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Synchronous or Asynchronous: Students' Perceptions And Learning Outcomes In Teaching English For Young Learners (TEYL) Courses

Yuli Astutik[1], Fika Megawati[2], Noly Shofiyah[3], Vidya Mandarani[4], Saltanat Meiramova[5], Pasya Rahma Tamara[6]
Universitas Muhammadiyah Sidoarjo, Indonesia [1,2,3,4,6]
A.K.Kussayinov Eurasian Humanities Institute, Kazakhstan[5]
Email Correspondence: yuliastutik@umsida.ac.id

Abstract

Background:
Despite the growing adoption of online learning, limited research has examined how synchronous and asynchronous modalities affect pre-service teachers' mastery of pedagogical theories in Teaching English for Young Learners (TEYL) courses. During the COVID-19 shift to remote teaching, TEYL teacher education faced the challenge of ensuring future teachers developed adequate pedagogical content knowledge despite reduced face-to-face interaction. This study addresses this gap by investigating the relationship between students' perceptions of synchronous (Zoom) and asynchronous (Moodle) learning and their academic performance in TEYL course.

Methodology:
This quantitative ex post facto study involved 71 fifith-semester students enrolled in TEYL course, divided into a synchronous class (n=40) and an asynchronous class (n=31). Data were collected through a validated 34-item perception questionnaire (Cronbach's $\alpha = 0.87$) and midterm exam scores. While the sample size was relatively small, it provided initial evidence of how different modalities function in a teacher education context.

Findings:
Regression analysis revealed a significant positive relationship between students' perceptions and their midterm exam scores in both modalities (($R^2 = .309$ synchronous; $R^2 = .325$ asynchronous). However, independent t-test results showed no statistically significant difference in exam performance between the two groups ($t(69) = 0.165$, $p = 0.87$).

Conclusion:
These findings suggest that well-structured synchronous and asynchronoous learning can both support TEYL teacher education effectively, provided that instructional design aligns with students' need and course objectives.

Originality:
This study is original in its focus on pre-service teachers in TEYL course an underexplored participant group and highlights how modality choice interacts with students' perceptions to shape learning outcomes. Its findings offer practical insights for teacher educators designing blended or hybrid curricula in the post-pandemic era.

Keywords	:	Synchronous learning; asynchronous learning; online learning; TEYL course; EFL context
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1. INTRODUCTION

The integration of technology into education has become an indispensable necessity across all levels, from kindergarten to higher education, requiring both educators and students to adapt to rapid technological advancements (Astutik et al., 2022; Astutik et al., 2021; Kalogiannakis & Papadakis, 2019; Reyneke & Botha, 2020). In higher education, particularly in teacher training programs, digital tools play a crucial role in maintaining instructional continuity and supporting professional competence development. Distance learning relies on modern technology to facilitate virtual interactions between teachers and students through video- and audio-conferencing tools (Ağçam et al., 2021; Kim, 2020). Within this context, English teacher-education programs must ensure that pre-service teachers not only acquire linguistic competence but also master pedagogical content knowledge (PCK) for TEYL a challenge that became more pressing during the shift to online learning. Students and lecturers can collaborate and receive instruction either synchronously or asynchronously (Zsifkovits et al., 2025). however, little is known about how these modes influence pre-service teachers' mastery of TEYL pedagogy and their perceptions of learning in a fully online environment.

Synchronous refers to real-time interaction between lecturers and students through video conferencing technology (Culbreth & Martin, 2025; Shlomo & Rosenberg-Kima, 2025). Unlike traditional face to face instruction that requires physical co-location, synchronous learning connects participants virtually at the same time, allowing direct interaction, immediate feedback, and live discussions despite geographical separation. Its major limitation is scheduling flexibility, as coordinating real time sessions can be challenging for students in different time zones. Common platforms for synchronous learning include Webex, Zoom, and Google Meet (Bhagat et al., 2020).

Meanwhile, asynchronous learning enables teachers or lecturers to prepare material in advance, and learning interactions can occur in a variety of modes, not always concurrently, such as discussion forums, independent study, or student assignments (Nordmann et al., 2020). Asynchronous learning is a method of self-education that promotes learning through asynchronous interactions. Email, online discussion boards, Wikipedia, and blogs all facilitate asynchronous learning (Kumar & Assistant, 2019). Asynchronous learning activities frequently involve interaction with course management systems such as Moodle for course delivery, email communication, discussion forum participation, and article reading. Moreover, teachers must provide timely feedback and maintain open communication with students in order to engage them in the learning process. In general, asynchronous learning has a number of advantages, including convenience, flexibility, increased interaction, and the ability to

balance personal and professional obligations. Edmoodo, Google Classroom, and Moodle are all examples of asynchronous platforms (Zabolotniaia et al., 2020).

Numerous studies on the adequacy of synchronous and asynchronous methods of English learning have been conducted in the last five years. The majority of these studies examined how remote study improved students' mastery of the target language. Alibakhshi & Mohammadi (2018) demonstrate that the synchronous method is more effective than the asynchronous method for students studying English collocations. As with Alibakhshi & Mohammadi, Lotfi & Pozveh (2019) discovered that university students who study English vocabulary synchronously score higher on tests than those who study it asynchronously. By contrast, Pineda (2017) discovered that using the synchronous method resulted in students making prompt errors in the target language's oral skills; thus, he argued that using the asynchronous method was more effective for students because they had time to identify their own work errors. From those previous studies, three of them used experimental research to examine the differences between synchronous and asynchronous methods used by students to master the target language. Thus, the authors conducted similar research on synchronous and asynchronous methods; however, their focus was primarily on students' perceptions of these methods in the Teaching English for Young Learners (TEYL) course at the higher education level, as well as their impact on students' learning outcomes.

Mastery of TEYL pedagogical theory is a crucial step in preparing future English teachers for young learners. Unfortunately, during the COVID-19 pandemic, all levels of education including teacher education in Indonesia were forced to transition to fully online instruction through synchronous and asynchronous modes. This shift shaped students' perceptions of online learning, which in turn could influence their engagement and academic performance in TEYL course. In educational research, perception is often defined as a learner's cognitive and affective appraisal of the learning environment, including how they value the content, experience autonomy, and feel competent to succeed (Chew & Cerbin, 2021; Ryan & Deci, 2020). From the perspective of Self-Determination Theory, students' perceptions of support for autonomy, relatedness, and competence play a key role in their intrinsic motivation and persistence motivation and persistence in learning activities (Astutik, Setiawan, & Anam, 2022). In online learning contexts, positive perceptions are linked to higher engagement, satisfaction, and achievement (Kohnke et al., 2021). Accordingly, this study conceptualizes perceptions not merely as sensory perception, but as students' evaluative stance toward the learning experience whether they find synchronous or asynchronous instruction meaningful, supportive, and conductive to achieving course objectives.

While existing studies have predominantly examined the impact of synchronous and asynchronous methods on language-skill outcomes such as vocabulary acquisition, grammar mastery, and oral communication performance (Alibakhshi & Mohammadi, 2018; Lotfi & Pozveh, 2019; Pineda, 2017) much less is known about their influence on pedagogical content knowledge (PCK) outcomes, particularly in teacher-education settings. Most prior work has measured students' linguistic proficiency or participation rates, leaving a gap in understanding how online modalities shape pre-service teachers' mastery of theoretical and practical

knowledge needed to teach English to young learners. TEYL teacher education is a distinct context because it requires future teachers to master developmentally appropriate methods, classroom management strategies, and task design principles suitable for young children (Astutik et al., 2021; Astutik & Purwati, 2021). As flexible learning systems become more common post-pandemic, it is crucial to examine whether synchronous and asynchronous formats equally support the acquisition of this specialized knowledge.

Following Shulman's (1986) framework, this study conceptualizes PCK as the integration of content knowledge and pedagogical knowledge required for effective teaching. In the context of TEYL, PCK involves understanding child language development, selecting developmentally appropriate instructional strategies, and managing your learners classroom behaviour (Borg, 2015). These components are critical for preparing pre-service teachers to design engaging lessons and create supportive learning environments. This study addresses this gap by focusing on students' perceptions and their learning outcomes in mastering core construct of TEYL PCK, including child language development theories, appropriate instructional strategies, and principles of teaching English in primary classrooms. These constructs were operationalized through a validated midterm exam covering six TEYL theory topics and a perception questionnaire capturing students' cognitive and affective responses to the learning process. By combining perceptual and outcome data, this study extends prior research on modality comparisons by shifting the focus from general language skills to the pedagogical preparation of future English for young learners' teachers in a post-pandemic higher-education context. As a result, the following research questions guide this study:

1. To what extent do students' perceptions of synchronous meetings using Zoom predict their learning outcomes in the TEYL course?
2. To what extent do students' perceptions of asynchronous meetings using Moodle predict their learning outcomes in the TEYL course?
3. Is there a statistically significant difference in learning outcomes between students enrolled in synchronous (Zoom) and asynchronous (Moodle) TEYL classes?

2. METHODOLOGY

Students enrolled in private universities in East Java, Indonesia, who seek to become English teachers for young learners, are required to master content and pedagogical knowledge, particularly the theories and practices of TEYL in an EFL context. This preparation is part of the English Education Study Program, which spans eight semesters and includes mandatory courses on TEYL. Students must also pass the university's English proficiency test as a requirement to ensure their readiness for school-based teaching practice. Both synchronous and asynchronous modes of instruction were utilized in this Teaching English for Young Learners (TEYL) course to enhance their preparedness for real-world teaching scenarios.

Table 1. Activities both Synchronous and Asynchronous

Week	Topic	(Class A1)	(Class B1)
		Synchronous (activities) through Zoom	**Asynchronous (activities) through Moodle**
1	Definition Teaching Language to Children	- Introduction - The lecturer checks the attendance of students by calling names one by one - Real-time online discussion via Zoom - Question and Answer	- Introduction - Students fill in the attendance column by clicking the "choice" feature on the Moodle - Teacher shares The lecturer gives feedback her video to explain the topic - Discussion in "chat" feature on Moodle
2	Background Knowledge on TEYL: Policy, Curriculum, Teacher and Students Characteristics	- The lecturer checks the attendance of students by calling names one by one - Students presentation in group - Students Real-time online discussion via Zoom - Question and answer - Lecturer gives feedback	- Students fill in the attendance column by clicking the "choice" feature on the Moodle - Students share their link of presentation video in 7-10 minutes on Moodle - Other students give comment and question to the presenters and presenters give response in "Forum" feature on Moodle. - The lecturer gives feedback and more explanation about the topic
3	The theory about Children Learning A foreign language	- The lecturer checks the attendance of students by calling names one by one - Students presents the theory about children learning a foreign language in group by sharing the power point - Students have Real-time online discussion via Zoom - Question and answer - Lecturer gives feedback	- Students fill in the attendance column by clicking the "choice" feature on the Moodle - Students share their link of presentation video in 7-10 minutes on Moodle - Live chat discussion in "live chat" feature on Moodle. - The lecturer gives feedback and more explanation about the topic
4	Teaching English in the primary classroom: Strategies and Techniques	- The lecturer checks the attendance of students by calling names one by one - Students presents the Teaching English in the primary classroom: Strategies and Techniques in group by sharing the power point - Question and answer, some students gave question on chat box and the presenter answer them orally - Lecturer gives feedback	- Students fill in the attendance column by clicking the "choice" feature on the Moodle - Students share their link of presentation video in 7-10 minutes on Moodle - Other students give comment and question to the presenters and presenters give response in "Forum" feature on Moodle. - Lecturer gives feedback and more explanation about the topic by inserting audio file

Week	Topic	(Class A1)	(Class B1)
		Synchronous (activities) through Zoom	**Asynchronous (activities) through Moodle**
5	Quiz	- The lecturer checks the attendance of students - The lecturer shares the questions in the Google form through chat box on zoom - Students open the Google form link and do the quiz given by lectures - Lecturer checks and give score of the result of students' quiz manually	- Students fill in the attendance column by clicking the "choice" feature on the Moodle - Lecturer posts the questions in "Quiz" feature on Moodle - Lecturer sets the time and grades; therefore, the score will appear automatically
6	The appropriate instruction in teaching children, Learning about children's development and interest, Children's language learning and acquisition	- The lecturer checks the attendance of students by calling names one by one - Students presents. The appropriate instruction in teaching children, learning about children's development and interest, Children's language learning and acquisition in group by sharing the PowerPoint - During the question-and-answer session, some students asked questions in the chat box, and the presenter responded to them orally. - The lecturer provides feedback by addressing students' presentation performance, offering specific suggestions for improvement, clarifying misunderstood concepts, and encouraging further exploration of the topic through questions and explanations.	- Students fill in the attendance column by clicking the "choice" feature on the Moodle - Students share their link of presentation video in 7-10 minutes on Moodle - Other students provide comments and questions to the presenters, and the presenters respond using the "Forum" feature on Moodle - Lecturer gives feedback and more explanation about the topic. Feedback is delivered in written form through comments on Moodle or shared documents.
7	Teaching Listening to young learners	- The lecturer checks the attendance of students by calling names one by one - Students presents Teaching Listening to young learners in group by sharing the power point - Question and answer session: Some students asked questions in the chat box, and the presenter answered them orally. - The lecturer provides feedback by addressing students' presentation performance, offering specific suggestions for improvement, clarifying misunderstood concepts, and encouraging further exploration of the topic through questions and explanations.	- Students fill in the attendance column by clicking the "choice" feature on the Moodle - Students share their link of presentation video in 7-10 minutes on Moodle - Other students provide comments and ask questions to the presenters, who then respond using the "live chat" feature on Moodle. - Lecturer gives feedback and more explanation about the topic. Feedback is delivered in written form through comments on Moodle or shared documents.

There are two classes, A1 and B1, each employing a different instructional method from the beginning of the course due to differences in student characteristics (Table 1). Students in class A1 use Zoom (synchronous) for TEYL lectures, while those in class B1 use Moodle (asynchronous).

This study employed a quantitative ex po facto design with nonequivalent groups, comparing students' learning outcomes based on their naturally assigned class section. Because class assignment was not randomized, potential differences such as employment status or time availability could confound the results. To ease this risk, the authors confirmed that both classes followed the same syllabus, learning materials, and assessment procedures, and we applied appropriate statistical analyses (independent samples t-tests and regression) to examine differences and associations rather than infer causality.

2.1 Participants and Sampling Techniques

This study employed a convenience sample of 71 fifth-semester English students enrolled in TEYL course. The participants were divided into two classes: Class A1, with 40 students, and Class B1, with 31 students. Students in these two classes had been using different learning methods since the beginning of the TEYL course. Class A1 students engaged in synchronous communication with the lecturer via Zoom meetings, while Class B1 students used asynchronous communication through the Moodle platform. This difference arose due to significant variations in the students' characteristics and circumstances. While Class A1 students were full-time students, Class B1 students balanced their studies with employment. Consequently, the asynchronous learning method via Moodle was more suitable for Class B1 students, enabling them to continue their education while working.

2.2 Instrument and Data Collection Technique

Apart from the questionnaire, this study also used a midterm exam as an instrument. Each meeting, from the first to the seventh, included five questions, all of which were related to the session's theme. The researchers developed the instrument through several procedures, including creating a question grid, organizing the test items and answer keys, and having the exam questions reviewed by subject-matter experts to establish content validity. Any questions unrelated to the lecture theme were subsequently revised. Both classes, A1 and B1, received the same set of questions to ensure comparability.

In collecting data, the researchers distributed a 34-item Likert-scale questionnaire to measure students' perceptions of synchronous and asynchronous lectures from cognitive and affective aspects during seven meetings between September and November 2020. The

questionnaire employed a five-point scale (1 = strongly disagree to 5 = strongly agree). Items 1-17 were positively worded, while Items 18-34 were negatively worded; the latter were reverse-coded prior to analysis to ensure scoring consistency. The instrument was adapted from Young & Norgard's (2006) study on evaluating the quality of online courses from students' perspectives. Adaptation steps included the development of an item grid, expert validation by two experts in TEYL to ensure relevance and clarity, and a pilot test with a small group of students from a different cohort. Minor revisions were made based on pilot feedback.

2.3 Data Analysis Technique

After collecting midterm exam scores and students' perception questionnaire responses, the data were analyzed in several steps to answer three research questions. First, prerequisite tests were conducted to ensure that the data met the assumptions of parametric analysis, including normality (Kolmogorov–Smirnov test), linearity, and heteroscedasticity. For Research Questions 1 and 2, simple linear regression analyses were conducted to examine the extent to which students' perceptions of synchronous (Zoom) and asynchronous (Moodle) learning predicted their learning outcomes, operationalized as midterm exam scores. For Research Question 3, an independent samples t-test was conducted to compare the mean exam scores between the two classes. To provide a more robust interpretations of the results, effect sizes were calculated along with p-values. The regression analysis yielded Cohen's $f^2 = 0.45$, indicating a large effect, while the independent t-test yielded Cohen's $d = 0.04$, indicating a negligible difference between the two modalities. These analytical steps ensured that the findings were interpreted as relationships rather than causal effects, consistent with the ex post facto non-equivalent groups research design.

3. FINDINGS

The data were obtained from the mid-semester examination results of students in the English Education program at a private university, specifically from two different classes: A1 and B1. Class A1 used synchronous learning (Zoom), while class B1 used asynchronous learning (Moodle Learning) in TEYL course. Before conducting a simple regression analysis, the researchers performed prerequisite tests on the data from both classes, including normality, linearity, and heteroscedasticity tests. The following section presents the findings to address the three research questions.

3.1 Students Perception of Synchronous Meetings (Zoom) And Their Learning Outcomes in The English for Teaching Young Learners Course.

Assumption test were conducted before the regression analysis. The Kolmogorov–Smirnov tests presented that the perception scores in both groups were normally distributed (Synchronous: $D(40) = 0.39$, $p = .994$; Asynchronous: $D(31) = 0.40$, $p = .964$), meeting the assumption of normality. The linearity test showed no significant deviation from linearity (Synchronous: $p = .374$; Asynchronous: $p = .458$), confirming a linear relationship between perception scores and learning outcomes. The heteroscedasticity tests indicated no violation of homoscedasticity (Synchronous: $p = .573$; Asynchronous: $p = .173$).

Since all assumptions were satisfied, a simple linear regression analysis was performed to examine whether students' perceptions of synchronous (Zoom) learning significantly predicted their TEYL course learning outcomes. The model was statistically significant, $F(1, 38) = 16.98$, $p < .001$, accounting for 30.9% of the variance in test scores ($R^2 = .309$). Table 2 presents the unstandardized and standardized coefficients, standard errors, t-values, and 95% confidence intervals.

Table 2. Regression Analysis Predicting TEYL Learning Outcomes from Students' Perceptions in Synchronous Learning

Predictor	B (Unstd.)	SE	β (Std.)	T	p	95% CI for B
(Constant)	25.76	–	–	–	–	–
Students' Perception (Synchronous)	0.421	0.102	0.56	4.12	< .001	[0.214, 0.628]

Note. B = unstandardized regression coefficient, SE = standard error, β = standardized coefficient, CI = confidence interval. Model summary: $F(1, 38) = 16.98$, $p < .001$, $R^2 = .309$.

Table 2 presents the regression coefficient indicates that for each one-point increase in students' perception scores of synchronous learning, their predicted midterm exam score increased by 0.42 points. The 95% confidence interval [0.214, 0.628] does not cross zero, confirming that this relationship is statistically significant and precise. The standardized coefficient ($\beta = 0.56$) suggests a moderately strong positive association between students' perceptions and their TEYL course performance, supporting the conclusion that students with more positive perceptions of synchronous learning tended to achieve higher learning outcomes.

3.2 Students Perception of Asynchronous Meetings (Moodle) And Their Learning Outcomes in The English for Teaching Young Learners Course.

Assumption tests were conducted prior to regression analysis. The Kolmogorov–Smirnov test indicated that the perception scores were normally distributed, $D(31) = 0.40$, $p =$

.964. The linearity test yielded a non-significant deviation from linearity (p = .458), confirming a linear relationship between perception scores and learning outcomes. The heteroscedasticity test also indicated no violation of homoscedasticity (p = .173). Since all assumptions were satisfied, a simple linear regression analysis was performed to examine whether students' perceptions of asynchronous (Moodle) learning significantly predicted their TEYL course learning outcomes. The model was statistically significant, $F(1, 29) = 13.98$, $p < .001$, accounting for 32.5% of the variance in exam scores ($R^2 = .325$). Table 3 presents the unstandardized and standardized coefficients, their standard errors, t-values, and 95% confidence intervals.

Table 3. Regression Analysis Predicting TEYL Learning Outcomes from Students' Perceptions in Asynchronous Learning

Predictor	B (Unstd.)	SE	β (Std.)	T	p	95% CI for B
(Constant)	26.43	–	–	–	–	–
Students' Perception (Asynchronous)	0.407	0.109	0.57	3.74	< .001	[0.183, 0.631]

Note. B = unstandardized regression coefficient, SE = standard error, β = standardized coefficient, CI = confidence interval. Model summary: $F(1, 29) = 13.98$, $p < .001$, $R^2 = .325$.

Table 3 shows the regression coefficient indicating that for each one-point increase in students' perception scores of asynchronous learning, their predicted midterm exam score increased by 0.41 points. The 95% confidence interval [0.183, 0.631] does not cross zero, confirming the statistical significance of this relationship. The standardized coefficient (β = 0.57) indicates a fairly strong positive relationship, meaning that students with more positive perceptions of asynchronous learning using Moodle tend to achieve higher learning outcomes.

3.3. The Differences of Student Learning Outcomes Between Synchronous and Asynchronous Classes.

To examine differences in learning outcomes between Class A1 (synchronous, Zoom) and Class B1 (asynchronous, Moodle), an independent-samples t-test was conducted.

Table 4. Differences in Student Learning Outcomes Between Synchronous and Asynchronous Classes

Variables	Mean	Std. Deviation	T	df	Sig
Class A	75.88	14.67	0.165	69	0.87
Class B	75.32	13.10			

Note. Independent-samples t-test shows no significant difference in learning outcomes between Class A1 and Class B1, $t(69) = 0.17$, $p = .87$, Cohen's $d = 0.04$ (negligible effect).

The results in table 4 indicate that students in the synchronous Zoom class (M = 75.88, SD = 14.67) and those in the asynchronous Moodle class (M = 75.32, SD = 13.10) achieved comparable scores. The negligible effect size (Cohen's $d = 0.04$) confirms that the mode of

online instruction whether real-time or time-shifted did not lead to a practically meaningful difference in learning outcomes.

4. DISCUSSION

This study found that students' perceptions of synchronous (Zoom) and asynchronous (Moodle) learning were significant predictors of their TEYL course learning outcomes, with moderately strong positive associations across both modalities. However, independent samples t-test did not reveal statistically significant differences in test scores between the two groups, suggesting that well designed online learning, regardless of whether it is real time or time shifted, can produce comparable performance outcomes. These findings suggest that, for TEYL teacher education, the choice between synchronous and asynchronous delivery may be influenced more by learner characteristics and logistical considerations than by differing expectations of learning outcomes. For instance, synchronous sessions may benefit students who prefer immediate feedback and collaborative discussions, while asynchronous formats may support those who require more time for reflection and task completion. In this context, both synchronous and synchronous modalities are widely used to facilitate learning, each offering unique opportunities and challenges (Rahmani et al., 2024; Nor & Wijaya, 2023).

While both synchronous and asynchronous learning are integral to online education, their pedagogical mechanism differs, making them beneficial for different types of learners. In TEYL teacher education, synchronous sessions via Zoom allow preservice teachers to engage in live discussions, model interactive teaching techniques, and receive immediate feedback, which is considered essential for developing classroom management and communication strategies for young learners (Mulbar et al., 2023; Yulitriana, 2021). In contrast, asynchronous learning through Moodle provides additional time for deeper reflection processing of theoretical concepts, supporting students who need more time to consolidate knowledge before applying it in microteaching or practicum assignment (Stuart et al., 2022). The positive perceptions reported by students indicate that when learners value teaching methods and see their relevance to their professional preparation, their motivation and persistence increase, in line with the values and autonomy components of self-determination theory (Ryan & Deci, 2020)

Unlike asynchronous, synchronous sessions appeared to encourage higher levels of interaction and engagement, as reflected in positive students' perceptions, although their overall learning outcomes were statistically comparable to those of the asynchronous group. This finding aligns with other studies highlighting the benefits of synchronous meetings in creating real time communication, immediate feedback, and a sense of classroom presence, all

of which contribute to better understanding (Mulbar et al., 2023; Nor & Wijaya, 2023). For the students in this study, synchronous learning activity via Zoom improved their understanding of the TEYL course, as the platform enabled direct communication with peers and instructors despite geographical distance.

A comparison of midterm exam results showed no statistically significant difference between the two groups, suggesting that synchronous and asynchronous methods can produce comparable results when designed and implemented appropriately. This is consistent with a growing body of literature showing that neither modality is inherently superior; rather, their effectiveness depends on learning objectives, student preferences, and the learning context (Rahmani et al., 2024; Stuart et al., 2022). Therefore, educators should choose between synchronous and asynchronous approaches not based on the assumption that one is universally better, but rather on their alignment with learners needs and learning objectives.

In addition to confirming the complementary roles of synchronous and asynchronous modalities, this study contributes to the broader discourse on online English language education in two significant ways. First, from a theoretical perspective, it extends current research on online learning by placing it in the context of TEYL, an area that remains underexplored in the literature. Second, the findings provide pedagogical insights for teacher educators, particularly in higher education, by demonstrating that the effective use of Zoom and Moodle can create meaningful learning experiences without favoring one modality over the other. This insight underscores the importance of aligning instructional decisions with learners' needs and learning goals, suggesting that the flexible integration of synchronous and asynchronous methods can optimize learning outcomes in TEYL courses.

These findings contribute to the growing literature on online teacher education by reinforcing the view that well designed synchronous and asynchronous modalities can support learning if aligned with learning objectives (Mulbar et al., 2023; Yulitriana, 2021). This study extends previous research by focusing on pedagogical content knowledge for TEYL, rather that general language skills, highlighting the importance of modality choice in the context of professional preparation. The results suggest that in TEYL teacher education, synchronous learning can be used strategically to model interactive teaching practices and facilitate immediate feedback, while asynchronous learning provides opportunities for reflection and self-directed learning, both of which are essential for developing teacher candidates' competence and autonomy (Ryan & Deci, 2020).

From a practical perspective, these findings suggest that curriculum designers and educators should integrate both platforms to accommodate diverse learners needs, for example by combining live discussions with flexible, individually paces assignment. This blended approach may be particularly beneficial in post pandemic higher education, where students' schedules and access to technologically vary. This study is not without limitations. The relatively small sample size and the context of a single institution limit the generalizability of the findings. Furthermore, the use of self-reported perception data may introduce response bias. Future studies should use larger, more diverse samples and incorporate qualitative data from classroom observations or interviews to triangulate findings and capture richer insights into student engagement and learning.

4.1 Limitations

Several methodological limitations should be acknowledged. First, this study used a nonrandom convenience sample, meaning the two classes may differ in aspects unrelated to the instructional modality (e.g., motivation, prior knowledge). Second, there was no pre test to establish baseline equivalence between the groups. Third, this study was limited to a single semester at a single institution, which limits the generalizability of the findings. Furthermore, learning outcomes were measured solely through midterm exam scores, which may not capture other dimensions of learning such as critical thinking or classroom performance.

5. CONCLUSION

This study examined the relationship between students' perceptions and their learning outcomes in synchronous (Zoom) and asynchronous (Moodle) TEYL courses. Results revealed that while positive perceptions were significantly associated with higher achievement, there was no meaningful difference in outcomes between the two modalities. These findings suggest that well-structured synchronous and asynchronous learning can be equally effective when supported by consistent instructional management. Theoretically, this study expands the discussion of online learning to the underexplored TEYL context in higher education, showing that both modalities can foster engagement and achievement. Practically, it highlights the need for flexible instructional design that strategically integrates synchronous and asynchronous elements and prepares future teachers with strong pedagogical and technological skill. Future research should employ experimental or mixed method designs to explore causal link between modality, motivation, and engagement, and to investigate long-term effects on knowledge retention and teaching readiness. Multi institutional and cross-cultural studies are recommended to enhance the generalizability of these findings and inform the development of

hybrid teacher training models that balance flexibility and interaction. In the post COVID are, these results reaffirm that both synchronous and asynchronous modes remain valuable tools for ensuring access, continuity, and quality of learning in diverse educational settings.

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