International Journal of Language and Literary Studies
Volume 7, Issue 4, 2025
Homepage : http://ijlls.org/index.php/ijlls

From Rote to Reflective: Integrating ChatGPT to Transform Learning Outcomes in Cambodian Education

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DOI: http://doi.org/ 10.36892/ijlls.v7i4.2188
APA Citation: Huot, S. & Loch, S. (2025). From Rote to Reflective: Integrating ChatGPT to Transform Learning Outcomes in Cambodian Education. *International Journal of Language and Literary Studies. 7*(4).1-15. http://doi.org/10.36892/ijlls.v7i4.2188

Received: *22/05/2025*

Accepted: *20/06/2025*

Keywords: *ChatGPT, generative artificial intelligence, critical thinking, digital pedagogy, reflective learning, Cambodian education .*

Abstract

Cambodia's education system has long been shaped by rote memorization, hierarchical classroom structures, and examination-focused curricula, practices that often inhibit the development of critical and reflective thinking. This paper investigates how the generative artificial intelligence (AI) tool ChatGPT, developed by OpenAI, may be a catalyst for changing Cambodian learning paradigms from repetition-based instruction to more reflective, student-centered interaction. Based on a narrative and theme integrative literature review that spans 2022–2025, the study compiles empirical and conceptual results from international and regional sources, all in line with policy frameworks in Cambodia. The impact of ChatGPT on conceptual understanding, learner motivation, and metacognitive development are among its key themes. The results imply that although ChatGPT can improve student learning when applied for dialogue, explanation, and feedback, its performance mostly depends on pedagogical design, instructor facilitation, and ethical integration. Infrastructure gaps, limitations in digital literacy, linguistic constraints, and cultural norms around teacher authority are all major issues. Including the creation of Khmer-language AI tools, integration of AI literacy into national curricula, and the requirement of pilot studies and ASEAN-level comparative research, the report ends with practical recommendations for legislators, teachers, and researchers. In the end, the analysis confirms that ChatGPT can help Cambodia's transformation toward a more reflective, fair, and future-oriented educational system by means of inclusive planning and consistent investment.

1. INTRODUCTION: CAMBODIA'S DIGITAL ERA EDUCATIONAL CHALLENGE

Rote memorization, high-stakes tests, and teacher-centered instruction have long defined the Cambodian educational system. These methods were mostly adopted during post-conflict reconstruction in the 1990s and early 2000s when fast access's priority above pedagogical quality took the front stage (Benveniste et al., 2008; Bray & Bunly, 2005). Often at the price of critical thinking, creativity, or problem-solving, classroom instruction in both general and higher education usually stresses factual memory, textbook conformity, and repetition-based learning. This legacy endures today when standardized tests still predominate in educational measurement and influence instructional techniques (MoEYS, 2019). This system is based on

a strong hierarchical structure in which professors are seen as authoritative figures, and student input is typically limited.

Confucian and Buddhist social ideals of respect and obedience to authority help to perpetuate a norm whereby students are hardly encouraged to question, criticize, or co-create knowledge (Tan, 2007). Learners thus turn from active participants in their own intellectual growth to passive receivers. Although Cambodia has made great strides toward increasing enrolment and raising literacy, the quality element of education, especially in terms of cognitive and reflective skill development, remains a major obstacle. Unlike Cambodia's conventional learning methods, international education agendas have changed toward reflective, inquiry-based, and critical learning paradigms. The 21st-century skills movement, led by organizations like as UNESCO, the OECD, and the World Economic Forum, focuses on competencies known as the "4Cs": creativity, collaboration, communication, and critical thinking (Trilling & Fadel, 2009; UNESCO, 2015). These frameworks emphasize the importance of learners developing higher-order thinking and adaptable problem-solving skills in the face of fast technological, environmental, and societal change. As part of this change, digital fluency and artificial intelligence literacy are becoming more and more important elements of worldwide educational systems (OECD, 2023). Students must be not just proficient users of AI tools but also ethical and critical interactors with them. Defined by Schön (1992) as the process by which people critically analyze their ideas, decisions, and practices, reflective learning has grown to be a major instructional tool for producing independent and resilient students. This global pedagogical reorientation emphasizes how urgently nations like Cambodia must transcend rote learning and create a more dynamic, reflective learning environment.

Within this worldwide change, OpenAI's generative artificial intelligence model ChatGPT presents an unparalleled chance to assist Cambodia in moving toward reflective learning settings with a student-centric focus. Built on big language models (LLMs) like GPT-3.5 and GPT-4, ChatGPT may interact with students in dialogic exchanges, offer real-time feedback, help with writing and problem-solving, and support concept exploration (Wan et al., 2022; Zhai, 2023). Its accessibility through online browsers and mobile devices makes it an enticing tool for classrooms with low resources, particularly in Cambodia, where technology competence is unequal but fast rising in Digital Readiness Assessment (2022). Crucially, ChatGPT's design lets it be a cognitive partner instead of only a tool. When used in conjunction with guided pedagogy, it can help students reflect, metacognition, and develop concepts (Kasneci et al., 2023). For example, when students are asked to justify their responses, analyze alternatives, or reflect on the reasoning process behind an answer, ChatGPT can help by asking follow-up questions and providing personalized elaboration. ChatGPT's pedagogical potential, however, depends on how teachers define its use, the quality of the prompts, and the degree to which reflective learning structures are included in classroom practice; it is not automatic.

This current study aims to look into ChatGPT's potential to transform Cambodian education from a rote-focused approach to one based on reflective, critical, and inquiry-driven learning. The study pursues three specific objectives: (1) to systematically assess international empirical and conceptual research on the educational applications of ChatGPT, with a focus on student performance, learning perception, and reflective skill development; (2) to contextualize these global findings within Cambodia’s educational landscape, examining their relevance to existing policy priorities, teacher practices, and cultural norms, and (3) to identify the practical,

infrastructural, and ethical challenges associated with the integration of ChatGPT in Cambodian classrooms and universities, and to propose strategies for sustainable and equitable adoption of AI in pedagogy.

2. REVIEW OF THE LITERATURE: REEVALUATING LEARNING WITH AI

2.1. Theoretical Models

The transition from rote to reflective learning is supported by various major educational theories that promote higher-order thinking, active knowledge production, and metacognitive reflection. From simple tasks like remembering and understanding to sophisticated processes like analysis, assessing, and creating, Bloom's Revised Taxonomy, developed by Anderson and Krathwohl (2001), provides a generally accepted framework for classifying cognitive talents in education. This taxonomy has been useful in pushing for instructional strategies that value the depth of learning above factual recall. Within the scope of AI technologies like ChatGPT, this helps teachers create assignments and questions that foster conceptual comprehension and synthesis instead of memorization. Constructivist pedagogy, founded on the writings of Lev Vygotsky and Jean Piaget, holds that learners actively construct knowledge through experiences, interaction, and scaffolding offered by more knowledgeable peers or tools (Piaget, 1972; Vygotsky, 1978). When utilized sensibly, ChatGPT can be a digital scaffold for students in their Zone of Proximal Development (ZPD), providing customized explanations, feedback, and step-by-step directions to support the constructivist model of learning.

Finally, Schön (1992) developed a theory of reflective practice that emphasizes the importance of learners becoming reflective practitioners who engage in ongoing self-assessment and critical inquiry. Reflection-in-action and reflection-on-action are both vital for developing adaptable, autonomous learners. Generative AI can facilitate this by prompting students to articulate reasoning, consider alternative viewpoints, and reflect on their learning processes, particularly through dialogue-based interfaces.

2.2.Limitations of Rote Learning in Southeast Asia

Despite the global pedagogical shift toward learner-centered models, many education systems in Southeast Asia remain entrenched in content-heavy, exam-oriented instruction. Studies show that curricula across the region, including in Thailand, Vietnam, Laos, and Cambodia, prioritize factual memorization and rigid conformity to syllabi (Hallinger & Bryant, 2013). Many times, depending on pedagogic approaches, teachers limit possibilities for student-led research or artistic expression. These issues are especially acute in Cambodia. Emphasizing assessments-driven reforms, the MoEYS has historically focused on standardized testing, grading openness, and exam integrity (MoEYS, 2019). While such reforms have reduced corruption and increased credential credibility, they have also reinforced restricted notions of academic achievement based on passive knowledge consumption.

Furthermore, classroom dynamics can hinder questioning and critical thinking due to strongly established cultural norms that support teacher authority and hierarchical interactions (Huot & Em, 2025; Tan, 2007). Students often focus on duplicating what they have learned rather than synthesizing or applying it on their own. This background highlights the urgency as well as the difficulty in using ChatGPT to support reflective and dialogic learning.

2.3. The Growth of Generative AI in Global Education

The publication of ChatGPT in late 2022 represented a watershed moment in global education, sparking broad experimentation with generative AI technologies in schools and universities. Constructed on OpenAI's GPT-3.5 and GPT-4 architectures, ChatGPT can generate coherent text outputs in response to human requests, spanning idea generation and feedback providing to modeling of academic talks. Teachers have started using ChatGPT in their curricula in many nations to help with academic writing, clarify difficult ideas, and advance self-regulated learning. Wang and Fan's (2025) meta-analysis of 51 research spanning 2022-2024 indicated significant improvements in student writing quality, motivation, and topic retention when ChatGPT was utilized with traditional instruction. Kasneci et al. (2023) found that ChatGPT can improve student involvement by serving as a supportive "thinking partner," especially in individualized or collaborative assignments. Especially these advances have spurred legislative reactions. For instance, the Ministry of Education of Singapore and the Education Office of South Korea have started pilot projects to investigate the responsible use of artificial intelligence in educational settings including curriculum reform and teacher training on ethical AI use (OECD, 2023).

2.4.Critical Thinking in AI

One of the most intriguing applications of generative AI in education is its ability to encourage critical thinking and reflective inquiry, notably through dialogic engagement and Socratic questioning. ChatGPT can help students assess arguments, consider alternative explanations, and investigate cause-and-effect linkages in ways that are consistent with higher-order cognitive objectives (Baidoo-Anu & Ansah, 2023; Zhai, 2023). Still, there are major hazards even with this promise. Documenting widespread occurrences of "*AI hallucinations,*" Borji (2023) and Huot and Em (2024) show that ChatGPT creates factually erroneous or manufactured information that seems believable. These mistakes might mislead pupils lacking enough background knowledge to spot mistakes, therefore compromising the results of education (Susnjak, 2024). Furthermore, the data on which ChatGPT was trained shapes its outputs, therefore introducing cultural, ideological, or linguistic biases into responses, especially problematic in multicultural and postcolonial settings like Cambodia. The higher incentive for plagiarism adds still another risk. Students who portray AI-generated text as their own without honing personal reasoning or synthesis skills could be lacking in Such reliance over time may undermine original ideas and lower student interaction with foundational knowledge. The phenomena of "cognitive offloading," whereby students outsource thinking to artificial intelligence technologies, might also result in a drop in autonomous problem-solving and introspection.

Integrating artificial intelligence use with robust pedagogical scaffolds is crucial to help to overcome these obstacles. Teachers must help pupils check AI responses, consider the logic behind responses, and separate original work from AI help. Activities that critically assess ChatGPT's recommendations, apply artificial intelligence as a comparative tool, and stress ethical use practices should be included in instructional design. Without these protections, using ChatGPT could compromise the same objectives of reflective and critical learning it seeks to advance.

2.5.Digital Education Scene in Cambodia

Although Cambodia has made great progress toward digital transformation in education, some institutional problems still exist. The MoEYS ICT in Education Roadmap 2021–2025 describes national goals for developing digital infrastructure, improving teacher digital abilities, and growing e-learning platforms (MoEYS, 2021). Complementing the roadmap is the Digital Education Strategy 2024–2028, which gives basic digital competencies top priority, localized content development, and integration of new technologies, including artificial intelligence, first importance. Still, implementation varies between areas. Digital Readiness Assessment (2022) claims that just 33% of rural Cambodian homes have consistent internet connectivity and that device ownership remains low, particularly among public school students. Moreover, many educators say they have just little access to sophisticated digital technologies outside of standard PowerPoint and Google Classroom (UNESCO, 2020). The linguistic and cultural localization of artificial intelligence techniques poses still another obstacle. Most existing generative models, like ChatGPT, are mostly in English with minimal capabilities in Khmer, Cambodia's national language. Particularly for instructors and students in rural or monolingual environments, this limits access and generates linguistic inequalities. Cultural perceptions also play a role. While digital tools are increasingly accepted, there remains a degree of skepticism about the role of AI in education, especially concerning its impact on student integrity, effort, and ethical behavior (MoEYS, 2024). Overcoming these challenges requires not only infrastructure development but also policy support, teacher training, and stakeholder engagement at all levels of the system. An overview is provided in Table 1.

Table 1: Key Themes in the Literature on AI, Rote Learning, and Reflective Pedagogy

Subsection	Theme	Key Insights	Cambodian Context
Theoretical Frameworks	Educational Foundations of Reflective Learning	Bloom's Revised Taxonomy emphasizes a move from memorization to creativity; Constructivism and Reflective Practice support active, inquiry-based learning.	Provides a theoretical basis for shifting Cambodian classrooms from passive learning to reflective, student-centered models.
Rote learning's limits	Southeast Asian pedagogy teaching remains exam-centric	Emphasizing memorization and teacher authority. Cambodia reflects regional trends supported by MoEYS assessment priorities.	Emphasizes the need of changing Cambodian curricula and teaching strategies to encourage deeper learning.
Development of Generative AI	Adoption of ChatGPT in Education	Used worldwide for task planning, idea generating, personalized feedback, and writing support. Demonstrated to raise learner autonomy and academic performance	Showcases how ChatGPT could be used in Cambodian classrooms and institutions as a low-cost learning tool.
Artificial Intelligence and Critical Thought	Reflective Thinking and Socratic Invasion	ChatGPT can help with metacognition and discussion, but it requires instructor support to avoid superficial participation and dependency.	If coupled with teacher preparation, it supports incorporation of ChatGPT into critical thinking education.
EdTech Landscape of Cambodia	Possibilities and Challenges for AI Integration	Although national policies exist (MoEYS Roadmap), rural-urban disparities, a shortage of Khmer-language resources, and insufficient	Urges context-specific AI application tactics in education, with an emphasis on equity,

Subsection	Theme	Key Insights	Cambodian Context
		teacher AI literacy continue to be significant impediments.	language, and infrastructure.

3. METHODOLOGY: REVIEW DESIGN AND ANALYTICAL FRAMEWORK

3.1. Review Type

This examination of literature adopts a narrative and thematic integrative review design, suitable for synthesizing both empirical findings and conceptual frameworks across diverse sources. Integrative reviews, as stated by Whittemore and Knafl (2005), allow for the inclusion of studies utilizing various approaches, enabling comprehensive insights into new issues, such as the educational use of ChatGPT, where systematic reviews may be premature due to the field's infancy. Together with insights from Cambodian education policy and development reports, the review includes worldwide literature from high-resource settings. This method supports a glonacal (Global, National and Local) perspective (Marginson & Rhoades, 2002), whereby global, national, and local educational dynamics are simultaneously considered to evaluate how generative AI tools might change classroom practices from rote learning to reflective thinking in Cambodia.

3.2. Data Sources and Search Strategy

The review used a methodical search strategy across five main academic databases known for their relevance to education and technology research: Scopus, Web of Science, ERIC (Education Resources Information Centre), JSTOR, and Google Scholar, so guaranteeing a strong and thorough evidence base. The search was undertaken between January 2022 and March 2025, coinciding with the public release of ChatGPT and the consequent boom in educational research on generative AI. Boolean operators helped to arrange search terms so that pertinent themes could be combined:

"ChatGPT," OR "large language models," AND "reflective learning," OR "critical thinking," OR "metacognition," AND "Cambodia," OR "Southeast Asia," OR "education," AND "rote learning," OR "exam-oriented learning," OR "student-centered learning,"

Reference list screening and citation chaining were also used to find more relevant material, particularly research on low- and middle-income countries (LMICs) or Southeast Asian education systems.

3.3. Exclusion and Including Standards

This study used well-defined inclusion and exclusion criteria during the process of selecting the literature to guarantee analytical rigor and subject relevance. Reviewed studies consisted of official education reports released between 2022 and 2025, conference proceedings, and peer-reviewed journal publications. Eligible research included those that specifically addressed ChatGPT, reflective pedagogy, or the broader educational use of generative AI technologies, particularly those with proven consequences for teaching practice, curricular innovation, or learner engagement. Research done at both K–12 and higher education levels was considered, including studies from both global settings and sources particular to Cambodia to support comparative and localized studies. Along with conceptual and theoretical frameworks pertinent to AI-enhanced education and reflective learning, the review drew on a varied corpus of literature, including empirical research with quantitative, qualitative, and mixed-methods

methodologies.

Studies that only focused on non-generative educational technology, such as videoconferencing platforms (e.g., Zoom) or learning management systems (e.g., Moodle), were removed since they were outside the scope of generative AI. Also omitted were non-academic or informal sources like opinion blogs, editorials, and commercial white papers lacking methodological transparency or peer validation. Regardless of their relevance to artificial intelligence, studies lacking a comprehensive address of pedagogical transformation, critical thinking, or reflective learning were also excluded. Following a modified form of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) rules, the screening method guaranteed uniformity, openness, and replicability through the review process (Page et al., 2021).

3.4. Analytical Method

Under guidance from Braun and Clarke's six-phase model of theme analysis (2006), the selected material was investigated using a thematic coding system. This method was chosen for its flexibility in gathering latent and manifest material within conceptual and qualitative data. Focusing on these three key areas of educational reform allowed us to achieve our research objectives. First, the discipline of student performance and knowledge explored how ChatGPT influences students' conceptual clarity, academic achievement, and subject-matter comprehension. Second, the group on learning perception and engagement examined students' motivating responses, their readiness to interact with AI tools, and the supposed utility of ChatGPT in daily learning contexts. Third, the subject of reflective and critical thinking development assessed ChatGPT's degree of supporting higher-order cognitive processes, open-ended research, and metacognitive reflection. Cross-referencing current educational frameworks, including Bloom's Revised Taxonomy, a theoretical construct advanced by Anderson and Krathwohl (2001). Reflective Practice theory, an approach introduced by Schön (1992), and recent meta-analyses on generative AI in education (e.g., Wang & Fan, 2025) helped to validate themes. Emerging themes were also mapped to Cambodian education policy priorities, including those mentioned in MoEYS ICT in the education roadmap 2021–2025 and the draft digital education strategy 2024–2028, guaranteeing contextual alignment.

3.5. Restraints of the Examining

Although the review presents a current and critical synthesis of generative artificial intelligence's ability to facilitate reflective learning in Cambodia, certain constraints have to be admitted. First, the recency of ChatGPT research restricts the depth and breadth of accessible material. Since the instrument was only made public in late 2022, most of the present research is still exploratory, and few long-term, large-scale empirical investigations are accessible. This temporal limit might influence the generalizability of results and the strength of educational impact evaluations (Borji, 2023). Second, direct, actual data from Cambodian classrooms is lacking. This study does not include firsthand data from local teachers or pupils, even though it places worldwide results within Cambodian educational systems and practices.

Consequently, conclusions on the applicability of ChatGPT in Cambodian colleges and universities remain speculative. Third, the analysis suffers from language and cultural constraints. Most examined literature comes from the Global North, where infrastructure, instructional approaches, and AI readiness vary greatly from those in Cambodia; it is written in English. Studies on Khmer-language artificial intelligence applications, rural digital divides,

and regional educational norms, all of which are vital for successful and fair AI integration in Cambodia, remain conspicuously lacking. Notwithstanding these constraints, this study offers a key basis for the next studies, policy formulation, and teacher development initiatives. The data in Table 2 provides a roadmap for the reflective and ethical adoption of generative AI technologies in Cambodian classrooms and higher education settings by combining global insights with national education priorities.

Table 2: Methodology Summary Review Analytical Framework and Design Tools

Section	Component	Description
Review Type	Integrative Narrative Review	Evaluates ChatGPT's potential in moving from rote to reflective learning by combining worldwide empirical and conceptual studies with Cambodian policy texts.
	Focus Theme	Education transformation themes: critical/reflective thinking, learning perspective, student performance.
Data Sources and Search Strategy	Database 2022–2025 used	Scopus, Web of Science, ERIC, JSTOR, Google Scholar.
	Keywords	"ChatGPT," "reflective learning," "rote learning," "Cambodia," "AI in education," and "critical thinking."
	Methods of Searching	Relevant worldwide and Southeast Asian literature was gathered using Boolean operators, reference list scanning, and citation chining.
	Included Research	Programs Emphasized ChatGPT, reflective pedagogy, or generative AI in education; global and Cambodian settings; empirical and theoretical works; peer-reviewed articles, conference papers, and official reports (2022–2025).
Exclusion Standards	Excluded Studies	on non-generative EdTech (e.g., Zoom), non-academic blogs or white papers, and sources not related to pedagogy, critical thinking, or educational transformation.
	Protocol	Transparency, dependability, and replicability driven by a screening protocol inspired by PRISMA.
Methodical Approach	Analysis	Based on Braun and Clarke (2006) Thematic Coding Framework, manual coding into three domains
	Student Interpretive Skills and Performance	Using ChatGPT looks at learning results, understanding, and concept mastery.
	Learning Perception and Engagement	Examining student motivation, attitude toward artificial intelligence, and classroom interaction helps one better understand learning perception and engagement.
	Critical and Reflective	Thought evaluates growth in metacognition, Socratic thought, and autonomous research.
	Framework Synchronization	Bloom's Taxonomy, Reflective Practice theory(Schön, 1992), and Cambodian MoEYS methods (2021–2028) mapped to coded themes.
Constraints	Recent Research	Though most of the research is exploratory or temporary, ChatGPT is a recent technology (Borji, 2023).

Section	Component	Description
	Lack of Localized Data	Not any main data from Cambodian schools; contextual relevance is deduced from secondary sources.
	Linguistic and Cultural Divide	Most of the literature is English-language and Global North; little is known about Khmer AI technologies or culturally based pedagogy.

4. THEMATIC DISCOVERIES CHANGING THE LEARNING FRAMEWORK

ChatGPT's inclusion into classrooms marks a possible turning point for changing how students interact with materials, view learning, and grow in reflective thinking. Three interrelated themes, conceptual understanding and performance, student motivation and perception, and metacognitive growth through reflective practice, emerged from the review when one drew on worldwide research and placed it within the Cambodian educational system.

4.1. Improving Performance and Conceptual Understanding

ChatGPT's ability to increase conceptual clarity and enhance academic performance is among the most often recorded advantages for use in the classroom. ChatGPT has been demonstrated in several research to assist students in reevaluating difficult material, clarifying unclear concepts, and extending basic responses into more orderly academic arguments (Kasneci et al., 2023; Wang & Fan, 2025). In situations when students struggle with second-language expressiveness or discipline-specific vocabulary, a difficulty well-documented in Cambodian secondary and tertiary institutions, this is especially important (UNESCO, 2020). ChatGPT can offer vocabulary choices that improve both fluency and coherence, sentence-level recommendations, and outlines in writing-intensive courses. In science or mathematics, the tool can help iterative learning by dissecting difficult tasks into reasonable steps and clarifying conceptual mistakes. When students utilized ChatGPT for feedback on draft essays, Zhai (2023) found that their performance on final tests improved noticeably when compared to peers who got just peer or teacher comments. Many Cambodian students, who often struggle with English competency and analytical writing skills, can find ChatGPT to be a kind of customized scaffolding that helps to offset limited teacher-student contact in congested classrooms. As the literature emphasizes, though, this advantage is best realized when students learn how to interact with AI tools critically and iteratively rather than depending just on them for summaries or answers.

4.2.Changing Learning Motivation and Student Viewpoint

The way ChatGPT influences students' perceptions of learning raises still another important issue. Students from all around the world increasingly view ChatGPT as a kind of "learning assistant," a responsive and nonjudging friend who lowers anxiety related to failure by means of experimentation encouragement (Jalon Jr et al., 2024). Especially in project-based or self-paced learning situations, the tool's 24/7 availability, conversational interface, and capacity to offer instantaneous feedback help to increase student autonomy. Studies conducted in higher education environments in Korea, the UK, and India revealed that among students using ChatGPT, higher degrees of academic motivation, curiosity, and help-seeking behavior (Baidoo-Anu & Ansah, 2023). These effects were most pronounced when the AI tool was integrated into instructional design rather than offered as an optional supplement. In Cambodia, where many students are accustomed to passive and authority-driven learning environments,

the use of ChatGPT may encourage more proactive engagement, especially when supported by teachers who encourage digital exploration and promote trust in AI-assisted learning. However, perception is not uniformly positive and may be influenced by factors such as digital fluency, socioeconomic background, and school infrastructure. Students unfamiliar with prompt-based tools or without adequate digital access may feel overwhelmed or disengaged unless given structured guidance and equitable support.

4.3. Fostering Reflective Thinking and Metacognition

Perhaps the most transformative potential of ChatGPT lies in its ability to support reflective thinking and metacognitive development, key components of 21st-century learning goals, and Bloom's higher-order taxonomy levels (Anderson & Krathwohl, 2001). Through open-ended prompts, clarification questions, and follow-up suggestions, ChatGPT can simulate Socratic dialogue, prompting students to reconsider assumptions, elaborate on ideas, or compare perspectives. For example, a prompt such as *"Explain your reasoning and consider an alternative viewpoint"* can be extended by ChatGPT into a series of follow-up questions that deepen reflection. In writing-intensive disciplines, students can use the tool to draft learning journals, personalized reflections, or response papers, thereby engaging in reflection-in-action and reflection-on-action (Schön, 1992). Several studies emphasize that the effectiveness of ChatGPT in fostering reflective thinking is not inherent to the technology itself but rather depends on teacher mediation and pedagogical design (Kasneci et al., 2023; Zhai, 2023). Without scaffolding, students may revert to surface-level interactions or treat the AI as a shortcut, undermining the learning potential. Therefore, for Cambodian educators aiming to develop reflective classrooms, professional development must emphasize prompt literacy, metacognitive questioning, and the ethical use of AI to support, not replace, student reasoning, as summarized in Table 3.

Table 3: Summary of Thematic Findings: Shifting the Learning Paradigm with ChatGPT

Theme	Key Insights	Relevance to Cambodian Education
Enhancing Conceptual Understanding and Performance	- ChatGPT assists with rephrasing, clarification, and expansion of academic ideas. - Improves academic writing and comprehension. - Increases subject retention through interactive support.	- Supports students struggling with language and analytical expression, especially in English and science subjects. - Compensates for limited teacher feedback in overcrowded classrooms.
Changing Student Perception and Learning Motivation	- Students view ChatGPT as a "learning assistant." - Increases engagement, curiosity, and learning ownership. - Perception shaped by digital fluency, teacher encouragement, and trust in AI.	- Shifts student roles from passive to proactive learners. - Encourages inquiry in hierarchical classrooms when guided by digitally fluent teachers.
Fostering Reflective Thinking and Metacognition	- Enables deeper thinking through Socratic prompts and follow-up questions. - Useful for journals, reflections, and open-ended learning tasks.	- Aligns with goals of reflective pedagogy and metacognitive skills development in Cambodian curriculum reform.

Theme	Key Insights	Relevance to Cambodian Education
	- Requires teacher scaffolding to avoid shallow usage.	- Calls for teacher training in AI-supported inquiry.

5. DISCUSSION: INTEGRATING CHATGPT INTO CAMBODIAN CLASSROOMS AND UNIVERSITIES

The integration of ChatGPT into Cambodian education marks a significant opportunity to bridge the gap between traditional, memorization-based learning and the reflective, student-centered paradigms endorsed by global education frameworks. However, the move from theory to practice entails navigating technological, pedagogical, and cultural complexities. This section discusses how educators can operationalize reflective learning through ChatGPT, the systemic challenges they may face, the ethical and cultural implications of AI integration, and the specific considerations for Cambodia's higher education sector.

5.1. From Theory to Practice: Operationalizing Reflective Learning

Translating the theoretical promise of ChatGPT into meaningful classroom practice requires a deliberate shift in instructional design and pedagogy. Teachers must adopt active learning strategies that encourage students to engage with AI tools not as content generators but as cognitive partners in knowledge construction. This includes implementing project-based learning, where students use ChatGPT to explore problem scenarios, propose solutions, and reflect on their reasoning; peer-to-peer dialogue, in which students collaboratively critique ChatGPT-generated responses; and flipped classrooms, where learners interact with AI-generated material before class and use in-person sessions for discussion and application. Teachers can also design prompt-based assignments that explicitly require students to analyze, evaluate, or reframe ChatGPT's outputs, such as asking students to fact-check or re-interpret AI responses using course materials or local examples. These strategies align with constructivist and reflective pedagogies, fostering deeper learning while also training students to use AI critically and ethically (Anderson & Krathwohl, 2001; Schön, 1992). In Cambodia, however, such approaches demand a departure from lecture-driven instruction and require capacity-building initiatives for teachers to develop skills in lesson planning, prompt engineering, and digital facilitation. Without pedagogical restructuring, the benefits of ChatGPT may remain confined to theoretical discussions rather than becoming tools for transformation.

5.2.Challenges in Implementation

Despite the pedagogical potential of ChatGPT, practical implementation in Cambodian classrooms faces several structural and systemic challenges. Access remains a major barrier, particularly in rural areas. The urban-rural digital divide is reflected in disparities in internet availability, device ownership, and school ICT infrastructure. According to the APO, Digital Readiness Assessment (2022), while internet penetration in urban centers like Phnom Penh exceeds 70%, only 33% of rural households report reliable connectivity. Many students do not have personal smartphones or laptops, and schools often lack the resources to support device-intensive learning environments. Digital skill gaps are also evident. Most Cambodian teachers have received basic ICT training, but few are familiar with AI tools, prompt-based learning, or critical media literacy. This hampers their ability to confidently incorporate ChatGPT into lesson plans or evaluate its outputs for appropriateness and accuracy. Additionally, many students are unfamiliar with English-dominant digital platforms, further compounding access barriers.

Language is another critical challenge. Currently, ChatGPT's functionality in Khmer is limited, with inconsistent translation accuracy and minimal localized content. This makes the tool-less usable for students in public schools who are not proficient in English, potentially reproducing linguistic inequities in classrooms. Developing bilingual interfaces or localized Khmer-language AI models would be essential for inclusive AI integration.

5.3. Ethical and Cultural Considerations

The deployment of AI tools in education raises complex ethical and cultural questions that must be addressed before widespread implementation. In the Cambodian context, a key cultural tension arises from the traditionally hierarchical nature of classrooms, where teachers are seen as primary knowledge authorities, and students are expected to passively absorb rather than actively challenge information (Tan, 2007). This structure can inhibit the integration of ChatGPT, which thrives in open-ended, inquiry-driven environments. If not thoughtfully introduced, AI may be perceived by teachers as a threat to their authority and by students as a tool that contradicts norms of deference.

To reconcile AI-driven inquiry with cultural respect for educators, one strategy is to position ChatGPT explicitly as a teacher-endorsed supplementary tool. For example, teachers can present ChatGPT as a classroom assistant or "thinking partner" that supports, rather than replaces, traditional instruction. Assignments can be co-designed by teachers and AI, with clear guidance on how students are expected to engage critically with both. Teachers can model the ethical and reflective use of ChatGPT in lessons, such as querying the AI, analyzing its answers, and inviting students to critique the outputs. This reinforces the teacher's role as the facilitator of learning while legitimizing the use of AI within culturally acceptable boundaries.

Additionally, schools can provide AI orientation sessions where students are taught to view ChatGPT as an extension of classroom dialogue guided by teacher supervision. Teachers should be encouraged to contextualize AI prompts in relation to local cultural and ethical norms, reinforcing trust in teacher-AI collaboration. By framing AI use as aligned with educator authority and national curriculum goals, it becomes possible to foster critical thinking without challenging core cultural expectations. These strategies not only promote AI acceptance but also empower educators to remain central figures in the learning process amid digital transformation.

5.4.Implications for Higher Education

In Cambodia's universities, the role of ChatGPT is even more pronounced. Students are increasingly using it for academic writing, idea generation, language support, and even thesis drafting. While this opens opportunities for self-directed learning and career-relevant skill development, it also demands that institutions reform their pedagogical approaches and assessment strategies. There is an urgent need for university-led initiatives to train both faculty and students in digital literacy, AI ethics, and research integrity. Curricula must evolve to include critical AI literacy, enabling learners to analyze, critique, and build on ChatGPT responses rather than merely copying them. Moreover, academic policies must be updated to clearly delineate acceptable and unacceptable uses of AI tools, especially in high-stakes assessments like theses and final projects. The integration of ChatGPT also has implications for career preparation. As industries increasingly adopt AI-driven tools, graduates who can use ChatGPT for writing, planning, and communication tasks will be at an advantage. Cambodian

universities must ensure that students are not only competent users of AI but also critical thinkers and ethical innovators within the digital economy.

6. CONCLUSION AND RECOMMENDATIONS

Integrating ChatGPT into Cambodia's education system presents a valuable opportunity to transition from traditional rote learning to a more reflective, inquiry-based approach. Global research indicates that, when thoughtfully implemented with appropriate instructional design and teacher involvement, ChatGPT can enhance conceptual understanding, boost student engagement, and foster critical thinking. However, AI is not a standalone solution. The successful adoption of ChatGPT depends on its integration into curricula that are culturally and linguistically appropriate, along with robust teacher facilitation and ethical guidelines. Teachers remain essential, not only for delivering content but also for guiding ethical reasoning and reflective learning. Thus, ChatGPT should be viewed as a supportive cognitive tool rather than a replacement for educators.

To effectively integrate ChatGPT into Cambodia's education system, a comprehensive approach involving policy reform, school-level initiatives, and research efforts is essential. Here's a concise overview of the key recommendations: first, policy-level initiatives need to enhance curriculum; MoEYS should update national curricula to include AI literacy and critical thinking as core competencies across all educational levels and invest in digital infrastructure to bridge the urban-rural divide, including expanding internet access, providing devices to underserved regions, and establishing technical support systems for schools and students. Second, the school-level strategies should integrate ChatGPT into teaching and design lesson plans that incorporate ChatGPT to promote reflective learning. Methods can include project-based learning, peer reviews, and self-assessment activities supported by AI-driven feedback, and teacher training is required to Implement continuous professional development programs to equip educators with skills to effectively use AI tools, design appropriate prompts, and guide students in ethical AI usage. Last, the research and development include pilot studies; universities and NGOs should conduct localized studies to assess the pedagogical impact of ChatGPT, focusing on student engagement, reflective practices, and ethical considerations, and Khmer-language AI models are expected to develop and evaluate generative AI models in the Khmer language to ensure accessibility and cultural relevance across the national education system. By addressing these areas, Cambodia can foster an educational environment that leverages AI to enhance learning outcomes and promote equity.

To guide future research on integrating AI tools like ChatGPT in Cambodian education, the following areas should be prioritized: First, longitudinal studies are needed to assess how AI tools influence students' reflective thinking, motivation, and academic performance over time. Second, regional comparative analysis examines how ASEAN countries such as Vietnam, Thailand, and Indonesia implement generative AI in education to derive insights applicable to Cambodia. Third, application in diverse educational settings should investigate the effectiveness of ChatGPT in non-traditional educational contexts, including vocational training, multilingual classrooms, and informal education environments.

At its core, transitioning from rote to reflective learning in Cambodia is both necessary and achievable. With thoughtful design, strategic investment, and ethical grounding, ChatGPT can

catalyze educational transformation, promoting deeper engagement, equitable access, and future-ready skills across Cambodian schools and universities.

REFERENCES

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives: Complete edition*. Addison Wesley Longman, Inc.

APO. (2022). *Digital readiness assessment: Methodology & framework*. The Asian Productivity Organization (APO). https://www.apo-tokyo.org/wp-content/uploads/2022/03/DRA_Handbook-2021_FA.pdf

Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, *7*(1), 52–62. https://doi.org/10.61969/jai.1337500

Benveniste, L., Marshall, J., & Araujo, M. C. (2008). *Teaching in Cambodia*. Human Development Sector East Asia and the Pacific Region The World Bank and Ministry of Education, Youth and Sport Royal Government of Cambodia. https://documents1.worldbank.org/curated/en/161351468020945260/pdf/448500WP0Box3210KH0Teachers11Final1.pdf

Borji, A. (2023). A categorical archive of ChatGPT failures. *arXiv preprint arXiv:2302.03494*, 1–41. https://doi.org/10.48550/arXiv.2302.03494

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bray, T., & Bunly, S. (2005). *Balancing the books: Household financing of basic education in Cambodia*. Comparative Education Research Centre, the University of Hong Kong and Human Development Unit, East Asia & Pacific Region, the World Bank.

Hallinger, P., & Bryant, D. (2013). Mapping the terrain of educational leadership and management in East Asia. *Journal of Educational Administration*, *51*(5), 618–637. https://doi.org/10.1108/JEA-05-2012-0066

Huot, S., & Em, S. (2024). Integrating English language teaching with environmental sustainability: A comprehensive review of pedagogical strategies and global impacts. *Angkor University Journal of Entrepreneurship and Green Innovation*, *1*(2), 1–13. https://www.researchgate.net/publication/388109397

Huot, S., & Em, S. (2025). Effective strategies of English teaching in Cambodia's underserved communities: Bridging digital divide to access education quality. *Journal of Education Innovation and Language Teaching (JEILT)*, *1*(1), 53–77. https://doi.org/10.63381/jeilt.v1i1.38

Jalon Jr, J. B., Chua, G. A., & de Luna Torres, M. (2024). ChatGPT as a learning assistant: Its impact on students learning and experiences. *International Journal of Education in Mathematics, Science and Technology*, *12*(6), 1603–1619. https://doi.org/10.46328/ijemst.4471

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., . . . Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, *103*, 1–9. https://doi.org/10.1016/j.lindif.2023.102274

Marginson, S., & Rhoades, G. (2002). Beyond national states, markets, and systems of higher education: A glonacal agency heuristic. *Higher education*, *43*, 281–309. https://doi.org/10.1023/A:1014699605875

MoEYS. (2019). *Education strategic plan 2019–2023*. Phnom Penh, Ministry of Education, Youth and Sport,. http://cdc-crdb.gov.kh/en/twg-jmi/sector_strategy/ESP2019-2023_EN.pdf

MoEYS. (2021). *ICT in education roadmap 2021–2025*. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport. https://moeys.gov.kh/storage/uploads/documents/65dd5f904dc9d.pdf

MoEYS. (2024). *Education strategic plan 2024-2028*. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport. https://moeys.gov.kh/storage/uploads/documents//67316f9d3a57f.pdf

OECD. (2023). *OECD Digital Education Outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing, Paris. https://doi.org/10.1787/c74f03de-en

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., & Brennan, S. E. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *bmj*, *372*(71), 1–9. https://doi.org/10.1136/bmj.n71

Piaget, J. (1972). *The Psychology of the Child*. Basic Books.

Schön, D. A. (1992). *The reflective practitioner: How professionals think in action*. Routledge.

Susnjak, T. (2024). Beyond predictive learning analytics modelling and onto explainable artificial intelligence with prescriptive analytics and ChatGPT. *International Journal of Artificial Intelligence in Education*, *34*(2), 452–482. https://doi.org/10.1007/s40593-023-00336-3

Tan, C. (2007). Education reforms in Cambodia: Issues and concerns. In O.-S. Tan (Ed.), *Educational Research for Policy and Practice* (Vol. 6, pp. 15–24). https://doi.org/10.1007/s10671-007-9020-3

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. John Wiley & Sons.

UNESCO. (2015). *Rethinking education: Towards a global common good?* The United Nations Educational, Scientific and Cultural Organization,. https://doi.org/10.54675/MDZL5552

UNESCO. (2020). *National education responses to COVID-19: Summary report of UNESCO´s online survey*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000373322

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard university press.

Wan, C., Cadiente, A., Khromchenko, K., Friedricks, N., Rana, R. A., & Baum, J. D. (2022). ChatGPT: An evaluation of AI-generated responses to commonly asked pregnancy questions. *Open Journal of Obstetrics and Gynecology*, *13*(9), 1528–1546. https://doi.org/10.4236/ojog.2023.139129

Wang, J., & Fan, W. (2025). The effect of ChatGPT on students' learning performance, learning perception, and higher-order thinking: insights from a meta-analysis. *Humanities and Social Sciences Communications*, *12*(1), 1–21. https://doi.org/10.1057/s41599-025-04787-y

Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of advanced nursing*, *52*(5), 546–553. https://doi.org/10.1111/j.1365-2648.2005.03621.x

Zhai, X. (2023). Chatgpt and AI: The game changer for education. *Zhai, X.(2023). ChatGPT: Reforming Education on Five Aspects. Shanghai Education*, 16–17. https://ssrn.com/abstract=4389098