all the conveniences presented by technology, there are still challenges related to the utilization of technology, including the lack of technological skills among lecturers and students, as well as infrastructure limitations such as unstable internet connections. This was conveyed by one of the students, in his interview he said that:

> *Applications such as Google Classroom, Microsoft Teams, Zoom, etc. really help us in the process of working on both group and individual assignments. The only problem that we often feel is the slow internet network (informant 4)*

Efforts to utilize technology continue to be made and developed by institutions. One of them is through the Islamic Education Management Training with the theme "Making Learning Media Through AI (Artificial Intelligence) in Improving Teacher Competence". The training discussed the utilization of AI for education. Informant explained that:

> *Education that adapts to technology will give birth to a generation that is superior and ready to compete in the future (informant 5)*

In his presentation, informant emphasized that the use of AI technology is a necessity in the digital era. Teachers are not only required to understand technology but also be able to integrate it in learning to improve self-competence and motivate students. The findings show that the appropriate use of technology can provide benefits in the form of ease of completion of tasks by students, not only that student can also personalize learning according to the needs of each individual. In addition, by utilizing features such as online discussion, automatic task scheduling and progress reporting, it makes it easier for lecturers to carry out class management so that the group dynamics that occur in the classroom can be optimized. From this it can be concluded that technology not only supports lecturers in managing group dynamics, but also creates an inclusive learning space for students according to their individual needs and learning styles. This innovation shows that technology can be a strategic solution to improve the effectiveness of collaborative classes and encourage students' digital skills that are relevant to future challenges.

The findings of this study confirm that the use of technology in collaborative classroom management can improve learning effectiveness, especially in terms of communication, coordination, and monitoring student progress. This is in line with the Technology-Enhanced Learning (TEL) theory, which emphasizes that technology can enhance the learning experience by providing wider access to information and supporting collaborative interaction. The use of platforms such as Google Classroom and Microsoft Teams allows for more flexible learning, where students can access materials and discuss without time and space constraints.

However, the main challenges found in this study, such as infrastructure limitations and lack of technological literacy, indicate that the success of technology integration is highly dependent on user readiness and institutional support. The Diffusion of Innovations theory Qiao et al., (2021) explains that technology adoption in education requires a gradual process, where users must

be provided with training and support in order to use it effectively. Initiatives such as the Islamic Education Management Training on AI utilization reflect the institution's strategy in accelerating technology adoption among lecturers and students.

Furthermore, these findings also support the Personalized Learning theory (Shimizu et al., 2022), which emphasizes that technology allows students to adapt their learning styles according to individual needs. With features like online discussions, task automation, and progress monitoring, lecturers can optimize group dynamics and create a more inclusive learning space. Therefore, the use of technology in collaborative classes not only improves classroom management but also equips students with digital skills that are relevant for the future.

CONCLUSION

Based on research results, the effectiveness of collaborative classroom management is very dependent on optimizing the role of lecturers, well-managed group dynamics, and the use of technology. The role of lecturers as facilitators is a major factor in creating an inclusive learning environment and ensuring active student participation. The main challenges faced are limited time and imbalance of contributions in group work, which can be overcome through strategies such as role rotation and facilitation of group reflection. Apart from that, institutional support in the form of training and benchmarking also plays an important role in improving the quality of project-based (PjBL) and problem-based (PBL) learning. Meanwhile, technological innovation has been proven to support classroom management by improving coordination, communication and personalization of learning. Even though there are obstacles such as limited infrastructure and technological literacy, proper technology integration can help create learning that is more effective and relevant to the needs of the digital era.

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