Applying Artificial Intelligence to Train Multimodal Information Processing Skills for Ethnic Minority Students in Particularly Disadvantaged Areas: The Case of Khmer Ethnic Minority Students at Khanh Hoa Secondary and High School, Can Tho City, Vietnam

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ABSTRACT:
In the context of digital transformation of education, artificial intelligence opens up many possibilities to support the teaching of Literature, especially in training the skill of receiving multimodal information documents for ethnic minority students in particularly difficult areas. This study focuses on the case of Khmer ethnic students in grade 11 at Khanh Hoa Secondary and High School, Can Tho city, Vietnam, to propose and test measures to apply artificial intelligence to support students in reading, comprehension, analyzing and evaluating multimodal information texts. The project was implemented according to the pedagogical experimental model before and after the impact, with the research subjects being grade 11 students, including 144 Khmer ethnic students out of a total of 262 students. The experimental content consists of 10 reading comprehension lessons in the first semester of the 2025-2026 school year, using multi-modal information documents associated with Khmer culture and local life such as videos, infographics and documents introducing cultural heritage. The study proposes measures to use AI in language preparation, literacy comprehension, non-verbal channel analysis, connection of modes of expression, feedback, and self-assessment. The research results are expected to contribute to clarifying the role of AI as a pedagogical support tool, promoting reading comprehension, academic Vietnamese language proficiency, digital competence, and equitable learning for Khmer ethnic students in the context of digital education.

Keywords: artificial intelligence; skills to receive multimodal information texts; Khmer ethnic students; areas with special difficulties; teaching Literature.

1. Introduction

In the context of digital transformation of education, artificial intelligence (AI) is opening up the possibility of supporting teaching beyond the role of projection or illustration of traditional technology. AI can participate in many stages of the learning process such as explaining concepts, summarizing texts, suggesting questions, giving product feedback, personalizing tasks, and assisting with self-assessment. For Literature, the application of AI has practical significance in teaching reading comprehension, especially when Vietnam's General Education Program 2018 emphasizes the ability to receive multimodal text-style information documents. However, for Khmer students in particularly difficult areas, this process is affected by limitations in academic Vietnamese, equipment, Internet, digital learning materials and information verification capacity. Therefore, it is necessary to research the application of AI to train skills in receiving multimodal information texts, in order to develop reading comprehension, digital competence, critical thinking and promote educational equity.

This study aims to propose and initially test measures to apply artificial intelligence to train the skills of receiving multimodal information documents for Khmer ethnic students at Khanh Hoa Secondary and High School, Can Tho city. text reception skills and the supporting role of AI in teaching reading comprehension in Literature, researching and analyzing the characteristics of Khmer students in terms of language, culture, learning conditions, digital competencies and receptive psychology. From there, the study builds a system of measures to support students in the following stages: language preparation, reading and comprehension of text channels, decoding non-verbal channels, connecting modes of expression, evaluating texts and self-regulating the learning process. AI is approached as a means of supporting controlled pedagogy, contributing to the development of reading comprehension, academic Vietnamese, digital competencies, and active learning abilities.

The research object of the project is the process of applying artificial intelligence to train the skills of receiving multi-modal information documents for Khmer ethnic students in grade 11 at Khanh Hoa Secondary and High School, Can Tho city. observe, decode, analyze, connect, evaluate, and apply information presented by various modes of expression, including text channels, images, charts, symbols, colors, layouts, and other non-verbal elements. This skill is considered through basic elements such as text type recognition, reading and comprehending text channels, decoding non-verbal channels, connecting modes of expression, evaluating the effectiveness of communication, applying information to practice, expressing the results of reception in Vietnamese, and using AI responsibly in learning. With the characteristics of Khmer and Vietnamese bilingualism, Khmer students have difficulties in academic Vietnamese vocabulary, expressive ability and experience in reading digital texts, and possess rich community cultural resources that can be exploited as a pedagogical advantage in teaching Literature.

The scope of the study is limited to Khanh Hoa Secondary School and High School, Bung Tum area, Khanh Hoa ward, Can Tho city, this is an area recognized as a particularly difficult economic region (https://www.cantho.gov.vn/?pageid=32075&p_steering=49826), with the target being grade 11 students, including a significant number of Khmer ethnic students (about 50%). In terms of content, the research focuses on the skills of receiving multimodal information texts in teaching reading comprehension in Literature. Teaching materials are selected in the direction of association with Khmer culture and local life, such as texts such as infographics about the Ooc-om-booc festival, articles introducing Bat Pagoda, clips about the custom of building sand mountains, Chan Kieu Pagoda. The study was implemented in 10 reading comprehension lessons in each class in the first semester of the 2025–2026 school year; the use of AI does not depend on a specific tool but focuses on learning support functions such as keyword interpretation, information simplification, text summarization, question suggestions, image analysis support as well as layout, response to answers, and help students self-evaluate under direction, teacher control.

2. Methodology

The study uses pedagogical experimental methods based on pre-impact and post-impact models to test the feasibility and initial effectiveness of the application of AI in training skills to receive multi-modal information texts for Khmer ethnic students. In the pre-impact stage, students perform reading comprehension tasks to determine the initial level according to the following criteria: type recognition, reading comprehension of text channels, decoding non-verbal channels, connecting modes of expression, evaluating texts, applying information and expressing in Vietnamese. During the impact phase, AI is used as a controlled support tool, under the direction of teachers, to help students prepare language, analyze text, receive feedback, and self-regulate the learning process.

Experimental data is processed using Excel through basic statistical indicators such as frequency, percentage, average score, and the difference between the results before and after the impact. In addition to the composite score, the study analyzes each criterion of text reception skills with progress and limited aspects. Qualitative data from answers, worksheets, classroom observations, and student feedback were used to supplement evidence of changes in interest, confidence, Vietnamese language expression, and awareness of responsible use of AI.

3. Results

3.1. Literature review

For research on artificial intelligence in education, in recent years, AI, especially generative AI, has become an important research direction in education thanks to its ability to support personalized learning, create learning materials, give feedback, evaluate the process, and develop self-learning capacity. International studies and recommendations of OECD (2026) and F. Miao and W Holmes (2023) all emphasized that AI needs to be used in a learner-centered manner, ensuring ethics, data safety, fair access and not replacing the role of human thinking. Some recent overviews such as D. T. T. Mai, C. V. From (2024), C. Zhai, S. Wibowo (2024) and D. Marzano (2025) have simultaneously pointed out the potential and risks of AI, especially the risk of dependence, impairment of critical thinking and the reception of unverified information. However, existing studies still lack specialized experiments in Literature at the high school level, especially for Khmer students in particularly difficult areas. Therefore, it is necessary to build a controlled pedagogical model for AI to support each operation of receiving multimodal information texts.

Studies on multimodal texts and skills for receiving multimodal information documents Most are based on social semiotics and multimodal theory, in which text is understood as a whole that creates meaning from the coordination of language, images, colors, compositions, sounds, gestures, space, and other symbolic resources. This approach expands the concept of reading comprehension, helping language education adapt to the modern media environment. In terms of cognition, the theory of multimedia learning R. E. Mayer và L. Fiorella (2021) contributing to explaining the mechanism of learners processing information through text and image channels, and providing a basis for designing appropriate multi-channel learning materials. Recent studies such as Mills Kathy A and Len Unsworth (2016), R. Linder and F Falk-Ross (2024); A. R. G. Gatcho, J. P. G. Manuel (2024) It also shows that multimodal reading comprehension is not only the reception of illustrative media but also the process of decoding, connecting, evaluating, and creating meaning from many sources of information. However, there is still a lack of research to develop specific assessment criteria, pedagogical intervention models with integrated AI and approaches associated with the indigenous culture of Khmer ethnic students.

In language teaching, AI is increasingly seen as a tool to support the development of reading, writing, vocabulary, language feedback, and self-learning skills. AI chatbots can explain difficult words, simplify text, generate reading comprehension questions, summarize content, suggest expressions, and respond to assignments; thereby being able to support Khmer students to overcome difficulties in academic Vietnamese, vocabulary and complex text structures. However, without pedagogical orientation, learners may rely on AI, copy answers,

or take in unverified information. Thus, this study positions AI as an aid in the reading comprehension process: language preparation before reading, text and non-verbal channel analysis during reading, feedback and self-assessment after reading, under the organization and control of teachers.

The education of ethnic minority students is always associated with issues of school language, cultural identity, learning conditions and equitable access. For Khmer students in the Mekong Delta, the development of academic Vietnamese language competence should be carried out simultaneously with respecting and exploiting Khmer cultural capital as a pedagogical resource. Previous studies such as D. H. Tran and S. N. Huynh (2025), V. D Nguyen (2025) mainly focusing on bilingual education, pronunciation errors, sentence writing errors, expressive ability and difficulties in learning Literature in general; Meanwhile, the reception of multimodal information texts, digital texts, infographics, videos, charts or posters has received little attention. In the context of AI application, the issue of digital equity has become even more urgent, as differences in equipment, the Internet, digital capabilities, and pedagogical support can increase learning inequality. Therefore, AI needs to be organized as a controlled support tool, associated with group learning, shared devices, oriented learning sheets, original text comparison, and criteria for responsible use of AI.

In Vietnam, the 2018 General Education Program in Literature is oriented to develop qualities and competencies, in which reading and comprehension plays a central role. The emphasis on information texts and diverse forms of expression poses requirements for teaching innovation in the direction of processing, evaluating and applying multi-channel information. However, there is still a lack of empirical research on the application of AI to train the skills of receiving multimodal information texts for Khmer students in grade 11 in particularly difficult areas.

Previous studies have clarified three important foundations: the potential of AI in personalized learning, feedback, and assessment innovation; theoretical basis of multimodal reading comprehension such as the process of decoding, connecting and evaluating multiple channels of expression; at the same time, emphasizing the role of language, culture and learning conditions for ethnic minority students. However, there is still a lack of empirical studies that simultaneously integrate AI, multimodal information texts and Khmer students in particularly disadvantaged areas. Therefore, this research aims to propose an AI-assisted process, develop evaluation criteria, select language materials associated with Khmer culture, and contribute to promoting educational equity in the context of digital transformation.

On the basis of the research overview, the topic inherits three main orientations: AI is only effective when it is organized according to clear pedagogical goals, with the guidance of teachers and a verification mechanism; receiving multimodal information documents is the process of creating complex meanings between text and non-verbal channels; teaching Khmer students needs to pay attention to language, culture and technological conditions. From there, the study proposes a model of applying AI according to the reading comprehension process, emphasizing academic Vietnamese language support, information visualization, feedback, and responsible use of AI.

3.2. Theoretical basis

3.2.1. Artificial intelligence and application of artificial intelligence in education

Artificial intelligence in education is understood as the application of technological systems capable of processing language, data, images and learning feedback to support teaching, assessment and management of education. In the context of high school, generative AI opens up the possibility of supporting teachers to design learning materials, build questions, create worksheets, respond to products, and personalize learning tasks. However, AI needs to be approached in a human-centered manner, in which technology plays a role in supporting and empowering teachers and students, rather than replacing human thinking and pedagogical roles.

For Literature, AI should not be used as a tool to replace students' reading comprehension activities, but should be positioned as a means to support the

process of receiving texts. AI can help students explain keywords, simplify information, suggest questions, orient visual observations, charts, diagrams, and self-check answers. In this study, AI is used to support Khmer students in particularly disadvantaged areas to overcome barriers in academic Vietnamese, non-verbal reading comprehension and multimodal information processing, while ensuring the principles of control, verification, responsible use and fair access.

3.2.1.1. Principles of applying artificial intelligence in teaching and receiving multi-modal information documents

The application of AI in this research is guided by six basic principles to ensure pedagogy, feasibility and educational accountability. First of all, AI must serve the goal of developing student capacity, especially multi-modal information text reception skills, academic Vietnamese language ability, digital competency and critical thinking, instead of replacing reading comprehension or personal thinking activities. Secondly, the use of AI needs to be suitable for the context of particularly difficult areas, taking into account the conditions of equipment, Internet, learning duration and digital capacity of students. Third, AI must support the linguistic and cultural characteristics of Khmer students through keyword interpretation, information visualization, and connection with local culture. At the same time, teachers play a leading role in design, orientation, verification and evaluation; students are instructed to use AI responsibly, know how to compare with the original text, avoid copying machines, and ensure fair access in the classroom.

3.2.1.2. System of measures to apply artificial intelligence to teach and receive multi-modal information documents

From the established principles, the study proposes a system of measures to apply AI according to the process of receiving multi-modal information documents, in accordance with the characteristics of Khmer students in particularly difficult areas. First of all, AI is used to support teachers in selecting, adjusting language materials and designing reading comprehension tasks associated with Southern Khmer culture, such as the Ooc-om-booc festival, Khmer pagoda, Bat pagoda or Chén Kieu pagoda. Next, AI assists students in preparing the language before reading, explaining keywords, simplifying terminology, and activating background knowledge. During the reading process, AI is used to guide students to identify topics, key information, text structures, and analyze images, charts, layouts, colors, and symbols. AI also supports connecting the text channel with the non-verbal channel, designing stratified reading comprehension questions, initial feedback, and helping students self-assess. In addition, this tool is used to individualize tasks according to learners' level and organize group learning to overcome equipment limitations, ensure equitable access, develop cooperation capacity, express Vietnamese and use AI responsibly.

3.2.2. Multi-modal information documents and skills for receiving multi-modal information documents

3.2.2.1. Multi-modal information documents

The concept of multimodal texts is based on social semiotics theory and multimodal theory. G. Kress (2010) argues that contemporary communication cannot be considered only through verbal or written language, but should be seen as a combination of multiple modes of meaning-making such as images, writing, composition, color, sound, gestures, and other symbolic resources. Mills and Unsworth (2017) also defines multimodal competencies derived from social semiotics and involves the use of two or more modes of meaning generation in communication. This understanding is very suitable for teaching Literature today, when students have to receive texts with a combination of writing, images, charts, diagrams, symbols, colors, layouts and videos.

From a teaching perspective, Jewitt and Carey (2008) said that the change in the media environment has changed the concept of literacy in schools; Students not only need to read, but they also need to understand how different modalities work together to create meaning in the classroom and in life.

According to the General Education Program in Literature of Ministry of Education and Training (2018), multimodal information documents are documents with the purpose of providing, explaining, introducing, guiding or explaining information through a combination of many modes of expression such as writing, images, colors, charts, diagrams, tables, symbols, sounds, videos and presentation layouts. It can be identified by some basic characteristics. Firstly, the text has a clear informational purpose, aiming to provide knowledge, data, facts, processes, instructions or explanations. Secondly, texts use many modes of expression, in which the text channel coordinates with images, charts, diagrams, tables, colors, symbols, sounds or videos. Third, the text is intuitive, helping readers visualize, compare, remember and process information more effectively. Fourth, the text has a clear information organizational structure, usually expressed through headings, headings, symbols, layouts, visual paths or image sequences. Fifth, the text requires the reader to make connections between information channels to fully understand the message.

3.2.2.2. Skills in receiving multimodal information documents

Receiving multimodal information texts is a complex cognitive process. Learners must not only read the written content but also observe, select, decode, associate and evaluate non-verbal elements. According to Mayer (2009), humans learn from words and images through different information processing channels; The design and reception of multimedia information should pay attention to the principle of cognition to avoid overload and support effective learning. From the perspective of reading comprehension, A. R. G. Gatcho, J. P. G. Manuel (2024) showing that readers' interaction with multimodal texts involves a complex coordination of textual, visual, and audio elements in the reading environment.

Multimodal information text reception skills are understood as the ability to read, observe, decode, analyze, connect, evaluate and apply information presented by various modes of expression (images, colors, layouts, charts, diagrams, symbols, audio or video).

The process of receiving multimodal information documents in this study consists of five steps: text recognition; reading and comprehending the text channel; reading comprehension of non-verbal channels; connecting modes of expression; evaluate and apply information. This process emphasizes that students must not only identify the type, theme, communication purpose, and key information of the text, but also to decipher images, colors, charts, symbols, audio, video, and presentation layout. At the heart of the reception process is the ability to explain the relationship between the literal and non-verbal channels in order to create full meaning. To assess this skill, the study used eight criteria: type recognition, literacy comprehension, non-verbal channel reading, modal connection, text assessment, information application, Vietnamese expression, and responsible use of AI. These criteria are important both in terms of teaching (helping teachers clearly identify the elements that need to be trained for students when receiving multimodal information texts) and in terms of research (creating a basis for measuring student changes before and after the impact of experiments).

3.2.3. Measures to apply artificial intelligence to teach and receive multimodal information documents

The application of AI in teaching and receiving multimodal information texts needs to be organized as a targeted pedagogical process, rather than using discrete or arbitrary use. On the basis of AI theory in education, multimodal theory, multimedia learning and capacity development orientation in Literature, the study proposes a system of measures to support teachers and students at the basic stages of the reading comprehension process. AI can assist in selecting and adjusting language materials, designing questions, creating keyword tables, preparing the language before reading, and suggesting warm-up activities suitable for the Vietnamese language level, living capital and cultural context of Khmer students in particularly disadvantaged areas.

During the reading process, AI is used to assist students in identifying key information, reading and understanding text channels, analyzing non-verbal channels, connecting writing to images, charts,

colors, layouts, and symbols. After reading, AI can support feedback, self-assessment, task individualization, and group learning to overcome device limitations. However, any results generated by AI need to be compared by students with the original text, rephrased in their own language, and verified by teachers. This approach helps AI become a purpose-driven learning support tool, contributing to the development of multimodal reading comprehension, academic Vietnamese, collaboration, and responsible use of AI.

3.3. Organizing experimental teaching

3.3.1. Experimental purpose

The pedagogical experiment was organized to test the feasibility and initial effectiveness of the application of artificial intelligence in training the skills of receiving multi-modal information documents for Khmer ethnic students at Khanh Hoa Secondary School and High School, Can Tho city.

In this study, AI is positioned as a controlled pedagogical support tool that does not replace students' reading comprehension or thinking. The experiment focused on assessing students' development before and after the impact through the following criteria: text type recognition, text channel reading, non-verbal channel decoding, connection of expression modes, text evaluation, application of information, expression in Vietnamese, and responsible use of AI. At the same time, the study considers the ability of AI to support students in preparing vocabulary, analyzing information, expressing reading comprehension results and self-adjusting answers in conditions of limited equipment, Internet, digital capacity and academic Vietnamese.

3.3.2. Experimental subjects

The experimental subjects were grade 11 students of Khanh Hoa Secondary School and High School, Can Tho city. The total number of grade 11 students was 262 students, including 144 Khmer ethnic students (54.96%). Specifically, the number of students in the classes is distributed as follows: 11A1 has 47 students with 25 Khmer ethnic students (53.19%); 11A2 has 45 students with 23 Khmer ethnic students (51.11%); 11A3 has 42 students with 24 Khmer ethnic students (57.14%); 11A4 has 44 students with 26 Khmer ethnic students (59.09%); 11A5 has 39 students with 21 Khmer ethnic students (53.85%); 11A6 has 45 students with 25 Khmer ethnic students (55.56%).

The above data shows that Khmer ethnic students account for more than half of the total number of grade 11 students. This is an important practical basis for selecting grade 11 as an experimental subject, and at the same time ensuring that the research can reflect relatively clearly the characteristics of receiving multi-modal information documents of Khmer students in the school context.

3.3.3. Experimental content

The experimental content is designed in the direction of training skills in receiving AI-powered multimodal information texts. The experiment is implemented in 10 reading comprehension lessons in the first semester of the 2025-2026 school year. The selected texts have a connection with Khmer culture, local life and teaching requirements for reading and comprehension of multimodal information texts in Grade 11 Literature.

The experimental content consists of three stages: pre-experimental, in-experiment and post-experiment.

3.3.3.1. Pre-experimental stage

In the pre-experimental stage, students perform the task of reading and comprehending multi-modal information texts in the form of videos/clips "The unique custom of building sand mountains of the Khmer people" (https://www.youtube.com/watch?v=7Co-EdnpR5I). This language was chosen because of its proximity to the Khmer cultural foundation, and at the same time integrates many modes of expression such as images, narration, sounds, community contexts and cultural symbols. The purpose of this phase is to determine the student's initial level of text recognition skills, literacy and non-verbal channels, connection of modalities, evaluation of the effectiveness of communication, application of information and expression in Vietnamese. AI has

not yet been used as the main support tool; The results of the work are considered as input data to identify students' initial difficulties in the process of receiving multimodal texts.

3.3.3.2. Experimental stage

The experimental phase was the focus of the study, in which teachers organized reading comprehension lessons with integrated AI to assist students in receiving multimodal information texts. The two selected materials include the infographic "Activities of the Ooc-om-booc Festival – Ngo Boat Racing in Can Tho City in 2025" (https://congly.vn/cong-an-tp-can-tho-bao-dam-tuyet-doi-an-toan-le-hoi-ooc-om-boc-dua-ghe-ngo-499792.html) and the text introducing the heritage "Discovering Soc Trang Bat Pagoda – The Mysterious Khmer Temple" (https://letoandulich.vn/blog-du-lich/kham-pha-chua-doi-soc-trang-ngoi-chua-khmer-huyen-bi/). These language materials are both associated with Southern Khmer culture and clearly show the characteristics of multimodality through a combination of writing, images, layouts, colors, symbols, event information and explanatory elements. AI is applied in five steps: start-up, language preparation, reading and comprehension of text and non-verbal channels, connecting and evaluating information, application and self-assessment.

During the experiment, AI is used flexibly depending on the device conditions and digital capacity of students. With the team with the device, the teacher instructs students to ask questions to the AI to explain keywords, summarize information, suggest image analysis, connect text to pictures, and respond to answers. For the group that lacks equipment, teachers can prepare AI results in advance to be presented or converted into worksheets. Students do not copy the AI results intact, but must compare them with the original text, discuss the group, and rephrase them in their own language. This combination of individual, group, and whole-class organization creates a safe learning environment, supporting Khmer students to develop academic Vietnamese, collaborative capacity, critical thinking, and a sense of responsible use of AI.

3.3.3.3. Post-experimental stage

After completing the lessons with integrated AI, students perform the task of reading and comprehending the multi-modal information text in the form of a clip "Chua Chan Style – Soc Trang" (https://www.youtube.com/watch?v=eyftw4YFhlc). This language material is similar to the pre-experimental text because it combines explanations, images, sounds, cultural contexts and information introducing the Southern Khmer heritage. The purpose of this phase is to assess the change in students' skills in receiving multimodal information texts after AI-assisted training. The reading comprehension is designed according to the structure corresponding to the pre-experimental period, focusing on the following criteria: identifying the type of text, identifying the main content, analyzing the non-verbal channel, connecting the narration with images, evaluating the effectiveness of communication, contacting the local culture, etc expressed in Vietnamese and use AI responsibly.

During the experiment, data was collected from a variety of sources to comprehensively assess student change. The main tools include pre-experimental tests, post-experimental tests. Quantitative data is processed using Excel through scores, percentages, GPAs, and pre- and post-experimental differences. Qualitative data is analyzed through student responses, observational notes, expressions in group discussions, and teacher comments. The combination of the two types of data helps to assess not only learning outcomes but also the process of students receiving texts, using AI, interacting with groups, and expressing themselves in Vietnamese.

3.4. Evaluation of experimental results

The evaluation of experimental results was carried out on 144 Khmer ethnic students in grade 11 at Khanh Hoa Secondary and High School, Can Tho city. The evaluation data consisted of two groups: the results according to each criterion for receiving multimodal information documents and the results of pre- and post-experimental test scores. The evaluation criteria include: text type recognition, text channel reading, non-verbal channel reading,

connection of modalities, text evaluation, application of information, good expression in Vietnamese, and responsible use of AI.

3.4.1. Skills in receiving multi-modal information documents according to the characteristics of document types

From the students' learning products during the experiment, teachers make statistics and synthesize according to each of the set reception skill criteria.

Table 1. Results of assessment of reception skills according to criteria

Judging Criteria	Pre-experiment	Pre-experimental rate	Post-experiment	Post-experimental rate	Increase
Text Type Recognition	92/144	63,89%	138/144	95,83%	+46 students
Reading comprehension of text channels	88/144	61,11%	129/144	89,58%	+41 students
Nonverbal Channel Reading Comprehension	67/144	46,53%	135/144	93,75%	+68 students
Connecting Methods	61/144	42,36%	127/144	88,19%	+66 students
Text Review	72/144	50,00%	132/144	91,67%	+60 students
Use of information	83/144	57,64%	139/144	96,53%	+56 students
Good expression in Vietnamese	115/144	79,86%	140/144	97,22%	+25 students
Responsible Use of AI	65/144	45,14%	130/144	90,28%	+65 students
General Average	**80/144**	**55,55%**	**134/144**	**92,36%**	**+54** students

The data shows that before the experiment, the average number of students who met the criteria was 80/144 students, equivalent to 55.55%. After the experiment, this number increased to 134/144 students, equivalent to 92.36%. The average increase was about 54 students, showing a marked improvement in the skill of receiving multimodal information texts after the AI-based teaching process.

In the criteria for identifying the type of text, the percentage of students who met the requirements increased from 63.89% before the experiment to 95.83% (138/144) after the experiment. These results show that students have made significant progress in defining text types, information purposes, and modes of expression, thanks to a guided reading comprehension process and the support of AI.

In the literacy comprehension criterion, the percentage of students who met the requirements increased from 61.11% before the experiment to 89.58% (129/144) after the experiment. This result shows that AI has effectively supported the interpretation of difficult words, identified keywords, summarized key information, and helped Khmer students improve their academic Vietnamese language proficiency in the reading comprehension process.

In the non-verbal reading comprehension criterion, the percentage of students who met the requirements increased sharply from 46.53% to 93.75%, the highest improvement in the criteria (135/144). The results showed that the combination of worksheets, open-ended questions, and support from AI helped students more effectively analyze

images, colors, layouts, sounds, and visual elements in multimodal text.

In the criterion of connecting modes of expression, the percentage of students who met the requirements increased from 42.36% to 88.19%, with 66/144 students making progress after the experiment. This result shows that AI effectively supports the comparison of text channels with image channels, helping students identify text as a whole to create multimodal meaning.

In the text evaluation criteria, the percentage of students who passed the test increased from 50.00% to 91.67%, with 60/144 students making progress after the experiment. These results show that students have shifted from emotional comments to grounded assessments, based on the clarity of the information, the relevance of the images, the composition, and the effectiveness of incorporating modes of expression.

In terms of information application, the percentage of students who met the requirements increased from 57.64% to 96.53%, with 56/144 students making progress after the experiment. The results showed that students knew how to relate text content to Khmer life, community, and culture, thanks to a combination of close language materials, appropriate organization of activities, and AI-oriented support.

In the criterion of expression in Vietnamese, the percentage of students who met the requirements increased from 79.86% to 97.22%, with 25 students making progress after the experiment. Although the increase is not as high as other criteria, this result is still meaningful because the initial starting point is quite high, and at the same time shows that AI effectively supports expression editing, clarifying meaning, and increasing coherence in answers.

In the criterion of responsible use of AI, the percentage of students who met the requirements increased from 45.14% to 90.28%, with 65 students making progress after the experiment. The results showed that students developed a better awareness of how to ask questions, verify information, contrast the original text, and avoid machine copying when using AI in learning.

Overall, all evaluation criteria increased after the experiment, the most prominent of which were non-verbal channel reading, connecting modes of expression, and responsible use of AI. These results show that AI, when integrated into the directed teaching process, effectively supports the core skills of multimodal information text reception.

3.4.2. Pre-experimental and post-experimental test scores

In addition to the results according to the skill criteria, the study also analyzed the results of the pre- and post-experimental tests according to four levels: Good (above 8.0), Fair (from 6.5 to 7.9), Pass (from 5.0 to 6.4) and Failed (below 5.0). Statistics show that the total number of students both before and after the experiment is 144 students, ensuring consistency with the research sample.

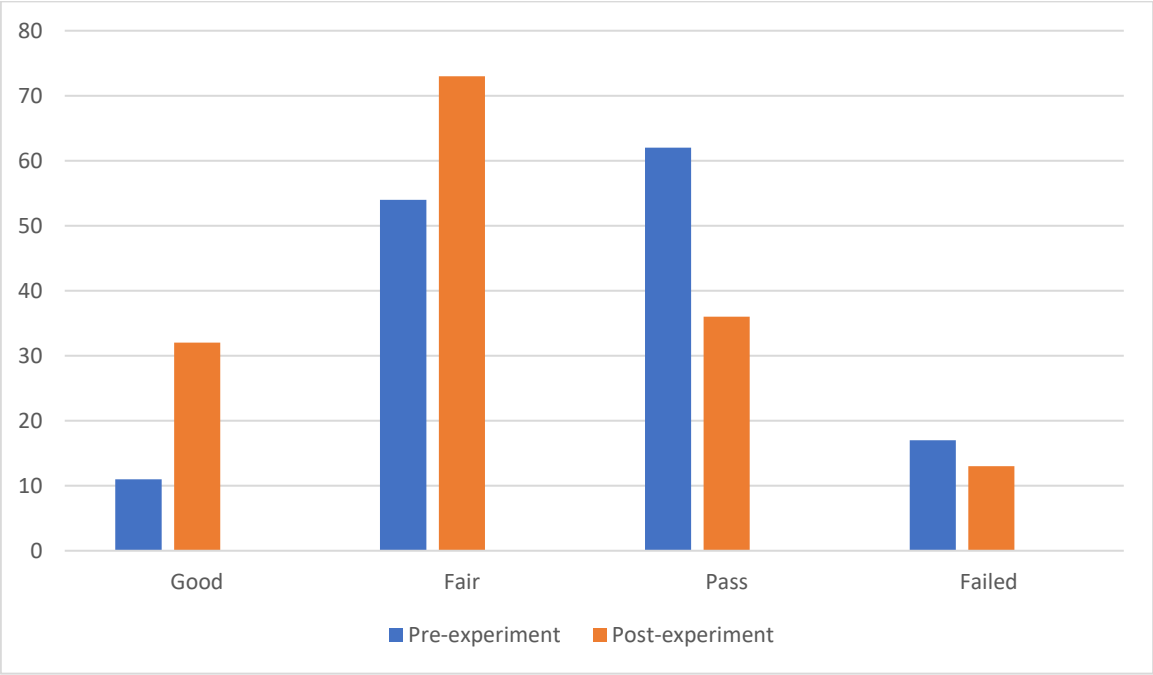

Figure 1. Graded by pre-experimental and post-experiment scores

The results showed that the quality of students' reception of multimodal information texts was significantly improved after the experiment. The percentage of students who achieved the Good level increased from 7.64% (11/144) to 22.22% (32/144), while the Good level increased from 37.50% (54/144) to 50.69% (73/144) and became the highest group. Generally, the number of students increased from 65/144 to 105/144, respectively from 45.14% to 72.92%. This increase of 27.78 points shows that teaching with the application of AI has contributed to significantly improving students' ability to analyze, evaluate and apply information.

The decrease in the Pass and Fail groups reflects a positive trend after the experiment. The number of students at the Passing level decreased from 62 to 36, indicating that a section had moved to the Fair or Good level. Notably, the Failing group decreased from 17 to 3 students, respectively, from 11.81% to 2.08%. This result shows that AI-enabled measures have contributed to the group of students who are still limited in language, reading comprehension methods and multimodal information processing.

The score results showed a positive shift from the low levels to the higher levels after the experiment: the number of students who achieved Good and Good levels increased, while the Pass and Fail groups decreased. This confirms the initial impact of AI-powered teaching on the ability to receive multimodal information texts. However, this improvement is the result of a combination of pedagogical measures, in which AI is integrated in a directional manner, teachers control the learning process and language materials associated with Khmer culture.

Comparing the two groups of data can see the consistency between the score results and the evaluation by criteria. The increase in the percentage of students achieving Good and Good levels corresponds to a marked improvement in the criteria of nonverbal channel reading, connecting modalities, evaluating texts, and using AI responsibly. This shows that the progress after the experiment is not only reflected in the scores, but also reflects the substantive development in the operation of receiving multimodal information texts.

The experimental results showed that Khmer students' skills in receiving multimodal information texts improved significantly after the AI-assisted teaching process, with the average pass rate in eight criteria increasing from 55.82% to 92.88%. The strongest increase in criteria included reading and

comprehension of non-verbal channels, connecting modes of expression, and responsible use of AI. At the same time, the percentage of students achieving Good and Good levels increased from 45.14% to 72.92%, while the Failed group decreased significantly. This result confirms that AI is only effective when it is integrated in a clear pedagogical process, with appropriate language materials, group activities, study sheets, teacher verification and specific evaluation criteria.

4. Discussion

The results of the study show that the application of artificial intelligence in teaching and receiving multi-modal information texts has practical significance for Khmer ethnic students in particularly difficult areas. After the experimental process, the number of students who met the requirements in the skill criteria increased, especially in the criteria of reading comprehension of non-verbal channels, connecting modes of expression and using AI responsibly. At the same time, the test scores also had a positive change: the percentage of students who achieved good and good levels increased, while the percentage of students who did not pass decreased markedly. These results are the basis for affirming that the topic is meaningful and contributes in the following aspects.

In terms of theory, the topic contributes to supplementing the scientific basis for teaching and receiving multimodal information texts in Literature, when concretizing reading comprehension activities into observable criteria such as reading text channels, decoding non-verbal channels, etc connecting methods, evaluating, applying information and using AI responsibly. At the same time, the study expands the understanding of AI as a tool to support controlled pedagogy, not replacing the role of teachers or student thinking. The association of multimodal theory with the linguistic, cultural characteristics and access to technology of Khmer students also contributes to emphasizing the need for differentiated, humane and equitable teaching.

In terms of practice, the project provides a teaching process for reading and comprehension of multimodal information texts that can be applied in Literature in high schools, including the following steps: activation of knowledge, preparation of language and context, reading comprehension of literal and non-verbal channels, connect and evaluate information, apply and self-evaluate. Experimental results show that the average percentage of students who meet the requirements increased from 55.82% to 92.88%, especially in non-verbal reading comprehension skills, modal connectivity and responsible use of AI. At the same time, the study suggests teachers how to flexibly exploit AI in the design of language materials, questions, worksheets, feedback and group learning, associated with Khmer culture and particularly difficult regional conditions.

From the perspective of Literature teaching methods, the study has proposed a way to integrate AI in the direction of capacity development, linking this tool with each specific reading comprehension operation such as explaining keywords, identifying key information, analyzing image channels, connecting words to pictures, etc evaluate the text and adjust the answers themselves. This process helps to train the skills of receiving multimodal information texts to become systematic, which can be applied to many forms of language materials such as infographics, videos or heritage introduction texts. In particular, the inclusion of the criterion of responsible use of AI in the assessment contributes to the formation of digital competence, critical thinking and a sense of honest learning for students.

For the education of ethnic minority students, the project proposes a direction to support Khmer students to receive multi-modal information documents through a combination of AI, differentiated teaching and exploitation of indigenous culture. AI is used to explain keywords, simplify information, suggest questions, and support feedback, thereby reducing barriers to academic Vietnamese and multimodal reading ability. At the same time, the selection of language materials associated with Khmer festivals, pagodas, local customs and heritage helps students mobilize personal cultural capital, increase confidence and develop Vietnamese language ability in a meaningful context. The decrease in the number of students

who have not achieved from 17 to 3 shows that the support impact on the student group is still limited.

For digital transformation of education, the topic contributes to affirming that the application of AI in teaching Literature is not only about adding technological tools, but also about redesigning learning activities to develop learners' capacity. AI is integrated as a means of reading comprehension, feedback, and self-assessment, and is controlled by responsible use criteria. In the context of particularly difficult areas, forms such as group learning, use of shared devices, study sheets and verification with original documents show the ability to implement digital transformation in a fair, feasible and academically responsible way.

From the research results, the project has four main scientific contributions. Firstly, research and build a model of applying AI in teaching and receiving multi-modal information texts for Khmer students, associated with reading comprehension goals, learner characteristics, local cultural language materials, group activities and assessment criteria. Secondly, the project proposes a specific system of evaluation criteria, including reading text channels, reading image channels, connecting methods, applying information, expressing Vietnamese and using AI responsibly. Third, the study provides initial empirical evidence of the effectiveness of AI in teaching Literature. However, it is necessary to continue to expand the scope of experiments to verify the reliability and generalization of the model.

In short, the topic is significant in many aspects: supplementing the theoretical basis for teaching and receiving multimodal information texts; propose how to apply AI in Literature teaching in a controlled way; supporting Khmer ethnic students to develop Vietnamese language competence, multi-modal reading comprehension and digital competencies; at the same time, it contributes to promoting the digital transformation of education in the direction of fairness and humanity. Experimental results show that AI is only really effective when it is placed in a clear pedagogical process, associated with the cultural and linguistic characteristics of learners, guided by teachers, and with specific evaluation criteria.

5. Conclusion

Research on the application of artificial intelligence to train the skills of receiving multi-modal information documents for Khmer students in grade 11 at Khanh Hoa Secondary and High School, Can Tho city shows that this is a meaningful approach in the context of teaching innovation in Literature and digital transformation of education. In terms of theory, the study affirms that AI does not replace teachers or students' thinking, but plays a role as a pedagogical support tool, helping learners access texts that are oriented, grounded and capable of self-regulating the learning process.

In terms of practice, the study has proposed and implemented a teaching process for receiving AI-powered multimodal information texts, including the following stages: start-up, language and context preparation, reading and comprehension of text and non-verbal channels, connecting and evaluating information, etc application and self-assessment. In this process, AI is used to explain keywords, summarize information, suggest questions, orient image analysis, support feedback, and self-assessment.

The research results show that the integration of AI in Literature teaching can contribute to the development of multimodal reading comprehension, academic Vietnamese, digital competencies, critical thinking, collaboration, and a sense of responsible use of AI for Khmer students. However, the study is still limited in terms of the scope of the experiment, the duration of the implementation and the lack of an independent control group. Therefore, further studies need to expand the area, subjects, control experimental design and continue to develop the Literature teaching model in the direction of individualization, fairness and responsibility in the context of digital transformation.

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