

The Cloud-powered Hybrid Learning Process to Enhance Digital Natives' Analytical Reading Skills

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Abstract—Analytical reading is a necessary cognitive skill for advancing to other skills required in the digital age. Thailand is focused on the instructional development and use of digital media to enhance the digital natives' analytical reading skills, which will assist learners of all ages in effectively and quickly adapting to changes in the digital environment. After the COVID-19 pandemic situation, educational institutions in Thailand have begun to embrace a hybrid learning approach like never before. The limitations of the existing learning process for boosting digital natives' analytical reading skills are the lack of integration between reading techniques, hybrid pedagogies, and emerging learning technologies to enhance learners' seamless learning experiences. Thus, this study aims to propose the Cloud-powered Hybrid Learning process (Cp-HL process) to enhance digital natives' analytical reading skills. This study consisted of two main stages in the research methodology: 1) learning process development; and 2) learning process evaluation. The developed Cp-HL process had four main learning phases: (1) preparation for hybrid learning; (2) presentation for interactive learning; (3) practice with analytical reading; and (4) progress reports on analytical reading skills. All the experts agreed that the newly developed Cp-HL process performed extremely well in terms of overall suitability.

Keywords—Hybrid learning; cloud-powered learning tools; learning process; analytical reading skills; digital natives

I. INTRODUCTION

Thailand's Key National Strategies for Human Capital Development and Strengthening focused on innovative-based instructional development and the use of digital media to help the Thai people become more moral, skilled, disciplined, kind, analytical readers, and able to "know, get, and adapt" to new technology, so that no one was left behind [1].

Analytical reading skills are high-level cognitive skills that allow a person to break down an intellectual or conceptual whole into parts for their individual study. This helps a person think, seek information, analyze information, solve problems based on that information, and make decisions in everyday life with more clarity [2–4]. The cooperative integrated reading and composition (CIRC) technique based on cooperative learning, which is intended to develop reading, writing, and other language skills, is one way to develop analytical reading abilities [5–7].

Digital natives become acquainted with digital media, digital technologies, and cloud computing at a youthful age and regard digital devices as an integral and necessary part of their lives. Many teenagers and children in developed countries are considered "digital natives" because they communicate and learn primarily through computers, social networking sites, and instant messaging. Thus, digital natives think, learn, and understand the world differently than people who have not been exposed to digital technologies [8–10].

Previous studies found that Hybrid Learning (HL) strategies are more successful than conventional learning strategies [11–13]. The success of implementing the HL strategy (experimental class) demonstrates that the hybrid strategy is appropriate for millennial students (generation Z as digital natives), or students born between 1995 and 2010. This supports several previous studies [14–15]. The HL strategy is superior to the typical classroom or face-to-face class in terms of active learning, student learning results, and learning satisfaction [13–15].

The limitations of the existing learning model for boosting digital natives' analytical reading skills are the lack of integration between characteristics of digital learners, digital reading techniques, hybrid pedagogies, and emerging learning technologies in a hybrid learning mode to enhance learners' seamless learning experiences [2, 16].

Thus, this study aims to propose the Cloud-powered Hybrid Learning process (Cp-HL process) to enhance digital natives' analytical reading skills. This article presents the research objectives, literature review on hybrid learning, cloud-powered learning tools, the CIRC technique, digital natives' analytical reading skills, the developed conceptual framework, research methodology, key findings, conclusions, and discussions.

II. RESEARCH OBJECTIVES

- 1) To develop the Cp-HL process in order to enhance digital natives' analytical reading skills.
- 2) To evaluate the suitability of the Cp-HL process to enhance digital natives' analytical reading skills.

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III. LITERATURE REVIEW

A. Hybrid Learning (HL)

After the COVID-19 pandemic, the one new normal in instructional design is Hybrid Learning (HL) [13, 17–18, 32]. HL, also known as blended learning or flipped learning, may vary widely in instructional design, execution, and learning support. "Face-to-face (F2F)" instruction includes those courses in which 0 to 29% of the content is delivered online, which includes both traditional and web-facilitated courses [13, 19–20]. The remaining alternative online courses are defined as having at least 80% of the course content delivered online. Whereas HL is defined as having 30 to 79% of the course content delivered online via F2F [13, 20]. This pedagogy combines the best components of both traditional classroom instruction and online classroom instruction, creating a flexible and dynamic learning environment. In a hybrid learning setting, students have the opportunity to attend classes in person, participate in online learning activities, and access digital resources and tools [19–20, 32–33].

B. Cloud-powered Learning Tools

Cloud-powered learning tools enable instructors to set up hybrid learning spaces where students can communicate and work together from anywhere using their digital devices, both in online learning mode and in on-site learning mode. These tools can be divided into four categories [13, 17–18, 21–29]: 1) social communication tools, such as Facebook®, LINE®, Telegram®, and Discord®; 2) browsing and seeking tools, such as Google Chrome®, Firefox®, Microsoft Edge®, and Safari®; 3) interactive presentation tools, such as Zoom®, Google Meet®, Microsoft Teams®, and ClassPoint®; 4) analytics and evaluative tools, such as ClassDojo®, Kahoot!®, Google Forms®, and Google Analytics®

C. CIRC Technique

The cooperative integrated reading and composition (CIRC) technique is the most effective and relevant technique for teaching students to read. CIRC derives from cooperative learning, which facilitates students' comprehension of the assigned reading material. Students are instructed to work in groups to achieve the objective of reading descriptive text and photos [5–7, 30].

D. Digital Natives' Analytical Reading Skills

Digital natives' analytical reading skills are rooted in the principles of analytical reading described in Dechant (1982) [31]. Previous studies about the level of understanding learners have of texts (reading) can be summarized into three components discussed as follows: 1) Comprehension reading is the level at which the reader can clearly explain, remember, and recall the idea or the details of the readable information. 2) Interpretative reading is a level of insight that is deeper than understanding the meaning of a word. Readers must be able to interpret or understand what the author does not directly address. 3) Analytical reading can reveal the latent meaning, understanding, aims, opinions, attitudes, and language level that the author has available. When they summarized what they read, they said what they liked and didn't like about it. When they retold a story, they used the information from their writing to make a conceptual schema.

Thus, digital natives' analytical reading should start with reaching and comprehending the elements of the media symbol systems, especially digital media, and then considering their validity and analyzing the message of the story in digital media by checking the elements to see how those elements make sense in terms of being intelligible, justifiable, or practicable or not. Digital natives' analytical reading essentially disassembles the entire intrinsic elements of the story under specific media symbol systems and examines how the elements relate to one another to respond to the story via interacting digital media symbol systems [2–4, 8–10]. Elements of analytical reading for digital natives can be put into five main categories [2–10]: 1) the media symbol system; 2) content; 3) language; 4) purpose; and 5) structure.

IV. CONCEPTUAL FRAMEWORK

As shown in Fig. 1, the conceptual framework of this research used three ideas to come up with the Cp-HL process to help digital natives become better at analytical reading.



Fig. 1. Conceptual framework

Fig. 1 shows the main concepts and variables of the study to enhance the analytical reading skills of digital natives. The conceptual framework is made up of three parts:

(1) The basics of novel concept formation were divided into three concepts: *a*) Cloud-powered learning tools, which have four types: *i*) social communication tools; *ii*) browsing and seeking tools; *iii*) interactive presentation tools; *iv*) analytics and evaluative tools. *b*) Hybrid learning, which has two main learning modes: *i*) online learning mode; and *ii*) on-site learning mode. *c*) The CIRC technique, which has four main learning steps: *i*) instructor presentation; *ii*) team practice; *iii*) reading testing; *iv*) team recognition.

(2) The manipulated variable was the Cp-HL process to enhance digital natives' analytical reading skills into four main learning phases: *a*) preparation for hybrid learning (online learning mode); *b*) presentation for interactive learning (online learning mode); *c*) practice with analytical reading (on-site learning mode); *d*) progress reports in analytical reading skills (on-site learning mode)

(3) The dependent variable was digital natives' analytical reading skills, which had three components: *a*) identifying the intrinsic elements of the story and media symbol systems; *b*) analyzing the message of the story and media symbol systems; *c*) responding to the story and media symbol systems.

V. RESEARCH METHODOLOGY

A. Phase I: Development of the Cp-HL Process in Order to Enhance Analytical Reading Skills for Digital Natives

In the first phase, we conducted research in the following steps: 1) a scoping review on the development of the Cp-HL process to enhance digital natives' analytical reading skills (i.e., hybrid learning, cloud-powered learning tools, CIRC

technique, analytical reading skills, and digital natives) in Thai Journals Online (ThaiJO), Education Resources Information Center (ERIC), and Scopus online databases published between 2017 and 2022 using content analysis of the research article's texts; 2) synthesis and construction of the conceptual framework; and 3) development of the Cp-HL process to enhance digital natives' analytical reading skills according to the Sloan Consortium's HL guidelines [20], which specifies a proportion of program content delivered online ranging from 30 to 79% as the most widely accepted and popular in Thailand.

B. Phase II: Evaluation of the Suitability of the Cp-HL Process to Enhance Analytical Reading Skills for Digital Natives

In the second phase, we conducted research in the following steps: 1) creating research tools for evaluating the

suitability of the Cp-HL process; 2) proposing the Cp-HL process to nine experts in educational technology, Thai language, and instructional system design (three experts per side), each of whom holds a PhD or its equivalent and has at least three years of relevant experience; and 3) analyzing the results of the validation and evaluation of the Cp-HL process by the mean and standard deviation (S.D.). The suitability evaluation questionnaire was built on a five-point Likert scale (5 = strongly agree; 4 = agree; 3 = neither agree nor disagree; 2 = disagree; 1 = strongly disagree).

VI. RESEARCH FINDINGS

A. The Developed Cp-HL Process to Enhance Digital Natives' Analytical Reading Skills

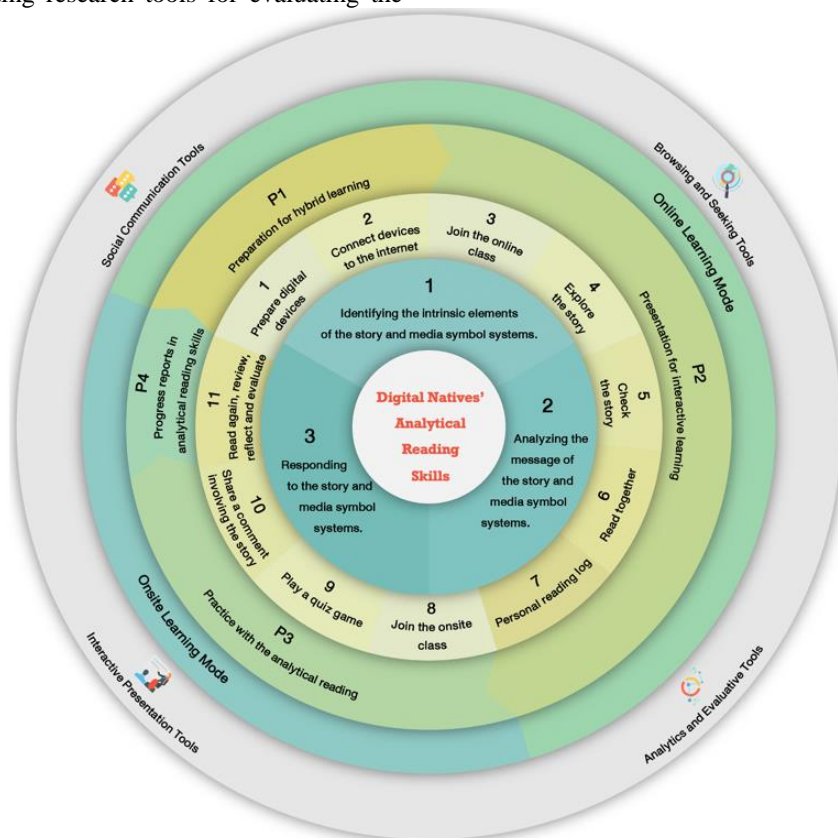


Fig. 2. The Cloud-powered Hybrid Learning process (Cp-HL process) to enhance digital natives' analytical reading skills

The developed Cp-HL process to enhance digital natives' analytical reading skills is illustrated in Fig. 2. This learning process consists of four main processes (4Ps) and 11 learning steps, as follows:

1) *P1: Preparation for hybrid learning*: In the first phase of the learning process, learners play an important role in self-directed learning; this phase has two learning stages under the online learning mode: a) Prepare digital devices (e.g., desktop, laptop, tablet, smartphone, and wearables); b) Connect devices to the Internet over a 3G, 4G, 5G, or Wi-Fi connection.

Thus, at this stage, the role of the instructor in hybrid learning management, as follows: a) Set up learning objectives, learning experiences (e.g., learning contents, pedagogies, and learning technologies), and learning assessments (e.g., formative assessment, summative assessment) that directly address the desired learning outcome, which is digital natives' analytical reading skills; and b) Encourage informal and formal communications using a variety of social communication tools (e.g., Facebook®, LINE®, Telegram®, and Discord®) and keep their frequency with learner groups in preparation for hybrid learning so instructors can open the learning cycles.

2) *P2: Presentation for interactive learning:* In the second phase of the learning process, learners play an important role in active learning; this phase has five learning stages under the online learning mode: *a)* Join the online class via browsing and seeking tools (e.g., Google Chrome®, Firefox®, Microsoft Edge®, and Safari); *b)* Explore the story on the interface display of interactive presentation tools (e.g., Zoom®, Google Meet®, Microsoft Teams®, and ClassPoint®); *c)* Check the story to identify the story's intrinsic elements and media symbol systems; *d)* Read together to analyze the story's message and media symbol systems; *e)* Personal reading log via browsing and seeking tools.

Thus, at this stage, the role of the instructor in an interactive presentation, as follows: *a)* Make it clear that instructors have high expectations for learning outcomes, that there are requirements for learning tasks and activities, and that there are rules for how to talk and interact in the classroom, both in online and on-site learning modes; and *b)* Respect diverse student abilities and learning styles to create a safe and engaging hybrid learning environment that allows for multiple responses. This will help make the classes more engaging (cognitively, socially, and emotionally) for both online and on-site learning.

3) *P3: Practice with the analytical reading:* In the third phase of the learning process, learners play an important role in collaborative learning; this phase has three learning stages under the on-site learning mode: *a)* Join the onsite class via analytics and evaluative tools (e.g., ClassDojo®, Kahoot!®, Google Forms®, and Google Analytics®); *b)* Play a quiz game via analytics and evaluative tools; *c)* Share a comment involving the story using the Think-Pair-Share (TPS) technique.

Thus, at this stage, the role of the instructor in practice with the analytical reading is very important, as follows: *a)* Respect diverse student opinions and thinking styles to create a safe and engaging hybrid learning environment that allows for multiple responses; *b)* Employ student peer assessment to promote collaborative learning skills; *c)* Develop reciprocity and cooperation among students to enhance peer support and collaboration.

4) *P4: Progress reports in analytical reading skills:* In the fourth phase of the learning process, learners play an important role in reflective learning under the on-site learning mode. This step emphasizes that the students read again, review, reflect, and evaluate the digital media for identifying the intrinsic elements of the story and media symbol systems, analyzing the message of the story and media symbol systems, and responding to the story and media symbol systems. Thus, at this stage, the role of the instructor in the progress reports of analytical reading skills, as follows: *a)* Employ student self-assessment to promote self-regulated learning skills, such as time management and learning progress monitoring; *b)* Give them quick feedback, and encourage them when they need it; *c)* Always end each lesson with a summary of what was learned and a look at what will be taught in the next lesson.

B. The Suitability of the Cp-HL Process to Enhance Digital Natives' Analytical Reading Skills

TABLE I. THE EVALUATION OF THE SUITABILITY OF THE CP-HL PROCESS TO ENHANCE DIGITAL NATIVES' ANALYTICAL READING SKILLS

Items of evaluation	Result		Suitability Level
	Mean	S.D.	
1. P1: Preparation for hybrid learning			
1.1 Prepare digital devices	5.00	0.00	Strongly agree
1.2 Connect devices to the Internet	4.66	0.50	Strongly agree
2. P2: Presentation for interactive learning			
2.1 Join the online class	5.00	0.00	Strongly agree
2.2 Explore the story	5.00	0.00	Strongly agree
2.3 Check the story	4.66	0.50	Strongly agree
2.4 Read together	5.00	0.00	Strongly agree
2.5 Personal reading log	4.44	0.73	Agree
3. P3: Practice with the analytical reading			
3.1 Join the onsite class	5.00	0.00	Strongly agree
3.2 Play a quiz game	4.44	0.73	Agree
3.3 Share a comment involving the story	4.66	0.50	Strongly agree
4. P4: Progress reports in analytical reading skills			
4.1 Read again, review, reflect and evaluate	5.00	0.00	Strongly agree
Overall	4.81	0.27	Strongly agree

From Table I, the suitability of the Cp-HL process to enhance digital natives' analytical reading skills was overall the most suitable, with a mean of 4.81 and a standard deviation of 0.27.

VII. CONCLUSIONS AND DISCUSSION

In this article, we propose the “Cloud-powered Hybrid Learning Process” (Cp-HL process) as an instructional process involving the use of cloud-powered learning tools in hybrid learning for the purpose of enhancing digital natives' analytical reading skills by providing access to a wide range of digital resources and tools in both online and on-site learning modes according to the Sloan Consortium's HL guidelines [20], which specifies the proportion of program content delivered online from 30 to 79% as the most widely accepted and popular in Thailand. The Cp-HL process to enhance digital natives' analytical reading skills. This process consisted of four major learning phases and 11 learning steps, as follows:

1) *P1: Preparation for hybrid learning:* There were two learning steps under the online learning mode: *a)* Prepare digital devices; and *b)* Connect devices to the Internet. Cloud-powered learning tools used in this process include social communication tools (e.g., Facebook®, LINE®, Telegram®, and Discord®).

2) *P2: Presentation for interactive learning:* There were five learning steps in the online learning mode: *a)* Join the online class; *b)* Explore the story; *c)* Check the story; *d)* Read together; and *e)* Personal reading log. Cloud-powered learning

tools used in this process include: i) browsing and seeking tools (e.g., Google Chrome®, Firefox®, Microsoft Edge®, and Safari®); and ii) interactive presentation tools (e.g., Zoom®, Google Meet®, Microsoft Teams®, and ClassPoint®).

3) P3: *Practice with the analytical reading*: Under the onsite learning mode, there were three learning steps: a) Join the on-site class; b) play a quiz game; and c) Share a comment involving the story using the Think-Pair-Share (TPS) technique. Cloud-powered learning tools used in this process include analytics and evaluative tools (e.g., ClassDojo®, Kahoot!®, Google Forms®, and Google Analytics®).

4) P4: *Progress reports in analytical reading skills*: There was a critical learning step under the on-site learning mode: read again, review, reflect, and evaluate the digital media. Progress reports represent the expected learning outcomes, which are digital natives' analytical reading skills, which have three components: a) identifying the intrinsic elements of the story and media symbol systems; b) analyzing the message of the story and media symbol systems; and c) responding to the story and media symbol systems. Cloud-powered learning tools used in this process include analytics and evaluative tools.

According to nine experts' evaluations of the suitability of the developed Cp-HL process, all experts agreed that the Cp-HL process was the most suitable overall for improving digital natives' analytical reading skills, with a mean of 4.81 and a standard deviation of 0.27. Based on these findings, we anticipate that our CP-HL process will be implemented in both online and onsite learning modes that integrate digital reading techniques, hybrid pedagogies, and cloud-powered learning tools to promote digital natives' analytical reading skills, which align with the characteristics of digital learners.

In the future directions of hybrid learning research [17, 32], it will still be challenging to integrate pedagogical strategies with new learning technologies to help learners of all ages gain access to learning, help people learn, and achieve the learning outcomes that society needs in lifelong learning, including those with certain barriers to learning, whether they are in formal education, non-formal education, or alternative education.

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