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Views on Digital Education and Innovative Research

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Abstract

Digital education and innovative research are the key factors in education and innovation. The digital-technological-education and research are suggested to shed in line with educational reforms and innovation of language teaching. With the AI applied in education, digital education (DE) and innovative-language-teaching (ILT) are explored, improving the teacher and student digital competence and skills. By transforming the DE and ILT, this study promoted teachers, scholars, students, and practitioners to research the effects and challenges in digital education and innovative-language-teaching, with the different research designs, such as analytical, descriptive, exploratory, explanatory, and predictive research designs. This further promoted teachers, scholars, and practitioners conduct the future studies on AI challenges and impacts in education, bettering the critical thinking, taking the problem-solving, and decision making. Digital education and innovative-language-teaching significantly contributes to the betterment of digital competence, skills, and literacy – reforming the educational quality and outcomes.

Keywords: *digital education, innovative-language-teaching, digital, innovation, reform, decision-making*

1. Views on Digital Education & Innovative-Language-Teaching

Digital education (DE) is the factor for developing to the education outcomes. Besides, innovative-language-teaching can access language teaching with the digital platforms (Chhorn, 2025; Giannoutsou et al., 2024; Ourn & Chhorn, 2025). Digital education research is needed to motivate and engage teachers, students, and scholars involve with DE and ILT frameworks (Chhorn et al., 2025; OECD, 2023). However, AI challenges in education and language teaching is limitedly researched in the era of DTT (James et al., 2021; Huot & Em, 2025; UNICEF, 2021). HEIs might promote teachers or students to develop the research in digital education and innovative-language-teaching (Balyer & Öz, 2018; Hang-chuon, 2021).

With 21st century education, DE is prioritized for educators or scholars to empower the digital education and innovative-language-teaching (MoEYS, 2019). Internet-digital devices significantly increased in research with digital technology (Ministry of Post and Telecommunications [MPT], 2023). The

index of school responsibility is low in DE and ILT (Ourn & Chhorn, 2025). DE and ILT affected the academic performance and educational outcomes (DASH et al., 2021; Nizariah, 2021) and ensured digital educational contents at all settings (Bates, 2015; UNESCO, 2023). Reforming the digital education system with internet-digital platforms contributes to education outcomes, enhancing online learning, and integrating the digital teaching and learning (Dirk et al., 2021; Forrester, 2016; OECD, 2017; Paulo, 2020).

DE & ILT involved the integration of digital technologies into the teaching and learning process, with internet platforms (Benavides et al., 2020; Alenezi, 2023), developing the critical thinking and digital learning platforms (Abad-Segura et al., 2020; Bisri et al., 2023; Mohamed Hashim et al., 2022; Rof et al., 2020; Shenkoya & Kim, 2023; Valdés et al., 2021). DE is challenged with the strategic and cultural barriers (Akhmetshin et al., 2020; Akour & Alenezi, 2022; Bucăța et al., 2022; Díaz-Garcia et al., 2023; Gkrimpizi et al., 2023; Gkrimpizi & Peristeras, 2022; Rima Aditya et al., 2021) and it influences the digital technological readiness, competencies, and skills (Elçiçek & Erdemci, 2021; Larionov et al., 2021; Latifah et al., 2022; Litiņa & Miltuze, 2023; Niță & Guțu, 2023; Valverde-Berrocso et al., 2022; Wekerle et al., 2022). DE and ILT proffers teachers the chance to better the students' critical thinking and use the digital framework-initiatives (Alenezi, 2021; Silva, 2017; Yureva et al., 2020).

4. AI Frameworks in DE and ILT

AI frameworks lies in a sense of responsibility with the future research in DE and ILT, reflecting the digital landscape and education outcomes (Culminas-colis & Reyes, 2024; Kim & Choi, 2018). AI challenges are the critical gaps for research frameworks in education and language teaching, such as critical thinking and problem -solving (James et al., 2021; Ribble & Bailey, 2007; Ribble & Park, 2019). AI collaborates with the future-research framework – being a set of technical competency and digital life (DQ Institute, 2019) and encompassing the use of digital technologies and embracing the teaching and learning digital-practices (Jones & Mitchell, 2016; Vuorikari et al., 2022; Yureva et al., 2020). AI framework is challenged for critical thinking in the DE and ILT settings (MoEYS, 2024; Öztürk, 2021). Further, AI in education shifts competency-based education, critical thinking, and problem-solving (Flores & Mean, 2024; Keo et al., 2024a; MoEYS, 2016; Pang et al., 2022). AI education sets out to integrate education system, with learning achievement and outcomes (Dirk et al., 2021; Hang-Chuon, 2021).

DE and ILT frameworks play a role in creating new internet-digital platforms. DE & ILT neglect the technical abilities increasingly support the success in reforming higher education quality (HEQ) (Khan et al., 2024). As the studies by Koehler et al. (2013), integrating technological knowledge into digital education and innovative-language-teaching foster the creativity in global digital-innovation ecosystems (Morel & Spector, 2022; MoEYS, 2024; NV, 2017; Paulo, 2020). Promoting the research on AI education prioritizes digital research literacy (UNESCO Institute for Statistics, 2018), high-research competencies (Gong et al., 2023; In-Seong et al., 2022; Sok & Heng, 2024), digital-research navigation (MoEYS, 2016), and digital teacher training (Timotheou et al., 2023; Yılmaz Özden, 2023).

5. Conclusion

Frameworks in digital education and innovative-language-teaching research involved engaging teachers, students, scholars, practitioners to cultivate the research knowledge and skills. The critical digital-research is the research trends challenging teachers, scholars, and/or practitioner. This shed in light with the AI utility integrated and navigated digital education and innovative-language teaching. DE and ILT should be applied int the context of reforming educational systems, strategies, and policies. This key insights of DE and ILT can leverage substantial digital-research extend educational settings, and integrate innovative-language-teaching and learning, in particular digital-educational-research practices and AI-research frameworks.

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Facilitating Poetry Learning for Language Students at Eastern University, Sri Lanka through Decoding Poetic Syntax: A Techno-Stylistic Integrated Approach

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Abstract

English poetry, with its intricate syntax, often presents significant challenges for language students, particularly in higher education contexts. Understanding poetic syntax is important for language students because it unlocks deeper layers of meaning. At Eastern University, Sri Lanka (EUSL), language students often encounter challenges in decoding poetic syntax through traditional methods that emphasize memorization, teacher-centred lectures, and limited classroom exercises. Such approaches, while foundational, frequently fail to foster analytical depth or sustained engagement. By contrast, technology-enhanced approaches provide interactive, adaptive, and learner-centred environments that simplify the decoding of poetic syntax. As today's students are technophiles, providing them with innovative learning methods rather than traditional approaches is indispensable in order to significantly enhance their enthusiasm for poetry learning. Based on this, the researcher has developed a computational tool, "Poetic Syntax Decoder", in order to easily understand the structures in English poems. The study, being descriptive and qualitative, involved twenty first-year language students from the Department of Languages at EUSL. The data for the study were collected from a variety of English poems. To measure the effectiveness of the tool, two tests were administered. First, a traditional pretest assessed the participants' initial understanding of poetic structures, followed by a post-test utilizing the developed tool as a learning and testing platform for deciphering poetic structures. The results indicated a significant improvement in participants' performance on the post-test compared to the pretest. Thus, the findings reveal that students exposed to technology-enhanced learning demonstrated improved proficiency in interpreting poetic syntax, alongside increased motivation and autonomy. Finally, the integration of computer-assisted tools into poetry education at EUSL demonstrates how modern computational tools can bridge gaps in traditional teaching, making the study of poetic syntax decoding both approachable and intellectually rewarding.

Keywords: *EUSL, poetry learning, poetic syntax, traditional method, computational tool, improved proficiency*

1. Introduction

Poetic syntax is a key stylistic feature, and understanding it is a necessary tool for language students at universities because it unlocks a deeper comprehension of poetic texts and enhances their analytical capabilities. Culler (2002) says that poetry often deviates from conventional grammatical structures, employing inversions, ellipses, and unusual word order to achieve specific aesthetic and semantic effects. By dissecting these syntactic choices, students learn to identify how poets manipulate language to create rhythm, emphasize certain words or phrases, and evoke particular emotions or ideas (Abrams and Harpham, 2015). For example, analyzing the inversion in Milton's (1667) "Of Man's first disobedience, and the fruit / Of that forbidden tree whose mortal taste / Brought death into the World, and all our woe", reveals how the delayed subject ("fruit") heightens the dramatic impact and foreshadows the consequences of the forbidden act. This analytical skill is not merely about identifying grammatical anomalies; it's about understanding the purpose behind these deviations and their contribution to the poem's overall meaning and artistic merit (Leech, 1969). Further, Eagleton (2008) states that a strong grasp of poetic syntax fosters a more nuanced appreciation of linguistic flexibility and the expressive potential of language, which is invaluable for students pursuing careers in fields such as literary criticism, creative writing, and even linguistics. It also cultivates critical thinking, as students must actively engage with the text to decipher its intended meaning rather than passively consuming it (Short, 1996). Vendler (1997) describes that mastering poetic syntax equips language students with sophisticated tools for interpreting complex literary works and articulating their insights with precision and depth.

2. Literature Review

This literature review explores the growing body of research advocating for the integration of computer technology-incorporated methods to enhance language students' ability to decode poetic syntax, arguing for their superiority over purely traditional methods. The inherent structural deviations and stylistic choices within poetry, such as inversion, ellipsis, and enjambment, demand analytical tools that can systematically break down and visualize these linguistic phenomena (Sperberg-McQueen, 2002). Traditional methods, relying heavily on close reading and instructor interpretation, can be subjective and may not provide the granular, objective analysis that computational tools offer. The advent of digital humanities and computational tools has opened new avenues for analyzing literary texts. Tools such as Natural Language Processing (NLP) and text visualization

software can provide students with unprecedented insights into the syntactic structures of poems. For instance, part-of-speech tagging can automatically identify the grammatical function of each word, highlighting deviations from standard sentence structures and making inversions immediately apparent (Jockers, 2013). This objective identification of grammatical roles can significantly aid students in reconstructing the underlying prose order of a poetic line, a crucial step in comprehension. Further, dependency parsing, a more advanced NLP technique, can map the grammatical relationships between words, visually representing the syntactic tree of a sentence. This visual representation can be particularly beneficial for students who struggle with abstract grammatical concepts, allowing them to see how words connect and modify each other within a poetic context (Pustejovsky & Stubbs, 2012). The ability to interact with these visual representations, manipulating and exploring different interpretations, fosters a deeper and more active engagement with the text than passive reading alone.

Biber et al. (1999) say that by analyzing large collections of poetic texts, students can identify common syntactic patterns within specific periods or by particular poets, and then contrast these with individual poems that intentionally subvert these norms. This comparative approach, facilitated by computational tools, allows students to move beyond isolated textual analysis to a broader understanding of poetic conventions and innovations. Computer-assisted learning platforms can incorporate interactive exercises where students are tasked with reordering scrambled poetic lines to their original syntactic structure or identifying instances of specific syntactic devices (e.g. anaphora, chiasmus) within a text. Such gamified approaches can increase student motivation and provide immediate feedback, reinforcing learning in a way that traditional assignments often cannot (Gee, 2003). While traditional methods provide essential foundational skills in close reading and critical interpretation, their limitations in systematically dissecting complex syntactic structures can hinder comprehensive understanding. Computer technology-incorporated methods, conversely, offer objective, visual, and interactive tools that empower students to decode poetic syntax with greater ease and depth.

Decoding of Poetic Lines of English Poems into Ordinary English

The intricate beauty of English poetry often lies in its nuanced language, figurative expressions, and condensed imagery, which can pose a challenge for readers seeking direct comprehension. Decoding poetic lines into

ordinary English involves unraveling these layers to reveal the underlying meaning, making the poem accessible without diminishing its artistic merit. This process is important for academic analysis, allowing for a deeper understanding of the poet's message, themes, and stylistic choices (Perkins, 1987). By dissecting the metaphorical and symbolic language, one can bridge the gap between poetic abstraction and concrete understanding. This analytical approach not only aids in interpretation but also highlights the poet's skill in conveying complex ideas through evocative language. The transformation from poetic to ordinary language often involves identifying key similes, metaphors, and personifications and then rephrasing them in a straightforward manner while retaining the original sentiment and intent (Frye, 1957). This activity is not about reducing the poem's complexity but rather about illuminating its core message for a broader audience, including those new to poetic analysis. The process of decoding poetic lines can be illustrated through examples from the following classic English poems: Consider the lines in the poem, "A Poison Tree" by William Blake.

*I was angry with my friend;
I told my wrath, my wrath did end.
I was angry with my foe;
I told it not, my wrath did grow.*

The above lines can be decoded into ordinary English as:

When I was angry with my friend, I expressed my anger, and it dissipated.

However, when I was angry with my enemy, I suppressed my anger, and it intensified.

This decode or translation clarifies the poem's central theme of suppressed anger leading to destructive consequences.

Similarly, consider the lines in the poem, "The Solitary Reaper" by William Wordsworth.

*No Nightingale did ever chaunt
More welcome notes to weary bands
Of travellers in some shady haunt,
Among Arabian sands.*

The lines can be interpreted as:

No nightingale has ever sung more beautifully or offered more comfort to tired groups of travelers resting in a shaded oasis in the Arabian Desert.

This above decoding illuminates the profound impact of the reaper's song, comparing it to the most soothing and welcome sounds in a desolate landscape.

Further, consider the lines in the poem, "An Unknown Citizen" by W.H. Auden

*He was found by the Bureau of Statistics to be
One against whom there was no official complaint,
And all the reports on his conduct agree
That, in the modern sense of an old-fashioned word, he was a saint,*

These lines can be translated into ordinary English as:

Government statistics indicated that no formal complaints were ever filed against him, and all official records of his behaviour consistently show that, by contemporary standards, he was an exemplary and morally upright individual.

This decoding highlights the poem's satirical commentary on conformity and the reduction of individual identity to statistical data.

These examples demonstrate how decoding poetic language into ordinary English can unlock deeper meanings and facilitate a more comprehensive understanding of the poet's message and the poem's thematic concerns (Eagleton, 2008). This analytical approach is fundamental for both students and literary scholars seeking to engage more deeply with poetic texts.

Decoders of Poetic Syntax in English Poems

While there isn't a single, universally recognized decoder or computational tool that perfectly decodes English poetic syntax into ordinary English, several approaches and research efforts have explored this complex task. The challenge lies in the inherent ambiguity, figurative language, and deviation from standard grammatical structures often found in poetry. However, advancements in Natural Language Processing (NLP) and computational linguistics offer promising avenues. The following are some approaches that modern NLP offers for poetic syntax analysis:

1. **Part-of-Speech (POS) Tagging:** This involves identifying the grammatical category of each word (e.g. noun, verb, adjective, and adverb). Poetic inversion often rearranges typical subject-verb-object (SVO) order. By accurately tagging words, a system can then attempt to reorder them into a more conventional structure. For example, in a poetic line, "A feather on the bright sky I am", POS tagging would identify 'feather' as a noun, 'on' as a preposition, 'bright' as an

adjective, ‘sky’ as a noun, ‘I’ as a pronoun, and ‘am’ as a verb. This allows for reordering to “I am a feather on the bright sky”.

2. **Dependency Parsing:** This technique analyzes the grammatical relationships between words in a poetic line, showing which words modify or depend on others. For instance, it can identify the subject of a verb or the object of a preposition, even if they are separated by other words due to poetic license. This is important for understanding the core meaning when syntax is inverted or fragmented.
3. **Named Entity Recognition (NER):** While more focused on identifying proper nouns (people, places, organizations), NER can help distinguish between common nouns and specific entities, which can be important for contextual understanding, especially when allusions are present.
4. **Coreference Resolution:** This identifies when different words or phrases refer to the same entity. In poetry, pronouns or descriptive phrases might refer back to an earlier, less obvious subject. Resolving these coreferences helps clarify who or what is being discussed.

Despite the existence of various NLP and computational tools for analyzing poetic syntax, their complexity and limited accessibility hinder their usefulness. Many of these tools are not only cumbersome to use but also restricted by download limitations, creating barriers for students, researchers, and scholars. To address these challenges, this study introduces the “Poetic Syntax Decoder”, a novel computational tool designed to simplify the analysis of poetic structures, providing an intuitive and freely accessible solution for uncovering the intricate syntax of poetry.

3. Methodology

The methodology employed in this research was both descriptive and qualitative. In this study, a student-friendly computational tool, “Poetic Syntax Decoder”, was developed to master the decoding of poetic structure in English poems.

Research Participants

In this study, 20 first-year students enrolled in the B.A. degree, which includes English as one of the subjects, from the Department of Languages at EUSL were taken as participants.

Data Collection and Distribution

A total of sixty (60) poetic lines were collected from the English poems in the syllabus. From the 60 poetic lines, 20 were utilized for a conventional pretest.

Subsequently, another 20 poetic lines were fed into the developed tool to help participants practise with both their laptops and desktops. Finally, a post-test was conducted with the tool, employing the final 20 poetic lines for this assessment.

Research Design

This study was carried out in three phases: Phase 1, Phase 2, and Phase 3.

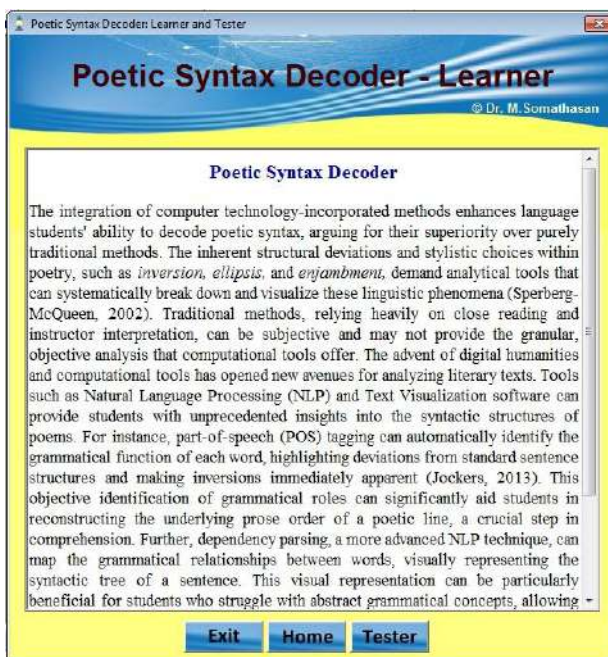
1. Phase 1: Pretest

In this phase, a traditional pretest in the format of Multiple Choice Questions (MCQs) was conducted to evaluate the participants' existing knowledge of decoding the poetic structure into ordinary English. The pretest was scored out of 100 marks. Then, the responses to the test were recorded for the purpose of results, analysis, and conclusions.

2. Phase 2: Development of the Computational Tool and Practice

In this phase, a computational tool, "Poetic Syntax Decoder", was developed by the researcher, utilizing the programming language Visual Basic 6. A sample visual representation of the developed computational tool is given below:

The Sample Visual of the Developed Computational Tool



Mechanism of the Developed Tool

The innovative tool, “Poetic Syntax Decoder”, is a computer programme for mastering the knowledge of decoding poetic syntax into ordinary English. This tool is two-fold: Learner and Tester. In the learning part (by clicking the ‘Learner’ button), language students at EUSL thoroughly learn the poetic structures of certain English poems and how they are converted into their ordinary English equivalents. On the other hand, students use the testing part (by clicking the ‘Tester’ button) to test their gathered knowledge of how poetic syntax is converted into ordinary English. When clicking the ‘Tester’ button, a testing environment will appear, in which the student can see a ‘Sentence’ button. When clicking it once (then, it changes into the ‘Next’ button automatically), a poetic line will display with four interpretations (one is correct and the other three are incorrect) in ordinary English. Consider the following example:

Poem - “The Solitary Reaper” by William Wordsworth

“Behold her, single in the field,” means,

1. Watch out for her, as she is a dangerous lone soldier on the battlefield.
2. Look at her, she is by herself working in the field.
3. The speaker is referring to a unique, one-of-a-kind flower growing in the grass.
4. See that woman, she is getting ready for her wedding ceremony in the meadow.

Now, to decode the given poetic line, students have to read four interpretations carefully and find out the correct answer (here, 2). For most students, it would be difficult to decode the meaning of the poetic line because of its structure. However, if the structure is in ordinary English, like “Look at her, she is by herself working in the field”, almost all the students would understand it.

If a student likes, he can check his status, i.e. whether he is right or wrong, by clicking the ‘Check’ button in the tool after every sentence, after any number of sentences, or at the end of the activity. The ‘Next’ button is used to go to the next sentence. As far as the marks are concerned, 5 marks are given for the correct answer and 0 marks are given for the wrong one or for not attempting the answer. The ‘Refresh’ button is used to refresh the activity and the ‘Exit’ button is for ending the programme. This is the mechanism of the tool. Further, this tool was practised by the participants with both their laptops and desktops for one week.

3. Phase 3: Post-test

In this phase, a post-test was conducted with the developed tool to understand the participants' gained knowledge in decoding the poetic syntax of English poems. Further, the post-test was evaluated out of 100 marks. The answers to the test were recorded for results, analysis, and findings.

Analysis of the Results

Based on the study, the following results (Table 1) were analysed to draw the findings by comparing the results of the pretest (i.e., the traditional method) with the results of the post-test (i.e., the innovative method) regarding the participants' knowledge of decoding the poetic structure of poems into ordinary English.

The Results of Pretest and Post-test on Decoding Poetic Syntax				
Marks Range	Number of Participants (20)			
	Pretest	Percentage (%)	Post-test	Percentage (%)
0-24	2	10%	0	0%
25-29	3	15%	0	0%
30-34	2	10%	0	0%
35-39	5	25%	0	0%
40-44	4	20%	2	10%
45-49	2	10%	1	5%
50-54	1	5%	3	15%
55-59	1	5%	4	20%
60-64	0	0%	3	15%
65-69	0	0%	4	20%
70-84	0	0%	2	10%
85-100	0	0%	1	5%
	20	100%	20	100%

Table 1 – The results of pretest and post-test on decoding poetic syntax

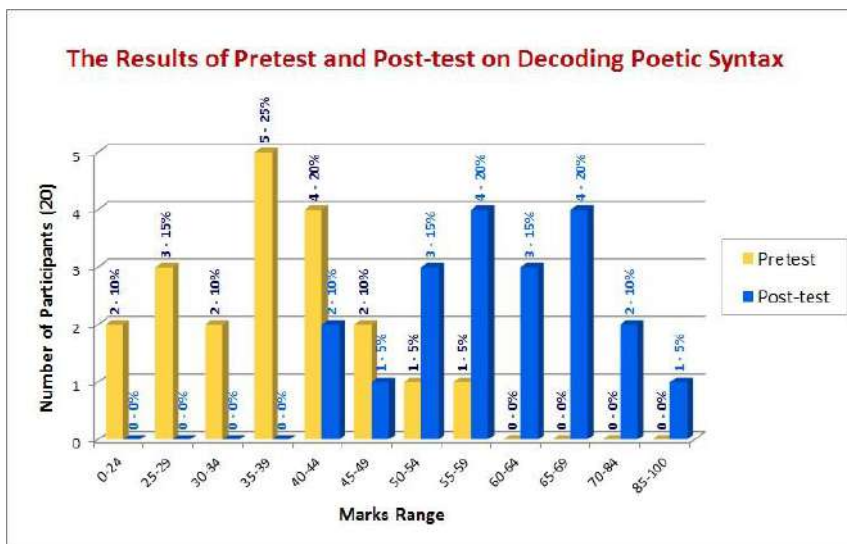


Figure 1 – The results of pretest and post-test on decoding poetic syntax

Figure 1 presents a comparison of participants' pretest and post-test scores, highlighting their ability to translate complex poetic structures from English texts into clear, accessible language. The results demonstrate significant growth in their capacity to analyze and interpret poetic syntax, particularly through the use of the newly designed educational tool, "Poetic Syntax Decoder". This innovative learning and assessment platform enabled participants to effectively decode and reframe intricate poetic devices from course readings into straightforward, contextually comprehensive English.

4. Findings

The findings of this study underscore the significant efficacy of the "Poetic Syntax Decoder" as a computational learning tool in enhancing students' ability to decode poetic syntax. A comparative analysis of pretest and post-test results revealed a marked improvement in participants' performance: while the majority of students scored below 50 in the traditional pretest, nearly all post-test participants achieved scores of 50 and above, with several attaining scores in the 65–84 range. This demonstrates that computational tools proved significantly more effective in unravelling the complexities of poetic structures than conventional teacher-centred methods (Jockers, 2013). By providing an innovative platform for analysis

and interactive exploration, the tool empowered B.A. English students at EUSL to engage more deeply with English poetry, fostering a nuanced and informed appreciation of the literary form. The integration of this technology into the language classroom produced a highly engaging learning experience, with all participants expressing enthusiasm for the interactive and feedback-rich environment (Gee, 2003). A particularly notable advantage of the tool was its capacity to deliver instant, formative feedback, enabling students to iteratively refine their skills in translating poetic language into everyday English, ultimately enriching their comprehension of literary texts (Pustejovsky & Stubbs, 2012). The findings thus confirm that technology-enhanced learning environments can substantially bridge the gap between students' initial limitations and the analytical proficiency required for meaningful poetic interpretation.

Based on the findings of this study, several recommendations are proposed to enhance the teaching and learning of poetic syntax in higher education contexts, particularly in universities in Sri Lanka and similar settings. First, it is strongly recommended that language departments formally integrate computational tools such as the "Poetic Syntax Decoder" into their English literature and language curricula. As Jockers (2013) argues, digital tools offer unprecedented capacity for objective, systematic analysis of literary texts that traditional methods alone cannot replicate. Accordingly, curriculum designers and faculty should consider embedding technology-assisted learning modules alongside conventional poetry instruction to ensure a blended pedagogical approach. Second, institutions should invest in training educators to use Natural Language Processing (NLP)-based tools effectively in classroom settings. Biber et al. (1999) emphasise that corpus-based and computational approaches to language can reveal syntactic patterns with a precision that enriches both teaching and research; however, their value is contingent on pedagogically informed implementation. Faculty development programmes should therefore equip teachers with the technical competence and instructional strategies required to deploy such tools meaningfully. Third, this study recommends that future research expand the sample size and diversity of participants to validate the scalability of such tools across different linguistic backgrounds and proficiency levels. As Gee (2003) points out, gamified, interactive learning platforms have transformative potential, but their design must be sensitive to learners' sociocultural contexts. Fourth, developers and researchers should focus on making computational poetry tools more accessible by hosting them as web-

based or mobile applications to overcome download and hardware limitations. Finally, similar tools should be developed for other challenging areas of literary analysis, such as figurative language and prosody, thereby broadening the scope of technology-enhanced literary education (Pustejovsky & Stubbs, 2012; Eagleton, 2008).

5. Conclusion

The research presented a novel approach to enhancing poetry comprehension among language students at EUSL, by integrating technostylistic methods for decoding poetic syntax. The study's findings unequivocally demonstrate the efficacy of the developed computational tool in facilitating a deeper understanding of English poetry. The significant improvement observed in post-test scores compared to pretest results, particularly in the ability to translate complex poetic structures into ordinary English, underscores the potential of technology-enhanced learning environments in language education. Such environments can bridge the gap between linguistic complexity and learner comprehension. This aligns with broader trends in educational technology, where computational tools are increasingly leveraged to address specific learning challenges. The qualitative data further support these quantitative findings, with participants reporting increased confidence and reduced frustration when engaging with previously challenging poetic texts. Thus, this research contributes significantly to the field of language pedagogy, particularly in the context of literary studies, by offering a scalable and replicable model for improving poetry learning outcomes.

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Safeguarding Digital Classrooms: Cybersecurity Implications of AI-Driven Tools in Cambodian Education

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Abstract

In Cambodia, both universities and schools are using new artificial intelligence tools, such as Learning Management Systems (LMS) and automated proctoring systems. With these tools, however, important questions about cybersecurity remain unanswered. This article examines cybersecurity concerns associated with Cambodia's increasing use of foreign providers and cross-border platforms of AI in education. The author analyses primary research results based on local case studies from Phnom Penh and Siem Reap and provides a comparative analysis of other countries in the ASEAN region. The author sheds light on some of the most important educational, structural, and policy-related weaknesses of the education system in Cambodia. Some of the most important weaknesses documented in the research include the lack of effective data governance, reliance on proprietary, high-risk technologies, the absence of a formal incident response, the lack of digital skills among educators and students, and the lack of effective data governance. The absence of the Personal Data Protection Law and the Cybercrime Law only make these policy gaps worse and increases the risks to data sovereignty and the rights of students. The author provides a set of recommendations that are the result of a collaboration among educators, policymakers, tech providers, civil society, and AI developers. The recommendations include the establishment of digital trust, improved privacy regulations, the localization of educational AI, the incorporation of digital literacy into the curriculum, and the establishment of new public procurement regulations that will enhance the cybersecurity of educational institutions.

Keywords: *Cybersecurity in Education, AI in Cambodian Schools, Data Protection and Privacy, Educational Sovereignty, AI and Surveillance, Digital Ethics*

I. Introduction

The Cambodian education sector experienced rapid digitalization as an effect of the COVID pandemic. In response to school closures, the Ministry of Education, Youth and Sport (MoEYS) shifted to digital formats to ensure

learning continued. Education staff began using digital Learning Management Systems (LMS), such as Moodle and Google Classroom and communicating with students on the social media platforms Telegram and Facebook Messenger (MoEYS, 2022; UNESCO, 2021). While initially the use of these tools was meant to be temporary, they became part of Cambodia's educational ecosystem and established a basis for more lasting integration of digital and potential artificial intelligence (AI) technologies. Holmes et al. (2019) describe AI in education as a potential positive force that can help automate administrative work, customize learning experiences, and improve access to education. In Cambodia, these tools include AI software that assists with grading, tutoring apps like Khanmigo and ChatGPT, online proctoring tools like Exam.net, and plagiarism detection software like Turnitin and Grammarly. These technologies are not widely used yet, but are beginning to be used more frequently, especially in urban-based universities and among providers of private education (ITU, 2022). AI-based tools are used more often without formal integration, with teachers and students using unsecured, unregulated controls, and unsupervised trial tools (UNESCO, 2021).

On the other hand, the rapid use of new tools has outpaced implementation of proper cybersecurity and digital literacy education. Only increasing cyber-attacks and education sector are now being attacked from all the problems of phishing, ransomware, data breaches, and surveillance. It is a concern in Cambodia also, where schools often use old hardware, shared login accounts, and other unsecure systems with poor data governance (CCHR, 2021). The concern stems from the factors which stress the reliance on foreign-based AI tools, especially those using external cloud services²¹. As noted by Cavoukian (2009), the use of foreign cloud services raises issues of data sovereignty and user sovereignty, especially in the case of the entities in control of cloud service. While data control, including facial recognition data and behavioural data, as well as psychological and academic data involves the users themselves, such services clouding foreign data control on the users from Cambodia. Such services, in cloud control, disperse data, and while using on the students, the data is yielded.

In Cambodia, tools are frequently adopted, including AI, before terms of service, and data policies, and algorithms are assessed (Huot & Loch, 2025a;

Young, 2021). Students therefore are data privacy, data bias and behavioural surveillance of AI systems use). Limiting use (paying or free) impacts exposure (CCHR, 2022; Holmes et al., 2019). In Cambodia, Binns et al. (2018) stress the importance of both law & regulation; in this case, legal accountability and oversight (the third missing mechanism). In contrast, the Cambodian Centre for Human Rights (CCHR) assesses reliance on foreign AI tools and cloud services without the use of algorithms and the availability of data services in Cambodian legal and regulatory systems as the imposition of conditions with severe limitations on the data service (risk). In the absence of data policies, cloud service data control is exercised, while the reliance on software is provided (CCHR, 2022; Holmes et al., 2019). While AI tools are provided free of charge, the students become the subjects of behavioural monitoring and surveillance practices.

The intention of this study is to acknowledge the risks and focus on embedding frameworks of cybersecurity and ethics that need to accompany positive changes resulting from the use of AI in education, such as improving learning outcomes and decreasing teachers' workloads. As such, this study has the following objectives:

1. To analyze potential risks to cybersecurity associated with the use of AI in Cambodian classrooms.
2. To contextualize safeguarding and cybersecurity of digital classroom with AI.
3. To outline evidence-based reform, being implemented in collaboration with a diverse set of cybersecurity frameworks and AI in education.

II. Conceptual Framework

AI Utilization in Education Sector

Automated intelligent systems in education encompass the many facets of human thought, with understanding and critical thinking. These systems perform automated interactions in the teaching, learning, and evaluation processes. The scholarly community recognizes the application of AI in education as an ecosystem of sub-education applications that integrate machine learning, natural language processing, and data analysis, which in turn reconfigure the distribution of educational authority, learner psycho-social and academic support, and assessment systems (Luckin & Holmes, 2016). While the oldest educational styles focused on the digitization of

information, the AI educational systems alter the processes of learning analytics, education, and evaluation through continuous data capture and algorithm-based predictions (Holmes et al., 2019). With the sociological and political perspective, the role of AI-based education systems in setting the parameters of educational governance is significant. It shows an increasing influence of educational systems in establishing and reinforcing a private set of regulations that govern educational control, the learning process, and the responsibilities of educational institutions.

Educational AI-tools can be categorized into three types, as such automated assessment tools and writing support tools, intelligent tutoring systems and chatbots, and AI surveillance and proctoring tools (Huot, 2025; Luckin & Holmes, 2016). Writing support tools and automated assessment tools (such as plagiarism detection, grammar feedback systems, and automated scoring tools) assist in the evaluation of writing and scoring assessments. These tools are designed to be efficient and uniform in their assessments, but they undercut valuable aspects of the evaluation process by evaluating writing using proprietary systems and setting evaluation metrics that are not disclosed to the writer (Holmes et al., 2019). Some of the intelligent tutoring systems (ITS) and chatbots enable students to engage with the system in a manner similar to that of a tutor. Students can ask questions and request explanations, and the system will provide guidance. This can be done at times that are not during formal classes (VanLehn, 2011). The final category, AI surveillance and proctoring tools, use surveillance tools (webcams, keystroke tracking, eye tracking, etc.) to monitor students' behaviour and biometrics to assess their risk and behaviour (Williamson, 2019). All these tools share similar educational goals. The aim of the system is to provide educational support using data, feedback loops, and computer processing (Holmes et al., 2019; Huot & Loch, 2025c).

Systems of educational governance recognize the pedagogical importance of AI/ML based technologies, but more importantly, the systems identify the governance structures of decision rights in education, which accesses to what data, regulates scope of data usage, keeps the data user accountable, outlines the applicable standards of data user misconduct, and limits the user's rights in the event that, an error, bias, or data breach occurs. The scholars of algorithmic accountability warn that educational AI could

eventually lead to a regime of educational oppression in which institutions rely upon outputs that they cannot fully assess, while users are subjected to decisions that they cannot meaningfully challenge (Veale & Binns, 2017). In such cases, the educational benefits of personalization and efficiency that such systems will provide must be counterbalanced with the political risks that accompany opaque governance, unregulated data flows, and an unequal ability to govern data systems.

Adoption of Technologies in Cambodian Classrooms

In Cambodia, the adaptation of AI educational tools can be constructed as asymmetric and hybrid. The use of these tools develops quickly, focusing on the connectivity, English language skills, and institutional resources, while the educational tools remain underdeveloped in other areas. Cambodia's national digital transformation agenda explicitly states digitalization as a pathway for development with long-term effects, as seen in the Cambodia Digital Economy and Society Policy Framework 2021-2035 and Cambodia Digital Government Policy 2022-2035 (RGC, 2021, 2022). In these policies, digital systems and digitalization are centered as tools for modernization, improving public service, and developing the country's human resources. Such policies create an opportunity for the digitalization of the education sector, with increased use of platforms, digital partnerships and services, which often use AI tools.

Within institutions, the adoption of AI tends to transpire through three pathways. First, some universities and higher-resourced secondary schools, especially in locales with prevalent English-medium instruction, incorporate automated writing and plagiarism detection systems into their academic writing and assessment processes. Second, in the absence of formal policy frameworks, the teachers and students use the generative AI and tutoring applications in an informal fashion to summarize lessons, translate Khmer and English, draft outlines, and practice target language skills. Third, in the remote or blended learning contexts, schools use the monitoring tools integrated into the learning management systems or online assessment platforms that, even when introduced as integrity features, may promote surveillance (Williamson, 2019). Cambodia's current landscape shows one dominant feature: reliance on foreign-developed platforms. Given that such platforms' terms of service, data hosting, and model training practices are

clouded by foreign jurisdictions. Cambodia lacks data oversight and audit powers. At the same time, Cambodia's legal drafts environment concerning the protection of personal data has been evolving, but not in a consolidated fully built legal regime.

Reporting in 2025 mentions that Cambodia published a draft law on the protection of personal data and that the law has been commented on, suggesting that law is expected to be implemented, but not fully operational. This effectively means that, for Cambodian institutions, the governance of AI tools is more a function of institutional capacity (contracts, procurement, IT, academic integrity) than of applicable national data protection systems and frameworks that are enforceable. These conditions result in a distinct pattern: Cambodian education is not AI-free. AI is present in education in socially uneven ways, determined by access to language, devices, digital literacy of teachers, and the capacity of institutions to convert broad digital policy ambitions into the specific governance frameworks in classrooms. The Education Strategic Plan 2024-2028 emphasizes that digital transformation and frameworks of the national policy are integral guiding documents for education policy, reiterating a preferred trajectory, even when the pace of implementation is uneven (MoEYS, 2024).

Works of AI Tools in Data Flows and Processing Mechanisms

With ethical and cybersecurity perspective, understanding the data lifecycle is essential when assessing AI in education. Most AI-powered tools function on the same four-cycle process, such as input and capture, transmission and processing, feedback and action, retention and secondary use. The users create some type of content, for example, an essay, a query to a bot, an audio response, or a log into an online assessment. This input, along with metadata, is captured and is, in some cases, tied to timestamps, device IDs, and interaction logs that can provide clues about a user's learning behavior and patterns (Holmes et al., 2019). In the second stage, data is sent to remote (cloud-based) servers where proprietary algorithms perform various tasks such as natural language parsing, similarity checks, scoring, or conversation generation. In the third stage, data structures (e.g., feedback, scores, flags, suggestions) determine the revision behaviors of the students, the score assessment of the teachers, or the decision of the institution. In the end, data are retained for a certain period, and based on their operating

policies and user agreements, they can be reused to improve services, train algorithms, or update new and improved filtering systems.

Scholars argue that this data is not politically neutral. When educational platforms translate learning into behavioral traces and predictive patterns, students and teachers usually cannot access the same granule levels of inferences that platforms and vendors can generate, creating marked asymmetries of visibility and power (Pangrazio et al., 2023; Raffaghelli et al., 2020). These digital traces may include highly sensitive, student-referenced materials, such as writings, mistakes, topics, and histories of interactions. It is also sensitive when things are retained or reused. Furthermore, digital records may also be sensitive in cross-border jurisdictional circumstances when parent companies and servers are located outside the user's country (Hok et al., 2026; Huot & Hok, 2025). Legally, the user's country will have limited access to breaches and disputes of the records. In Cambodia, where national frameworks are legally in a consolidation phase, the importance of good record keeping and institutional procurement is magnified by these frameworks, as are the practices of consent and disclosure (Huot & Loch, 2025c).

The processing stage also runs the risk of systematic error and bias. It is particularly the case when Technology Integrated Language Learning (TILL) tools are biased based on a lack of diversity in the training data used by the tools (Lee et al., 2025). The evaluative criteria for the tools tend to focus on the hegemonic center, which overlooks the outer circles of English (approximately, Asian countries) and penalizes peripheral outer, resulting in reinforcing and reproducing stark cultural blindness (Kachru, 1985). The problem is exacerbated when there is limited data in the Khmer language. This aligns with large-scale language technology critiques that highlight bias, a lack of representation, and the tendency to construct incorrect answers that present to users with unjustified certainty (Bender et al., 2021). If students are misled by these answers and lack the necessary skills to verify them, AI can quietly change the way students learn.

The Concerns of Student Privacy and Cybersecurity

When educational institutions use AI-based technologies, they increase the chances of suffering a cyberattack, given AI tools create new access points and data collection services (Huot & Loch, 2025b). The focal point of a

school's or a university's cyber risk is not the sensationalist notion of being hacked, but rather the mundane gaps like unprotected passwords, shared logins, unprotected networks, and the general lack of access control and incident response plans (Huot & Such, 2025). When slavery, social security, and (in the case of automated proctoring) behavioral or emotional surveillance data are collected, these gaps take on a greater level of risk. Two issues, in particular, are troubling from a governance and privacy perspective. First, there is the normalization of surveillance. PAI (proctoring artificial intelligence) systems may not simply facilitate assessments but may chill student behaviors and foster a lack of trust through the transformation of assessments into constant surveillance, especially when consent is weak and alternatives are not offered (Williamson, 2019). The second is the lack of accountability. Students may find themselves in positions of consequence with little or no recourse when automated systems flag them for suspicious behaviors or originality detection (Huot & Tep, 2025).

This situation directly contradicts accountability and contestability principles of governance (Veale & Binns, 2017). The lack of control and opaque decision made also speaks to the absence of justice. This is one of the reasons why privacy scholars suggest that the adoption of privacy by design approaches (data minimization, purpose specification, and appropriate security) be made standard, as opposed to optional (Cavoukian, 2009).

In Cambodia, these implications are interwoven with the country's digital transformation objectives. As the digital policy frameworks aim to leapfrog digital adoption, there is a need to ensure that in the education sector, pace of scaling is matched with adequacy of governance (Huot & Loch, 2025b). Given that Cambodia is on record as moving toward comprehensive data protection via draft law, as opposed to a historically defunct enforcement regime, the burden on institutions is greater; contracts, procurement policies, teacher training, and student guidance must fulfil most of the governance needs, as shown in Figure 1.



III. AI Frameworks and Cybersecurity in Cambodian Education

In terms of legality and institutions, the governance of AI in education in Cambodia is emergent and uneven. Recent national dialogues include digital transformation as an aspect of modernisation, but the required regulatory frameworks for the governance of AI, educational data, and cybersecurity remain incomplete (Huot & Em, 2025a). Cambodia's digital readiness reports by UNESCO highlight advancements in parts of the country's digital policy, but there is still a lack of core elements of the ethical and rights-based AI frameworks, especially those concerning data protection, responsibility, and the operationalisation of frameworks concerning the same (UNESCO, 2023, 2024). This is particularly true for education as students are likely to be the most affected as the use of AI tools in education is becoming commonplace, and such tools collect personal data, sensitive behavioural and learning data, as well as data related to the users' interactions.

Cambodia's draft law on personal data protection is an important legal development in this area. The Ministry of Posts and Telecommunications (2021) has published multiple drafts, seeking to capture the essence of other laws in terms of the principles of lawful processing, the protection of personal data and its processing, data subject's rights, purpose limitation, data protection and security, and data transfer controls (Ministry of Posts and Telecommunications, 2021). While this may indicate progress on

Cambodia's legal protection of personal data to meet global requirements, the problem is Cambodia's legal protection of personal data is not lacking in legal terminology. It is lacking in the operationalization of the formal legal structures in different sectors. UNESCO (2024) noted that Cambodia has yet to develop a sufficient governance framework that turns generalized digital principles into enforceable, operational frameworks in specific sectors. This is particularly true in education. The draft law does not specify how data related to minors, online proctoring, biometric data, and learning analytics should be dealt with.

The Cambodia's draft law on personal data protection, International Center for Not-for-Profit Law (2025) also argues that the draft framework is too vague and is not attentive enough to risks pertaining to specific sectors. As a result, schools and universities have no actionable ways to address how to handle student data connected to AI systems that are located overseas, what multinational companies operate educational platforms, or how to handle student data contained in cloud systems outside of Cambodia (Huot et al., 2024). While the draft law mentions informed consent, sensitive data, and cross-border data flows, these remain under-specified concerning educational governance. Cambodia still lacks a developed supervisory framework for schools to address questions of data retention, obtainment of parental consent, and institutional accountability regarding the unlawful or excessive collection of student data (Lee et al., 2025). In this sense, the law lacks the guidance needed to effectively address these issues concerning the education system and governance of AI-driven educational systems.

A related trend has emerged in cyberspace. Drafted several years ago, Cambodia's cybercrime law has generated considerable public comment, but most of the feedback seems to address crime, surveillance, interruptions, and state security, rather than the everyday protections of an institutional nature. The scope of the draft law has the potential of negatively impacting civil liberties, while providing little, if any, protective legal coverage for the average user (Human Rights Watch, 2020). From an educational point of view, the greatest shortcomings of the cybercrime draft law are that such legislation will not address the everyday governance issues that AI will create in classrooms, nor impose any obligations on schools for breach notifications, protect children on educational platforms, impose standards

for surveillance in the AI assessment, or establish the minimum cyber protections for the digital teaching resources (Huot & Em, 2025b). For this reason, the draft cybercrime law will most certainly not address the educational cyber protections that Cambodian institutions so urgently need. While the MoEYS (2024) is implementing digital reforms on an organizational level, it is yet to formulate an all-encompassing AI governance framework applicable to schools and universities, outlining the integration of ICT, the modernization of processes, and the incorporation of online learning into the system; however, it is silent on the ethics of AI, the governance of educational data, accountable cybersecurity, and the regulation of EdTech procurement. UNESCO (2024) also reports that gaps remain for Cambodia in the preparation of institutions and the governance of coordination. Therefore, the adoption of AI in education is fragmented, internally improvised, or vendor driven in the absence of national directives. Teachers, students, administrators, and parents remain without adequate support on what is safe, legal, and ethically considered to be the appropriate use of AI in education (MoEYS, 2021).

Comparisons with other countries show Cambodia's current state is not bound to happen. A country that shows this is Singapore, as it has already incorporated a working data protection regime. The Personal Data Protection Act (PDPA) provides the duties of the Data Protection Officer and has issued Advisory Guidelines for the Education Sector which speak to issues of consent, student records, biometrics, and breaches (Personal Data Protection Commission Singapore, 2019, 2024). In this case, educational digital innovation is integrated to a solid legal framework. Vietnam illustrates this as well in a different way. The more state-centred control in its cybersecurity and its personal data protection regulations, i.e., Decree No. 13/2023/ND-CP, show more in its recognition of the need for a more enforceable governance to digital education than institutional improvisation (Government of Vietnam, 2023; U.S. International Trade Administration, 2022). In comparison to these countries, Cambodia shows a more primitive out the phases of institutionalization.

The issues with the law are also aggravated by the limitations of the educational institutions themselves. In Cambodia, UNESCO (2024) emphasizes the importance of having more effective human and

institutional capacities. Moreover, the guidelines to the Cambodian Child Online Protection document recognize the growing dangers of digital technology and the institutions and the industry's responsibility to combat it (Ministry of Posts and Telecommunications, 2021). In most of Cambodian educational institutions, the relying on cheap, mainstream foreign platforms used to be more common; now, it is used in most of them. There are serious dangers related to unauthorized access and data loss, and weak accountability. These include the use of personal devices, informal cloud data storage, and data storage on institutional system. Many teachers are left without adequate training in the use of cyber-hygiene, the ethics of AI, and the privacy restrictions. On the other hand, Huot and Tep (2025) suggest that students may engage with AI casually and without sufficient awareness of the legal and ethical implications of the digital footprints they create.

At an organizational level, the lack of formal procedures heightens these risks. Cyber incidents become difficult to capture, manage and address when schools do not have procedures for breach reporting, incident escalation, digital forensics, vendor review, and learning after incidents. Cambodia's ability to implement Trustworthy AI in education hinges on panopticons (UNESCO, 2024). Educational institutions, in the absence of these structures, must improvise, and improvisation leads to poor and inconsistent protection, weak remedy, and loss of trust.

Cambodia has the digital ambition to implement an education system that uses artificial intelligence and is far more advanced than the ability to protect the system. In relation to this, Zuboff's (2023) critique of the asymmetry of data relationships is pertinent. She argues that in the digital system, the knowledge, the ability to survey, and the power to make decisions are concentrated in the hands of the owners of the platforms, while those who create the data are dependent and exposed. In the Cambodian educational system, this is evidenced in the heavy dependence on foreign platforms, the lack of oversight of the education sector, and the restricted ability of educational institutions to control the data of the students (Huot & Such, 2025). Thus, the use of AI and Cybersecurity in Education in Cambodia is much more than a technical issue, it is a matter of law, policy, and institutional frameworks that require the collaboration of policymakers, ministries, regulators, school administrators, and teachers.

IV. Emerging Trends of Educational AI-Tools and Cybersecurity

When designing meaningful and realistic protections, discussions of AI ethics and cybersecurity should focus on concrete rather than abstract policy engagements. In Cambodia, several digital educational risks have been informally handled, reactively or with limited institutional considerations. However, recent cases from Cambodia and other countries show that the adoption of AI tools is faster than the ethical, cyber, and institutional response frameworks (Huot & Loch, 2025b). Digital education scholars warn that in schools; technological innovations are never neutral or purely technical. They are influenced by governance, organizational culture, and the capacity of educational systems to ensure learners' protective rights in practice (UNESCO, 2024; Williamson, 2017, 2019).

A growing trend has resulted in increased vulnerability in educational institutions to phishing, credential harvesting, and other basic but effective cyberattacks. Some educational institutions, particularly schools and universities, exhibit digital systems that are reliant upon traditional approaches (weak accounts, uninformed users, and an underdeveloped incident-response framework) (Huot & Loch, 2025d). Cybersecurity experts express great concern that inadequate digital literacy, weak password use, and poor social engineering awareness continue to be among the greatest vulnerabilities in educational institutions (ITU, 2022; OECD, 2021). In Cambodia, these vulnerabilities are exacerbated by the inconsistent capacity of institutions and a lack of unambiguous breach-response communication protocols (Huot & Loch, 2025c). In the absence of clear communication protocols, institutions that fail to engage in multi-factor authentication, employee cyber hygiene training, and the establishment of cyber incident rapid reporting systems broaden the range of negative impacts beyond cyber disruptions to transgress privacy, distort educational integrity, and erode trust in the institution.

A second leading trend is the rapid emergence of AI-based monitoring and assessment tools, particularly online proctoring systems. While these tools are marketed as addressing concerns of fairness, efficiency, and academic dishonesty, researchers argue that they heighten the surveillance, stress, and data harvesting within educational settings. Williamson (2019) believes that educational technology is increasingly driven by what she calls techno-

solutionism, where complex educational and moral dilemmas are reframed within the context of automated surveillance and control. In the same vein, UNESCO (2024) draws attention to the fact that, in the absence of appropriate privacy, transparency, and human oversight, the adoption of AI in education may create additional risks, and perhaps even more so for schools. Continuous monitoring through facial recognition, screen capture, keystroke tracking, and behavioural flagging systems can turn educational assessments into surveillance rather than equitable assessment.

This issue is even more concerning when parents and students lack any plausible means of comprehending the system. Informed consent is not a mere formality. Users must have the opportunity to understand the scope of data collection, duration of data retention, location of data processing, and the identity of data users. Privacy and digital governance experts argue that biometric and behavioural data are particularly sensitive and warrant additional protection, as such data are highly personal, difficult to revoke, and prone to misuse when processed and transferred (Raffaghelli et al., 2020; UNESCO, 2024). Without examining foreign vendor privacy policies and contracts before implementing foreign-funded AI systems, schools impose extreme surveillance on students and, even worse, students are not aware of what surveillance is being conducted.

A growing trend last seen at educational institutions is the reliance on outside vendors - the systems of which are rarely evaluated independently. Third-party AI tools are introduced under the guise of increased efficiency, innovation, or security (Huot et al., 2024). In fact, the internal workings, error rates, and biases of these systems are often unknown to the educational institutions. Scholars of AI governance warn that accountability gaps may arise from such absence of transparency. For example, automated systems may tentatively penalize users for non-misconduct, including unreliable internet connection, poor lighting, or distracting disabilities. Automated systems may misclassify or generate false positives (UNESCO, 2024; Williamson et al., 2020). The consequences of these systems in educational environments extend beyond mere technical errors. These systems can contribute to the shaping and redefining of trust, dignity, and the overall assessment and disciplinary processes of students.

What regional examples have shown teaching AI for example. Sometimes educational AI is perceived as vendor lock-in, low accountability, surveillance, etc., even in advanced digital environments (Huot & Em, 2025a). Therefore, what is relevant is not if technology is integrated, but how it is governed, justified, and contextualized. Digital governance literature suggests that effective protection is the result of multiple, layered approaches to governance. Transparent and secured procurement, independent vendor reviews, data minimization, breach notification, appeals, and regular oversight in the name of ethics all represent the kind of layered approaches that the literature recommends (OECD, 2021; UNESCO, 2024). In the absence of such, educational AI is likely to deepen the institutional vulnerability it is designed to mitigate.

A number of lessons can be drawn from the developments of this case. First, AI systems are not neutral. Scholars contend that automated systems tend to mirror the values, biases, and priorities that are baked into the system's design, dataset, and institutional use (Williamson, 2017; Zuboff, 2023). When deployed without an ethical framework, such tools may legitimize surveillance, hide the dynamics of power, and limit the capacity of students to challenge the decisions of an automated system. Second, knowledge and regional learning are important. At the level of the ASEAN, Cambodia can engage in dialogues, collaborative studies, and the cross-border exchange of policies concerning the ethics of AI, cybersecurity, and safe digital education (UNESCO, 2017). Nonetheless, learning by comparison should not equal an uncritical adoption of policies. Effective governance will have to be context-specific to Cambodia's legal framework, digital and governance infrastructure, administrative capacity, and educational philosophy. Finally, digital education should not be evaluated on the availability of instruments alone. Access is important, but it is not enough. As Selwyn (2021) remarked, educational technology should be critiqued in relation to pedagogy, rights, and power, and not in a framework of mere instrumentalism and efficiency. Cambodia is at a critical juncture. The country can choose a path of continued adoption of unregulated and fragmented AI tools, which allows institutions to improvise after damage has been done. Alternatively, it can take a considered approach where AI and digital transformation are used alongside strong ethical, safe, transparent, and educational practices. For

Cambodia to achieve sustainability in the use of AI in education, it will require further innovation and infrastructure. More importantly, it will require placing the rights of the learners, accountability of the institutions, and the trust of the public at the core of the digital governance model.

V. CONCLUSIONS

This recent study focused on the application of AI and data-driven digital technologies in the educational sector. Cambodia took steps towards the digitalization of education. However, the institutional framework would serve to protect the educational stakeholders from the risks posed by the inadequate protection of data, oversight, transparency of the algorithms, academic fraud, fragile digital framework, and an overreliance on external governance of digital tools. Cambodian education system lacked autonomy and self-reliance to develop sophisticated and effective digital education delivery systems and digital service systems to manage and support education. Cambodia's reliance on foreign systems places their education digital delivery systems at risk of dependence on unregulated educational services and provider systems that captured the education system's data. Therefore, education system should use other digital services, and effective digital-services could be integrated to ensure the education systems. In this context, initiatives needed to be viewed as technological defences and ethical governance of technology in a transparent and responsible manner. Without ability to audit platforms, set boundaries, or build local solutions, Cambodia was likely to become an educational future consumer instead of an educational future producer. The focus should be placed on ensuring equity, safety, dignity, trust, and people centric development.

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Generative AI and Cambodian curriculum: Risks and Rewards for Student Learning and Research Integrity

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Abstract

This paper analyzed the incorporation of generative artificial intelligence (AI) into Cambodian education system, focusing on the curriculum development, pedagogy, and academic integrity. This study reviewed the uses of ChatGPT, Grammarly, and Notion AI by Cambodian students and educators. With the generative AI for education, such as personalized feedback, research assistance, and digital skills training, the perils of facilitating cheating, misinformation, and worsening the digital divide pervasive in education were just as considerable. The tiered policy strategies and practical frameworks were useful for the education institutions, teachers, and technology creators in using ethical and inclusive AI. The research emphasized on contributions to national policy frameworks, advanced educational tools, interoperability, and proactive role and educational equity.

Keywords: *Generative AI, Cambodian education, academic integrity, digital pedagogy, ChatGPT, educational policy*

I. Introduction

The adoption of educational technology tools in Cambodian educational systems has the potential to improve workflows and transform pedagogical practices. In particular, tools such as OpenAI's ChatGPT and the numerous educational technologies using the tool have the potential to improve educational experience. AI Educational technologies have the potential to assist students process learning by answering questions, suggesting learning strategies, and guiding the learning process (Huot & Loch, 2025). Further, as noted by Hok et al. (2026), educators can use educational technologies to improve themselves by generating learning content, answering students' questions, and providing real-time feedback on student work. All of which can enhance learning and streamline classroom processes. In the future,

educators will have access to new educational technologies, the use of which will profoundly affect the Cambodian educational system.

Educational institutions worldwide are trying to find balance on how to incorporate tools like ChatGPT into their systems. Some develop AI-driven tools like writing centres or teaching assistant apps (Holmes et al., 2019). Other institutions have opted to institute bans or use AI-detection tools due to concerns regarding cheating and plagiarism (Dwivedi et al., 2023). As Cambodia rapidly adopts the generative AI technologies, AI applications like ChatGPT, Grammarly, and Quillbot are independently utilized by the Cambodian students at the high school and university (CCHR, 2023; UNESCO, 2023). This grassroots usage corresponds to digital transformation which escalated with the COVID-19 pandemic. School closures necessitated the digital education platforms like Zoom, Google Meet, Google Classroom, and Moodle. Cambodian education community (students and teachers) rapidly acclimated to the digital technologies. However, this digital pivot and the technologies utilized brought to light the considerable unaddressed the gaps in educational infrastructure, digital competencies, and readiness of the educational institutions (ITU, 2022; MoEYS, 2022). This is true in situations where students lack academic support or have insufficient proficiency of language instruction (UNESCO, 2022). With the increased adoption of AI tools in education, Ministry of Education, Youth and Sport (MoEYS) made modifications to curriculum to incorporate educational AI.

The educators and students are left without ethical or practical instructions on the use of educational AI tools (Huot & Such, 2025). Generative AI in the academic context is not harmful or beneficial. Its consequences on learning are contingent on its constructive deployment in the curriculum, institutional regulation, and how learners and educators understand its use. Here, AI educational tool may have positive or negative consequences and may provide the much-needed impetus to the personal learning and skill development or impairs critical thinking (MoPT, 2021). AI is a potential threat to academic integrity or a potential game changing tool for education. With the AI application in Cambodian education systems, developing policy, curriculum and training helps the students and educators use and analyze AI tools with responsibility and creatively (Holmes et al., 2019; Luckin et al., 2016). This study will analyze the integration of generative AI with the academic integrity in Cambodia. Using empirical evidence, fictionalized case studies, and policy reviews, the author weighs the potential benefits and challenges to the implementation of AI in Cambodian education.

II. Conceptual Framework of Literature Review

AI Tools for Research and Academics

AI can generate contents, such as text, image, computer code, and speech. These systems use in a large number with the internet and online text for their training and researching data. Holmes et al. (2019) defined the early AI systems and contemporary generative AI systems as the ability to create new, contextually appropriate, and human-like. Huot and Tep (2025) argued that generative AI systems can prompt users with written text, summary and paraphrased documents, and translation between English and other major languages. AI systems can help users understand complex information. AI systems can generate names and descriptions for documents (Dwivedi et al., 2023; Luckin et al., 2016). Accordingly, Dwivedi et al. (2023) examined the specific functions of generative AI as an assistant in academic settings that required repetitive or language-heavy tasks. They also noted that AI could automate some of the early stages of the academic writing process, such as brainstorming, and outlining, and, in turn, impacting the students' active participation and productivity.

Students, in global and local contexts as well as Cambodia, started to depend on the certain generative AI tools with different educational opportunities. AI tool in education that offered the generative AI was Open AI's Chat GPT. According to the studies confirmed by Holmes et al. (2019), Chat GPT turned into an informal academic assistant, helping students in writing the essays, clarifying topics, translating, and generating citations. Grammarly, an AI-enabled tool that, with its primary function of working as a grammar and style checker, improved writing by fluency and even structures (Luckin et al., 2016). Grammarly, also, was a corrective tool and a real-time tutor in a constructive manner, providing corrective feedback instead of direct teaching. Notion AI served as a digital planner and organizer. QuillBot, on the other hand, had the ability to rephrase and reconstruct documents, avoiding plagiarism (Dwivedi et al., 2023). Google Bard and Bing Copilot combined Large Language Models (LLM) with web search functionalities to a means of querying the higher-level academic questions and obtaining AI-generated answers along with supporting references (Huot & Hok, 2025). Obtaining information to conduct research, preparing drafts, and becoming familiar with a new topic were the most common purposes (Holmes et al., 2019). Although these tools were widely adopted for some time, informal surveys, as well as anecdotal reports, students in Cambodia used these tools to lessen the effects of language deficiency and to fill in the missing pieces (ITU, 2022; UNESCO, 2021).

Influences of AI Tools on Future Teaching

Generative AI can be acted as an adaptable resource for understaffed pedagogical resources constructive, reinforcing approaches. The significant impacts of AI have been in the fields of education, language, and writing. According to Holmes et al. (2019), AI tools can assist learners in revising and improving quality of their texts. This was extremely valuable in multilingual developing countries like Cambodia, where the lack of English proficiency was a significant barrier to the academic achievement (UNESCO, 2021). Accordingly, Luckin et al. (2016) pointed out that generative AI can assist in scaffolded learning, particularly with writing and research assignments. In large classrooms, where the teacher feedback was primary, an AI generated, model answer can function as a guiding template for students to complete their own work. In addition, generative AI provided time lag feedback, which was an enormous burden for teachers to provide. AI suggestions about tone, structure, and vocabulary can assist students in revising their work, creating a self-directed learning environment. Holmes et al. (2019) stated that feedback was the most transformative in education systems.

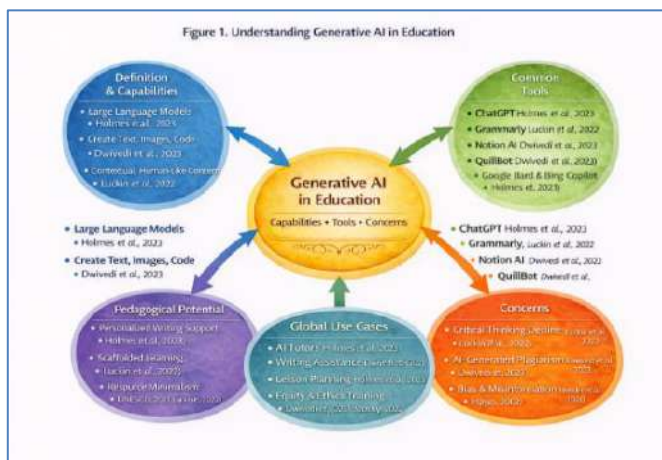
Institutions globally began experimenting with various structured-uses of generative AI within teaching and academic assistance. For instance, the tutors replicated the function of individual teachers in helping students work through problem-solving processes and providing customized explanations (Holmes et al., 2019). AI tutors can respond to student queries, administer quizzes, and cater to varying learning preferences. Moreover, university libraries employed the generative AI to help students with research focused synthesis, bibliographic construction, and academic keyword queries. As reported by Dwivedi et al. (2023), AI enriched writing labs were designed to assist the users at the brainstorming, argument structuring, and peer review simulation steps of the writing process. AI was used by educators to produce lesson plans, quizzes, and rubrics, which saved time and fosters increased instructional uniformity. Holmes et al. (2019) state that AIs had the potential to create more inclusive instructional designs by providing students with adaptive learning resources. While these examples served to illustrate the usefulness and adaptability of generative AIs, they also illustrated the need for structured oversight, ethics, and professional development for the educators and students.

AI Risks for Learning and Research Integrity

The generative AIs can be useful, but some challenges can occur when trying to use them in the correct manner. Luckin et al. (2016) stated that students became more passive in their learning if there was an over-reliance on using

AI to do work for them. However, there was less thinking employed at any level, whether it was by evaluating something, synthesizing thoughts, or by using logic to come to conclusions. Chheang and Huot (2025) supposed that AI was used to perform tasks for students and make basic loss of educational value. The next challenge tried to identify AI as the author of the plagiarized work. Dwivedi et al. (2023) suggested a traditional plagiarism scanner such as Turnitin cannot pick up an AI author while the AI was the author. But this led to questions about authorship and teacher's ability to verify what a student accomplished. When there was a lack of developed institutional policies on academic integrity, the bias and misinformation could be happened. Bender et al. (2021) detailed the issues of large language models reproducing the bias present in training data and producing outputs that were the racist, sexist, and erroneous. With the problematic in schools, learners were often ill-equipped to apply the critical literacy and necessary skills to interrogate or validate information produced by AI.

Generative AI also presented the possibility of amplifying digital inequality. The ITU (2022) and UNESCO (2022) reports described the inequitable access to the high-speed internet, digital devices, and English language skills within Cambodia, meaning rural and economically disadvantaged learners may not access and benefit from AI-supported learning, thereby increasing the disparity in learning outcomes of the more and less socially privileged. These issues highlighted the importance of Cambodia and similar lower and middle-income countries devising relevant policy frameworks, prioritizing investment in AI literacy, and developing ethical safeguards to defend the integrity of education, while utilizing the potential of AI, as shown in Figure 1.



III. Critical Arguments

Effects of AI Tools in Cambodian Education-contexts

Cambodian education level is managed by a government official through Ministry of Education, Youth and Sports (MoEYS). The national education system is divided into two subsections: general education (grades 1 through 12) and higher education. The education system is described by various education specialists (UNESCO, 2022), having a curriculum relied on the educational methods and assessments, with recall and high-stakes testing. The Curriculum Framework for General identifies the 21st century skills as valuable, with teacher-centred and textbook-driven pedagogy dominating classrooms Education (MoEYS, 2019). The rote memorization advocated by Luckin et al. (2016) will continue to become decreasingly useful in helping students to develop skills relating to problem solving, digital communication, and ethical reasoning which are necessary in a world filled with technology that violated human rights. The lack of adopting technology into pedagogy and curriculum amplifies the dissonance between curriculum objectives and classroom practice.

Cambodia tried to broaden digital education, and it continued to experience a digital divide. According to reports by the ITU (2022) and the Ministry of Posts and Telecommunications, Internet accessibility is improved and is reachable. However, there is a lack of accessible, affordable, and quality broadband, timely devices, and dependable electricity, especially in remote rural areas. In this case, the students start using the tools such ChatGPT or Grammarly. Holmes et al. (2019) stated that AI tools may serve as compensatory mechanisms to fill instructional voids. In Cambodia, learners cited inadequate English skills and insufficient writing assistance as the primary drivers of AI platform reliance. Dwivedi et al. (2023) observed that many students used AI tools as institutional support. Without an absence of clear academic policies, the students are left to set their own standards regarding the extent to which AI will be used. Cambodian universities and schools lack with the formal policies and strategic frameworks for the operationalization of artificial intelligence at academic level. Educational institutions use traditional essay detection systems (e.g., Turnitin) (Dwivedi et al., 2023).

In addition, the absence of educational governance frameworks compels individual educators and school administrators to weigh the ethical and pedagogical ramifications of AI without the pedagogical tools. Equipping learners with the ability of using AI in a constructive and ethical way is an essential educational aim in the 21st century (Holmes et al., 2019). However,

the curriculum continues to revolve memorization and standardized testing. As the use of AI becomes more common, these educational structures are at risk of being rendered irrelevant. The rapid digital transformation in education must be matched with a curriculum reform that embeds digital literacy, critical inquiry, and readiness for a digital workforce (UNESCO, 2022). Without these changes, Cambodian students, as illustrated in Table 1, will be skilled in using AI technologies, but will be unable to understand the social and economic ramifications or how to engage constructively in a digital economy.

Table 1. *The Cambodian Educational Context: Key Dimensions*

Dimension	Description
Curriculum Framework	Led by MoEYS, the national curriculum emphasizes rote learning and exam-based assessment. It lacks integration of 21st-century skills and modern digital pedagogy.
Digital Literacy Challenges	Urban–rural divides remain stark. Urban areas have better internet and device access, while rural areas face shortages. Most teachers are untrained in AI or digital pedagogy.
Student AI Use Patterns	University students in urban areas are using AI tools like ChatGPT for writing and translation. Usage is informal and often not understood or guided by faculty.
Institutional Readiness	There are no national or institutional policies governing AI use. Academic integrity codes remain outdated. Tools to detect AI-generated content are not in place.

Pros and Cons of Generative AI into Education Systems

The use of generative artificial intelligence (AI) significantly benefits the education systems, shaping the generative AI use in education. It, however, addresses the issues of engagement, access, skills provisioning, academy, and institutional capacity. Generative AI contributes to the improvement of student interaction through feedback. AI feedback can help students solve any problems and fill the gaps. Generative AI proves to be supportive of teachers, dealing with a workload, old materials, and scant opportunities (UNESCO, 2022). Drafting quizzes, creating lesson plans that align with learning goals, and providing basic feedback on the student assignments are examples of AI tools, with repetitive tasks. Holmes et al. (2019) said that the

use of AI is supervised and can be function as a teaching assistant, allowing relationship-based, interpretive, and mentoring teaching roles.

Generative AI also plays a role in the democratization of knowledge by eliminating language, cost, and accessibility barriers. ChatGPT and Google Bard, for example, help learners translate language, summarize text, and explain unfamiliar ideas. These tools help learners access the educational support and eliminate the need for expensive textbooks and private tutoring (UNESCO, 2021). AI's mobile compatibility makes accessible (ITU, 2022). In this case, generative AI potentially bridges the gap between formal education and self-directed, serving lifelong learning. The use of AI tools at the tertiary level is notable in terms of aiding research and writing. Generative AI aids the writing process by helping students develop research questions, identify patterns within a research area, summarize research papers, and construct bibliographies (Dwivedi et al., 2023). AI, used in a responsible manner, can play the role of a scaffold in the support of intellectual work rather than a substitute (Holmes et al., 2019).

The use of generative AI also develops a host of necessary 21st century skills such as digital literacy, prompt engineering, and ethical decision making. With the studies confirmed by Luckin et al. (2016), the integration of AI into learning systems fosters the creation of systems. AI integration meets the goals of developing a digital and knowledge-based economy (MoPT, 2021). Integration of AI into educational settings will be of the utmost importance to the development of country and its people. Nevertheless, the potential benefits of emerging technologies in educational settings are accompanied by numerous challenges. AI tools can facilitate undetectable ghost-writing because the authorship of AI-generated text is simply not attributable to the human user, even though the text is original. Plagiarism detection tools used by educational institutions are ineffective at recognizing instances of this practice. Students may lack understanding of ethical implications of utilizing AI and may unwittingly present AI-generated text as their own (Holmes et al., 2019).

Rewarding students for unexamined AI-generated responses is likely to create a culture and develop higher-order thinking skills (MoEYS, 2019). This poses intellectual resilience for success in higher education and the workforce. The incorporation of bias and misinformation as a challenge is notable (Bender et al., 2021). Due to a lack of digitized resources in the Khmer language, resources generated by AI will further push to the margin's local histories, cultural narratives, and social realities (UNESCO, 2022). Generative AI is typically portrayed as democratizing tools. If access is

unequal, the tools are democratizing in a negative sense. In Cambodia, there are no national policies, school-specific procedures, or frameworks concerning the training of teachers on the use of generative AI in education (CCHR, 2023). The absence of such policies creates ambiguity within the educational system. The risks associated with AI will outweigh the benefits unless there is adequate institutional capacity-building and reforms in the assessment systems, as highlighted in Table 2.

Table 2. *Opportunities and Challenges of Generative AI Integration in Cambodian Education*

Dimension	Key Opportunities	Major Challenges
Student Learning	Real-time feedback, enhanced engagement, personalized support	Reduced critical thinking, superficial learning
Teaching Practice	Lesson planning support, workload reduction, differentiated instruction	Lack of training, uncertainty in ethical guidance
Access and Equity	Low-cost academic support, mobile accessibility	Rural–urban digital divide, English-language dominance
Knowledge and Culture	Support for research and self-directed learning	Bias, misinformation, marginalization of local context
Governance	Potential to leapfrog infrastructure limitations	Policy vacuum, institutional unpreparedness

Generative-AI Use and Analysis in Education

Adoption of generative AI in Cambodian education is informal, decentralized, and unregulated. With the formal institutional strategies or national policy, it unregulated AI adoption is the result of individual experimentation by students and educators in terms to responding the specific pedagogical and academic challenges (Huot & Em, 2025). ChatGPT and other AI tools are used to draft essays, create paraphrased versions of sending documents, and translate content from other disciplines to English (Huot & Tep, 2025). The use of AI tools for writing essays, however, raises important questions of plagiarism and academic integrity (Huot & Loch, 2025). AI tools is defined as a form of academic dishonesty that is a response to the social and ethical norms of using writing aids. In this case, faculty members are bound to the absence of academic integrity frameworks and are left with the imposition of their own social and ethical norms.

However, AI-generated instructional materials help students advance their understanding. The pedagogical power of AI tools can promote fair and equitable access to educational technology, the development of situational instructional materials, and structured training (Luckin et al., 2016; UNESCO (2021). The use of AI in research and instruction of higher education, with guidelines for academic integrity and disclosure of AI-authored materials is also instituted in the pilot programs for (Vietnam MOET, 2022). Schools and policymakers are innovating in a policy vacuum (Huot & Hok, 2025; Huot & Tep, 2025). Otherwise, the integration of generative AI in education is likely to increase fragmentation and inequity.

Table 3. *Case Examples and Key Analytical Insights*

Case Context	Description	Core Issues Identified	Implications
Phnom Penh Universities	Students use ChatGPT for writing, paraphrasing, and translation	Blurred boundaries between assistance and misconduct; lack of integrity policies	Need for AI disclosure norms and assessment redesign
Rural High School	Teacher uses AI for quizzes and lesson preparation	Cultural mismatch, limited AI literacy, ethical uncertainty	Urgent need for teacher training and localized AI tools
ASEAN Comparison	Singapore and Vietnam implement structured AI policies	Cambodia lacks national AI education framework	Risk of regional marginalization without coordinated governance

IV. Conclusion

Generative AI was used for digitalizing the education system that brings with a host of new challenges, such as redefining learning, authorship, equity, and the governance of a rapidly digitizing society. AI tool was about the function of educational frameworks, pedagogical approaches, and socio-cultural environments. The ethics of AI and educational technologies are informed by notions, cultural, and infrastructural diversity. The adoption of AI systems is likely to elicit hegemonic systemic bias, disregard local epistemologies, and undermine relational equity in a bias. Generative AI

significantly influenced the students' learning outcomes, motivation, critical thinking, and academic identity, and at what educational level. The use of generative AI in education was about the reference to transform the education systems and reform. Incorporating generative AI was not only a matter of technological implementation, but also a matter of pedagogy, and ethics.

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The Strategy of Muhammadiyah Special Branch Leadership (PCIM) in Developing Islamic Education among Indonesian Students in Turkiye

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Abstract

This study aims to analyze the strategies of the Muhammadiyah Special Branch Executive (PCIM) in Turkiye in developing Islamic education among Indonesian students in a diaspora and secular environment. This research employs a qualitative case study approach. Data were collected through online interviews with PCIM administrators, virtual observations of religious activities, and documentation from various official sources. The findings reveal that PCIM Turkiye implements four main strategies: (1) religious coaching and regeneration through activities such as PCM Talks, mentoring, and social action; (2) educational innovation and digitalization of da'wah through online studies and Islamic e-books; (3) institutional strengthening and leadership regeneration; and (4) adaptation to the socio-cultural context of Turkiye through a cultural da'wah approach and cross-institutional collaboration. These strategies indicate that Islamic education in diaspora contexts is informal, participatory, and adaptive to globalization. In conclusion, PCIM Turkiye presents an integrative and transformative model of Islamic education that balances religious values with cross-cultural realities.

Keywords: *Da'wah Strategy, Diaspora, Digitalization, Islamic Education, PCIM Turkiye*

1. Introduction

Islamic education in the era of globalization has undergone significant transformation alongside the increasing mobility of Muslim students across countries. One notable phenomenon is the presence of Indonesian students in Turkiye, who face challenges in maintaining their Islamic identity within a secular and multicultural environment (Sultani et al., 2024). Beyond formal education, these students require non-formal religious spaces to sustain their spiritual development and strengthen their religious values.

In this context, diaspora-based organizations such as the Muhammadiyah Special Branch Executive (PCIM) Turkiye play a crucial role. These organizations not only facilitate religious learning but also function as social and cultural platforms that support identity formation among Muslim students abroad (Haq & Rahman, 2025). Muslim diaspora communities are

shaped by processes of adaptation and transnational interaction, where religious identity must be continuously negotiated within different socio-cultural contexts (Ejiofor, 2023).

From a sociological perspective, education serves as a means of transmitting and transforming cultural values, particularly in contexts where individuals interact with different socio-cultural environments (Bourdieu, 1986). In diaspora settings, Islamic education becomes an important medium for maintaining religious identity while adapting to new cultural realities. This requires strategies that are not only pedagogical but also context-sensitive to the host country's social and institutional framework. In Türkiye, where the education system is strongly influenced by secularism, non-formal religious activities must be conducted in adaptive and socially acceptable ways (Mujib, 2024).

Although previous studies have highlighted the role of PCIM and similar organizations in strengthening religious life among Indonesian students abroad (Satriawan et al., 2022), most of these studies focus on general organizational roles or individual religious practices. There remains limited scholarly attention to how Islamic education is systematically designed, structured, and implemented within diaspora institutions, particularly in specific socio-cultural contexts such as Türkiye.

Therefore, this study aims to analyze the strategies employed by PCIM Türkiye in developing Islamic education among Indonesian students. It focuses on how Islamic educational programs are designed and implemented in non-formal settings, as well as how these strategies contribute to sustaining religious identity in a diaspora context. This research is expected to contribute to the discourse on transnational Islamic education and provide practical insights for developing adaptive and context-based religious education models for Muslim students abroad.

2. Literature Review

This study is grounded in three main conceptual frameworks: Islamic education theory, organizational strategy in diaspora contexts, and cultural adaptation theory. These frameworks are used to analyze how Islamic education is formulated, implemented, and adapted within diaspora-based organizations such as PCIM Türkiye.

Islamic Education Theory

Islamic education is not merely the transmission of religious knowledge, but a holistic process aimed at forming *insan kāmīl*, encompassing spiritual, intellectual, moral, and social dimensions. This perspective emphasizes that

education in Islam integrates cognitive, affective, and behavioral aspects, making it fundamentally different from purely knowledge-based systems. Previous studies highlight that character (adab) and ethical formation are central elements of Islamic education across different contexts (Huda et al., 2024).

In contemporary settings, Islamic education must also respond to the challenges of modernization and globalization. In countries such as Turkiye, Islamic education operates within a secular national framework, requiring a balance between maintaining religious values and adapting to state regulations and social norms (Mujib, 2024). This condition creates a dynamic tension between religious ideals and contextual realities, which shapes the form and implementation of Islamic education.

However, most existing studies on Islamic education tend to focus on formal institutions such as schools and madrasas. As a result, there is still limited scholarly attention to how Islamic education is developed in non-formal settings, particularly within diaspora communities where institutional support may be limited. This indicates a gap in understanding the broader forms of Islamic education beyond formal structures.

Therefore, Islamic education in diaspora contexts needs to be understood as a flexible and adaptive process that extends beyond institutional boundaries. It involves not only the transmission of knowledge but also the internalization of values through social interaction and lived experience. This perspective provides a foundation for analyzing how Islamic education is practiced within community-based organizations such as PCIM Turkiye.

Organizational Strategy in Diaspora Context

The implementation of Islamic education in diaspora communities cannot be separated from the role of organizations that facilitate and sustain it. From an organizational perspective, strategy is understood as a consistent pattern of decisions and actions that shape an organization's direction and its response to environmental challenges. In diaspora contexts, these challenges include cultural diversity, geographical dispersion, and the need to maintain identity in a foreign environment.

Previous research shows that maintaining religious values among students requires adaptive and context-specific strategies (Badiana et al., 2025). Organizations must be able to design programs that are relevant to the needs of their members while responding to external pressures such as globalization and secularization. This highlights the importance of strategic planning, program innovation, and organizational flexibility.

According to Satriawan et al. (2022), Studies on PCIM in various countries demonstrate its role in strengthening transnational Islamic networks and facilitating religious activities among Indonesian diaspora communities. However, these studies generally focus on the organizational role at a macro level and tend to describe activities rather than analyze the underlying educational strategies.

As a result, there is still limited understanding of how diaspora organizations systematically design, implement, and evaluate Islamic education programs. This gap suggests the need to examine organizational strategy not only as an administrative function but also as a pedagogical process that shapes the form and effectiveness of Islamic education in diaspora settings.

Cultural Adaptation and Islamic Education

Islamic education in diaspora contexts is closely related to the process of cultural adaptation. Cultural adaptation theory explains that individuals and communities living in new cultural environments must negotiate their original values with those of the host society. This process involves various strategies such as integration, assimilation, separation, or marginalization (Cross & Madson, 1997).

In the context of Islamic education, cultural adaptation requires educational practices that are flexible and responsive to socio-cultural realities. Students living in diaspora environments often encounter different norms, values, and religious expressions, which influence how they understand and practice Islam. Therefore, Islamic education must not only preserve religious identity but also enable students to engage constructively with their environment.

Studies on Islamic education reform indicate that educational practices in Muslim societies are shaped by interactions between tradition, modernization, and globalization (Fadhluazzakiyy et al., 2025). However, these studies mainly focus on national or regional contexts and do not fully address the unique challenges faced by diaspora communities.

Consequently, there is a need to explore how cultural adaptation processes influence the design and implementation of Islamic education in non-formal settings. Understanding this relationship is essential to explain how Islamic education can remain relevant and effective in diverse and changing environments.

Research Gap and Theoretical Positioning

Several studies have highlighted the importance of diaspora organizations in maintaining religious identity among Muslim students abroad. These

organizations function as spaces for learning, interaction, and social support, helping students navigate the challenges of living in a foreign environment. However, most of these studies remain descriptive and do not provide a detailed analysis of the educational processes involved.

In particular, there is limited research that integrates Islamic education theory, organizational strategy, and cultural adaptation into a single analytical framework. Existing studies tend to examine these aspects separately, resulting in a fragmented understanding of Islamic education in diaspora contexts.

This fragmentation creates a gap in understanding how Islamic education is systematically designed and implemented in non-formal environments. It also limits the ability to explain how educational strategies are adapted to specific socio-cultural conditions, such as those found in Türkiye.

Therefore, this study seeks to fill this gap by analyzing how PCIM Türkiye formulates and implements Islamic education strategies that are adaptive, participatory, and context-sensitive. By integrating multiple theoretical perspectives, this research aims to provide a more comprehensive understanding of Islamic education in diaspora contexts.

3. Methodology

This study employs a qualitative approach using an instrumental case study design, as proposed by Yin (2018). The case of PCIM Türkiye is not examined solely for its uniqueness, but as a means to understand broader issues related to Islamic education strategies in diaspora contexts. This study was conducted within the Muhammadiyah Special Branch Executive (PCIM) of Türkiye, based in Ankara but with members and activities spread across several major cities, including Istanbul, Konya, and Bursa. Since the researchers are located in Indonesia, the data collection was carried out online through interviews via Zoom and virtual observations of PCIM Türkiye's activities, which were broadcast on their digital platforms. This location was chosen because PCIM Türkiye is one of the branches of Muhammadiyah abroad that is active in developing education-based Islamic activities and the regeneration of Indonesian students. Considering the potential bias of virtual observation, this study applies several validation strategies. First, prolonged engagement was conducted by observing activities over a sustained period to identify patterns of interaction. Second, data were cross-checked through in-depth interviews with participants to confirm the authenticity of observed behaviors. Third, documentation such as recorded sessions, activity reports, and digital publications were analyzed

to verify the consistency between observed and reported practices. Through these strategies, the study ensures that the observed digital interactions reflect actual practices rather than superficial representations.

The data sources in this study consist of two types, namely primary data and secondary data:

1. Primary data was obtained directly from the results of interviews with the general chairman of PCIM Turkiye for the 2024-2026 period and Advisor III of PCIM Turkiye for the 2024-2026 period. The informants in this study were selected purposively based on their direct involvement and strategic roles in organizing and implementing Islamic educational activities within PCIM Turkiye. Although limited in number, these key informants were considered highly relevant and information-rich, enabling an in-depth understanding of the research focus. In qualitative research, the adequacy of informants is determined by the depth and relevance of data rather than quantity, and the information obtained was further strengthened through triangulation with observation and documentation.
2. Secondary data were obtained from supporting documents, including activity reports, articles, official social media posts by PCIM Turkiye, news on the Muhammadiyah website, and relevant academic literature on the Muhammadiyah diaspora and Islamic education.

The data collection technique is carried out in three main ways:

1. Interview: The researcher conducted a semi-structured interview with the management of PCIM Turkiye to explore strategies and challenges in implementing Islamic education programs. Interviews were conducted online using interview guidelines prepared to align with the research focus.
2. Virtual observation, The researcher observed the activities of PCIM Turkiye, which were broadcast through social media such as Facebook and Instagram. This observation aims to understand the context for implementing Islamic education strategies, the form of interaction among members, and the learning atmosphere created.
3. Documentation complements data from interviews and observations, such as study pamphlets, work programs, and news about PCIM Turkiye's Islamic activities. This documentation helps verify the accuracy of the data and enriches the research description.

Data analysis was carried out using the model of Miles et al. (2014), which includes three main stages:

1. Data condensation is the process of selecting, simplifying, and focusing on essential data relevant to the research focus.
2. Data presentation (data display), presenting data in the form of thematic narratives, matrices, or charts to facilitate understanding the relationship between variables
3. Conclusion drawing and verification: interpreting the data to identify meanings and patterns that reveal PCIM Turkiye's strategy for developing Islamic education.

In addition, the validity of the data is maintained through the triangulation of sources and methods, namely by comparing results from interviews, observations, and documentation. The researcher also conducts member checking of informants to ensure the accuracy of data and interpretation.

The interview instrument was developed in the form of a semi-structured guide designed to explore key aspects of Islamic education strategies. The main indicators include: (1) objectives and orientation of Islamic education programs, (2) curriculum and content of learning activities, (3) methods and approaches used in delivering religious knowledge, (4) organizational roles and program management, and (5) evaluation and perceived impact of the programs. This flexible structure allows for in-depth exploration while maintaining consistency across participants.

This study also incorporates researcher reflexivity to minimize subjectivity. The researcher acknowledges their positionality as an external observer based in Indonesia, which may influence interpretation of the data. To address this, interpretations were continuously compared with participants' perspectives obtained through interviews and supported by documented evidence. This reflexive approach helps ensure that the findings are grounded in participants' experiences rather than solely shaped by the researcher's assumptions.

Table 1. Research Question and Type of Analysis

Research Question	Type of Analysis
How does PCIM Turkiye design Islamic education programs for Indonesian students?	Descriptive and thematic analysis
What strategies are used in implementing non-formal Islamic education?	Thematic analysis based on educational dimensions
How do these strategies adapt to diaspora and secular contexts?	Interpretative analysis using acculturation theory
What is the perceived impact of these programs on students?	Evaluative qualitative analysis

4. Findings

Based on the results of in-depth interviews with two main informants, namely the General Chairman of PCIM Turkiye and Advisor III of PCIM Turkiye for the 2024–2026 period, and strengthened by virtual observation and documentation of activities, this study found that the development of Islamic education at PCIM Turkiye is carried out in a structured, adaptive, and contextual manner in accordance with the reality of Indonesian students in the Turkish diaspora environment. Interview data were analyzed thematically and categorized into four major themes: religious formation, digitalization of da'wah, institutional strengthening, and cultural adaptation. The findings indicate that Islamic education developed by PCIM Turkiye is not merely understood as formal religious instruction, but rather as a socio-religious process aimed at strengthening Islamic identity, spirituality, leadership, and solidarity among Indonesian students abroad. In this context, PCIM Turkiye functions as a dynamic non-formal Islamic learning community where students actively participate in religious, intellectual, and social activities.

In general, there are four main strategies implemented by PCIM Turkiye in developing Islamic education among Indonesian students in Turkiye: (1) religious formation and regeneration, (2) educational innovation and digitalization of da'wah, (3) institutional strengthening and organizational sustainability, and (4) adaptation to diaspora challenges and secular socio-cultural contexts.

Religious Formation and Regeneration

The results of the interviews show that religious formation and cadre regeneration constitute the primary strategy of PCIM Turkiye in fostering Islamic education among Indonesian students. According to the Chairman of PCIM Turkiye, religious development activities are conducted continuously through persuasive, participatory, and experience-based approaches rather than through rigid doctrinal instruction.

The informant stated:

"We invite them to break the fast together, to pray, for Blessing Friday. If there is a disaster, we help together. From there, many people who did not pray before, slowly joined in prayer."

(Chairman of PCIM Turkiye, Interview, 2025)

This statement indicates that the Islamic educational approach implemented by PCIM Turkiye emphasizes experiential learning and social engagement. Islamic values are internalized gradually through collective religious

activities and humanitarian actions. In this context, religious education is not limited to cognitive understanding but also functions as a process of spiritual awareness and character formation.

Virtual observations also show that activities such as PCM Talks, Friday Blessing, Ramadan studies, and social fundraising programs create a communal learning atmosphere among Indonesian students in Türkiye. These activities strengthen solidarity and foster a sense of belonging within the diaspora community.

This finding indicates that Islamic education within PCIM Türkiye is implemented through participatory and community-based approaches. Religious learning is integrated with social interaction and collective activities, enabling students to internalize Islamic values through direct experience and social engagement.

In addition, the Chairman of PCIM Türkiye emphasized that the organization seeks to provide inclusive religious guidance for students from various educational and religious backgrounds:

"Students who join PCIM activities come from different levels of religious understanding. Therefore, our approach must be flexible, humane, and inclusive." (Chairman of PCIM Türkiye, Interview, 2025)

This finding demonstrates that the religious formation strategy adopted by PCIM Türkiye is adaptive to the multicultural and transnational realities faced by Indonesian students in Türkiye.

Educational Innovation and Digitalization of Da'wah

The findings also reveal that PCIM Türkiye actively develops Islamic educational innovation through digital platforms and online learning activities. One of the flagship programs consistently implemented is PCM Talks, an online Islamic discussion program conducted regularly through social media platforms.

According to Advisor III of PCIM Türkiye:

"PCM Talks was created not only as a religious lecture forum, but also as a collaborative discussion space where Indonesian students can share ideas, experiences, and Islamic perspectives according to their academic backgrounds." (Advisor III of PCIM Türkiye, Interview, 2025)

This statement shows that digital Islamic education within PCIM Türkiye is designed to be participatory and dialogical. Students are not merely passive listeners but actively involved in producing and disseminating Islamic knowledge.

The study also found that PCM Talks has become one of the most sustainable

digital da'wah programs implemented by PCIM Turkiye, reaching more than 148 episodes. Through this program, Islamic educational discussions can reach Indonesian students across different cities in Turkiye despite geographical limitations.

This finding suggests that digital platforms function not only as communication tools but also as effective educational media in sustaining Islamic learning within diaspora communities. The use of digital da'wah enables PCIM Turkiye to overcome geographical barriers while maintaining student participation in religious and intellectual activities.

Virtual observations conducted through Instagram Live broadcasts and documentation from the official Instagram account of PCIM Turkiye also support this finding. The documentation shows that PCM Talks has been consistently implemented as a digital Islamic education program involving Indonesian students from various cities in Turkiye. These digital activities indicate that PCIM Turkiye effectively utilizes social media as a medium for Islamic learning, intellectual discussion, and diaspora engagement.



Figure 1. PCM Talks as a Digital Islamic Education Program Conducted by PCIM Turkiye

Source: Official Instagram of PCIM Turkiye (@pcim.turki), accessed January 2026.

The documentation above demonstrates how PCIM Turkiye utilizes digital media as an instrument for Islamic learning and religious dissemination within the diaspora context. Virtual observation indicates that the use of Instagram Live and digital publications enables wider participation among Indonesian students in different regions of Turkiye.

The integration of interviews, virtual observations, and digital documentation demonstrates that Islamic educational activities in PCIM Turkiye are systematically organized and continuously adapted to technological and social developments among Indonesian students abroad. In addition to online studies, PCIM Turkiye also develops digital educational

content such as Islamic e-books, worship guidelines, and informational publications related to Islamic practices in Turkiye. One of the informants explained:

"We also prepare digital materials such as prayer guidelines and explanations about religious differences between Indonesia and Turkiye so students can adapt more comfortably."

(Advisor III of PCIM Turkiye, Interview, 2025)

This finding reflects the adaptive nature of Islamic education developed by PCIM Turkiye, particularly in responding to cultural and religious differences experienced by Indonesian students in the diaspora environment.

Institutional Strengthening and Organizational Sustainability

From an institutional perspective, the interviews show that organizational strengthening is considered essential for maintaining the sustainability of Islamic educational activities. Advisor III of PCIM Turkiye explained that the organization actively empowers various assemblies and divisions to ensure that educational programs continue despite leadership changes.

The informant stated:

"We try to make the organization sustainable. Therefore, programs should not depend on one person alone. Every division must actively contribute to educational and da'wah activities."

(Advisor III of PCIM Turkiye, Interview, 2025)

This statement indicates that institutional strengthening within PCIM Turkiye is carried out through collaborative organizational management and regeneration mechanisms. Each assembly plays a strategic role in supporting Islamic educational activities, ranging from media management and publication to social and philanthropic programs.

This finding reflects that organizational sustainability in diaspora contexts depends on collaborative leadership and systematic cadre regeneration. Islamic education is therefore institutionalized not only through religious programs but also through organizational management and leadership development.

The study also found that PCIM Turkiye already possesses a permanent secretariat office in Istanbul, which functions as a center for organizational coordination, Islamic discussions, and cadre development activities. This institutional infrastructure strengthens the continuity and legitimacy of Islamic educational activities among Indonesian students in Turkiye.

Adaptation to Diaspora Challenges and Secular Contexts

The findings reveal that PCIM Turkiye faces several challenges commonly

experienced by diaspora student organizations, including geographical distance, academic mobility, financial limitations, and the secular socio-cultural environment of Turkiye.

One of the informants explained:

"From Kayseri to Istanbul can take more than 12 hours. The ticket is expensive, so offline meetings are difficult to conduct regularly."

(Chairman of PCIM Turkiye, Interview, 2025)

This condition demonstrates that geographical and economic factors significantly influence the implementation of face-to-face Islamic educational activities among Indonesian students in Turkiye.

These challenges indicate that Islamic education in diaspora settings requires flexible and adaptive strategies. The reliance on digital coordination and online learning reflects the transformation of Islamic educational practices in response to transnational mobility and secular social environments.

To address these challenges, PCIM Turkiye developed adaptive organizational strategies through digital coordination systems, medium-term planning, and organizational standardization. The Chairman of PCIM Turkiye explained:

"I made AD/ART and organizational guidelines so that whoever becomes chairman already has a clear reference and can continue the programs." (Chairman of PCIM Turkiye, Interview, 2025)

This finding indicates that PCIM Turkiye attempts to maintain organizational sustainability through structured administrative systems and long-term planning mechanisms. Such strategies allow Islamic educational programs to continue despite changes in leadership and the dynamic conditions of student life in the diaspora.

Furthermore, the findings show that the Islamic educational approach implemented by PCIM Turkiye is adaptive and culturally sensitive. Rather than adopting confrontational forms of da'wah, the organization emphasizes educational, social, and collaborative approaches in engaging with the multicultural environment of Turkiye.

5. Discussion

The results of the study show that PCIM Turkiye's strategy in developing Islamic education in the Indonesian student community takes place through social, digital, and institutional approaches. These findings indicate that Islamic education is not only present in the form of formal institutions such as schools or madrasas, but can also grow through community spaces and

religious social activities. In the context of PCIM Turkiye, Islamic education develops as a process of *tarbiyah* and *ta'dib* that lives in the midst of a diaspora society, where Islamic values are instilled through example, togetherness, and habituation in daily life.

Islamic Education in the Context of the Diaspora: from Formal to Social-Communal

This phenomenon strengthens the idea of Syed Muhammad Naquib al-Attas in a book written by Mawangir (2016) that the essence of Islamic education (*ta'dib*) is not just the transfer of knowledge, but the formation of a civilized person through the relationship between knowledge, faith, and charity. In the context of Indonesian students in Turkiye, activities such as *PCM Talks*, *Baitul Arqam*, and *Friday Blessings* are effective means to build contextual Islamic awareness. Interestingly, although it does not have a physical building like a madrasah, PCIM Turkiye acts as a "*living Islamic education space*", where students learn about Islam in a global social context. This shows that Islamic education in the era of globalization is no longer limited to the classroom, but rather extends to digital, social, and cultural spaces.

These findings are in line with Fadhluzzakiyy et al. (2025) research which shows that Muslim diaspora organizations play a significant role in maintaining the Islamic identity of students abroad through activities sosial dan keagamaan. This means that PCIM Turkiye functions as a *socio-religious* institution that not only instills religious knowledge, but also builds awareness of Islamic identity in a cross-cultural context.

Tarbiyah Dimension: Sustainable Non-Formal Islamic Education

The educational process that takes place at PCIM Turkiye can be categorized as a form of non-formal and informal Islamic education, as the concept of *tarbiyah* in classical Islamic education theory. According to An-Nahlawi (1989), *tarbiyah* encompasses the entire process of guiding humans gradually towards the perfection of faith and morals. Activities such as religious mentoring, online studies, and cadre coaching are manifestations of this *tarbiyah*. In an interview, the PCIM management explained that many students who were previously less active in religious activities, then experienced behavioral changes after joining PCIM activities. This phenomenon shows the internalization of values through social experience and example. A learning mechanism that is in line with the social learning theory by Bandura (1977), which emphasizes the importance of observation and imitation in the behavioral learning process. Thus, Islamic education at PCIM Turkiye works through the *mechanism of learning by observing and*

doing students learn by imitating senior religious practices and experiencing firsthand social activities with Islamic values. This shows the sustainability of non-formal education that forms *religious habitus* in the diaspora environment

Islamic Education and Digital Transformation

Another significant finding is how PCIM Turkiye has successfully utilized digital media as a means of Islamic education. The PCM Talks program, which has run for more than 148 episodes, is tangible evidence of the transformation of Islamic education into an online space. The study that was broadcast virtually expanded the reach of religious learning, even reaching students in various cities in Turkiye and other European countries. This phenomenon reinforces Nashir (2021) view of *progressive Islam*, which emphasizes the importance of innovation and digital literacy in modern education and da'wah. Through digital media, PCIM Turkiye not only conveys the teachings of Islam, but also creates a collaborative and cross-geographical learning culture, a form of digital tarbiyah. This activity also reflects the transition of the Islamic education paradigm from *traditional learning* to *knowledge sharing*, where students are no longer passive listeners, but actively participate in producing Islamic content, such as e-books and da'wah videos. Thus, PCIM Turkiye presents a *digital participatory Islamic learning* model that is relevant to the global Muslim youth.

Dimensions of Values and Character in Islamic Education PCIM Turkiye

Social activities such as Blessed Friday, humanitarian fundraising, and disaster relief in Turkiye show that Islamic education at PCIM emphasizes not only the cognitive aspect, but also the affective and social aspect. Students learn the values of humanity, empathy, and social responsibility, as well as the principles of *character education* put forward by (Lickona, 2012). In this case, charitable and social activities are a means of real Islamic character education (*experiential moral education*). Islamic values such as sincerity, trust, and solidarity are not taught through lectures, but are instilled through direct experience. In this way, PCIM Turkiye has succeeded in shaping the *social character of Islamic* students in a secular environment, making Islamic education a process of habituating civilized life in the midst of diversity. This finding is in line with Srimulyani (2021) research which highlights that religious organizations of students abroad function as a vehicle to strengthen the spiritual and social values of diaspora Muslim students. Thus, Islamic education at PCIM Turkiye has a strong praxistic

dimension: instilling Islamic values through social charity and community service.

Institutional and Cadre Regeneration as Islamic Leadership Education

From an institutional perspective, PCIM Turkiye develops a sustainable cadre system through *Baitul Arqam* and the *Great Deliberation (Musyabis)*. The process of regeneration of administrators is accompanied by the transfer of values and experiences, which shows the existence of a form of *organizational learning* in the context of Islamic education. This concept is strengthened by Nashir (2021) who stated that regeneration in Muhammadiyah is a form of continuous education that integrates faith, knowledge, and charity. Cadres are not only fostered to understand the teachings of Islam, but also trained to become trustworthy and adaptive leaders to the challenges of the times. In the context of the diaspora, this process is very important because students live in a pluralistic environment, demanding communicative and open leadership skills. Thus, PCIM Turkiye's regeneration strategy not only produces activists, but also educates a generation of global Islamic leaders with a multicultural perspective

Islamic Education as Cultural Adaptation and Value Diplomacy

PCIM Turkiye shows a form of Islamic education that is adaptive to secular and plural contexts. The da'wah approach is not confrontational, but cultural and educational. Cooperation with local institutions such as AKDAV, Yedihilal, and IHH reflects the polite and open diplomacy of Indonesian Islamic values. This is in accordance with the view of Azra (2002) about the role of diaspora organizations as agents of moderate Islamic soft diplomacy in the archipelago. Through social activities and cross-institutional collaboration, PCIM Turkiye indirectly introduces *Islam rahmatan lil 'alamin* to the Turkish people and the international community. Islamic education in this context not only shapes individuals, but also builds a positive image of Indonesian Islam in the global realm. Thus, PCIM Turkiye's activities contain a dimension of intercultural Islamic education, which teaches tolerance, dialogue, and respect for differences.

6. Conclusion

This research confirms that the Muhammadiyah Special Branch Executive (PCIM) of Turkiye plays a significant role in the development of Islamic education for Indonesian students in the secular diaspora environment. The strategy implemented by PCIM Turkiye is integrative, covering four main aspects: religious formation, digital innovation, institutional strengthening, and cultural adaptation. First, coaching activities such as PCM Talks studies,

mentoring, and social action form religious awareness and social solidarity of students as a tangible form of tarbiyah-based non-formal Islamic education. Second, the use of digital technology through online platforms and e-book publications shows PCIM's ability to adapt da'wah to virtual spaces, creating a participatory learning model that is cross-city and cross-cultural. Third, strengthening organizational structure and continuous regeneration shows that Islamic education not only shapes individuals of faith, but also produces young Muslim leaders who are adaptive and globally minded. Fourth, a moderate and collaborative cultural approach with local institutions makes PCIM Turkiye an agent of diplomacy of Islamic values rahmatan lil 'alamin in the international arena. Thus, the Islamic education model developed by PCIM Turkiye is adaptive, inclusive, and transformative, able to balance Islamic idealism and Turkish socio-cultural realities. These findings confirm that Islamic education in the context of the diaspora not only serves to maintain religious identity, but also expands the role of Islam as a moral, social, and intellectual force at the global level.

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Factors Involving Cambodian Students' Choice in Social Science Learning Track at High School in Svay Rieng Province

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Abstract

The study aimed to identify factors for students to choose social science major. The methodology research was used by quantitative method. The sample used in this study was six high schools which located in three districts/towns. These samples were 300 students studying in grade 11 to 12. The result of this study was shown that factors of students' choosing social science major was the interest in the subject for students' personality factor (internal factor) which was the highest percentage (18%). Among them, the need for study, the need for learning various skills and the need for work were the internal factor which was the highest percentage. In addition to curriculum and examination factors, the factor influencing the choice of a social science major was 18% for rich in research documents.

Keywords: *Social science, internal factor, external factor, curriculum*

1. Introduction

In our world, education was the key to a better life for every child and the foundation of a strong society (Lake, 2015). Incheon Declaration (2015) stated that education was a fundamental human right and a right that could lead to other rights. To fulfill this right, all countries must ensure the universal right to quality, inclusive and equitable education, which should be free and compulsory for all.

The 1993 Constitution of the Kingdom of Cambodia recognized the right of all citizens to quality education. Article 65 of the Constitution stated that the State would protect and promote the right of citizens to quality education at all levels and would take all necessary measures to ensure that this education reached all citizens (Kingdom of Cambodia, 1993). In line with the Constitution of the Kingdom of Cambodia, the Cambodian Education Law, which was promulgated in December 2007, stated that every citizen had the right to receive at least nine years of quality education free of charge in public schools (National Assembly, 2007). The Royal Government of Cambodia accepted the view that education was a fundamental right that played an important role in enabling citizens to achieve all-round development. Therefore, in the Fourth Phase of the Royal Government's Rectangular Strategy, the education sector had been identified as one of the priorities among others (Royal Government of Cambodia, 2018).

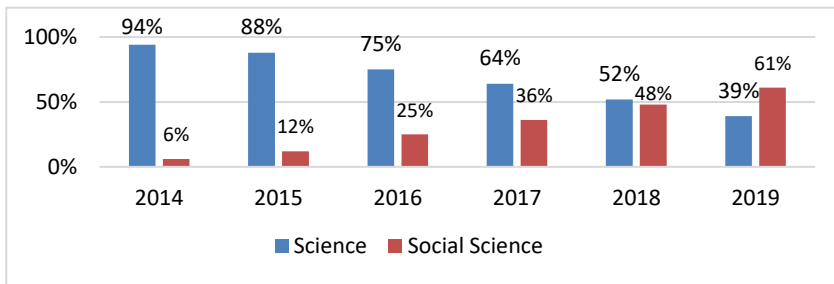
Today, the Royal Government of Cambodia has been paying great attention to human resource development (Royal Government of Cambodia, 2018). In response to the Royal Government's 4th Quadrangular Strategy, the first pillar "Strengthening the Quality of Education, Science and Technology", the Ministry of Education, Youth and Sports had an important role in developing people into complete individuals who had equal growth in knowledge, skills, attitudes and physical fitness (Royal Government of Cambodia, 2018).

On October 11th, 2011, His Excellency Im Sethy, the Minister of Education, signed the implementation of a new curriculum divided into two: a science major and a social science major for grades 11 and 12 (MoEYS, 2011). The selection of these courses is based on students' preferences, without passing an aptitude test, and the selection is based on the form that the school distributes to fill. The selection of these two majors encourages students to choose courses according to their abilities and preferences.

In recent years, students at high school level had turned to choose social science major for their studies. As Figure below, it was shown that the number of students, who had chosen science and social science, had changed in recent years. For students in science major in 2014, they had chosen up to 94%, while social science students had only 6%. From year to year, the number of students who had chosen social science had continued to increase, while the number of students who had chosen science major had also decreased. In 2019, the number of students who had decided to choose science had decreased to 39%, and the number of students who had chosen social science had increased to 61%. If we looked at the growth in

each year, we would see that the number of students who had chosen social science had increased by up to 55% in the last 5 years. In view of the problems mentioned above, the researcher decided to choose the topic “Factors Involving Cambodian Students’ Choice in Social Science Learning Track at High School in Svay Rieng Province” to conduct a research study with the following objectives.

Figure 1: Students' Chosen majors: Science and Social Science



This research aimed to understand the factors influencing social science major selection among social science students.

2. Literature Review

Students' choice of major for study at the high school level was influenced by internal factors, external factors, and curriculum and examination factors. The choice of the majors in high school was strongly influenced by gender roles, interests, values, abilities, and future academic outcomes (Akpan, 1986). Similarly, Galotti (1999) also found that college students' choice of subjects was influenced by internal factors such as gender, interests, values, abilities, and future academic outcomes. Furthermore, Porter and Umbach (2006) also found that the most important factor in choosing major was the students' own personality.

Gender was a significant factor in students' choice of major (Huruma, 2015). Another study, Calkins and Welki (2006), had shown that students' choice of majors differed by gender. In this study also found that female students chose majors based on the specific subject they were studying in class, while male students chose majors based on the job market demanding related to the major they were studying. Moreover, Dickson (2010) also showed that gender had a significant impact on students' choice of majors in college. Male high school students preferred science majors more than female high school students, and they were more likely to choose majors in higher education (Miller et al., 2006). They found that gender biased students

towards choosing science or social science majors in college. Similarly, a study by Wiswall and Zafar (2015) also found significant differences between male and female students in their choice of the science and the social science major. Another study by Osagie and Alutu (2016) on science and technology career choices found that female secondary school students were more interested in the science major than male secondary school students. In contrast, a study by Hansberry and Moroz (2001) in Australia found that female secondary school students preferred the social science major while male secondary school students preferred the science major. Students' personal interests were a factor in their decision to choose majors (Calkins & Welki, 2006; James, 2007; Wally-Dima, 2013). According to Calkins and Welki (2006), the most influential factor in students' choice of subjects was their own interest in choosing the major. In their study, they stated that 93% of students, they had chosen were based on their interest in the major. A similar study found that 93% of male students also chose majors based on their interests (Huruma, 2015). In a similar study, studied in Finland and Portugal also found that personal interests and preferences were factors in students' choice of majors (James, 2007). High school students were highly interested in the science major even though they had little knowledge about the major (Wally-Dima, 2013). Students' ability were a factor in their decision to choose majors of study at the high school level (Huruma, 2015). This study showed that 94% of female students chose a course of study based on their ability in science subjects. Other studies also found that students' ability factors and interests were important factors in choosing a course of study at university (Beggs et al., 2008).

The needs for the future education and employment were important factors in the decision-making process of individual students in choosing a particular major for further studies in college (Tripney et al., 2010). In Cambodian context, a study by Voeng (2014) showed that economic knowledge was the main factor in students' decision-making process for further studies in higher education. A study by Sofi (2016) found that secondary school students in India chose the science major or the social science major with employment needs in mind when they graduated. This study examined several factors such as gender, family economic status, and student ability, but only the career needs of students after graduation were found to be more important than other factors in determining the majors of secondary school students in India (Sofi, 2016). A similar study by Adeyemi (2009) found that students who chose geography as an elective subject in

high school in Botswana were interested in their careers. The study found that 95% of students chose the subject based on their job expectations after graduation. A similar study by Voeng (2014) found that first-year students at a university in Phnom Penh chose social sciences or English as their major because of job requirements.

Parents or guardians of students contributed to the decision of students to choose their major for study (Boudarbat & Montmarquette, 2006). They stated that the educational level of the parents had a significant influence on the choice of majors for their children. Similarly, a study by Goyette and Mullen (2006) found that the educational level of the parents had a significant influence on the choice of major for their children in science and social sciences. In the Cambodian context, a study by Yep (2008) found that 11% of the decision to choose a major for students pursuing higher education was due to labor market needs and 59% to parental factors. Thus, in Cambodian society, parents really had an influence on their children's decision to study in higher education. One study showed that parental income could influence their children's decision to choose a major. Akarsu and Kariper (2013) showed that parental level of knowledge and family economic status were among the other factors that contributed to the decision to study the science major.

Friends were the most influential factor for students in choosing a course of study (Walmsley et al., 2010). Furthermore, another study examining the influence of personal and future career factors on career choice showed that friends were considered to be a factor influencing course choice (Al-Rfou, 2013). However, a study with Cambodian students showed that friends had the least influence on course choice, at only 1% compared to other factors (Yep, 2008). Teachers were a factor influencing students' perceptions of biology as a school subject (Kubiatko et al., 2017). This study, conducted at the secondary school level, found that biology teachers had a positive influence on both male and female students' attitudes towards biology. Another study by Athanasou and Petoumenos (1998) showed that teachers could influence students' motivation through specific aspects of their teaching, but more importantly, through their orientation. School factors also contributed to the decision to choose a major. Secondary school students in Tanzania decided to choose arts subjects due to the lack of resources in schools for science subjects, such as laboratories and science teaching and learning materials (Komba, 2014).

3. Methodology

This study was conducted using a quantitative method, using a survey questionnaire to collect data from the target group and to answer the research questions. There were 300 senior high school students in grades 11 to 12 were chosen in this study in which located six different high schools in Svay Rieng Province. 50 students were selected from each high school in three districts/towns in Svay Rieng Province. This study used a survey questionnaire with closed-ended and open-ended questions. In preparing the questionnaire, the researcher prepared and modified the questionnaire from Huruma (2015) and Voeng (2014). The researcher made some adjustments and added some more points to be consistent with the researcher's topic. After collecting the data from the questionnaires by direct filling and Google Forms, the researcher used Microsoft Excel to analyze the data and create graphs and tables. All data collected were analyzed in percentages and explained by comparing the factors that contributed to the students' decision to choose the social science major. This analysis was based on indicators that had been identified as factors that contributed to the students' decision to choose the social science major.

4. Findings

In this chapter, the researcher presented the results of data analysis, interpretation and analysis of the data obtained through the questionnaire. The results obtained would be discussed on the main points that focus on the factors that determine the decision to choose the social science major by students in Svay Rieng Province.

4.1 Students' perceptions of internal factors

There were 300 students who participated in this study to answer internal factors influencing to choose their social science subject at their school.

Table 1: Students' perceptions focusing on internal factors (personality)

No	Items	N	%
1	Interest in the subject	282	18%
2	Excellent in social sciences	198	13%
3	Learn well in studies.	265	17%
4	Belief that subjects correspond to gender	116	7%
5	Subjects you want to study in college	244	16%
6	Learn other skills in the future	237	15%
7	Find a job in the future	225	14%
	Total	1567	100%

Based on the table 1 above indicated that “Interest in the subject” was the highest factor among all internal factors. There were 282 students, 18%, answered “yes”. The lowest percentage of this result was “the gender-appropriate academic belief factor”, only 7% which had 116 answering “Yes”. And other factors had ranged from 13% to 17%.

In conclusion, the strongest factor influencing students' decision to choose the social science major was **“interest”**. And there were also two strong factors influencing to choose the social science major: **“ability to learn well in study”** and **“Subjects you want to study in college”**.

4.2 Students' perceptions of external factors

There were 300 students who participated in this study to answer external factors influencing to choose their social science subject at their school.

Table 2: Students' perceptions focusing on external factors

No	Items	N	%
1	Friends give advice	31	5%
2	Choose by friends	27	4%
3	Parents give advice	64	10%
4	Parents forced to choose	15	2%
5	Spending money on education	154	23%
6	The teacher instructed	36	5%
7	Very interested in teaching	246	37%
8	The principal advised	22	3%
9	The school only has social studies classes.	17	3%
10	Insufficient science materials	61	9%
	Total	673	100%

The table 2 above showed that “interested in teaching” factor was the highest factor which had 37%. And another “spending money on education” factor had 23% to agree the external factors influencing to their choice. Other factors had ranged from 10% to 2%. In conclusion, external factors had weak influenced on students to choose their subject at school. The “the teacher's interest in teaching” factor was the strongest factor, which had 37%.

4.3. Student perceptions of the curriculum and exams

There were 300 students who participated in this study to answer “curriculum and exams” factors influencing to choose their social science subject at their school.

Table 3: Students' perceptions of the curriculum and exams

No	Items	N	%
1	Previous years' high school diploma results	169	11%
2	Only 7 subjects are tested.	221	14%
3	Can pass the baccalaureate exam easily	152	10%
4	Social science subjects are easier to study than science subjects.	219	14%
5	Science subjects (physics, chemistry, biology, earth and environment) are optional subjects.	84	6%
6	Mathematics scores are equivalent to civics, history, and geography.	209	14%
7	Rich in research documents	277	18%
8	The exam is only given in the 12 th grade curriculum.	196	13%
	Total	1527	100%

The table 3 above showed that the 5th indicator, “science elective subjects (physics, chemistry, biology, and earth and environment) as elective subjects”, 84 students who answered yes, was 6%. It was the lowest percentage factor. In the 7th indicator, “rich research documents”, there were 277 students who answered yes, which was 18%. It was the highest percentage factor. And there were 2 higher indicators which students answered yes: the 2nd indicator, “Only 7 subjects are tested” was 14%, and the 4th indicator, “Social science subjects are easier to study than science subjects” was 14%. In summary, students decided to choose social science subjects to study that high school with higher percentages based on “rich in research documents” with 18%, “only 7 subjects are tested” with 14% and “Social science subjects are easier to study than science subjects” with 14%.

Table 4: Factors influencing students' choice of social science major

No	Items	%	Order
1	Internal factors	17%	1
2	External factors	50%	3
3	Curriculum and exam factors	33%	2

The table 4 above clearly showed that social science students who decided to choose their major was different from internal factors, external factors and curriculum and exams factors. For internal factors, the percentage was the highest compared to two other factors. For “curriculum and exams” factors was the second highest percentage after internal factors which had 64%, and the lowest percentage was external factors, which had only 22%. In conclusion, internal factors and “curriculum and exams” factors were factors in which influenced students to choose the social science major at an average level, while external factors are at the weak level. Thus, students choose majors for their studies based on both the internal factors, and “curriculum and exam” factors

5. Discussion

According to the results of this study and the theory presented in literature review above, it was found that students in grade 11 and 12 of secondary school who decided to choose the social science major considered internal factors, external factors, and curriculum and examination factors. These three factors contributed to the students’ decision to choose the social science major. The results of this study clearly showed that internal factors were the highest percentage of factors in the decision to choose the social science major for social science students compared to external factors and curriculum and examination factors.

Social science students decided to choose the social science major because they had needs for their future studies, careers, and jobs. According to the results of the study, the percentage of students between 75% and 81% decided to choose the social science major because of their future studies, careers, and jobs. In line with the study by Sofi (2016), it was found that students at the secondary school level in India chose the science major or the social science major considering their future employment. According to Tripney et al. (2010) showed that the demands of their college and work were factors in their decision to choose a major. A similar study by Voeng (2014), in Cambodia, studied first-year students at a university in Phnom Penh who chose the social science major or English as their majors, also because of work demands. In line with Holland’s theory, which states that students’ personality types are useful for making decisions about continuing their higher education and future careers (Holland, 1997). Etinger (2012) found that people often choose a major or a career based on their perceived fit with their personality, the environment of the major, and the job they are looking for.

The curriculum and exams seemed to have encouraged students to become interested in the social science major. According to this study, approximately 92% of students chose the social science major because this major had a plenty of research materials for self-study. Approximately 73% of students studying the social science major believed that social science major was easier to study and pass than the science major, that was the reasons why they chose the social science major. Furthermore, because of the curriculum which students studied in public schools with 10-core subjects, but at the national exam, only 7 subjects were taken. Regarding the results of the national grade 12 exam, it also contributed to encouraging students to choose the social science major. Approximately 56% of students decided to choose the social science major because they saw that the results of the national grade 12 exam showed that students' chosen social science major had more successful results than students' chosen the science major.

6. Conclusion

The results of the study showed that social science students who decided to choose social science major were internal factors, which were at an average level of 67%. On the other hand, curriculum and examination factors were also factors with a higher percentage after internal factors, which were also at an average level of 64%. These two factors were factors in choosing social science major for students with similar percentages. As for external factors, which were at a weak level, the factors in deciding to choose social science major for their studies were only 22%. In conclusion, according to the study results, the researchers concluded that students who decided to choose the social science major because their abilities were still limited in studying science majors. At the same time, social science students believed that the social science major were easier to study than the science major. Only 7 subjects (Khmer literature, mathematics, history, geography, ethics-civics, foreign language, and one elective subjects of these: chemistry, physics, biology, and earth and environment) were required to take the exam. The results of the diploma exam and the strictness of the exam made to students to choose social science majors for their study. Therefore, internal factors and curriculum and exam factors were indeed factors in students' choices in deciding to choose the social science major.

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Exploring Teachers' Perceptions of Professional Learning Community Implementation in Cambodian Secondary Schools

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Abstract

Professional Learning Communities (PLCs) in Cambodian New Generation Schools (NGS) seeks to foster collaboration and professional growth. This study investigates the teachers' perceptions in secondary school in Kampong Cham and identifies the challenges hindering their effective implementation. This issue is crucial for strengthening teacher development and advancing Cambodian educational reforms in line with the international standards. A quantitative research was designed, with the structured questionnaire administered to 66 secondary school teachers and six school leaders selected by using the purposive sampling. Data were analyzed using descriptive statistics. Results indicated that teachers and school leaders generally perceived the PLC implementation positively, particularly organizational structures and support systems. However, two major challenges emerged: heavy workloads and time constraints, and misconceptions about PLC principles. Additional difficulties included limited collaboration, passive participation, and lack of trust among members. While the PLCs are promising for enhancing the teacher collaboration and instructional practices, addressing these challenges is essential. Findings provided valuable insights for policymakers, school leaders, and educators aiming to strengthen professional learning cultures in Cambodia.

Keywords: *Professional Learning Communities; New Generation Schools; teachers' perceptions; challenges*

1. Introduction

1.1. Context and Problem Statement

With the vision 2030-2050, Cambodia will become an upper-middle-income country by 2030 and a high-income country by 2050 (Ministry of Education, Youth and Sport [MoEYS], 2021b). To meet this vision, the Royal Government of Cambodia has identified human capital development as the first pillar of its Phase 4 Quadrant Strategy (Royal Government of Cambodia [RGC], 2021). In the Phase 1 Quadrant Strategy, human capital development is placed in the first of the five pentagons. The first pillar of the first pentagon identifies strengthening the education quality, sports, science and technology, which are linked to the first and fifth key priorities of the five key priorities: people, roads, water, electricity and technology (RGC, 2023). The Ministry of Education, Youth and Sports has a key role to play in producing human resources that meet these development goals. To support Cambodia's Vision 2030-2050, the Ministry of Education, Youth and Sports has incorporated the Education Sector Roadmap 2030 into the Education Sector Strategic Plan 2019-2023, identifying a number of key strategies that include a focus on the entire education system, schools, teachers and students (MoEYS, 2019). The primary goal of this effort is to achieve better learning outcomes. Achieving learning outcomes requires mutual support among education staff (Burns et al., 2017). In the third strategy of Continuous Professional Development Framework for Teachers and Principals on Providing Continuous Professional Development, the Professional Learning Community is a model of continuous capacity development that includes a variety of activities, including mentoring, coaching, and consulting (MoEYS, 2019).

The establishment of a Professional Learning Community (PLC) is an appropriate response to promote collaborative learning activities among education staff in order to improve student learning outcomes (Hangchuon, 2020). In particular, in high-quality professional development in new-generation schools, teachers need to participate in professional learning communities that are held at least two to three times a month to collaboratively reflect on teaching practices and strengthen professional ethics, which are the core of the new-generation school model (Donaher & Wu, 2020). According to DuFour (2004), PLCs are focused on changing the way we teach and assess students' learning for a new era of education. In this sense, teachers need to focus on three questions: (1) What do we want students to know? (2) How do we know that students have acquired the

knowledge that has been taught? and (3) How do we respond when students struggle to learn? PLCs are an educational reform initiative, a model for the development of educational staff, a strategy for building school capacity, transforming schools into communities that extend beyond the classroom, teaching methods, and curriculum to advance students' learning and teachers' teaching (Mullen, 2009).

The implementation of PLCs in countries in the region and around the world has become a topic of discussion and research. According to Harris & Jones (2010), in Wales, PLCs are an opportunity to create transformative professional practices. Harris & Jones (2010) added that through PLCs, teachers can learn from new practices and create new knowledge that contributes to the development of the entire education sector. Similarly, in the Philippines, through PLCs, teachers can understand their strengths and know what needs to be improved in order to develop appropriate capabilities to address challenges in their profession (Tayag, 2020). According to Hairon & Tan (2016), the implementation of PLCs focuses on three main concepts and four key questions, which are modeled on the work of DuFour (2004). The three concepts include (1) enabling students to learn, (2) building a collaborative culture, and (3) focusing on student learning outcomes. The four key questions include (1) What do we expect students to learn? (2) How will we know that they have learned? (3) How should we respond when they have learning difficulty? and (4) How should we respond when they have learned and mastered?

The value of implementing PLCs is to create a culture of collaboration, focus on student learning outcomes, and reflective discussion (MoEYS, 2021a). However, most studies on the implementation of PLCs have been conducted in various countries, as shown above. Studies on this topic in the Cambodian context do not seem to be available or are not yet widespread. Therefore, the researchers are interested in the implementation of professional learning communities in the Cambodian context, focusing on the implementation of PLCs within the framework of the new generation school program.

2. Literature Review

Professional Learning Communities

According to various sources, a PLC has various definitions (DuFour, 2004; MoEYS, 2021a; Stoll & Louis, 2017). DuFour (2004) states that a PLC is a group of individuals who share a common interest in education, including teachers, school boards, education offices, ministries of education, or

organizations. Another definition of a PLC is a group of teachers who share and discuss their daily practices in a reflective, collaborative, learning-focused, and growth-promoting manner (Stoll & Louis, 2007). MoEYS (2021a) defines a PLC as a group of teachers, instructors, and principals who are committed to working together to learn from each other through action research, lesson study, and self-reflection on practice to improve the motivation, performance, and learning outcomes of the students they teach. Therefore, a common definition can be that a PLC is a regular discussion meeting between educational actors to explore ways to improve student learning outcomes. DuFour (2004) suggested that to create a PLC, one must focus on student learning, collaborate, and focus on student learning outcomes. MoEYS (2021a) identified three principles for the creation and functioning of PLCs. The three principles include (1) a culture of collaboration, (2) a focus on student learning outcomes, and (3) reflective discussion.

Educators who create PLCs recognize that they must create a structure that allows them to work together to achieve a common goal: improving student learning outcomes (DuFour, 2004). In this sense, teachers are given the opportunity, power, and freedom to collaborate and plan and discuss their own perceptions and practices (MoEYS, 2021a). At the same time, collaboration requires a positive culture, shared purpose, openness, time, and recognition of professional development (Henderson, 2018). PLCs assess the effectiveness of their work through student outcomes. In this sense, groups of teachers work collaboratively to discuss and assess their students throughout the school year. This allows teachers to see how their students are performing on a range of skills in comparison to other students (DuFour, 2004). According to DuFour (2004), the mission of formal education is not to ensure that students are taught, but to ensure that they have learned. This means that learning needs to be focused. In the discussion, teachers need to focus on three key questions: (1) What do we want students to learn? (2) How do we know that students have learned what we want them to learn and what are the challenges in their learning? and (3) What do we do if students have not learned what we want them to learn? (MoEYS, 2021a).

Key Activities Implemented in PLC

According to Caine & Caine (2010), there are many ways that can be done to implement a PLC, in particular four ways that should be considered: group study, action research, community of practice and dialogue cycle. According

to MoEYS (2021a), three key activities are identified as being implementable in a PLC. These key activities include action research, lesson study and self-reflection. Action research is conducted with the aim of responding to real-world problems based on evidence from research. MoEYS (2020) suggests that action research should be conducted in four stages: (1) defining the problem, (2) developing and implementing a plan, (3) collecting and analyzing data, and (4) using and sharing the results. After defining the problem, the researcher begins to plan by determining what to do, who to involve, when to start and where to meet for interperceptions, etc. The next step is to collect and analyze data through individual or group interperceptions. The data collected and analyzed must be disseminated, shared, and implemented in the classroom (MoEYS, 2020).

In addition to action research, lesson study is also one of the three main activities that can be carried out in PLCs. MoEYS (2021a) also shows that lesson study is a group work in which teachers collaborate to review and analyze teaching practices and help provide methods and produce teaching materials, etc. MoEYS (2021a) states that there are four stages in a cycle of lesson study. Stage 1 is lesson planning. In this stage, teachers need to discuss and assign a teacher to prepare for teaching. After receiving the assignment, the teacher needs to study the lesson content and prepare the lesson plan. After completing the plan, the whole group needs to work together to review the lesson plan. Finally, feedback is provided. Stage 2 is teaching practice and observation. In this stage, the group of teachers needs to have recording devices to record the activities of the assigned teacher. Observation focuses on the teacher's teaching methods and the students' learning styles. Stage 3 is discussion on teaching and learning. In this stage, all group members need to discuss and find out points to be tested and points to be improved in teaching. The final stage is continuous improvement. During this phase, all team members help drive continuous improvement and continue to assign others to implement the teaching to continue learning and sharing experiences (MoEYS, 2021a).

The final key activity is self-reflection on practice. According to MoEYS (2021a), self-reflection is manifested through examining one's own daily teaching practice and gaining self-awareness and making a thorough evaluation of one's teaching practice. Through self-reflection on practice, teachers can learn from experience to gain deeper self-awareness and create a culture of lifelong learning (Finlay, 2008). Self-reflection on practice occurs in four key stages: (1) teach, (2) measure one's own teaching performance

or ability, (3) consider new ways to improve student learning, and (4) try out new ideas from others or oneself, and finally, repeat (MoEYS, 2021a). The three key activities highlighted are all aimed at promoting a culture of collaboration between teachers and school leaders. The overall goal of the above activities is to help foster mutual support between teachers and teachers, and between teachers and school leaders to improve student learning outcomes, since good collaboration between teaching teams can achieve better results (Ronfeldt et al., 2015).

Key Elements Supporting the Implementation of PLCs

According to MoEYS (2021a), the implementation of PLCs focuses on (1) group learning, (2) classroom observation and mentoring, (3) participation in professional learning community tasks, (4) stakeholders in the implementation of PLCs, and (5) a clear support and incentive system. Group learning is considered a practice method in PLCs that aims to set a specific plan and time for teachers to meet. In addition, group learning helps teachers to discuss and provide knowledge to each other. Two or more teachers can study together to reflect on their work practices (MoEYS, 2021a). Group learning is an opportunity for teachers to learn from each other and gain good experiences that help them respond well to student learning (Donegan et al., 2000). At the same time, group discussions create mutual understanding and enhance closer collaboration. Indeed, peer learning is a way to build trust and rapport that also supports professional development (Pollara, 2012). Gutierrez & Kim (2018) found that it is essential for teachers to learn from their experiences in collaboration with their colleagues to ensure the development of quality learning outcomes. They added that the creation of PLCs in schools will provide opportunities for teachers to learn from their experiences in practice, as they are the foundation for further reflection and practice (Gutierrez & Kim, 2018). At the same time, drawing on and sharing experiences can be achieved through trusting dialogue. Rhodes' (2017) research shows that peer learning for new teachers is an effective way to support them. He added that for new teachers to use peer learning to develop and reflect on their practice, they need formal dialogue and learning with peers (Rhodes, 2017).

Classroom observation is one of the activities that helps to collect information to reflect and tailor teaching methods to the specific situation of each classroom. Each classroom observation should be planned and recorded clearly so that it can be used to reflect on the next observation (MoEYS, 2021a). A study by Vincent (2018) showed that classroom

observation is an effective tool that benefits both the observer and the observed, as it helps to promote professional development. He also emphasized the importance of participants in using classroom observation as a professional development tool and providing sufficient time for participation in classroom observation activities (Vincent, 2018). Another study by Carroll & O'Loughlin (2014) showed that classroom observation brings about teacher-teacher relationships, improves teaching and improves learning engagement. In addition, classroom observation should be conducted especially for new teachers. Involving selecting observation partners, being self-directed and being voluntary in order to build mutual trust and cooperation between participants is necessary (Carroll & O'Loughlin, 2014).

In addition to the above activities, PLCs also require community members to actively participate in various activities, including group study, lesson study, classroom observation, consultation, sharing experiences, and reflecting on and evaluating student learning outcomes (MoEYS, 2021a). Good participation in PLCs will have a positive impact on the entire organization. Toole & Louis (2002) suggested that participation in PLC tasks supports teachers' work lives. It creates a supportive work environment and creates a career path that attracts and retains teachers. In addition, it also supports teachers' learning. Regular participation in PLCs will continuously improve teachers' work practices. In particular, this participation creates a school culture that influences the prediction and positive change in schools (Toole & Louis, 2002). Along with the above activities, PLCs also require a strong and clear support system to ensure effective and sustainable implementation. Relevant entities such as ministries, departments and offices of Education, Youth and Sports, teacher training institutions, school principals and teachers are included in the composition that supports the establishment and implementation of PLCs in schools (MoEYS, 2021a).

PLC Implementation

Studies have also been conducted to gain a deeper understanding of the support for PLCs from various stakeholders. Saad (2019) conducted a study on the implementation of PLCs in Malaysia and found that school-based support for teachers is essential. The study highlighted that school strategic planning is an important factor that helps to promote the implementation of group learning activities in PLCs. The study also highlighted the importance of teacher leadership in the implementation of PLCs in schools (Saad, 2019). In addition, a study by Gray & Summers (2015) found that local

traditions and school norms influence the implementation of PLCs. The development of a PLC depends on the well-structured school system, trust in the administration, trust between teachers, and shared achievement (Gray & Summers, 2015). Therefore, school leadership is important for the implementation of PLCs. In addition, culture and social context are also fundamental factors that influence PLCs (Hairon & Dimmock, 2012).

Kaminski (2021) conducted a study on the design, implementation, and testing of PLCs in Massachusetts, USA. The study highlighted the importance of empowering staff, providing staff with opportunities to reflect, and collaborate in the learning environment. Eyanagho (2019) also found that opportunities for teachers to reflect on the knowledge they gain from PLC meetings influenced their teaching practices and had an impact on student learning. For PLCs to be sustainable, school cultures need to shift to a focus on collaborative, and supportive leadership, using research evidence in the teaching process (Hefner, 2011). This provides opportunities for teachers to build relationships, closeness, trust, and build team structures and leadership (Held, 2017). Another study by Somprach et al. (2007) in a number of schools in Thailand found that principals and teachers were actively involved in PLCs. Active participation in PLCs by teachers occurs because of the knowledge of the principal's leadership, which helps guide the principal to motivate teachers and, as a result, improve student learning (Somprach et al., 2017). In addition, motivation in PLCs is a necessary factor to promote the participation of community members in implementing PLC better (MoEYS, 2021a). Motivation can be done by providing opportunities for community members to participate in professional development programs, providing sufficient time, providing technical support, or providing rewards, etc. In addition, creating satisfaction, sharing, and mutual understanding within the community are also considered motivational (van den Beemt et al., 2018).

Challenges in Implementing PLC

According to several research studies, a number of challenges have occurred in implementing PLCs (Chua et al., 2020; Hairon & Tan, 2017; Tayag, 2020). These challenges include workload and time constraints, unclear understanding of PLC, lack of discussion culture, passive behavior of community members, lack of collaborative culture, and lack of trust. Chua et al. (2020), Hairon & Tan (2017), and Tayag (2020) found that the first challenge is workloads and time constraints. Workload and time constraints make it difficult to achieve good results in implementing PLCs. Spending time

attending PLC meetings can also affect the time spent on core tasks. Hairon & Tan (2017) conducted a study on the implementation of PLCs in Singapore. The results showed that the main obstacle to commitment to implementing PLCs is severe workloads. These workload arise from the increasing demands placed on them by stakeholders, including policymakers, parents, and leaders (Hairon & Tan, 2017). A study by Tayag (2020) in the Philippines also found that instead of attending meetings, teachers choose to use that time to perform other tasks, such as advising students, preparing teaching materials, and assessing student learning outcomes. Teachers are unable to fully attend meetings due to the high administrative workloads and the fact that principals encourage short meetings (Tayag, 2020). A study in a high school in Malaysia also found that workloads were a challenge (Chua et al., 2020). The study showed that teachers not only have regular teaching duties but also many administrative tasks to complete. Therefore, they have difficulty finding time to attend community meetings regularly (Chua et al., 2020).

The second challenge is the lack of clear understanding of PLCs (Chua et al., 2020; Hairon & Tan, 2017). Misunderstandings about the implementation of PLCs are a problem among administrators, schools, and teachers. The main reason for this lack of understanding stems from the lack of detailed documentation on the implementation of PLCs, with no comprehensive document detailing the role of PLCs or how to implement PLCs in detail. Therefore, when it comes to documenting the implementation of PLCs in regions outside Europe and the United States, there is a lack of clarity (Hairon & Tan, 2017). For example, a misunderstanding of the implementation of PLCs is a misunderstanding of the purpose of PLC meetings. In this regard, a study by Chau et al. (2020) found that some school principals saw PLC meetings as meetings that only focused on determining what to teach, what was in the curriculum, and what tasks to assign students to do. Some principals, however, believe that PLC meetings are about engaging students in classroom activities such as Gallery Walk, a teaching technique used to develop speaking skills (see Yeourng, 2021) in the classroom.

The third challenge is the lack of a discussion culture (Harris & Jones, 2010; Park & So, 2014). In the past, most teachers preferred to work alone and tried to hide their difficulties in order to save face (Park & So, 2014). Therefore, open discussion is a new thing that is difficult to adapt to immediately. For example, research shows that in some schools, PLCs

encounter resistance from teachers who are unfamiliar with how to work or who are uncertain about working in groups (Harris & Jones, 2010). In addition, a study in South Korea also showed a lack of confidence in discussion. Some teachers felt that they did not gain anything from participating in discussions. This is one reason why discussions are seen as not helping teaching practice (Park & So, 2014).

The fourth challenge is teacher passiveness (Chua et al., 2020; Park & So, 2014). Most teachers feel that they are doing their job well and are reluctant to ask for advice from others. Chua et al. (2020) highlighted that this is often the case among teachers with many years of experience who are reluctant to ask for advice from others. Their study was conducted in a school with a majority of Chinese teachers. Therefore, the culture of maintaining face can be a barrier to being open to asking for advice from others. Another study conducted by Park & So (2014) also found a similar challenge, which they called “psychological barriers” (p. 103). In this sense, Park & So (2014) refer to the issue of personal risk. In Korea, opening up classroom work to other teachers is still relatively new. Similar to the Chinese teachers in the school that Chua et al. (2020) studied, Korean teachers were afraid of revealing their classroom problems to other teachers and receiving evaluations from other teachers (Park & So, 2014).

The fifth challenge is the lack of trust in other teachers (Tayag, 2020). For a PLC to be successful, trust needs to be built among teachers and stakeholders. Lack of trust creates barriers to open discussions about student practice and learning. Tayag’s (2020) research showed that teachers are reluctant to share what they have and what they have implemented with other teachers after being criticized when they first presented it. In general, research on the implementation of PLCs has been conducted in countries other than Cambodia. The researcher has not yet been able to find any research articles on PLCs in Cambodia. Therefore, in this study, the researcher studied the implementation and challenges of PLCs in two target schools in Cambodia. However, this study only studied PLCs at the secondary level. In this study, the researcher sought to understand high-quality professional development in New Generation Schools (NGSs) that was implemented in 2015 (Donaher & Wu, 2020).

3. Methodology

This study was conducted with a quantitative approach with a questionnaire survey for participants. Survey research was used to gather information about their personality, opinions, attitudes, and experiences (Leedy &

Ormrod, 2015). In this study, the main focus was on teachers' perceptions of the PLC process and the challenges they face.

Population and Sample

This study was conducted with two target secondary schools in Kampong Cham province that are currently implementing the New Generation School program. In this study, the two schools were not identified by name, but were referred to as NGS 1 and NGS 2. Because it was a case study, a purposive sampling was used to identify participants who met the criteria for the research topic (Mills & Gay, 2019). Therefore, teachers from the two new generation schools were selected to complete the research questionnaire. By verifying teachers' perceptions on the implementation of PLCs and the challenges in implementing them, the researchers also asked the school leaders of the target schools to participate in completing a questionnaire for school leaders. A total of 72 people participated in the questionnaire, of which 6 were the school leaders and 66 were teachers in 11 specialized subjects. The total number of teachers in the two schools was 101, with NGS 1 having 37 teachers (20 female) and NGS 2 having 64 teachers (29 female). The sample size was not determined by any statistical formula because the study was conducted in a small population setting (Denscombe, 2017). In addition, due to the researcher's limited time and the busy schedule of the participants, data from only 72 people (37 female) were directly collected. Of the six school leaders (one female), two were from NGS1 and four from NGS 2. Of the 66 teachers (36 female), 20 were from NGS 1 and 46 from NGS 2. All teachers taught from grades 7 to 12. The 11 specialized subjects included Khmer, English, mathematics, physics, chemistry, biology, earth science, history, geography, moral-civics, and information technology. Information about the participants in this study is presented in Tables 1.

Table 1: Information about research participants (N =72)

Participants		Number		%
		Female	Total	
NGS1	School leaders	1	2	2.78
	Teachers	12	20	27.78
NGS2	School leaders	0	4	5.56
	Teachers	24	46	63.88

Data Collection Tools

This research used a questionnaire based on the content extracted from the "Guidelines on Establishing PLCs in Public Educational Institutions"

published in 2021 by the Ministry of Education, Youth and Sports (MoEYS, 2021a) for teachers and administrators to complete in order to meet the two research objectives of the topic. After being developed, the questionnaire was submitted to the main advisor and assistant advisor to decide on its use in data collection. The questionnaire used a Likert scale and was divided into three parts: Part 1 was demographic information that asked about the role, gender, age, specialty, teaching level, work location, qualifications, and work experience. Part 2 was questions related to the implementation of PLCs, which were further divided into two points: (1) work practices (31 indicators) and (2) PLC support systems (31 indicators). The third section is a set of questions regarding challenges in implementing PLCs (17 indicators) that build on previous research as described in the literature review. At the end of the questionnaire, the researcher left space for participants to write additional comments.

Data Collection

After receiving a letter of permission from the Department of Education, Youth and Sports of Kampong Cham Province, the researcher, the first author, went to the target schools and collected data directly through the completion of a questionnaire by the school leaders and teachers on printed sheets. Data collection took place over a period of 25 days, between July 5 and 30, 2022. During data collection, the researcher met with the participants in person and handed over the questionnaires to the participants to complete on site. Data collection continued until the total number of participants who completed the questionnaire was 72, as described above. The first researcher then decided to analyze the data in order to meet the deadline required by the educational institution to write a master's degree graduation report.

Data Analysis

The collected data were inserted into SPSS 26 to calculate the mean and standard deviation. The calculated mean and standard deviation were analyzed using descriptive statistics, with the following formula to interpret the average score of each indicator:

$$\frac{\text{Highest score} - \text{Lowest score}}{\text{Number of indicator levels}} = \frac{5 - 1}{5} = 0,80$$

1.00 to 1.80 means very poor

1.81 to 2.60 means poor

2.61 to 3.40 means average

3.41 to 4.20 means good

4.21 to 5.00 means very good.

Research Ethics

This research process was based on the principles of non-involvement of research participants. Research participants were not coerced, and the identity of the participants is kept confidential and anonymous. Participants had the right not to return the questionnaire without any pressure.

4. Findings

Teachers' and School Leaders' Perceptions of the Implementation of PLCs

Table 2 shows that, from the teachers' perceptions, the implementation of PLCs at the secondary level in Kampong Cham province was at the "good" level ($M = 3.90$; $SD = 0.73$). All five major implementation points received the same "good" result, especially the participation in the tasks of the PLC, which had a value of $M = 3.97$. This result indicates that the PLC members participated in the implementation of group studies and class observations and counseling regularly, and received good support and encouragement.

Table 2: Teachers' perceptions of the implementation of PLCs ($N = 66$)

No	Items	M	SD
1	Group Study	3.91	0.78
2	Class Observation and Counseling	3.95	0.69
3	Participation in the Tasks of the PLC	3.97	0.65
4	Key Stakeholders	3.88	0.77
5	Incentive System for the PLC	3.81	0.77
	Total	3.90	0.73

Table 3 shows that the school leaders' perceptions of the implementation of PLCs at the secondary level in Kampong Cham province are consistent with the teachers' perceptions. Overall, the implementation of PLCs at the secondary level in Kampong Cham province is at the "good" level ($M = 4.05$; $SD = 0.62$). In the principals' perceptions, the most prominent feature is group study, with a mean value of "very good" ($M = 4.44$; $SD = 0.53$).

Table 3: School leaders' perceptions of the implementation of PLCs ($N = 6$)

No	Items	M	SD
1	Group Study	4.44	0.53
2	Class Observation and Counseling	4.16	0.78
3	Participation in the Tasks of the PLC	4.01	0.62
4	Key Stakeholders	3.80	0.55
5	Incentive System for the PLC	3.83	0.64
	Total	4.05	0.62

Table 4 shows that the implementation of PLCs at the secondary level in Kampong Cham province is generally “good” ($M = 3.98$; $SD = 0.68$). The results can be summarized as follows: The implementation of PLCs at the secondary level in Kampong Cham province is working well. Both the management and teachers have an understanding of group learning and are able to implement classroom observation and counseling. In addition, teachers are aware of the tasks they have to perform in PLCs. On the other hand, the results show that the management has encouraged and participated in supporting the implementation of PLCs.

Table 4: Teachers’ and school leaders’ shared perceptions of the implementation of PLCs ($N = 72$)

No	Items	M	SD
1	Group Study	4.18	0.66
2	Class Observation and Counseling	4.06	0.74
3	Participation in the Tasks of the PLC	3.99	0.64
4	Key Stakeholders	3.84	0.66
5	Incentive System for the PLC	3.82	0.71
	Total	3.98	0.68

Teachers’ and School Leaders’ Perceptions of Challenges in Implementing PLCs

Table 5 shows that from the teachers’ perspective, there are two main challenges in implementing PLCs. The first main challenge is workload and time constraints, which are at the “medium” level ($M = 3.34$; $SD = 0.93$). The second main challenge is a lack of clear understanding of PLC implementation, which is also at the “medium” level ($M = 3.34$, $SD = 0.89$). The other three challenges are at the “weak” level. The results indicate that the lack of a collaborative culture, passive behavior of PLC members, and lack of trust in other members are secondary challenges in implementing PLCs at the secondary level in Kampong Cham province.

Table 5: Teachers’ perceptions of challenges in implementing PLCs ($N = 66$)

No	Items	M	SD
1	Workload and time constraints	3.34	0.93
2	Unclear understanding of PLC implementation	3.34	0.89
3	Lack of collaborative culture	2.45	1.00
4	Passive behavior of PLC members	2.32	0.97
5	Lack of trust in other members	2.33	0.99

Table 6 shows the school leaders' perceptions of the challenges in implementing PLCs at the secondary level in Kampong Cham province. The principals' perceptions show that there are two main challenges in implementing PLCs, similar to the teachers' perceptions. The first main challenge is workload and time constraints. It is noteworthy that the school leaders' perceptions are at the "good" level ($M = 3.43$; $SD = 0.57$), which is slightly higher than the teachers' perspective. The second main challenge is the lack of clear understanding of the implementation of PLCs, which is at the "average" level ($M = 3.38$; $SD = 0.80$). The other three challenges are at the "weak" level. The results indicate that the lack of a collaborative culture, passive behavior of PLC members, and lack of trust in other members are secondary challenges in implementing PLCs at the secondary level in Kampong Cham province.

Table 6: School leaders' perceptions of challenges in implementing PLCs ($N = 6$)

No	Items	M	SD
1	Workload and time constraints	3.43	0.57
2	Unclear understanding of PLC implementation	3.38	0.80
3	Lack of collaborative culture	2.46	0.92
4	Passive behavior of PLC members	2.50	0.84
5	Lack of trust in other members	2.33	0.52

Table 7 shows that there are two main challenges in implementing PLCs at the secondary level in Kampong Cham province. The first main challenge is workload and time constraints, which are rated "medium" ($M = 3.39$; $SD = 0.75$), and the second main challenge is unclear understanding of PLC implementation, which is also rated "medium" ($M = 3.36$; $SD = 0.85$). The other three challenges, such as lack of collaborative culture, passive behavior of community members, and lack of trust in other members, are all rated "weak," indicating that these three challenges are secondary issues.

Table 7: Shared perceptions of the teachers and the school leaders on the challenges in implementing PLCs ($N = 72$)

No	Items	M	SD
1	Workload and time constraints	3.39	0.75
2	Unclear understanding of PLC implementation	3.36	0.85
3	Lack of collaborative culture	2.46	0.96

4	Passive behavior of PLC members	2.41	0.91
5	Lack of trust in other members	2.33	0.76

5. Discussion

Perceptions on the PLCs Implementation

The goal of PLCs is to create a culture of collaboration between teachers and stakeholders. Group learning is a mechanism that helps to create excellence in the profession of teachers and educators. Teachers' perceptions indicate that group learning by PLC members is at the "good" level, with a mean value of 3.91 and a standard deviation of 0.78. The principals' perceptions are similar and even higher, with a "very good" level, with a mean value of 4.44 and a standard deviation of 0.53. The overall results are at the "good" level ($M = 4.18$; $SD = 0.66$). Based on the results presented through the indicators in this section, it is clear that PLCs (1) meet weekly and monthly, (2) meet via ZOOM or Google Meet (especially during COVID-19), (3) compile and store content in a folder, and (4) store evidence of implementation in their professional portfolio. This result shows the participation of teachers who are members of the PLCs in new generation secondary schools in Kampong Cham province in teamwork. This result is consistent with the studies of Donegan et al. (2000), Gutierrez & Kim (2018), and Pollara (2012), who studied teamwork and stated that teamwork leads to the development of professional competence by building trust, sharing experiences and knowledge to better respond to students' learning needs. At the same time, Rhodes (2017) also studied teamwork and suggested that teamwork can greatly help teachers, especially new teachers. Overall, the teachers' and school leaders' perceptions of teamwork showed that community members are committed to participating in collaborative work and achieving good results.

Classroom Observation and Counseling

To reflect on their teaching practices, teachers are required to learn from others' experiences of using methods through classroom observation and consulting with those who are more experienced than themselves. Classroom observation and consulting explore good methods to be applied in teaching according to the actual situation of their classrooms will help to increase the effectiveness of teaching to improve student learning outcomes. The teachers' and the school leaders' perceptions show the same perceptions of the implementation of classroom observation and counseling in PLCs at the secondary level in Kampong Cham province. The responses of the teachers and the school leaders are at the "good" level. The teachers'

perceptions received a mean value of 3.95 and standard deviation 0.69, and the school leaders' perceptions received a mean value of 4.16 and standard deviation 0.78. The overall results are at the "good" level ($M = 4.06$; $SD = 0.74$). This result indicates that the classroom observation and counseling process is well implemented in PLCs. The management structure of the New Generation Schools in the two high schools in Kampong Cham province has a vice principal in charge of technical affairs and a community leader who leads all community activities and coordinates community work. The community leader works closely with the vice principal in charge of technical affairs to support community implementation and professional development of community members. Community members also conduct classroom observations and record information for reflection on their work. In addition, consultation with highly qualified and experienced people also received a good response. Vincent (2018) suggests that classroom observation provides many benefits to both the observer and the observed. It is an activity that will provide clear information for reflection during subsequent observations. Carroll & O'Loughlin (2014) also found similar findings to Vincent (2018). They suggest that classroom observation helps to build good teacher-teacher relationships that facilitate consultation and lead to improved learning. Overall, the classroom observation and counseling of PLCs at the secondary level in Kampong Cham province went well due to the participation of the school leaders and community leaders, as well as mutual consultation and advice.

Fulfilling the tasks of the PLCs

PLC members are required to actively participate in various aspects, such as group study, lesson study, classroom observation, consultation, sharing experiences and reflection, evaluating student learning outcomes, etc. The results of this study showed that the implementation of PLC tasks at the secondary school level in Kampong Cham province was at the "good" level ($M = 3.99$; $SD = 0.64$). This result indicates that community members participated in their tasks well. Based on the results shown through the indicators in this section, community members participated in the designated activities, ranging from lesson study, conducting evaluations, sharing experiences, to identifying students who are slow learners, to a good extent. Participation in PLC tasks also supports teachers' professional lives. It helps create a supportive work environment and creates a career path that can attract and retain teachers (Toole & Louis, 2002). In addition, it also supports teacher learning. Participation in PLC tasks will improve teachers'

daily work practices (Graham, 2007). In particular, participation in PLC tasks creates a school culture that influences school-wide settings and changes (Toole & Louis, 2002).

Key Stakeholders in Supporting Professional Learning Communities

The involvement and support of key stakeholders is essential for the implementation of PLCs. Ministry-level units, provincial departments of education, youth and sports, district education, youth and sports offices, teacher training institutions, school leaders and teachers all play a role in helping the implementation of PLCs to run effectively and sustainably. The responses of teachers and the school leaders to the questionnaire showed results at the “good” level. From the teachers’ perceptions, the mean value $M = 3.88$ and the standard deviation $SD = 0.77$. From the administrators’ perspective, the results obtained a mean value $M = 3.80$ and the standard deviation $SD = 0.55$. The overall results are at the “good” level ($M = 3.84$; $SD = 0.66$). This result indicates that all relevant units, especially the school principals, participated in the creation of PLCs and helped to support the activities of the created community. Saad’s (2009) study found that support from the school itself is a necessary element that stems from the leadership of the school principal. Gray & Summers (2015) also suggested that establishing a clear school structure, building teachers’ trust in the administration and in other teachers, leads to the development of PLCs. In addition, supporting the implementation of PLCs requires skillful school management and leadership (Hairon & Dimmock, 2012). Principals who work closely with PLCs build trust, team spirit, and leadership that create good relationships and strong team structures (Hefner, 2011; Held, 2017; Somprach et al., 2017). Overall, this research can be concluded that the implementation of PLCs at the secondary level in Kampong Cham province has received good support from stakeholders, especially from the school leaders.

Incentive System for PLCs

In addition to the cooperation of stakeholders, the implementation of PLCs also requires an incentive system to promote better implementation. The teachers’ and school leaders’ perceptions are at the same level of “good”. Teachers’ perceptions have a mean value of 3.81 and standard deviation 0.77, while the school leaders’ perceptions have a mean value of 3.83 and standard deviation 0.64. The overall result is at the “good” level ($M = 3.82$; $SD = 0.71$). This result indicates that PLC members receive sufficient encouragement through opportunities to participate in various programs

and receive opportunities to develop professional skills. In addition, the schools also support them materially and spiritually by providing suitable places for teaching and self-study, etc. A study by van den Beemt et al. (2018) found that in motivating, encouragement can be used by participating in professional development programs, providing sufficient time, providing technological support, or providing rewards, etc. In addition, motivation can also be achieved by creating satisfaction, sharing, and mutual understanding within the community. Overall, teachers' perceptions on the motivation system for PLCs show a good level of agreement.

Challenges of PLC Implementation

Based on the teachers' perceptions, which are similar to those of the administrators, several major challenges were found in implementing PLCs at the secondary level in Kampong Cham Province, Cambodia. The first major challenge is workload and time constraints. Workload and lack of time are factors that affect PLC meetings as well as other community activities, including group study, classroom observation, and counseling. This research shows similar results to studies by Chua et al. (2020), Hairon & Tan (2017), and Tayag (2020). Hairon & Tan (2017) found that work demands imposed by the stakeholders such as superiors or guardians were obstacles to the commitment to implementing PLCs effectively. Tayag (2020) and Chua et al. (2020) suggested that due to heavy workload and lack of time, teachers did not participate in PLC meetings. They had to spend time on administrative and other tasks related to their teaching. The second major challenge is lack of clear understanding of PLCs. According to teachers and administrators, these are challenges that need to be addressed in order to improve the implementation of PLCs. Some studies have shown that the lack of clear understanding of PLC implementation is due to the lack of detailed guidance documents and new experiences in implementation. For example, Hairon & Tan (2017) found a lack of rich literature on PLCs and the implementation of PLCs in non-European or American contexts. This lack of rich literature is because in Asian contexts, such as Cambodia, the establishment and implementation of PLCs only occurred after the above two regions (Hairon & Tan, 2017). This lack leads to unclear understanding, including misconceptions about PLC meetings, etc. In fact, a study by Chua et al. (2020) found that some principals in Malaysia perceived these meetings as only reviewing the content of the curriculum and determining the content to be

taught, and some principals thought that PLC meetings were some classroom activities.

In addition to the above challenges, there are other secondary challenges such as lack of collaborative culture, passive behavior of PLC members, and lack of trust in other members. Regarding the lack of collaborative culture, studies by Harris & Jones (2010) and Park & So (2014) found that it is a challenge in implementing PLCs in Wales and Korea. In this study, the perceptions of the school leaders and teachers show that this is a secondary problem, according to the average value of the indicators is $M = 2.46$. Meanwhile, the problem of passive behavior of PLC members and lack of trust in other members are also secondary problems, with the average values of the indicators being $M = 2.41$ and $M = 2.33$, respectively. The results of this study are similar to the study by Chua et al. (2020), Park & So (2014), and Tayag (2020) also found that passive behavior of PLC members and lack of trust in other community members are also challenges in implementing PLCs in Korea and Philippines. Overall, the above challenges are challenges that need to be addressed. Addressing these issues will improve the implementation of PLCs, which will contribute to improving teaching and learning effectiveness.

6. Conclusion

The results of this study showed that principals and teachers had a common perception of the implementation of PLCs at the secondary school level in Kampong Cham Province, Cambodia, where they considered the implementation to be “good”. Along with these results, this study also found some challenges that occurred in the implementation of PLCs. The first major challenge is workloads and time constraints, which are needed to be addressed. The results show that teachers have many tasks to complete, which are factors that affect the implementation of PLCs. The second major challenge is a lack of clear understanding of the implementation of PLCs. In addition to these two problems, secondary problems, as already shown, are also points that need to be addressed by various stakeholders, such as the Ministry of Education, Youth and Sports, provincial/district departments/offices of education, youth and sports, and school management committees, etc., to ensure that the implementation of PLCs in schools is more effective.

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