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BALANCING SYNCHRONOUS AND ASYNCHRONOUS LEARNING IN INDONESIAN HIGHER EDUCATION:THE ROLE ...

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BALANCING SYNCHRONOUS AND ASYNCHRONOUS LEARNING IN INDONESIAN HIGHER EDUCATION:THE ROLE OF REFLECTION IN ENHANCING ENGAGEMENT AND OUTCOMES

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ABSTRACT (9 pt)

Objective: This study investigates the effectiveness of synchronous and asynchronous learning modalities and examines the mediating role of reflection on learning outcomes in fully online Indonesian higher education.

Methods: Using a mixed-methods case study approach, data were collected through questionnaires (28 statements) and semi-structured interviews from 20 third-year students at a university in Cirebon, Indonesia. Participants were purposively selected based on completion of technology literacy courses and one semester of experience with both learning modalities. Qualitative data from one lecturer supplemented student perspectives. Data analysis followed the Miles, Huberman, and Saldana model.

Results: Asynchronous learning demonstrated high effectiveness in fostering critical thinking (77%), self-paced learning (85%), and draft revision opportunities (88%). Synchronous learning showed strong preference for immediate feedback (71%) but faced significant technical challenges, with 90% reporting audio problems and 65% experiencing delayed engagement. High neutrality in perceived skill improvement indicated uncertainty about comparative effectiveness. Interviews revealed 60% preferred synchronous learning despite technical obstacles, while 40% preferred asynchronous learning for flexibility.

Novelty: This study introduces a dual reflection pathway framework explaining how learning modalities activate distinct cognitive processes. Asynchronous learning operates through deliberate reflection via a three-stage mechanism (generalization, monitoring, refinement) with documented iterative cycles, while synchronous learning facilitates spontaneous reflection through immediate social presence. This framework advances theoretical understanding of reflection's mediating role in online learning effectiveness within the Indonesian context.

INTRODUCTION

The rapid development of digital technology and online education platforms has transformed higher education, making online learning an essential component of modern teaching and learning. As educational institutions worldwide integrate digital learning strategies, the balance between synchronous and asynchronous

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Page 1-15

learning models has become a central topic of discussion (Daniel, 2020; Garcia et al., 2021; Liguori & Winkler, 2020)(Daniel, 2020; Garcia et al., 2021; Liguori & Winkler, 2020)(Daniel, 2020; Garcia et al., 2021; Liguori & Winkler, 2020). In Indonesia, the implementation of fully online learning remains a challenge, as traditional face-to-face instruction is still the dominant mode of education. However, institutions such as Open University Indonesia have pioneered online learning models, providing valuable insights into the effectiveness of digital learning environments (Huang et al., 2023; Liutsko, 2023)(Huang et al., 2023; Liutsko, 2023)(Huang et al., 2023; Liutsko, 2023). These models emphasize flexibility, personalized learning, and collaborative approaches, which are critical for addressing the unique challenges of online education in diverse contexts.

The shift toward fully online learning presents both opportunities and challenges. On one hand, it offers greater flexibility, accessibility, and a wider range of instructional methods, which are particularly beneficial in a geographically and culturally diverse country like Indonesia (Tusyanah et al., 2024)(Tusyanah et al., 2024)(Tusyanah et al., 2024). On the other hand, concerns regarding student engagement, interaction, motivation, and learning outcomes persist (Rahman et al., 2020)(Rahman et al., 2020)(Rahman et al., 2020). The effectiveness of online learning depends on how well teachers structure their courses, manage digital interactions, and assess students' progress. Despite its growing adoption, online learning remains underexplored in terms of its impact on the learning process and students' reflective engagement, particularly in fully online environments in Indonesia.

While online learning provides an alternative to traditional classroom settings, questions remain regarding its effectiveness compared to face-to-face instruction. One of the primary concerns is whether the online learning process leads to effective knowledge retention and skill development, as students may experience varying levels of engagement and comprehension in digital learning environments. Research indicates that while online learning offers flexibility and accessibility, it often struggles with fostering the interpersonal interactions essential for effective learning (Akpen et al., 2024)(Akpen et al., 2024)(Akpen et al., 2024).

Each learning modality presents distinct characteristics that influence student engagement and outcomes. Synchronous learning, characterized by real-time interactions such as virtual meetings, offers immediate feedback and structured engagement but requires stable internet connectivity and careful scheduling (Zeng & Luo, 2024). Studies have identified social presence as a key factor mediating the

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Page 1-15

relationship between active learning and subjective course gains in synchronous classes (Ratan et al., 2022; Zhang et al., 2022). However, technical challenges such as poor audio quality, background noise, and unstable internet connections often hinder effectiveness (Bell et al., 2014; Bower et al., 2015; Zhang et al., 2022)(Bell et al., 2014; Bower et al., 2015; Zhang et al., 2022)(Bell et al., 2014; Bower et al., 2015; Zhang et al., 2022), and information overload from high social presence can negatively impact student engagement (Lee & Kim, 2023).

In contrast, asynchronous learning, facilitated by discussion forums, emails, and message boards, provides flexibility and self-paced learning opportunities that enhance critical thinking and self-directed learning. Research demonstrates that online discussion forums enhance learners' motivation, independence, and satisfaction (Ho, 2014), improve student engagement and language skills (Zheng & Warschauer, 2015), and effectively foster communication skills and problem-solving abilities in higher education (Delahunty, 2018). A meta-analysis by Zeng & Luo (2024) indicated that asynchronous learning generally promotes better knowledge retention than synchronous learning, although the effect size was small. Despite these benefits, asynchronous learning may reduce real-time interaction and motivation, requiring greater self-discipline from learners (Roseth et al., 2013; Shute & Rahimi, 2017)(Roseth et al., 2013; Shute & Rahimi, 2017)(Roseth et al., 2013; Shute & Rahimi, 2017). (Zeng & Luo, 2024)(Zeng & Luo, 2024)Ho (2014)Ho (2014)Zheng & Warschauer (2015)Zheng & Warschauer (2015)Delahunty (2018)Delahunty (2018)Zeng & Luo (2024)Zeng & Luo (2024)Ratan et al. (2022)Ratan et al. (2022)Zhang et al. (2022)Zhang et al. (2022)Cai et al. (2022)Cai et al. (2022)Lee & Kim (2023)Lee & Kim (2023)

Reflection is a crucial element in any learning process, particularly in teacher professional development and student learning. Through critical reflection, educators can assess their teaching methods, identify challenges, and make improvements to enhance student learning (Rudolph, 2019; Zhong et al., 2022)(Rudolph, 2019; Zhong et al., 2022)(Rudolph, 2019; Zhong et al., 2022). Reflective practices also enable students to critically assess their learning experiences, leading to improved self-regulation, motivation, and learning outcomes (Su et al., 2024)(Su et al., 2024)(Su et al., 2024). Incorporating peer self-regulated learning mechanisms and collaborative reflection among peers has been shown to enhance reflection and overall learning effectiveness in online settings (Kuo et al., 2023; Urzúa & Asención-Delaney, 2023)(Kuo et al., 2023; Urzúa & Asención-Delaney, 2023)(Kuo et al., 2023; Urzúa & Asención-Delaney, 2023). However, reflection in online learning environments is often overlooked or remains informal, with teachers rarely documenting their observations for systematic

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Page 1-15

evaluation. Systematic documentation of reflective practices can further enhance learning outcomes in both synchronous and asynchronous contexts, ensuring that reflection becomes an integral part of the learning process (Zhong et al., 2022)(Zhong et al., 2022)(Zhong et al., 2022).

While the integration of synchronous and asynchronous learning in higher education has been extensively studied, particularly through blended learning models (Lazarinis et al., 2024; Rahman et al., 2020)(Lazarinis et al., 2024; Rahman et al., 2020)(Lazarinis et al., 2024; Rahman et al., 2020), significant gaps remain. Previous research has predominantly focused on student perceptions, engagement levels, and the comparative benefits of each learning mode (Febrianto & Susanto, 2023; Kuo et al., 2023)(Febrianto & Susanto, 2023; Kuo et al., 2023)(Febrianto & Susanto, 2023; Kuo et al., 2023). However, three critical areas remain underexplored, particularly in the Indonesian context of fully online education: First, there is limited empirical analysis of the actual learning processes within synchronous and asynchronous environments and how these processes translate into measurable learning outcomes. Second, while reflection is recognized as essential for learning effectiveness, its specific role in enhancing online learning outcomes in fully online Indonesian settings has not been systematically investigated. Third, the interplay between technical challenges, student engagement, and reflective practices in shaping learning effectiveness requires deeper examination.

This study addresses these gaps by investigating fully online learning environments in Indonesia with three specific objectives: (1) to analyze the learning processes in synchronous and asynchronous classes and assess their effectiveness in improving students' skills and engagement; (2) to investigate the role of reflection—both teacher and student reflection—in understanding and improving online learning strategies; and (3) to identify challenges encountered by students in both learning modes, including technical issues, interaction difficulties, and motivation barriers. By addressing these objectives, this research contributes empirical evidence on how synchronous and asynchronous learning can be optimized through reflective practices in fully online education. The findings will help educators refine their approaches by balancing the benefits of real-time interaction with the flexibility and autonomy of asynchronous learning, ultimately fostering a more engaging and productive educational experience in the Indonesian higher education context.

RESEARCH METHOD

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Page 1-15

This study employed a case study method (Creswell & Poth, 2023)(Creswell & Poth, 2023)(Creswell & Poth, 2023) to provide a comprehensive and nuanced understanding of the challenges and effectiveness of synchronous and asynchronous learning in a fully online environment. The case study approach was chosen because its ability to provide an in-depth exploration of a specific phenomenon within its real-life context, making it suitable for investigating the reflective practices and learning experiences of students and lecturers during online learning. This method also aligns with the study's focus on capturing the complexities of online learning through both quantitative and qualitative data.

Participants

The participants in this study consisted of 20 third-year students from the Faculty of Education at a university in Cirebon, West Java, Indonesia. The participants were selected through purposive sampling based on several strategic criteria. Third-year students were specifically chosen because they possess sufficient academic maturity and prior learning experience to critically reflect on their educational processes, having completed at least two years of university study. Unlike first- or second-year students who are still adapting to higher education, third-year students can provide more nuanced insights into the comparative effectiveness of different learning modalities. Furthermore, these students had completed a full semester of instruction using both synchronous (e.g., virtual meetings) and asynchronous (e.g., discussion forums, emails) learning modalities, providing them with substantive experience necessary for meaningful reflection and comparison. The selection of a single class from one institution in Cirebon allowed for an in-depth case study approach, enabling detailed examination of the learning processes within a consistent educational context while controlling for institutional and curricular variables. The demographic composition of the participants was 21% male and 79% female, reflecting the gender distribution typical of education programs in the region.

In addition to student participants, one lecturer who taught the course was interviewed to provide pedagogical insights and triangulate student perspectives. The lecturer's contribution was limited to qualitative interview data and did not include quantitative questionnaire responses.

Data Collection

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Page 1-15

Data collection was conducted using a mixed-method approach, combining open-ended questionnaires and semi-structured interviews to gather comprehensive insights into the participants' experiences.

1. Questionnaires:

A questionnaire consisting of 28 statements was distributed to all participants via Google Forms. The statements were divided into 14 categories related to synchronous learning and 14 categories related to asynchronous learning, covering aspects such as engagement, motivation, feedback clarity, and technical challenges. Additionally, two open-ended questions were included to allow participants to elaborate on their experiences. The questionnaire responses were categorized into three groups:

a) Agreement with the application of online learning.
b) Disagreement with the application of online learning.
c) Neutral or uncertain responses about the implementation of online learning.

2. Interviews:

To gain deeper insights into the challenges faced by participants, semi-structured interviews were conducted via phone calls and Google Meet. The interview questions focused on three key aspects:

a) The facilities and infrastructure available to students for online learning.
b) Students' perceptions of the effectiveness of synchronous and asynchronous learning.
c) Specific problems encountered during fully online learning, such as technical issues, engagement difficulties, and feedback mechanisms.

The lecturer interview specifically explored instructional design considerations, observed student engagement patterns, and reflective teaching practices in online environments.

Data Analysis

Data analysis was conducted using the Miles, Huberman, and Saldana model (2014), which involves three iterative stages: data reduction, data display, and conclusion drawing/verification.

1. Data Reduction:

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Page 1-15

In this stage, the researchers organized and condensed the data collected from the questionnaires and interviews. Responses were grouped into thematic categories based on the research objectives, such as engagement in synchronous learning, critical thinking in asynchronous learning, and technical challenges. Lecturer interview data were analyzed separately to identify pedagogical insights that complemented student perspectives.

2. Data Display:

The reduced data were then displayed in a structured format, such as tables and figures, to facilitate analysis. Quantitative data from student questionnaires (N=20) were visualized in figures showing students' perceptions of asynchronous learning (Figure 1) and synchronous learning (Figure 2). Qualitative themes from student and lecturer interviews were organized into narrative summaries.

3. Conclusion Drawing and Verification:

In the final stage, the researchers interpreted the data to draw conclusions about the effectiveness of synchronous and asynchronous learning, the role of reflection in online learning, and the challenges faced by students. These conclusions were verified by cross-referencing the questionnaire and interview data to ensure consistency and reliability. The triangulation of multiple data sources strengthened the validity of the findings.

RESULTS AND DISCUSSION

Results

The study utilized questionnaires distributed via Google Forms to 20 third-year students, comprising 21% men and 79% women. The questionnaire consisted of 28 statements, divided into 14 categories related to synchronous learning and 14 categories related to asynchronous learning, along with two open-ended interview questions. All quantitative data presented in Figures 1 and 2 represent the perceptions of the 20 student participants only.

Students' performance in asynchronous learning

The data regarding students' perceptions of asynchronous learning is presented in Figure 1 and summarized in Table 1. The most notable findings include high agreement levels in several key areas: 88% of respondents agreed that discussion forums provided opportunities to correct mistakes in their drafts before posting

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Page 1-15

(Category 7), 85% agreed that discussion forums enabled them to control videos and prepare responses at their own pace (Category 9), and 81% agreed that discussion forums recorded both their own mistakes and those of their peers, facilitating better learning (Category 6).

Significantly, 77% of respondents acknowledged the necessity of employing critical thinking skills while using discussion forums (Category 8) and indicated that discussion forums allowed them to generalize, monitor, and modify responses better than in virtual meetings (Category 5). This finding directly supports the three-stage reflective mechanism central to this study's novelty: the ability to generalize patterns from peer contributions and learning materials, monitor one's understanding against documented feedback and errors, and refine responses through iterative revision before submission. The high agreement in Category 5 demonstrates that students explicitly recognized this deliberate reflective process as more effective in asynchronous environments compared to synchronous settings.

However, high neutrality was observed in several categories, particularly regarding skill improvement compared to virtual meetings (59% neutral in Category 1), engagement in active discussions (35% neutral in Category 9), and argumentation skill development (46% neutral in Category 11). The highest disagreement was found in Category 14, where 71% of respondents disagreed that discussion forums encouraged superficial responses, further validating the depth of reflective engagement in asynchronous learning.

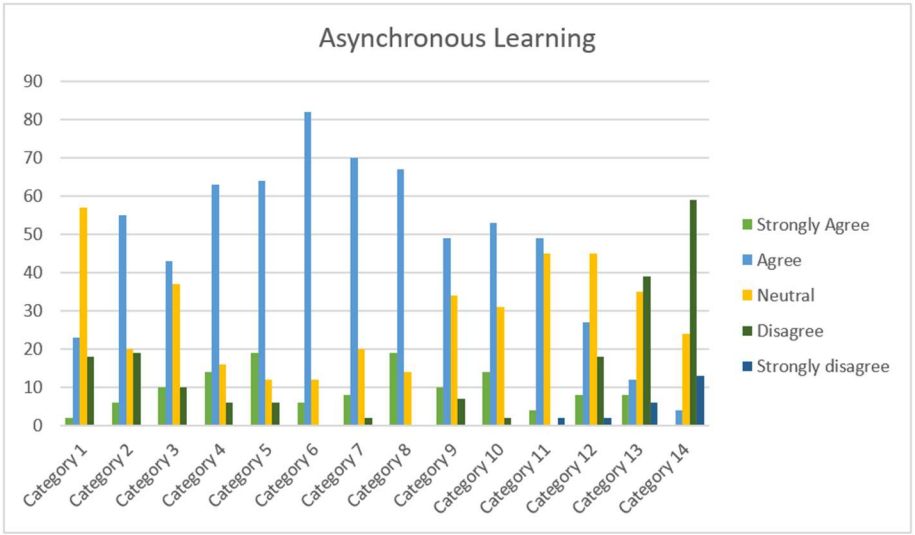

Fig. 1. Students' perception towards asynchronous learning

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

Students' performance in synchronous learning

Students' perceptions of synchronous learning are illustrated in Figure 2 and summarized in Table 2. The most striking finding was the overwhelming agreement (90%) that virtual meetings often involved audio problems or background noise (Category 25). Additionally, 71% of respondents preferred virtual meetings for receiving feedback from lecturers (Category 19), and 65% indicated that virtual meetings required concentration on one task at a time, unlike discussion forums (Category 28). Technical challenges were also evident, with 65% reporting delays in participant engagement due to technical difficulties and 61% indicating that location, device capabilities, and signal strength hindered their focus during discussions (Category 26).

High neutrality characterized many responses regarding the effectiveness of synchronous learning, particularly concerning skill improvement (69% neutral in Category 15), increased attendance benefits (63% neutral in Category 16), and motivation enhancement (58% neutral in Category 17). The highest agreement on positive aspects included clarity of lecturer explanations (56% in Categories 22 and 23) and feeling comfortable and connected during virtual meetings (48% in Category 24).

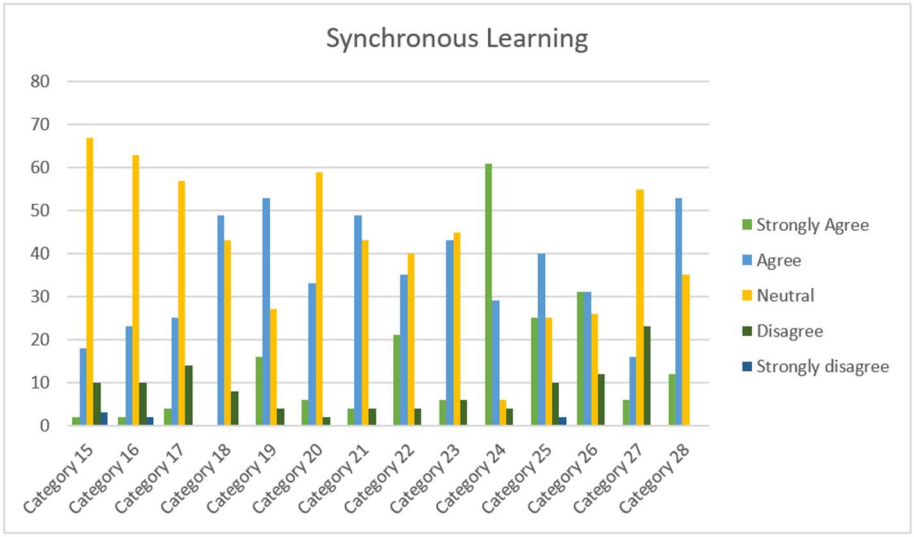

Fig. 2. Students perception towards synchronous learning

Challenges Faced by Students in Synchronous and Asynchronous Learning

Two open-ended interview questions were included in the Google Form to explore challenges in greater depth. Participants were asked to select their preferred learning

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

method and provide reasons for their choice. The analysis revealed that 60% of participants preferred synchronous learning through virtual meetings, while 40% opted for asynchronous learning via discussion forums.

Qualitative interviews with the lecturer provided complementary insights into these preferences. The lecturer observed that students who preferred synchronous learning valued immediate clarification of concepts but often struggled to articulate questions during live sessions due to time pressure. Conversely, students who favored asynchronous learning demonstrated more sophisticated written argumentation, suggesting that the additional time for reflection enhanced the quality of their contributions.

Discussion

Asynchronous Learning: Benefits and the Three-Stage Reflective Mechanism

The data analysis further indicated that respondents experienced skill improvement when using discussion forums compared to virtual meetings. This finding aligns with previous studies, such as Ho (2014)Ho (2014)Ho (2014) who highlighted the positive impact of online discussion forums on learners' motivation, independence, and satisfaction with the learning environment. Similarly, Zheng & Warschauer (2015)Zheng & Warschauer (2015)Zheng & Warschauer (2015) demonstrated that well-structured online discussions enhance student engagement, interaction, and overall language skills, as well as contribute to improved group project outcomes and test scores. Delahunty (2018)Delahunty (2018)Delahunty (2018) study also concluded that asynchronous discussion forums effectively foster learning and communication skills in higher education.

A key contribution of this study is the empirical identification of the three-stage reflective mechanism that explains asynchronous learning's effectiveness. The high agreement (77%) in Category 5, indicating that discussion forums allowed students to generalize, monitor, and modify responses better than virtual meetings, provides direct evidence of this mechanism in action:

1. Generalization Stage: Students extract patterns, principles, and key concepts from learning materials and peer contributions preserved in discussion forums. The permanent documentation of discussions (81% agreement in Category 6) enables students to review multiple perspectives and synthesize understanding over time.

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

2. Monitoring Stage: Students critically evaluate their understanding against documented mistakes (both their own and peers') and peer feedback. The visibility of errors in a non-threatening, asynchronous environment (88% agreement in Category 7 for draft revision opportunities) supports metacognitive monitoring without the time pressure of synchronous interaction.
3. Refinement Stage: Students modify and improve their responses before submission based on iterative reflection. The ability to correct mistakes before posting (88% agreement in Category 7) and control the pace of response preparation (85% agreement in Category 9) enables progressive refinement of thinking.

This three-stage mechanism operates through what we term "deliberate reflection", a conscious, iterative process enabled by the temporal flexibility and documentary permanence of asynchronous environments. The lecturer interview corroborated this finding, noting that "students who regularly engaged with discussion forums showed more sophisticated reasoning in their final submissions compared to early drafts, suggesting an iterative refinement process."

Respondents reported that discussion forums, emails, and discussion board messages facilitated faster, clearer, and more accessible responses, increasing their motivation to develop their skills through interaction. Cunningham et al. (2018)Cunningham et al. (2018)Cunningham et al. (2018) noted that students preferred screencast feedback for its clarity and ease of replay, prompting reflections on the challenges faced by educators using traditional text-based feedback methods. However, participants also expressed concerns about the clarity and comprehensibility of feedback provided via discussion forums. Ene & Upton (2014)Ene & Upton (2014)Ene & Upton (2014) found that most teachers' comments in Word documents primarily focused on content, leading to revisions in all aspects of writing, including content, organization, grammar, and mechanics. Conversely, de Lima et al. (2019)de Lima et al. (2019)de Lima et al. (2019) highlighted the challenges instructors face in monitoring activities within discussion forums due to limited resources.Coyle et al. (2017)Coyle et al. (2017)Tuma & Aljazeeri (2021)Tuma & Aljazeeri (2021)

The study also found that asynchronous learning encourages the development of critical thinking skills. Respondents acknowledged the necessity of applying skills such as inference, knowledge application, evaluation, and data analysis while engaging in discussion forums (77% agreement in Category 8). Prior research conducted by Klisc et al. (2017)Klisc et al. (2017)Klisc et al. (2017) Afify (2019)Afify

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Page 1-15

(2019)Afify (2019), and Gao (2024)Gao (2024)Gao (2024) has shown that online discussion forums enhance critical thinking, problem-solving, decision-making, and written communication skills while also aiding in information organization and analysis. Additionally, participants agreed that discussion forums allowed them to regulate their learning pace, review multiple perspectives, and address unanswered questions efficiently. This autonomy in learning was viewed as an essential advantage over synchronous virtual meetings.

However, some respondents noted challenges related to asynchronous learning, particularly in maintaining topic relevance within discussion forums. Aloni & Harrington (2018)Aloni & Harrington (2018)Aloni & Harrington (2018) and de Lima et al. (2019)de Lima et al. (2019)de Lima et al. (2019) suggested that these challenges often arise due to students engaging in off-topic discussions rather than a lack of content knowledge. Additionally, interaction difficulties were reported, as asynchronous learning requires self-motivation and proactive engagement. Despite these challenges, Tuma & Aljazeeri (2021)Tuma & Aljazeeri (2021)Tuma & Aljazeeri (2021) affirmed that asynchronous learning supports self-directed learning in a socially rich environment, fostering deep engagement and meaningful interaction.

Synchronous Learning: Advantages, Limitations, and Spontaneous Reflection

In contrast, participants who preferred synchronous learning via virtual meetings reported that this method provided a more effective means of skill development. They noted that frequent participation in virtual meetings was positively correlated with improved learning outcomes, greater motivation, and enhanced conceptual understanding. These findings align with Ratan et al. (2022)Ratan et al. (2022)Ratan et al. (2022), who identified social presence as a key factor mediating the relationship between active learning and subjective course gains in synchronous classes.

Synchronous learning facilitates what we term "spontaneous reflection", immediate, socially-mediated cognitive processing that occurs through real-time interaction. Respondents highlighted the benefits of receiving immediate feedback from instructors during virtual meetings (71% agreement in Category 19). This immediate feedback loop enables rapid clarification of misconceptions and on-the-spot conceptual refinement, contrasting with the deliberate, iterative reflection of asynchronous environments. However, the ephemeral nature of synchronous interaction means that reflective opportunities are fleeting and not documented for later review.

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

The lecturer noted that "synchronous sessions create energy and spontaneity that engages students immediately, but the fast pace means some students don't have time to fully process complex concepts." This observation highlights the trade-off between spontaneous reflection's immediacy and deliberate reflection's depth. While respondents found lecturer explanations during virtual meetings to be clearer (56% agreement in Categories 22 and 23), they expressed mixed views on whether direct discussions with lecturers boosted their confidence, suggesting that not all students benefit equally from real-time interaction pressure.

Additionally, virtual meetings fostered a sense of connection and comfort among participants (48% agreement in Category 24), further supporting their preference for synchronous learning. This social presence creates conditions for collaborative knowledge construction through immediate peer interaction, a dimension that asynchronous forums cannot fully replicate.

Despite these benefits, synchronous learning posed several challenges. Respondents frequently encountered technical issues, such as poor audio quality, background noise, and unstable internet connections, which hindered effective communication (90% agreement in Category 25). These challenges align with findings from Bell et al. (2014)Bell et al. (2014)Bell et al. (2014) and Bower et al. (2015)Bower et al. (2015)Bower et al. (2015), who identified audio disruptions and network instability as common obstacles in virtual learning environments. Furthermore, delayed participant entry into discussions often led to late responses, affecting the overall learning experience (65% reporting delays in Category 26). Variability in device capabilities and internet connectivity also posed challenges, making it difficult for some students to fully engage in discussions (61% agreement in Category 26). McDonald et al. (2012)McDonald et al. (2012)McDonald et al. (2012) noted that blended synchronous learning environments exacerbate these difficulties by dividing attention across multiple locations and communication channels.

Another issue associated with virtual meetings was the fast pace of discussions, which some participants found difficult to follow. According to Lowenthal et al. (2017)Lowenthal et al. (2017)Lowenthal et al. (2017) and Pratama et al. (2020)Pratama et al. (2020)Pratama et al. (2020), synchronous courses resemble traditional in-person classes with fixed schedules, requiring students to manage their time effectively. This lack of flexibility may hinder learners who prefer to study at their own pace.

Dual Reflection Pathways: A Theoretical Framework

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

The contrasting findings regarding asynchronous and synchronous learning reveal a fundamental insight: reflection operates through two distinct pathways depending on the learning modality. Deliberate reflection in asynchronous environments involves conscious, iterative cognitive processing enabled by temporal flexibility and documentary permanence, following the three-stage mechanism of generalization, monitoring, and refinement. Spontaneous reflection in synchronous environments involves immediate, socially-mediated cognitive processing through real-time interaction and feedback, creating fleeting but powerful moments of conceptual clarification.

Neither pathway is inherently superior; each activates different cognitive processes that serve different learning objectives. Asynchronous learning's deliberate reflection supports deep processing, critical analysis, and iterative improvement, essential for developing sophisticated reasoning and written communication skills. Synchronous learning's spontaneous reflection supports immediate clarification, social construction of knowledge, and rapid feedback loops, essential for maintaining motivation, addressing misconceptions quickly, and building social presence.

The high neutrality observed in skill improvement perceptions for both modalities (59% for asynchronous in Category 1; 69% for synchronous in Category 15) suggests that students recognize the distinct but complementary nature of these reflective pathways. The lecturer interview reinforced this interpretation: "Different students thrive in different environments. Some need time to think deeply, while others need immediate interaction to stay engaged. The ideal is probably a combination of both."

In summary, while synchronous learning through virtual meetings provided real-time interaction, efficiency, and a structured learning environment, it was often hindered by technical difficulties and time constraints. In contrast, asynchronous learning via discussion forums offered flexibility, critical thinking opportunities, and enhanced engagement but required self-discipline and proactive participation. These findings underscore the importance of selecting appropriate learning methods based on individual student needs and preferences, balancing the benefits and challenges of both synchronous and asynchronous learning environments through strategic integration of their distinct reflective pathways.

CONCLUSION

Fundamental Finding: This study provides novel insights into the mechanism by which reflection functions as a mediating process between learning modality and

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

educational outcomes in fully online environments. The key conceptual contribution is the identification of dual reflection pathways: deliberate reflection in asynchronous learning and spontaneous reflection in synchronous learning. Asynchronous learning operates through a three-stage reflective mechanism: (1) generalization, where students extract patterns and principles from learning materials and peer contributions; (2) monitoring, where they critically evaluate their understanding against documented mistakes and peer feedback; and (3) refinement, where they modify their responses before submission. This mechanism explains why asynchronous learning, particularly through discussion forums, demonstrates higher effectiveness in fostering critical thinking and knowledge retention (77% acknowledged critical thinking necessity, 85% valued self-paced learning, 88% utilized draft revision opportunities), students engage in iterative reflection cycles that are preserved in the digital environment, enabling repeated review and progressive improvement. In contrast, synchronous learning facilitates immediate but ephemeral reflection through real-time interaction, providing instant feedback (71% preferred this immediate feedback) but lacking the documentary permanence that supports deeper cognitive processing. The study reveals that reflection operates differently across modalities: asynchronous environments create structured opportunities for deliberate reflection through visible peer interactions and self-paced response preparation, while synchronous environments promote spontaneous reflection through social presence and immediate instructor feedback. However, technical challenges significantly undermine synchronous learning effectiveness (90% reported audio problems, 65% experienced delayed engagement), while high neutrality in perceived skill improvement (59% for asynchronous, 69% for synchronous) indicates uncertainty about comparative effectiveness. This dual pathway of reflection, deliberate versus spontaneous, offers a theoretical framework for understanding how different learning modalities activate distinct reflective processes, ultimately impacting learning outcomes. The documentation of this mechanism through empirical evidence (particularly the 77% agreement that discussion forums enabled better generalization, monitoring, and modification of responses) provides theoretical advancement in understanding reflection's mediating role in online learning. **Implication:** The study suggests that educators should design blended learning environments that strategically leverage both deliberate reflection (through asynchronous forums) and spontaneous reflection (through synchronous interactions). Instructors can optimize learning by having students document their thinking in discussion forums before engaging in real-time debates, thereby activating both reflective pathways. Educational institutions must address modality-specific

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IJORER, Vol. 4, No. 1, January 2023
Page 1-15

challenges: technical infrastructure for synchronous sessions and facilitation strategies for maintaining focus in asynchronous discussions. **Limitation:** This study is limited by its small sample size (N=20), single-institution focus in Indonesia, and one-semester observation period, which may restrict generalizability. The reliance on self-reported data may not fully capture actual cognitive reflective processes. The demographic skew toward female students (79%) typical of education programs may not represent other disciplines. Additionally, the quantitative analysis was based solely on student perceptions without including lecturer quantitative data, potentially limiting triangulation of effectiveness measures. **Future Research:** Future studies should validate the three-stage reflective mechanism across diverse contexts with larger samples and longer observation periods. Research employing learning analytics and experimental designs could objectively measure reflective depth and determine optimal blending ratios for different disciplines and cultural settings. In conclusion, this study underscores the importance of balancing synchronous and asynchronous learning modalities and highlights the mechanism by which reflection, operating through deliberate and spontaneous pathways, mediates learning effectiveness in online environments. By understanding these distinct reflective processes, educators can design more effective online learning experiences that strategically combine both modalities to cater to diverse student needs and optimize educational outcomes. The empirical documentation of the three-stage reflective mechanism in asynchronous learning and its contrast with spontaneous reflection in synchronous learning provides a theoretical foundation for future research and practical guidance for instructional design in fully online Indonesian higher education contexts.

REFERENCES

Afify, M. K. (2019). The influence of group size in the asynchronous online discussions on the development of critical thinking skills, and on improving students' performance in online discussion forum. *International Journal of Emerging Technologies in Learning*, *14*(5), 132–152. https://doi.org/10.3991/ijet.v14i05.9351

Akpen, C. N., Asaolu, S., Atobatele, S., Okagbue, H., & Sampson, S. (2024). Impact of online learning on student's performance and engagement: a systematic review. *Discover Education*, *3*(1), 205. https://doi.org/10.1007/s44217-024-00253-0

Aloni, M., & Harrington, C. (2018). Research based practices for improving the effectiveness of asynchronous online discussion boards. *Scholarship of Teaching and Learning in Psychology*, *4*(4), 271–289. https://doi.org/10.1037/stl0000121

IJORER : International Journal of Recent Educational Research
Homepage : https://journal.ia-education.com/index.php/ijorer
Email : ijorer@ia-education.com

p-ISSN : 2721-852X ; e-ISSN : 2721-7965
IJORER, Vol. 4, No. 1, January 2023
Page 1-15

Bell, J., Sawaya, S., & Cain, W. (2014). SYNCHROMODAL CLASSES: DESIGNING FOR SHARED LEARNING EXPERIENCES BETWEEN FACE-TO-FACE AND ONLINE STUDENTS. *International Journal of Designs for Learning, 5*(1), 68–82.

Bower, M., Dalgarno, B., Kennedy, G. E., Lee, M. J. W., & Kenney, J. (2015). Design and implementation factors in blended synchronous learning environments: Outcomes from a cross-case analysis. *Computers and Education*, *86*, 1–17. https://doi.org/10.1016/j.compedu.2015.03.006

Cai, Y., Pan, Z., Han, S., Shao, P., & Liu, M. (2022). The Impact of Multimodal Communication on Learners' Experience in a Synchronous Online Environment: A Mixed-Methods Study. *Online Learning*, *26*. https://doi.org/10.24059/olj.v26i4.3448

Coyle, Y., José, M., Prieto, R., & Rico, D. M. (2017). Children's interaction and lexical acquisition in text-based online chat. In *Language Learning & Technology* (Vol. 21, Issue 2). http://llt.msu.edu/issues/june2017/coylereverte.pdf

Creswell, J. W., & Poth, C. N. (2023). *Qualitative_Inquiry_and_Research_Design* (5th ed.). Sage Publications.

Cunningham, K. J., Chukharev-Khudilainen, E., Cotos, E., & Sauer, G. (2018). *Modes of feedback in ESL writing: Implications of shifting from text to screencast*.

Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, *49*(1–2), 91–96. https://doi.org/10.1007/s11125-020-09464-3

de Lima, D. P. R., Gerosa, M. A., Conte, T. U., & José, J. F. (2019). What to expect, and how to improve online discussion forums: the instructors' perspective. *Journal of Internet Services and Applications*, *10*(1). https://doi.org/10.1186/s13174-019-0120-0

Delahunty, J. (2018). Connecting to learn, learning to connect: Thinking together in asynchronous forum discussion. *Linguistics and Education*, *46*, 12–22. https://doi.org/10.1016/j.linged.2018.05.003

Ene, E., & Upton, T. A. (2014). Learner uptake of teacher electronic feedback in ESL composition. *System*, *46*(1), 80–95. https://doi.org/10.1016/j.system.2014.07.011

Febrianto, A., & Susanto, A. (2023). EFL Students' Reflections on their Language Learning Shifts : Before, During, and After COVID-19. *The Journal of AsiaTEFL*, *20*, 106–126. https://doi.org/10.18823/asiatefl.2023.20.1.7.106

Gao, X. (Andy). (2024). Language education in a brave new world: A dialectical imagination. *The Modern Language Journal*. https://api.semanticscholar.org/CorpusID:269658439

IJORER : International Journal of Recent Educational Research
Homepage : https://journal.ia-education.com/index.php/ijorer
Email : ijorer@ia-education.com

p-ISSN : 2721-852X ; e-ISSN : 2721-7965
IJORER, Vol. 4, No. 1, January 2023
Page 1-15

Garcia, S. E., Mzezewa, T., Vigdor, N., Zaveri, M., Zraick, K., Sisario, B., Anderson, M., & Padilla, M. (2021, January 21). A List of What's Been Canceled Because of the Coronavirus. *2021*.

Ho, K. K. W. (2014). The Role Of Learners' Academic Background On E-Learning. *International Journal of Systems and Service-Oriented Engineering*, *4*(4), 51–64. https://doi.org/10.4018/ijssoe.2014100104

Huang, X., Li, H., Huang, L., & Jiang, T. (2023). Research on the development and innovation of online education based on digital knowledge sharing community. *BMC Psychology*, *11*(1), 295. https://doi.org/10.1186/s40359-023-01337-6

Klisc, C., Mcgill, T., & Hobbs, V. (2017). Use of a post-asynchronous online discussion assessment to enhance student critical thinking. In *Australasian Journal of Educational Technology* (Issue 5).

Kuo, Y. C., Lin, H. C. K., Lin, Y. H., Wang, T. H., & Chuang, B. Y. (2023). The Influence of Distance Education and Peer Self-Regulated Learning Mechanism on Learning Effectiveness, Motivation, Self-Efficacy, Reflective Ability, and Cognitive Load. *Sustainability (Switzerland)*, *15*(5). https://doi.org/10.3390/su15054501

Lazarinis, F., Panagiotakopoulos, T., Armakolas, S., Vonitsanos, G., Iatrellis, O., & Kameas, A. (2024). A Blended Learning Course to Support Innovative Online Teaching in Higher Education. *European Journal of Education*. https://doi.org/10.1111/ejed.12820

Lee, B., & Kim, J. (2023). Managing Social Presence in Collaborative Learning with Agent Facilitation. *Sustainability (Switzerland)*, *15*(7). https://doi.org/10.3390/su15076185

Liguori, E., & Winkler, C. (2020). From Offline to Online: Challenges and Opportunities for Entrepreneurship Education Following the COVID-19 Pandemic. In *Entrepreneurship Education and Pedagogy* (Vol. 3, Issue 4, pp. 346–351). SAGE Publications Inc. https://doi.org/10.1177/2515127420916738

Liutsko, L. (2023). Online Higher Education On The Example Of The First University In The World: Open University of Catalonia (Personalized Teaching). *Cultural-Historical Psychology*, *19*(2), 70–75. https://doi.org/10.17759/chp.2023190209

Lowenthal, P. R., Snelson, C., & Dunlap, J. C. (2017). Live synchronous web meetings in asynchronous online courses: Reconceptualizing virtual office hours. *Online Learning Journal*, *21*(4), 177–194. https://doi.org/10.24059/olj.v21i4.1285

McDonald, J. P., Zydney, J. M., Dichter, A., & McDonald, E. C. (2012). *Going Online with Protocols: New Tools for Teaching and Learning*.

Pratama, H., Azman, M. N. A., Kassymova, G. K., & Duisenbayeva, S. S. (2020). The Trend in Using Online Meeting Applications for Learning During the Period of Pandemic COVID-19: A Literature

IJORER : International Journal of Recent Educational Research
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Email : ijorer@ia-education.com

p-ISSN : 2721-852X ; e-ISSN : 2721-7965
IJORER, Vol. 4, No. 1, January 2023
Page 1-15

Review. *Journal of Innovation in Educational and Cultural Research*, *1*(2), 58–68. https://doi.org/10.46843/jiecr.v1i2.15

Rahman, N. A., Arifin, N., Manaf, M., Ahmad, M., Mohd Zin, N. A., & Jamaludin, M. (2020). Students' Perception in Blended Learning among Science and Technology Cluster Students. *Journal of Physics: Conference Series*, *1496*(1). https://doi.org/10.1088/1742-6596/1496/1/012012

Ratan, R., Ucha, C., Lei, Y., Lim, C., Triwibowo, W., Yelon, S., Sheahan, A., Lamb, B., Deni, B., & Hua Chen, V. H. (2022). How do social presence and active learning in synchronous and asynchronous online classes relate to students' perceived course gains? *Computers and Education*, *191*. https://doi.org/10.1016/j.compedu.2022.104621

Roseth, C., Akcaoglu, M., & Zellner, A. (2013). Blending Synchronous Face-to-face and Computer-Supported Cooperative Learning in a Hybrid Doctoral Seminar. *TechTrends*, *57*(3).

Rudolph, J. (2019). Brookfield, S. D. (2017). Becoming a critically reflective teacher (2nd ed.). San Francisco, CA: Jossey Bass. *Journal of Applied Learning & Teaching*, *2*(2). https://doi.org/10.37074/jalt.2019.2.2.22

Shute, V. J., & Rahimi, S. (2017). Review of computer-based assessment for learning in elementary and secondary education. In *Journal of Computer Assisted Learning* (Vol. 33, Issue 1, pp. 1–19). Blackwell Publishing Ltd. https://doi.org/10.1111/jcal.12172

Sitompul, N. C. (2020). Pengalaman Pertama Belajar dengan Online Learning. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *5*. http://journal.um.ac.id/index.php/jptpp/

Su, Y., Xu, X., Zhang, Y., Xu, X., & Hao, S. (2024). Looking back to move forward: comparison of instructors' and undergraduates' retrospection on the effectiveness of online learning using the nine-outcome influencing factors. *Humanities and Social Sciences Communications*, *11*(1), 594. https://doi.org/10.1057/s41599-024-03097-z

Tuma, F., & Aljazeeri, J. (2021). Asynchronous group learning in learn from the learner approach: A Learning Object That Enhances and Facilitates Distance Self and Shared Learning. In *Annals of Medicine and Surgery* (Vol. 67). Elsevier Ltd. https://doi.org/10.1016/j.amsu.2021.102535

Tusyanah, T., Oktarina, N., Kharismaputra, A. P., Suryanto, E., & Andika, D. P. (2024). Exploring the effect of pre-service teachers' digital competence on paperless behavior. *Sustainable Social Development*, *2*(1). https://doi.org/10.54517/ssd.v2i1.2222

Urzúa, A., & Asención-Delaney, Y. (2023). Examining novice language teachers' reflections in an online community of practice. *Foreign Language Annals*. https://doi.org/10.1111/flan.12672

Zeng, H., & Luo, J. (2024). Effectiveness of synchronous and asynchronous online learning: A meta-analysis. *Interactive Learning Environments*, *32*(8), 4297–4313. https://doi.org/10.1080/10494820.2023.2197953

IJORER : International Journal of Recent Educational Research
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p-ISSN : 2721-852X ; e-ISSN : 2721-7965
IJORER, Vol. 4, No. 1, January 2023
Page 1-15

Zhang, R., Bi, N. C., & Mercado, T. (2022). Do zoom meetings really help? A comparative analysis of synchronous and asynchronous online learning during Covid-19 pandemic. *Journal of Computer Assisted Learning*, *39*, n/a-n/a. https://doi.org/10.1111/jcal.12740

Zheng, B., & Warschauer, M. (2015). Participation, interaction, and academic achievement in an online discussion environment. *Computers and Education*, *84*, 78–89. https://doi.org/10.1016/j.compedu.2015.01.008

Zhong, Q., Wang, Y., Lv, W., Xu, J., & Zhang, Y. (2022). Self-Regulation, Teaching Presence, and Social Presence: Predictors of Students' Learning Engagement and Persistence in Blended Synchronous Learning. *Sustainability*, *14*, 5619. https://doi.org/10.3390/su14095619