Ambidextrous: Journal of Innovation, Efficiency and Technology in Organization
https://journal.takaza.id/index.php/ambidextrous
Vol. 05, No. 03, 2026, pp. 634-647
E-ISSN: 3031-7002
E-mail:ambidex@takaza.id



Communication Barriers in Hybrid Lecture Systems: A Phenomenological Study of College Students

Ajeng Dwi Anjani[1*]
[1]Universitas Bina Sarana Informatika
Corresponding Author e-mail: Ajengdwi16009@gmail.com

Article History:
Received: 17-10-2026
Revised: 01-11-2026
Accepted: 01-11-2026

Keywords:*Communication Barriers, Students; Hybrid Learning; Higher Education; Phenomenological Study*

Abstract:*Hybrid learning offers flexibility in higher education but may create communication barriers that affect students' learning experiences. This study aimed to explore students' experiences of communication barriers in hybrid learning and identify their main forms. A qualitative phenomenological approach was employed. The participants consisted of three purposively selected students from LSPR Institute of Communication and Business, Indonesian Education University, and Gunadarma University, representing different academic and living circumstances. Data were collected through semi-structured interviews, observations, and documentation. The data were analyzed through data reduction, data display, conclusion drawing, and phenomenological interpretation, with triangulation used to strengthen credibility. The findings identified four categories of communication barriers: technical and infrastructure barriers, psychological and cognitive barriers, semantic barriers, and social-interactional barriers. The reported experiences included unstable internet connections, fatigue, difficulty understanding online course materials, and limited opportunities to develop peer relationships. Students adapted by managing their schedules, using alternative internet access, seeking additional learning materials, and creating more conducive study environments. The study concludes that communication barriers in hybrid learning vary according to students' personal circumstances and learning environments. These findings highlight the importance of reliable digital infrastructure, clear instructional communication, timely feedback, and opportunities for meaningful academic interaction.*

How to Cite: Ajeng Dwi Anjani (2026). **Communication Barriers in Hybrid Lecture Systems: A Phenomenological Study of College Students**. *5(3)*. Pp 634-647 https://doi.org/10.61536/ambidextrous.v5i03.965

https://doi.org/10.61536/ambidextrous.v5i03.965

This is an open-access article under theCC-BY-SA License.

Introduction

Digital transformation has transformed the way higher education institutions deliver learning, including through the implementation of hybrid learning, which integrates face-to-face lectures and online learning. This model provides flexibility in accessing materials, interacting with lecturers, and organizing academic activities according to student needs. However, this flexibility does not automatically guarantee effective communication during the learning process. Müller and Mildenberger (2021), through a systematic review and meta-analysis of blended learning in higher education, found that learning outcomes in this model are generally comparable to conventional learning, even when some face-to-face time is replaced by online activities. Meanwhile, Ashraf et al. (2022) identified various opportunities and challenges in implementing blended learning, including the need for technological readiness, digital competency, and appropriate pedagogical design. In the Indonesian context, Saputra et al. (2023) also discussed the use of hybrid learning for local wisdom-based character education, demonstrating that integrating technology into the educational process requires consideration of the learning context. Thus, the development of hybrid learning needs to be understood not only as a change in the method of delivering material, but also as a change in communication patterns that determine how academic messages are delivered, received, and interpreted by students.

In practice, the implementation of hybrid lectures in higher education presents a different experience for each student because academic interactions take place through both in-person and digital communication channels. Based on preliminary observations outlined in this research paper, students who study while working may experience delays in receiving lecture information due to divided attention, while students living in boarding houses may encounter internet connection disruptions when attending online presentations. Students studying in a family environment may also experience difficulty concentrating due to unsupportive learning environments. Furthermore, delays in feedback, limited two-way discussions, and difficulty expressing opinions can impact student engagement in academic activities. In line with this phenomenon, Emeilia and Muntazah (2021) examined communication barriers in online learning and demonstrated that the use of digital media presents communication challenges between instructors and students. Sila and Kamaludin (2021), through a study of Biology Education students at the University of Timor, found that students had relatively positive perceptions of the use of e-learning, but this positive perception needs to be distinguished from the interaction and communication experiences that arise in learning practices. Meanwhile, Widiawati (2023) identified technical, psychological, environmental, and semantic barriers that can interfere with students' understanding of the material. These findings demonstrate that communication issues in technology-based learning need to be examined by considering students' actual conditions, not just device availability and platform usability.

Previous studies on blended learning have shed light on the effectiveness of learning models, student experiences, and factors supporting academic engagement. Müller and Mildenberger (2021) showed that replacing part of face-to-face learning with online activities did not systematically result in lower learning outcomes compared to conventional learning.

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

These findings confirm that the effectiveness of hybrid learning depends on its implementation, not solely on the proportion of online and offline learning. From a student experience perspective, Armellini et al. (2021) found that a quality academic experience needs to be accompanied by social experiences and adequate learning support. Based on focus group discussions with 60 students, the study emphasized the importance of regular interaction between students, lecturers, and learning materials, including synchronous and asynchronous communication. Furthermore, De Bruijn-Smolders and Prinsen (2024), through a systematic review of student engagement in blended learning, demonstrated positive impacts on academic engagement, behavioral, cognitive, and affective outcomes across the reviewed studies. However, the researchers also emphasized that the social and personal dimensions of the learning experience require further attention. Overall, previous research provides a strong foundation for understanding the benefits of blended learning, but also suggests that student learning outcomes and engagement need to be situated within a broader framework of communication experiences.

However, previous studies have shown differences in focus and findings that need to be interpreted according to their respective contexts. Sila and Kamaludin (2021) focused on students' perceptions of e-learning during the pandemic, while Emeilia and Muntazah (2021) examined communication barriers in online learning in general. Widiawati (2023) more specifically identified technical, psychological, environmental, and semantic barriers that impact material comprehension. These differences do not mean that the findings contradict each other, but rather demonstrate that digital learning experiences can vary depending on the context, participant characteristics, and research focus. This explanation is reinforced by Li (2022), who examined the challenges of student isolation in blended learning and the relationship between social presence, interaction, and sense of community. Furthermore, van der Stap et al. (2024), through a systematic literature review, identified social presence and convergence as crucial elements in fostering online interaction in blended learning. Comparatively, these studies provide insights into perceptions of technology, forms of communication barriers, and the importance of social relationships, but employ different analytical focuses. Therefore, research findings on positive perceptions of the platform cannot be directly considered as evidence that academic communication has been effective, just as identifying barriers to online learning does not in itself explain how students experience and interpret these barriers in post-pandemic hybrid lectures.

Based on this review, a relevant research gap lies in the need for a deeper understanding of students' lived experiences facing communication barriers in hybrid learning systems after the COVID-19 pandemic. Previous research has addressed the effectiveness of blended learning, perceptions of e-learning, barriers to online communication, and the importance of interaction and social presence. However, within the reviewed body of studies, there is still a need for studies that specifically link students' subjective experiences to various forms of communication barriers in the context of hybrid learning that combines in-person and digital interactions. De Bruijn-Smolders and Prinsen (2024) underscore the need to understand student engagement across academic, personal, and social dimensions, while van der Stap et al. (2024) demonstrate the importance of social presence and interaction in blended learning. Both studies

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

provide a foundation for expanding the discussion from model effectiveness to students' communication experiences. Therefore, this research aims to address two main questions: how students experience communication barriers during post-pandemic hybrid learning and what forms of communication barriers they encounter. By formulating the problem, this study seeks to explain not only the existence of barriers, but also how students understand situations, interpret academic messages, and respond to interaction limitations based on their respective experiences.

This study aims to understand students' experiences in facing communication barriers in the post-pandemic hybrid lecture system and identify the types of barriers that affect the academic communication process. The urgency of this research stems from the need for higher education institutions to develop learning that is not only technologically flexible but also able to facilitate meaningful student interaction, message comprehension, and engagement. In line with Müller and Mildenberger (2021), the effectiveness of blended learning needs to be understood by considering its design and implementation, while Armellini et al. (2021) emphasize the importance of social experiences, interactions, and lecturer support in the quality of students' learning experiences. The novelty of this study lies in the use of a phenomenological approach to examine the experiences and meanings of communication barriers of three students from different study programs and universities: Management at LSPR Jakarta University, Industrial Product Design at Indonesia University of Education, and Management at Gunadarma University. Unlike studies that primarily evaluate learning effectiveness or identify barriers in general, this study links students' subjective experiences with technical, psychological and cognitive, semantic, and socio-interactional barriers using the phenomenological perspectives of Edmund Husserl and Alfred Schutz and the concept of noise in Shannon and Weaver's communication model. Theoretically, this study is expected to enrich the study of educational communication by explaining the relationship between communication conditions and meaning formation based on students' lived experiences. Practically, the research results are expected to be used as considerations for lecturers and universities in improving communication strategies, material delivery, feedback provision, and interaction support in implementing hybrid lectures.

Research Methods

Research Design and Type

This study uses a qualitative approach with a phenomenological method to understand students' lived experiences when facing communication barriers in a hybrid lecture system after the COVID-19 pandemic. The qualitative approach was chosen because the research focuses on understanding the meaning, subjective experiences, and social context of participants, rather than on hypothesis testing or statistically measuring relationships between variables. Sugiyono (2022) explains that qualitative research is used to understand phenomena in natural conditions by positioning the researcher as the primary instrument, while Sudaryono (2021) emphasizes the importance of alignment between research objectives, design, data collection techniques, and analysis. Specifically, the phenomenological approach in this study refers to Edmund Husserl's thinking on experience as experienced by individuals and Alfred Schutz on the meaning of social action based on individual experiences and motives. The choice of phenomenological interviews is also in line with Høffding et al. (2022), who explain that

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

interviews can be a rich source of knowledge for exploring human experience when conducted and interpreted methodologically. Thus, this design allows the research to identify technical, psychological and cognitive, semantic, and socio-interactional barriers while understanding how students interpret and respond to these barriers.

Participants and Informant Selection Techniques

Research participants were selected purposively, based on the suitability of individual experiences and characteristics to the research focus. In phenomenological research, informant selection is directed at individuals who have directly experienced the phenomenon under study and are able to explain those experiences in depth, rather than to statistically represent the population (Abdussamad, 2021; Sugiyono, 2022). This study involved three students from different universities and study programs: a Management student at LSPR University Jakarta who was working while studying, a Management student at Gunadarma University who lived with her parents, and a Industrial Product Design student at the Indonesian University of Education who lived in a boarding house during her studies. All three were selected based on the criteria of being active students, having attended hybrid lectures for at least two semesters after the pandemic, having experienced communication barriers in both online and offline activities, and being willing to share their experiences in depth. These diverse backgrounds allowed the researchers to explore a variety of experiences related to work activities, family environment, living conditions, and academic interactions. These considerations align with Sudaryono (2021)'s analysis of selecting samples appropriate to research needs, and Høffding et al.'s (2022) analysis of the importance of interviews focused on participants' concrete experiences. Therefore, three informants were used to explore the case and context of each individual's experience, not to generate statistical generalizations.

Data Collection Instruments and Techniques

In this qualitative study, the researcher served as the primary instrument, with a semi-structured interview guide serving as a supporting instrument to maintain the focus of data collection while providing space for participants to openly describe their experiences. The interview guide addressed several aspects, including experiences attending hybrid lectures, connection and device disruptions, psychological and concentration conditions, difficulties understanding lecturers' messages or materials, limited interaction with lecturers and other students, delayed feedback, and adaptation strategies. These aspects were developed based on the research focus and linked to previous studies on communication barriers in online learning (Emeilia & Muntazah, 2021; Widiawati, 2023), student perceptions of e-learning (Sila & Kamaludin, 2021), and the importance of interaction and social presence in blended learning (van der Stap et al., 2024). Data collection was conducted through semi-structured interviews as the primary technique, accompanied by observations of the face-to-face and online lecture contexts and relevant documentation, as described in the research sources. Documentation includes interview guidelines, transcripts, and photographs of interview activities. Literature and documents related to the implementation of hybrid learning were used to support interpretation. The use of interviews, observations, and documentation aligns with the descriptions of qualitative data collection techniques by Ardiansyah et al. (2023) and Abdussamad (2021). Because this study used qualitative instruments that were not intended to measure constructs through a numerical scale, psychometric validity and reliability testing were not applied. The quality of the instruments and their results was assessed through the appropriateness of the questions to the research objectives, the depth of the information obtained, and cross-checking with available data sources.

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

Research Procedures

The research was conducted over three months, from April to June 2026. The research procedure began with a literature review on educational communication, hybrid learning, communication barriers, and the phenomenological approach to determine the focus and experiential aspects that needed to be explored. Next, the researcher identified potential informants based on predetermined criteria, developed a semi-structured interview guide, and prepared the necessary documentation. The data collection phase involved in-depth interviews with the three informants, accompanied by observations of both face-to-face and online learning contexts and the collection of supporting documentation. The research manuscript mentioned the use of platforms such as Google Meet and Zoom in the context of online learning. After data collection, the interview results were transcribed, read repeatedly, and compared with observational notes and relevant documentation before grouping and interpretation. The analysis process was gradual and iterative to ensure that the resulting understanding remained based on the information provided by the participants, as per the principles of qualitative analysis discussed by Abdussamad (2021) and Sugiyono (2022). This procedure also took into account the context of hybrid learning implementation, which can vary across universities, as demonstrated by Ashraf et al. (2022) and Müller and Mildenberger (2021). Differences in institutional context are therefore treated as part of the participants' experiential background, rather than as completely uniform learning conditions.

Data Analysis Techniques

Data analysis was conducted qualitatively, combining phenomenological interpretation and an interactive analysis model, encompassing data reduction, data presentation, and drawing and verifying conclusions. The initial stage involved repeated reading of interview transcripts, observation notes, and documents to gain a comprehensive understanding of each informant's experiences. Next, the researcher identified significant statements related to communication barriers and grouped them into meaningful units based on similarities and differences in experiences. These meaningful units were analyzed by developing textural descriptions of the students' experiences and structural descriptions of the conditions that shaped those experiences, including the learning environment, technological constraints, psychological state, and academic interaction patterns. Next, the researcher synthesized these descriptions to understand the essence of students' experiences facing communication barriers during hybrid lectures. This phenomenological stage was carried out iteratively, along with data reduction, presentation of findings, and verification of conclusions, ensuring that interpretations were inseparable from the context and statements of the informants. Emzir (2021) and Abdussamad (2021) explain the importance of systematic analysis in transforming qualitative data into meaningful findings, while Sugiyono (2022) emphasizes the interactive nature of qualitative data analysis. Høffding et al. (2022) also emphasize the importance of thoroughness in interpreting the results of phenomenological interviews. Thus, the analysis does not stop at grouping types of barriers, but rather aims to explain the meanings students construct based on their lived experiences.

Data Validityand Ethical Considerations

Data validity was checked through technical triangulation by comparing interview information and supporting documentation, along with a comparison of experiences between participants to identify similarities, differences, and contexts that influence interpretation. This strategy aligns with Abdussamad (2021) and Sugiyono (2022), who position cross-checking of sources or techniques as a way to strengthen the credibility of qualitative data. Ahmed (2024) also outlined

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

the importance of credibility, transferability, dependability, and confirmability in ensuring the accuracy of qualitative research. Regarding ethics, the source text specifies willingness to participate as one of the criteria for selecting informants. However, the available documents do not explicitly explain the consent procedures after providing information, the anonymization mechanism, the right to withdraw, or the ethics committee approval number. Therefore, the existence of formal ethics approval cannot be ascertained from these documents alone. When preparing journal articles, authors should report the actual procedures followed regarding participant consent, confidentiality, data storage, and research permits, without including unsubstantiated claims or approval numbers. This explanation is important because ethics in qualitative research includes protecting participants' rights throughout the research process, not just during recruitment (Klykken, 2022; Potthoff et al., 2023).

Results and Discussion

Research result

The following results section is compiled based on the thesis Communication Barriers in Hybrid Lecture System: Phenomenological Study on College Students, specifically Chapter IV pages 69 to 100 which contains informant profiles, lecture experiences, forms of communication barriers, adaptation strategies, and research findings. The results are presented descriptively based on interviews and documentation reported in the manuscript, without adding statistical data or quotations that are not available in it.

A. Student Experience in Attending Hybrid Lectures

Interviews with three students from different universities revealed that the hybrid learning system provided diverse experiences, depending on their backgrounds, daily routines, and living environments. The first informant was a Management student at LSPR Jakarta University who was studying while working as a customer service representative. The second informant was an Industrial Product Design student at the Indonesian Education University who lived in a boarding house during her studies. The third informant was a Management student at Gunadarma University who attended classes from home with her family. All three informants stated that the hybrid system provided flexibility in organizing learning activities, but each still faced different challenges.

For the first informant, the evening class schedule provided the opportunity to work during the day and attend after-work classes. However, this situation required energy management and concentration, as academic activities took place after work. The second informant benefited from the flexibility of being able to attend face-to-face classes when scheduled and online from home. However, using a shared internet connection in their boarding house was a challenge. Meanwhile, the third informant benefited from saving time, energy, and transportation costs by not having to constantly come to campus. This experience was accompanied by difficulties in obtaining a stable signal, understanding online material, and maintaining concentration when the home environment was noisy.

B. Forms of Communication Barriers

The research identified four groups of communication barriers: technical and infrastructure barriers, psychological and cognitive barriers, semantic barriers, and socio-interactional barriers. These four groups were identified through the informants' experiences in receiving lecture information, understanding the material, interacting with lecturers and other students, and adapting learning activities to their personal and environmental circumstances.

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

Table 1. Summary of Findings of Communication Barriers in Hybrid Lectures

Kobstacle category	Empirical findings	Informants who experienced
Technical and infrastructure	The shared Wi-Fi connection becomes slow due to the large number of boarding house residents using it. The internet signal in the home is also unstable.	Informants 2 and 3
Psychological and cognitive	Physical fatigue after work affects concentration. Missing family when living away from home has also been reported.	Informants 1 and 2
Semantics or message understanding	Material is more difficult to understand when online learning only provides assignments without direct explanation. Informants also stated that face-to-face interaction aids comprehension.	Informants 2 and 3
Social-interactional	It's difficult to build close relationships with friends when class compositions change frequently. Instead, interaction through group assignments helps build camaraderie.	Informants 2 and 3

Source: Processed from the results of interviews presented in the research manuscript, pages 81 to 86. The informant's identity is abbreviated for the purpose of presenting the article.

In the technical and infrastructure category, the second informant experienced a slow internet connection because the boarding house's Wi-Fi was shared by many residents and his room was far from the router. This situation forced him to use his own internet quota when the Wi-Fi network was inadequate. The third informant reported signal interference because his house was located in an alley that made it difficult to obtain a stable network. These findings suggest that technical barriers arise in the form of limited connection quality used to attend online lectures.

In the psychological and cognitive category, the first informant stated that the main challenge was managing physical condition and concentration after work. He stated, "The main obstacle is probably energy management, physical condition, so you have to be smart about managing concentration and energy because lectures are after work" (Informant 1, interview, 2026). The second informant reported missing his family because he had to live away from home during his studies. These two experiences demonstrate different forms of internal obstacles, namely fatigue after work and the emotional state of living away from family.

In the semantic category, the third informant experienced difficulty understanding the material when online classes only gave assignments without direct explanations. He stated, "Online classes usually only give assignments without direct explanations of the material, so it's more difficult to understand" (Informant 3, interview, 2026). The second informant also stated that face-to-face meetings were more helpful for understanding because they provided opportunities to obtain direct examples, discuss with lecturers, and interact with friends. Thus, the interview data indicated that the difficulty in understanding was related to the method of presentation of the material and the opportunity to receive additional explanations during the learning process.

In the social-interactional category, the experiences of the two informants differed. The third informant reported difficulty building close relationships with fellow students due to the frequently changing class schedules. He stated, "I'm less close to my current friends because the class system is often shuffled" (Informant 3, interview, 2026). In contrast, the second informant stated that close relationships can still be built through group assignments and joint project activities. This finding suggests that opportunities for

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

interaction are not experienced equally by all students.

A. Student Adaptation Strategies

Interview results showed that all three informants adapted to the obstacles they faced. The first informant disciplined their time management, creating a schedule, setting reminders for lectures, and managing their energy to stay focused after work. The second informant used a personal internet quota as an alternative when their boarding house's Wi-Fi network was disrupted and maintained social connections through group academic activities. The third informant chose to attend online classes in a private room to minimize distractions from family members. He also stated that he tried asking questions through the learning platform and seeking additional materials when he didn't understand the lecturer's explanations.

Overall, the study identified three interrelated patterns of experiences. First, the flexibility of hybrid lectures provides benefits in managing time, space, energy, and costs. Second, there are four groups of communication barriers related to technical conditions, psychological and cognitive conditions, message comprehension, and social interactions. Third, students employ different adaptation strategies according to their individual needs. No hypothesis testing or inferential statistical testing was conducted because this study used a qualitative phenomenological approach. Therefore, the results focus on describing the experiences of three informants and not on estimating the prevalence of communication barriers in the general student population.

Discussion

A. Hybrid Lecture Flexibility and Student Experience

The research findings indicate that the hybrid learning system provides flexibility, but this benefit does not eliminate the communication barriers experienced by students. The differences in experiences between working students, students living in boarding houses, and students living with their families demonstrate that the same learning system can take place under different social conditions and routines. These findings align with Müller and Mildenberger (2021), who demonstrated that blended learning with reduced face-to-face time can produce learning outcomes equivalent to conventional learning, but its effectiveness still depends on the learning implementation. Ashraf et al. (2022) also identified that the implementation of blended learning presents both opportunities and challenges related to technological readiness and pedagogical design. Therefore, the results of this study demonstrate that flexibility is one of the benefits of hybrid learning, while the quality of the communication experience still requires separate consideration.

B. Technical and Semantic Barriers in Academic Communication

Technical and semantic barriers in this study represent two distinct issues, although they can occur within the same learning process. Internet network disruptions impacted smooth access to online communication, while limited direct explanations made it difficult for students to understand the material even though information or assignments were readily available. The experience of the second informant, who used a personal data plan, and the experience of the third informant, who struggled to understand assignments without explanations, demonstrate that meeting technological needs alone does not necessarily guarantee clarity of academic messages. These findings are consistent with Emeilia and Muntazah (2021), who identified technological limitations and interpersonal interactions as barriers to online learning communication. Widiawati (2023) also reported technical and semantic barriers that can impact material comprehension. Therefore, improving

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

communication in hybrid learning needs to encompass network quality, clarity of explanations, opportunities for questions, and feedback mechanisms.

C. The Role of Psychological Conditions and Academic Engagement

Differences in the informants' psychological states indicate that communication barriers do not always stem from the device or channel of message delivery. Fatigue after work in the first informant and longing for family in the second informant illustrate personal conditions that can affect readiness to participate in learning and maintain attention. In this context, the learning experience cannot be separated from students' lives outside the classroom. Armellini et al. (2021) emphasize the importance of students' learning and social experiences in implementing active blended learning, while De Bruijn-Smolders and Prinsen (2024) identify academic, behavioral, cognitive, and affective dimensions as part of student engagement in blended learning. The results of this study broaden understanding of the context of the three informants by showing how work activities and life as students away from home relate to the types of barriers they report. However, due to the limited number of informants, these findings cannot be used to conclude that all students who work or live far from their families will experience the same barriers.

D. Social Interaction and Student Sense of Connectedness

Findings regarding social relationships indicate that limited opportunities for interaction can be a barrier for some students, but this does not always result in the same experiences. A third informant felt less close to classmates when class compositions frequently changed, while a second informant maintained closeness through group activities and joint projects. These differences suggest that social relationships in blended learning are not solely determined by class format but also relate to the opportunities and methods students employ to foster interaction. Li (2022) found that social presence is related to a sense of community in blended learning and that interaction plays a role in these relationships. Similarly, van der Stap et al. (2024) emphasized the importance of social presence and convergence in fostering online interactions in blended learning. In the context of this study, group assignments were one form of activity that helped the second informant maintain social relationships, while changes in class composition were reported by the third informant as a barrier to developing closeness.

E. Communication Barriers in the Perspective of Shannon and Weaver's Model

When viewed through Shannon and Weaver's communication model, research findings can be understood as the presence of interference or noise in the process of conveying academic messages. Technical disruptions are evident in unstable internet connections, while difficulties understanding the material indicate problems with message reception and interpretation. Psychological conditions, such as fatigue, as well as environmental and social interaction barriers, demonstrate that students' communication experiences are related not only to the quality of the channel but also to the recipient's condition and the communication environment. Emeilia and Muntazah (2021) demonstrate that online learning can lead to technological limitations, communication fatigue, and reduced interpersonal communication. Meanwhile, Widiawati (2023) identifies technical, psychological, environmental, and semantic barriers in online learning. The findings of this study are consistent with these categories and demonstrate that a single student may encounter more than one form of barrier. Therefore, the noise model is useful for categorizing emerging communication issues, while the phenomenological approach helps uncover how these barriers are experienced by individuals within their life contexts.

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

F. Understanding Student Experiences and Adaptation Strategies

Through a Husserlian phenomenological perspective, the research findings demonstrate that similar experiences do not always yield the same meanings. The first informant viewed the flexibility of a hybrid schedule as an opportunity to maintain employment and education simultaneously, the second as a way to attend lectures while living abroad, and the third as a means to save time, energy, and transportation costs. From Schutz's perspective, their adaptive actions can be understood as efforts related to their background experiences and the goals they wish to achieve. Time management, the use of personal quotas, and the selection of quieter study spaces are concrete actions taken to maintain learning continuity. The studies of Armellini et al. (2021) on students' social and learning experiences and De Bruijn-Smolders and Prinsen (2024) on student engagement support the importance of viewing blended learning through the broader student experience. Thus, the analytical contribution of this research lies in the relationship between the types of barriers, life contexts, and adaptation strategies reported by each informant, rather than simply in an inventory of technical learning obstacles.

G. Implications, Limitations, and Directions for Further Research

Practically, the research findings demonstrate the need for universities to ensure adequate network access, provide more structured explanations of material, expedite feedback, and create consistent opportunities for academic interaction. Lecturers can strengthen two-way communication through discussion sessions, consultations, and spaces for students to express learning challenges. These recommendations align with van der Stap et al. (2024), who highlight the importance of social presence in blended learning interaction design, and Ashraf et al. (2022), who emphasize the pedagogical and technical challenges in implementing blended learning. However, this study has limitations because it only involved three informants from three study programs and three universities. The findings are not intended to represent all students or to compare the quality of hybrid systems across universities. Furthermore, the data primarily depict student perspectives, so lecturers' experiences and institutional policies are not directly represented. Future research could involve more students and lecturers, expand the diversity of institutions, and use comparative or mixed-method designs to examine the relationship between communication barriers, interaction quality, and student engagement.

Conclusion

This study concludes that Lithium Polymer (LiPo) batteries play a crucial role in supporting drone performance due to their high power-to-weight ratio, but their chemical characteristics make them susceptible to various issues that can impact operational safety and reliability. Based on a literature review, the main causes of LiPo battery problems include incorrect charging and discharging, physical damage due to impact, exposure to extreme temperatures, cell imbalance, and improper storage. These issues can lead to battery swelling, reduced capacity and flight time, sudden power loss, and thermal runaway, which can potentially lead to fires and accidents. Mitigation efforts that can be implemented include the use of a Battery Management System (BMS), charging within manufacturer-recommended limits, storage under proper conditions, temperature control, regular inspections, and replacement of batteries that have experienced damage or decreased performance. However, this study has limitations because it relies on a literature review and lacks experimental testing or direct operational data to measure the effectiveness of each mitigation method under various

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

flight conditions. Therefore, further research is recommended to develop a battery degradation prediction model based on voltage, current, temperature, charging cycles, and drone usage patterns, as well as test the effectiveness of battery monitoring and protection systems through controlled experiments. In its implementation, drone operators also need to consistently implement procedures for charging, storing, inspecting, and replacing batteries to reduce the risk of failure and optimize battery life.

References

Abdussamad, Z. (2021). Metode penelitian kualitatif. CV. Syakir Media Press.

Ahmed, S. K. (2024). The pillars of trustworthiness in qualitative research. Journal of Medicine, Surgery, and Public Health, 2, Article 100051. https://doi.org/10.1016/j.glmedi.2024.100051

Ardiansyah, Risnita, & Jailani, M. S. (2023). Teknik pengumpulan data dan instrumen penelitian ilmiah pendidikan pada pendekatan kualitatif dan kuantitatif. IHSAN: Jurnal Pendidikan Islam, 1(2), 1–9. https://doi.org/10.61104/ihsan.v1i2.57

Armellini, A., Teixeira Antunes, V., & Howe, R. (2021). Student perspectives on learning experiences in a higher education active blended learning context. TechTrends, 65, 433–443. https://doi.org/10.1007/s11528-021-00593-w

Ashraf, M. A., Mollah, S., Perveen, S., Shabnam, N., & Nahar, L. (2022). Pedagogical applications, prospects, and challenges of blended learning in Chinese higher education: A systematic review. Frontiers in Psychology, 12, Article 772322. https://doi.org/10.3389/fpsyg.2021.772322

De Bruijn-Smolders, M., & Prinsen, F. R. (2024). Effective student engagement with blended learning: A systematic review. Heliyon, 10(23), Article e39439. https://doi.org/10.1016/j.heliyon.2024.e39439

Emeilia, R. I., & Muntazah, A. (2021). Hambatan komunikasi dalam pembelajaran online di masa pandemi COVID-19. Akrab Juara: Jurnal Ilmu-Ilmu Sosial, 6(2), 155–166. https://doi.org/10.58487/akrabjuara.v6i2.2113

Emzir. (2021). Metodologi penelitian kualitatif: Analisis data. Rajawali Pers.

Høffding, S., Martiny, K., & Roepstorff, A. (2022). Can we trust the phenomenological interview? Metaphysical, epistemological, and methodological objections. Phenomenology and the Cognitive Sciences, 21, 33–51. https://doi.org/10.1007/s11097-021-09744-z

Husserl, E. (2012). Ideas: General introduction to pure phenomenology (W. R. Boyce Gibson, Trans.). Routledge. (Original work published 1913)

Klykken, F. H. (2022). Implementing continuous consent in qualitative research. Qualitative Research, 22(5), 795–810. https://doi.org/10.1177/14687941211014366

Li, L. (2022). Students' isolation challenges in blended EFL learning during COVID-19: How can social presence and interaction help develop sense of community? Psychology

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

Research and Behavior Management, 15, 3117–3131. https://doi.org/10.2147/PRBM.S388317

Müller, C., & Mildenberger, T. (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. Educational Research Review, 34, Article 100394. https://doi.org/10.1016/j.edurev.2021.100394

Potthoff, S., Hempeler, C., Gather, J., Gieselmann, A., Vollmann, J., & Scholten, M. (2023). Research ethics in practice: An analysis of ethical issues encountered in qualitative health research with mental health service users and relatives. Medicine, Health Care and Philosophy, 26(4), 517–527. https://doi.org/10.1007/s11019-023-10169-5

Saputra, A. M. A., Huriati, N., Lahiya, A., Bahansubu, A., Rofi'i, A., & Taupiq, T. (2023). Pendidikan karakter melalui pembelajaran hybrid berbasis kearifan lokal untuk mengembangkan potensi siswa. Journal on Education, 6(1), 1102–1110. https://doi.org/10.31004/joe.v6i1.3050

Schutz, A. (1967). The phenomenology of the social world (G. Walsh & F. Lehnert, Trans.). Northwestern University Press.

Shannon, C. E., & Weaver, W. (1949). The mathematical theory of communication. University of Illinois Press.

Sila, V. U. R., & Kamaludin. (2021). Persepsi mahasiswa Universitas Timor Prodi Pendidikan Biologi terhadap e-learning pada kondisi pandemi COVID-19. EduMatSains: Jurnal Pendidikan, Matematika dan Sains, 5(2), 123–138. https://doi.org/10.33541/edumatsains.v5i2.2191

Sudaryono. (2021). Metodologi penelitian: Kuantitatif, kualitatif, dan mix method (2nd ed.). Rajawali Pers.

Sugiyono. (2022). Metode penelitian kualitatif: Untuk penelitian yang bersifat eksploratif, enterpretif, interaktif, dan konstruktif. Alfabeta.

van der Stap, N., van den Bogaart, T., Rahimi, E., & Versendaal, J. (2024). Fostering online interaction in blended learning through social presence and convergence: A systematic literature review. Journal of Computer Assisted Learning, 40(4), 1712–1726. https://doi.org/10.1111/jcal.12981

Widiawati, R. (2023). Hambatan komunikasi mahasiswa dalam pembelajaran daring (Studi: Hambatan komunikasi dalam memahami materi). Prosiding Konferensi Nasional Sosial dan Politik (KONASPOL), 1, 311–326. https://doi.org/10.32897/konaspol.2023.1.0.2379GetFPV Learn. (2019). Drone Battery Safety: Charging and Storing LiPo Batteries. Diakses dari https://www.getfpv.com/learn/fpv-essentials/drone-battery-safety/

Grepow. (2025). How to Troubleshoot Common Drone Battery Issues. Diakses dari https://www.grepow.com/blog/comprehensive-drone-battery-troubleshooting-guide.html

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license

HobbyKing. In-depth Analysis of Common LiPo Battery Faults: From Swelling to Overheating, How to Ensure Battery Safety. Diakses dari https://hobbyking.com/blog/LiPoBatteryFailureAnalysis

Herewin. (2026). Drone LiPo Battery Troubleshooting: A Comprehensive Guide to Maintenance and Safety. Diakses dari https://www.herewinpower.com/blog/drone-lipo-battery-troubleshooting-a-comprehensive-guide-to-maintenance-and-safety/

Ayaa UAV Power. (2026). Maximize Drone LiPo Battery Life with BMS Insights. Diakses dari https://www.ayaauavpower.com/news/drone-lipo-battery/

Ayaa UAV Power. (2026). Drone LiPo Battery Safety & Maintenance Guide with Smart BMS. Diakses dari https://www.ayaauavpower.com/news/lithium-polymer-battery-drone/

Hassanalian, M., & Abdelkefi, A. (2022). Drone Delivery Systems and Energy Management: A Review and Future Trends. arXiv:2206.10765.

https://doi.org/10.61536/ambidextrous.v5i03.965
This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license