# Exploring the Efficacy of HyFlex Learning for Enhancing Reading Comprehension Skills of Secondary School Students: A Research and Development Study

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**Abstract.** This study examined the effectiveness of a HyFlex learning management plan for developing the reading comprehension skills of secondary school students. The research investigated the needs and challenges of secondary school students regarding reading problems in the context of applying HyFlex, the development of a learning management model that incorporates HyFlex, and the effect of the learning management plan on enhancing students' reading comprehension. The study employed a research and development method consisting of three phases: a needs analysis, the development of the learning management plan, and its implementation with participants. The study involved three distinct groups of participants. The first group consisted of 19 stakeholders involved in reading management, who took part in the needs analysis phase. The second group comprised five experts and 30 students who participated in the development process of the learning management plan. Finally, the third group consisted of 50 students who were involved in the implementation process of the learning management plan. The instruments were an interview form, a learning management evaluation form, the HyFlex learning management tool, a reading comprehension test, and a satisfaction interview. The findings reveal the presence of reading difficulties as part of broader language problems in Thailand, thereby emphasizing the need for targeted interventions. The results also indicate that Thailand is prepared for technology integration in learning, which aligns with other research. Moreover, the study demonstrates the effectiveness of the HyFlex learning approach, which combines face-to-face and online environments, to develop students' reading comprehension. These

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findings contribute to the understanding of effective instructional approaches for enhancing reading comprehension skills, and inform the implementation of evidence-based practices in reading instruction.

## 1. Introduction
Secondary school, encompassing the Grades 7–12 educational period, represents a critical phase in students' academic journey. During this developmental stage, the acquisition and mastery of reading skills become increasingly vital, as these skills have a profound impact on students' academic performance, personal growth, and prospects (Pranata, 2019). The ability to comprehend written texts is particularly crucial during this period, as it serves as a foundation for learning across various subject areas, facilitates the acquisition of knowledge, and cultivates essential cognitive and critical thinking abilities.

Reading comprehension, which is defined as the capacity to understand and interpret written texts (Goodman, 1967; Jiang et al., 2000; Rieben & Perfetti, 1991), assumes paramount significance in the secondary school context. The curriculum of secondary education places a strong emphasis on the cultivation of students' reading skills, by recognizing their indispensable role in fostering academic achievement, facilitating intellectual growth, and nurturing well-rounded individuals (Grabe & Stoller, 2002; Heller et al., 2002). Proficiency in reading comprehension empowers students to engage with complex and diverse textual materials, extract meaning, make connections, and construct knowledge from the information presented. The benefits of reading comprehension extend far beyond the academic realm. A robust grasp of this skill equips students with the tools necessary to navigate the challenges of everyday life, including personal interactions, decision-making processes, and the pursuit of lifelong learning (Mckay, 2018). Moreover, reading comprehension contributes to the development of critical and analytical thinking, and enables students to evaluate and synthesize information effectively, thereby enhancing their problem-solving capacities and nurturing a sophisticated intellectual outlook.

In spite of its importance for general education, reading comprehension presents unique difficulties for language learners, particularly in hostile learning environments (Gündoğmuş, 2018; Mohammed & Rashid, 2017). Using Thailand as an illustration, language learners in this context face unique challenges due to differences in language structure and lexical roots (Rungswang & Kosashunhanan, 2021; Thongwichit, 2018). Thai students must navigate the complexities of reading in a language that is notably different from their mother tongue. Thailand's linguistic landscape presents language learners with a unique set of obstacles. As Thai is the predominant language (L1) that is used in daily life and the workplace, exposure to foreign languages is limited. As a result, Thai language learners may be less exposed to diverse linguistic structures and vocabulary, which makes it difficult for them to acquire the skills necessary to comprehend texts written in other languages.

In addition, cultural factors in Thailand impede the development of reading habits among students (Chonmaitree, 2011). The promotion of reading as a pastime and a crucial means of acquiring knowledge may not be as widespread as desired. When students are exposed to fewer reading materials and read less frequently, their overall reading experiences are constrained. This dearth of exposure and practice can result in diminished reading skills and difficulty comprehending complex texts. Along with other language abilities, the significance of reading is acknowledged in the Thai educational context. This is evident from the results of standardized tests and the literature, which demonstrate ongoing efforts to improve reading proficiency. The incorporation of reading as an essential component of language education reflects the recognition of its significance and the understanding that the development of reading skills is crucial to the overall language development of students.

It seems that the situation in Thailand is structured by both linguistic and environmental aspects. In this case, HyFlex learning could present a solution to the problems. By implementing a HyFlex learning approach, language learners in Thailand can benefit from the flexibility and adaptability offered by this model. HyFlex learning is designed to make possible a combination of face-to-face instruction and online resources, and to enable students to access a broader range of reading materials and linguistic resources, beyond their immediate environment. Through the integration of online components, learners can engage with diverse texts and experiences, and bridge the gap between their native language and foreign languages. The online aspect of HyFlex learning also provides opportunities for learners to practice reading skills independently, and to access resources tailored to their language proficiency level and specific needs. This addresses their limited exposure to foreign languages and the challenges posed by differences in language structures and vocabulary roots. By leveraging the advantages of HyFlex learning, language learners in Thailand could enhance their reading skills and comprehension abilities, and overcome the limitations imposed by linguistic differences and limited exposure to foreign languages. Hence, considering the linguistic challenges and unsupportive learning environment in Thailand, this project investigated the potential of implementing HyFlex learning as a viable solution for enhancing the reading comprehension skills of language learners, addressing the existing gaps, and promoting effective language education practices.

## 2. Literature review
### 2.1 Reading Comprehension
Scholars have devoted substantial effort to comprehend the factors that contribute to reading comprehension. Kintsch and van Dijk's (1978) interactive compensatory model suggests that different reading skills and strategies, such as vocabulary knowledge, background knowledge, and inference-making, can compensate for each other to attain comprehension. Strengths in other areas can compensate for deficiencies in one area. Perfetti (1985) focuses on the cognitive and linguistic processes involved in reading, including word recognition, vocabulary knowledge, syntactic processing, and text integration, as well as their interaction. Kintsch's (1988) construction-integration model focuses on how readers construct mental representations of text, integrate information at multiple

levels, and establish connections between different parts of the text to derive meaning. Reading comprehension, according to Gough and Tunmer's simple view of reading (1986), comprises two components: word recognition (decoding) and language comprehension. Both decoding and language comprehension skills are required for effective reading comprehension.

Therefore, comprehending texts involves a combination of various factors. It requires linguistic comprehension skills to understand vocabulary, syntax and discourse structures. Cognitive processes, such as inference-making, summarizing, and making connections, play a crucial role in deriving meaning from the text. Metacognitive processes, including monitoring comprehension, setting goals, and self-evaluation, help regulate and guide the reading process. Additionally, word recognition (decoding), language comprehension and the ability to construct mental representations and integrate information from the text are important for successful comprehension. The interaction between these factors contributes to an individual's overall ability to comprehend texts effectively.

## 2.2 HyFlex learning

HyFlex learning, a relatively new concept in education, combines the principles of hybrid and flexible learning approaches (Liu & Rodriguez, 2019). It was developed by Beatty (2010), and integrates the advantages of both online and face-to-face learning while giving students the autonomy to decide how they prefer to learn. This approach is guided by principles such as learner choice, equivalency, reusability, and accessibility. According to Beatty (2010), hybrid learning refers to the integration of face-to-face and online components of a course, while the term "flexible" in HyFlex learning emphasizes the opportunity for students to engage with course materials and participate in a manner that suits their preferences. This distinguishes HyFlex learning from other modalities such as face-to-face, blended learning, hybrid, and online learning. In face-to-face learning, students and instructors physically meet in a classroom setting, while blended learning incorporates technology alongside in-person instruction. Hybrid learning involves a combination of face-to-face and online interactions, allowing for both synchronous and asynchronous engagement. Online learning, on the other hand, encompasses teaching and learning that occurs without the need for physical presence. HyFlex learning combines the hybrid and flexible aspects, enabling students to choose between face-to-face and online participation, resulting in three modalities: face-to-face, asynchronous online, and synchronous online (Malczyk, 2019).

Therefore, HyFlex learning provides a flexible and adaptable approach that can effectively support the development of students' reading comprehension skills. By incorporating linguistic, cognitive, and metacognitive processes, HyFlex facilitates a comprehensive learning experience that enhances students' understanding of written texts. Specifically, in the HyFlex framework, linguistic comprehension is addressed through various activities and resources. Students can engage with vocabulary-building exercises, syntactic analysis tasks, and discussions focused on discourse structures. Online components offer interactive language learning materials, such as multimedia resources, online dictionaries, and language-specific exercises, which enable students to enhance their

vocabulary, syntax, and discourse comprehension (Moorhouse & Yan, 2023; Ramadhan et al., 2022). Meanwhile, the cognitive aspect of reading comprehension is fostered through a range of activities within the HyFlex model. Students participate in close reading exercises, analytical discussions, and critical thinking tasks to develop their cognitive processes (Evans & Carr, 1985). Students can engage in online collaborative projects, where they analyze and interpret texts collectively, share perspectives, and generate insights. In face-to-face sessions, instructors facilitate guided discussions, and encourage students to employ higher-order thinking skills, such as inference-making, summarizing, and making connections. In addition, metacognitive development is integral to the HyFlex approach, as it empowers students to become aware of and regulate their reading strategies. Through online platforms, students can access self-assessment tools, reflection activities, and progress tracking features. In face-to-face sessions, instructors foster metacognitive processes by providing explicit instruction on effective reading strategies, promote self-monitoring, and guide students to set reading goals (Karkour, 2014). The flexibility of the HyFlex model means learners can choose their preferred mode of engagement, they can reflect on their own learning preferences and optimize their metacognitive awareness. By integrating linguistic, cognitive, and metacognitive processes in the HyFlex learning environment, students gain a comprehensive set of skills to enhance their reading comprehension abilities. This approach ensures that students not only acquire language proficiency, but also develop the critical thinking and metacognitive skills necessary for deep understanding and interpretation of written texts.

## 2.3 Related studies

The combination of face-to-face and online participation in reading classrooms has been the subject of research by several scholars (Djiwandono, 2018; Ghazizadeh & Fatemipour, 2017; Karkour, 2014; Noursi, 2020; Pammu et al., 2021; Schechter et al., 2015; Wirawan & Kristiani, 2022). Studies indicate that this blended learning environment is beneficial for reading classrooms, as it has been found to enhance learners' vocabulary, reading skills, thinking skills, and reading comprehension. Notably, the combined approach allows teachers and learners the freedom to tailor their learning experiences to their individual styles while strengthening self-regulation.

Reading development requires exposure to a variety of texts and provides learners with the freedom to choose texts, platforms for interaction, and learning activities, which can greatly benefit their progress. Consequently, the implementation of HyFlex learning in the Thai context holds promise. However, it is important to note that other studies primarily focused on the implementation of combined face-to-face and online participation in higher education, while the application of such methods in the context of secondary school students remains relatively underexplored. This is intriguing, because secondary school students, who belong to the Gen Z generation, are accustomed to technology and may find the HyFlex approach suitable to their learning style. Thus, the study aimed to address this gap by examining the needs and challenges of secondary school students regarding reading problems in the context of applying HyFlex. The study, furthermore, sought to develop a learning management model that

incorporates HyFlex as its core design and implement it to enhance students' reading comprehension.

## 3. Methodology
### 3.1 Research Design
The study used a research and development (R&D) methodology to explore the implementation of HyFlex learning in secondary school reading classrooms. It consisted of three phases: a needs analysis, development of a learning management system, and implementation with participants. In the needs analysis phase, data was collected to identify the specific requirements and challenges related to the reading problems of secondary school students. Based on the findings, a comprehensive learning management system was developed that took into account instructional strategies and technology integration. Expert evaluation was conducted to refine the system. Finally, the learning management system was implemented with a sample group to assess its effectiveness in enhancing reading comprehension and measuring participant satisfaction. This study aimed to contribute to the literature on HyFlex learning in secondary education, and to address the unique needs and challenges facing students in improving their reading comprehension skills. The detail of each phase will be discussed in the following subsections.

### 3.2 Phase 1. Needs Analysis
The initial stage of the research involved conducting a needs analysis to assess the requirements and challenges associated with implementing HyFlex learning to improve secondary school students' reading comprehension. This phase aimed to investigate the specific issues and conditions related to the integration of HyFlex learning in classroom settings. The study involved 19 stakeholders in the field of learning management: five education inspectors, four school administrators and 10 language teachers. They were chosen using the purposive sampling method, based on their active participation in reading development and their prior experiences in the Thai reading development context. Data collection was carried out through semistructured interviews that focused on relevant aspects. The collected data were subsequently subjected to content analysis for interpretation and identification of key themes and patterns.

### 3.3 Phase 2. Learning Management Plan Development and Evaluation
The second stage of the study involved the development of a comprehensive HyFlex learning management plan, which was subsequently evaluated through a peer review process. The draft of the HyFlex learning management plan stretches over 12 class hours and consists of six learning plans. To ensure the quality and effectiveness of the plan, it underwent evaluation by five experts in the field of language teaching. The evaluation process involved the review of both the draft of the HyFlex learning management plan, and an accompanying evaluation form. The data collected from the peer review evaluation were analyzed using descriptive analysis techniques, which allowed for a detailed examination and assessment of the plan's content, structure, and pedagogical approaches. This rigorous evaluation stage contributed to the refinement and improvement of the HyFlex learning management plan, and ensured its suitability and alignment with the objectives of the study.

**3.4 Phase 3. Implementation of the Learning Management Plan**

In the third phase of the study, the HyFlex learning management plan that had been developed was implemented in a reading class. The participants in this phase consisted of 50 Grade 8 students at a secondary school in Thailand who had been selected using a multistage method. The study used multiple instruments, including the HyFlex learning management plan itself, a reading comprehension test, and a satisfaction questionnaire, to gather relevant data. The collected data underwent analysis using descriptive analysis techniques, such as a t-test for statistical comparisons, and an effectiveness index with a predetermined criterion of 80. These analytical approaches allowed for a comprehensive assessment of the effectiveness of the implemented learning management plan, students' reading comprehension performance, and their satisfaction levels. The findings obtained from this phase contributed to evaluating the impact of the HyFlex approach on students' learning outcomes and their overall experience in the reading class.

**4. Results**

**4.1 Needs Analysis on Applying HyFlex Learning in Reading Classroom**

Results of the interviews conducted as part of the study reveal valuable insights from the participants regarding their students' reading comprehension difficulties, their perception of students' capabilities to use the internet for learning, and their belief in the potential of HyFlex learning to enhance students' writing skills. The interview data were analyzed using content analysis, which allowed for the identification and interpretation of key themes and patterns.

Regarding the first key answer, participants expressed that their students faced challenges in comprehending text. This difficulty was attributed to several factors, including a lack of vocabulary knowledge, insufficient reading skills, and a limited reading habit. Participants emphasized that students struggled to understand texts due to their limited range of vocabulary, which hindered their ability to grasp the meaning of unfamiliar words and comprehend the overall context of text. Additionally, participants reported that many students lacked essential reading skills, such as making inferences, summarizing, and making connections between ideas, which affected their overall comprehension. Furthermore, participants highlighted the low level of reading habits of students, and pointed out that the lack of exposure to various texts and limited reading experience impeded their reading comprehension abilities further.

Regarding the second key answer, participants observed that their students possessed the capability to use the internet for learning. The participants based this belief on their observations of students' learning behaviors and their significant reliance on smartphones as an integral part of their daily lives. Participants reported that students frequently used smartphones to access information, communicate, and engage in various online activities. This indicates a level of digital fluency and familiarity with online platforms, and suggests that students are well equipped to leverage the internet for learning purposes.

Moving to the third key answer, participants expressed a belief in the possibility of using HyFlex learning to help their students develop their writing skills. Participants recognized that HyFlex learning offers opportunities for flexibility and customization, and would enable students to engage in writing activities

tailored to their needs and preferences. They believed that the integration of online components, such as collaborative writing platforms and interactive writing exercises, could enhance students' writing skills. Participants also emphasized the potential of HyFlex learning to provide students with immediate feedback and support, and enable them to refine their writing abilities in real time. Overall, participants had a positive outlook on the potential of HyFlex learning to positively impact their students' writing skills.

## 4.2 Development of the Learning Management Plan

The second stage of data collection involved two main parts: expert evaluation of the plan, and a tryout process. The results of the plan evaluation are given in Table 1.

**Table 1. Learning management plan evaluation**

| Evaluation aspects | $\bar{x}$ | SD | Interpretation |
|---|---|---|---|
| Background and rationale | 4.00 | 0.71 | Appropriate |
| Supportive theory regarding HyFlex learning in developing reading comprehension | 4.20 | 0.84 | Appropriate |
| The objective of the learning management plan | 4.00 | 1.00 | Appropriate |
| Content | 4.20 | 0.45 | Appropriate |
| Components of the learning management plan | 4.35 | 0.52 | Appropriate |
| Learning material | 4.40 | 0.55 | Appropriate |
| Processes of the learning management plan | 4.14 | 0.47 | Appropriate |
| Expected outcomes | 4.20 | 0.45 | Appropriate |
| **Overall** | 4.18 | 0.52 | Appropriate |

A learning management plan was created, designed to span 12 class hours and encompass six lesson plans. The plan content included fundamental principles of reading comprehension, engaging in leisure reading, exploring news articles, practicing with short passages, reading short stories, and summarizing literature. The plan underwent evaluation by experts, who assessed its suitability and level of appropriateness. The plan was evaluated by experts to be at an appropriate level ($\bar{x}$ = 4.18, 0.52). Based on the positive evaluation results, the learning management plan was deemed appropriate and we subsequently proceeded to the trial phase for further examination and implementation.

The trial process involved the participation of 30 Grade 8 students at a school selected for its resemblance to the actual study participants in terms of relevant characteristics. The purpose of this trial was to assess the effectiveness and practicality of the learning management plan that had been developed. The results of the trial process are presented in Table 2, and shed light on the outcomes of the study.

**Table 2. Effectiveness of the learning management plan in the trial process**

| Analysis | Pre-test (30) | Process effectiveness | | | | | | Sum | Post-test (30) |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 (40) | 2 (40) | 3 (40) | 4 (40) | 5 (40) | 6 (40) | | |
| Sum | 349 | 987 | 995 | 982 | 1,023 | 1,001 | 1,015 | 6,003 | 746 |
| Mean | 11.63 | 32.90 | 33.17 | 32.73 | 34.10 | 33.37 | 33.83 | 200.10 | 24.87 |
| SD | 1.37 | 3.39 | 3.41 | 3.84 | 3.32 | 3.29 | 3.11 | 3.39 | 1.33 |
| % | 38.78 | 82.25 | 82.92 | 81.83 | 85.25 | 83.42 | 84.58 | 83.38 | 82.89 |
| Effectiveness Index ($E_1/E_1$) = 83.38/82.89 | | | | | | | | | |

The findings of the study demonstrate that the participants in the trial process achieved a mean score of 83.38% of the total score while engaging in activities outlined in the learning management plan. Additionally, they obtained a mean score of 82.89% in the post-test assessment. Consequently, the study calculated the process effectiveness ($E_1$) and outcome effectiveness ($E_2$), resulting in an effectiveness index ($E_1/E_2$) of 83.38/82.89, which surpasses the predetermined criterion of 80/80. These results indicate that the learning management plan was effective in both process and outcome dimensions, and meets the established benchmarks for effectiveness.

**Table 3. Comparison of participants' reading comprehension in the trial process**

| Reading comprehension | n | $\bar{x}$ | SD | df | t | Sig. |
|---|---|---|---|---|---|---|
| Pre-test | 30 | 11.63 | 1.38 | 13.23 | 34.06 | .000* |
| Post-test | 30 | 24.87 | 1.33 | | | |

Note. *p > 0.05

The study findings reveal a significant difference between the participants' reading comprehension scores in the pre-test (mean = 1.63, SD = 1.38) and post-test (mean = 24.87, SD = 1.33), as evidenced by a t-value of 34.06 (p < 0.05). This significant difference demonstrates the positive impact of the implemented learning management plan on the participants' reading comprehension abilities. The substantial improvement observed from pre-test to post-test indicates that the learning management plan effectively enhanced the participants' reading comprehension skills.

The interpretation of the study results indicates that the learning management plan demonstrated substantial effectiveness during the trial process, thereby validating its quality and suitability. As a result, the draft version of the learning management plan, which had proven successful in the trial, was implemented in the next phase of the study.

**4.3 Implementation of the Learning Management Plan**

The study employed a HyFlex learning management plan to facilitate the development of reading comprehension skills of 50 secondary school students. The effectiveness of the learning management plan was evaluated through the calculation of the effectiveness index, the analysis of the difference in students' reading comprehension scores before and after the implementation of the plan, and an assessment of the participants' satisfaction with the plan. The study results are summarized in Table 4.

**Table 4. Effectiveness of the learning management plan**

| Analysis | Pre-test (30) | Process Effectiveness | | | | | | Sum | Post-test (30) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | 1 (40) | 2 (40) | 3 (40) | 4 (40) | 5 (40) | 6 (40) | | |
| Sum | 596 | 1730 | 1760 | 1796 | 1786 | 1819 | 1813 | 10,704 | 1,208 |
| Mean | 11.92 | 34.60 | 35.20 | 35.92 | 35.72 | 36.38 | 36.26 | 214.08 | 24.16 |
| SD | 2.72 | 1.50 | 1.64 | 1.31 | 1.31 | 1.31 | 1.35 | 8.42 | 1.83 |
| % | 39.73 | 86.50 | 88.00 | 89.80 | 89.30 | 90.95 | 90.65 | 89.20 | 80.53 |

Effectiveness Index $(E_1/E_1)$ = 89.20/80.53

The study findings indicate that the participants in the study attained an average score of 89.20% of the total score while actively participating in learning management plan activities. Moreover, in the post-test evaluation, the participants achieved an average score of 80.53%. Calculating the process effectiveness $(E_1)$ and outcome effectiveness $(E_2)$, the study derived an effectiveness index $(E_1/E_2)$ of 89.20/80.53, which surpasses the predetermined effectiveness criterion of 80/80. These results confirm the efficacy of the learning management plan in terms of both the process and outcome dimensions, thereby successfully achieving the established benchmarks for effectiveness.

**Table 5. Comparison of participants' reading comprehension**

| Reading comprehension | n | $\bar{x}$ | SD | df | t | Sig. |
| --- | --- | --- | --- | --- | --- | --- |
| Pre-test | 50 | 11.92 | 2.72 | 49 | 30.48* | .000 |
| Post-test | 50 | 24.16 | 1.83 | | | |

Note. *p > 0.05

The study results indicate a notable and statistically significant difference between the participants' reading comprehension scores in the pre-test (mean = 11.92, SD = .72) and post-test (mean = 4.16, SD = 1.83), as confirmed by a t-value of 30.48 (p < 0.05). This significant difference underscores the positive influence of the learning management plan on the participants' reading comprehension capabilities. The substantial improvement observed from the pre-test to the post-test indicates the effective enhancement of the participants' reading comprehension skills through the application of the learning management plan.

**Table 6. Level of satisfaction among the participants with the learning management plan**

| Evaluation Aspects | Mean | SD | Levels of satisfaction |
|---|---|---|---|
| Content | 4.55 | 0.55 | Very high |
| Learning material | 4.35 | 0.53 | High |
| Learning activities | 4.41 | 0.56 | High |
| Innovation in learning management | 4.49 | 0.44 | High |
| Evaluation and assessment | 4.51 | 0.52 | Very high |
| **Average** | **4.46** | **0.52** | **High** |

The study findings suggest that the participants expressed a notable degree of satisfaction with the learning management plan, as indicated by a mean score of 4.46 (with a standard deviation of 0.52). This evaluation encompassed a comprehensive assessment of various components, including the content itself, the quality of learning materials, the effectiveness of learning activities, the innovative approaches used, and the methods of evaluation and assessment.

In essence, the study examined these aspects thoroughly to gain insight into how the participants perceived the overall quality and effectiveness of the learning management plan. The fact that the participants reported a high level of satisfaction across these dimensions implies that the plan was received well regarding its content, the quality of learning materials provided, the engagement of learning activities, the incorporation of innovative teaching methods, and the effectiveness of the evaluation and assessment techniques employed.

This overall positive evaluation underscores the success of the learning management plan in meeting the needs and expectations of the participants. It suggests that the plan effectively delivered valuable content, engaged learners with quality materials and activities, incorporated innovative teaching approaches, and accurately assessed their progress and understanding.

The positive feedback regarding content indicates that the participants perceived the plan's instructional materials and resources to be comprehensive, informative, and well designed. Additionally, the favorable evaluation of learning activities suggests that the participants found them engaging, interactive, and conducive to their learning needs. The recognition of learning innovation signifies that the participants appreciated the integration of novel and effective teaching approaches by the plan. Lastly, the positive assessment of evaluation and assessment indicates that the participants perceived the way the plan evaluated their progress and performance to be fair, meaningful, and supportive of their learning journey.

## 5. Discussion
The findings will be discussed regarding a number of issues.

### 5.1 Reading Problems in the Thai Context
The results of the study provide evidence of problems in reading classes in the Thai educational context. The findings are consistent with that of Thongwichit

(2018), Chonmaitree (2011), and Rungswang and Kosashunhanan (2021), who also found reading difficulties to be a persistent concern in the Thai context. Vocabulary knowledge, inadequate reading skills, and a lack of reading habits among Thai learners are still found to be obstacles in developing the reading skills of children in Thailand. The consistent alignment of the previous findings with the current study underscores the need for targeted interventions and instructional strategies to address the reading difficulties faced by students in Thailand.

The recognition that reading difficulties are part of the broader language problems in Thailand carries important implications for educators, policymakers, and curriculum designers. It highlights the necessity of developing comprehensive and effective reading instruction methodologies that address the specific needs of Thai learners. This may involve implementing strategies to enhance vocabulary acquisition, improving reading comprehension skills, and fostering a reading culture among students. By acknowledging and addressing the broader language problems relating to reading difficulties, educators and stakeholders can work towards equipping Thai learners with the necessary skills and competencies to excel in reading comprehension.

## 5.2 Readiness for Technology Integrated Instruction

The findings of the study indicate that Thailand is a country that is well prepared for the integration of technology in learning, owing to the widespread availability and utilization of smart devices, and online connectivity of learners. This observation aligns with the research conducted by Ngampornchai and Adams (2016), which supports the notion that Thailand is embracing technology as an essential tool for educational purposes. The study findings underscore the increasing prevalence of the use of smart devices, such as smartphones and tablets, by learners in Thailand. These devices serve as powerful platforms for accessing digital content, educational applications, and online resources, and enable learners to engage in self-directed learning and explore a vast range of educational materials. The widespread availability of internet connectivity enhances learners' access to information further, and facilitates their participation in online learning platforms and activities.

## 5.3 The Effectiveness of HyFlex Learning in Thai Reading Classrooms

The primary finding of the study relates to the benefits of employing a combination of face-to-face and online learning environments, guided by the principles of HyFlex learning, for the development of learners' reading comprehension. The results of the study align closely with research conducted by Djiwandono (2018), Ghazizadeh and Fatemipour (2017), Karkour (2014), Noursi (2020), Pammu et al. (2021), Schechter et al. (2015), and Wirawan and Kristiani (2022), that also demonstrate the effectiveness of a blended learning environment in reading classrooms.

The findings suggest that integrating face-to-face and online learning components within the HyFlex model has a positive impact on learners' reading comprehension abilities. The combination of these two environments allows for greater flexibility, personalization, and adaptability in the learning process, and

caters to the diverse needs and preferences of learners. The face-to-face interactions provide valuable opportunities for direct instruction, real-time feedback, and classroom discussions, while the online component offers additional resources, interactive activities, and asynchronous learning options. The alignment between the study's results and other research supports the notion that the combined learning environment, as facilitated by HyFlex learning, is conducive to effective reading instruction. This approach leverages the advantages of both face-to-face and online learning, and capitalizes on the strengths of each modality to create a more comprehensive and engaging learning experience. By providing learners with multiple avenues to access and engage with reading materials, the combined learning environment fosters active participation, critical thinking, and independent learning skills.

## 6. Conclusions

In conclusion, this study investigated the effectiveness of a HyFlex learning management plan in developing secondary school students' reading comprehension skills. The findings reveal several significant aspects related to the Thai language context, the readiness of Thailand for technology integration in learning, and the effectiveness of the HyFlex learning approach.

## 7. Recommendations

Based on the study's findings, we recognize the opportunity to broaden the scope of our recommendations for future research. Firstly, future studies could delve into the long-term effects and sustainability of implementing the HyFlex learning approach in reading instruction, to shed light on its enduring impact. Moreover, to enrich the study's applicability and relevance, it is advisable to explore the influence of socio-economic factors on reading comprehension. Additionally, investigating the realm of teacher professional development in the context of HyFlex learning could provide valuable insights for educators and researchers alike.

Furthermore, our recommendations encompass investigating the specific strategies and instructional methods of the HyFlex model that contribute to improved reading comprehension outcomes, thus, offering more comprehensive guidance for educational practitioners. To enhance the effectiveness of reading instruction, future research may consider exploring the potential benefits of integrating additional technological tools and resources within the HyFlex learning environment. Examining the impact of various online activities, multimedia materials, or collaborative tools on reading comprehension development could be particularly insightful.

Lastly, in recognition of the diverse learner profiles within the secondary school context, it is important to investigate the differential effects of the HyFlex learning approach on students with varying levels of prior knowledge, language proficiency, and reading abilities. By expanding the scope of our recommendations, we aim to contribute to a broader and more comprehensive understanding of the multifaceted aspects of reading instruction and its intersection with the HyFlex learning model.

In summary, this study contributes to our understanding of effective instructional approaches for developing reading comprehension skills of secondary school students. The findings emphasize the importance of addressing reading challenges, capitalizing on Thailand's readiness for technology integration, and recognizing the effectiveness of the HyFlex learning approach. The recommendations for further research outlined above are intended to advance our knowledge of this field and inform the implementation of evidence-based instructional practices to enhance reading instruction in the future.

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