

# Using Cognitive Strategies in Teaching Animal Classification and Vocabulary Acquisition for Grade Four Thai Learners

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## ABSTRACT

Learning vocabulary and concepts in a science classroom using English as a medium of instruction is a challenge in Thailand. This study explored the use of cognitive strategies in enhancing vocabulary acquisition to improve conceptual understanding among Grade 4 Thai learners in the English program. Twenty-five learners of a private school in Pathum Thani, Thailand enrolled during the first semester of school year 2023-2024 were the subjects of this study. This study was anchored in Research & Development and utilized a quasi-experimental one-group pretest and posttest design with qualitative support. Coding, weighted mean, and Likert scale were used to interpret and analyze the gathered data. Findings show that the contextualized material was strongly agreed upon by the subject matter experts after careful evaluation to be used in applying cognitive strategies. The level of acceptability of the material got a score of 4.77 or strongly accepted based on its design, content, appropriateness. Thus, this study provides valuable insights for educators to explore the use of supplementary materials to improve engagement and lesson delivery to support learning outcomes in Thailand.

**Keywords:** contextualized material, cognitive strategies, conceptual understanding, Grade 4 Thai learners, vocabulary acquisition

## INTRODUCTION

The Thai Education system consists of 12 years of free basic education: 6 years of primary education, 3 years of lower secondary, and 3 years of higher secondary education which utilizes the Thai Basic Education Core Curriculum that aims at equipping the learner with the foundational knowledge and basic skills necessary to further their education and career <sup>[1]</sup>(Office of the Education Council [OEC], 2017). However, many Thai students seem to be unable to acquire English vocabulary and improving English proficiency seems to be such a failure despite continuous and extreme attempts, and need to be addressed according to <sup>[2]</sup>Taladngoen (2019). <sup>[3]</sup>Khamkien (2010) claimed that the students' performance does not meet the standard required despite the 9-12 years of learning English in formal education <sup>[4]</sup>(Foley, 2019).

In 2017, Educational Testing Service (ETS), the world's most extensive educational testing and assessment organization issued a report on the results of the Test of English as a Foreign Language (TOEFL) for both the Internet-Based Test (IBT) and Paper Based Test (ITP) for adult Thais. Results showed that among the four English skills, reading seems to be the weakest point for Thais, while the ITP test showed that grammar was Thais' weakest point. Moreover, the Test of English for International Communication (TOEIC) from

2012 to 2017 results inferred that Thailand was consistently among the poor-performing countries, in which the average scores on listening and reading, 300 and 248, respectively, were always considered to be low <sup>[4]</sup> (Waluyo, 2019).

In 2019, Bangkok Post reported that the average Ordinary National Educational Test (O-NET) score of sixth graders was below 50% (with 100 as the highest score) in all four subjects tested. The average scores were 54.4%, 34.4%, 32.9%, and 35.6% for Thai language, English, mathematics, and general science, respectively <sup>[5]</sup> (Mala, 2021).

In 2022, the Education First English Proficiency Index (EF EPI), released the latest ranking of countries and regions by English skills in 2022. The EF EPI ranking of Thailand is 94th out of 111 countries and 21st among 24 countries in Asia, with a “Very Low Proficiency” score. The EF EPI bands strongly correlate to the Common European Framework Reference (CEFR), an international standard for describing language ability levels. The “Very Low Proficiency” band corresponds to CEFR’s B1 level <sup>[6]</sup> (Education First [EF], 2022).

In 2023, the Program for International Student Assessment (PISA) released the result of their assessment of the knowledge and skills of Grade 10 students in mathematics, reading, and science in 81 countries. Thailand’s performance declined compared to 2018 in all subjects <sup>[7]</sup> (Program for International Student Assessment [PISA] 2022 Results Volume I, 2023).

The result shows the performance of Thailand in mathematics, science and reading. About 35% of students in Thailand attained Level 2 or higher in reading. At this level, students can identify the main idea in a text of moderate length, find information based on explicit, though sometimes complex criteria, and can reflect on the purpose and form of texts when explicitly directed to do so. However, almost no one can comprehend lengthy texts, deal with concepts that are abstract or counterintuitive, and establish distinctions between fact and opinion, based on implicit cues pertaining to the content or source of the information. On the other hand, some 47% of students in Thailand attained Level 2 or higher in science. These students can recognize the correct explanation for familiar scientific phenomena and can use such knowledge to identify, in simple cases, whether a conclusion is valid based on the data provided. 1% of students were top performers in science, meaning that they can creatively and autonomously apply their knowledge of and about science to a wide variety of situations, including unfamiliar ones (PISA 2022 Results Volume I, 2023).

The aforementioned results in different testing organizations that evaluated Thai people’s English proficiency reveal the challenges that Thai students face in learning science concepts in a classroom using English as a medium of instruction. Additionally, the researcher who is an EFL teacher in various learning areas for over a decade strongly observed that Thai primary learners in general lack the basic vocabulary knowledge which hinders them from gaining a meaningful understanding of the words and thus understanding of the concept they are learning. <sup>[8]</sup>Alqahtani (2015) stated that learning science words poses some challenges because learners do not use them daily, making them unfamiliar and difficult.

In the science classroom, the researcher observed the difficulty of the learners in understanding the vocabulary and concept of classifying animals. The concept of animal classification is a basic knowledge that learners must understand. Classification is the arrangement of objects such as organisms, ideas, or information into groups. Its purpose is to make things easier to identify, describe, organize, find, and study. Although classification itself is meant to help people to unify or clarify objects they are interested in, publications show that students might find it difficult to classify plants, animals, and other organisms <sup>[9]</sup> (Chylenska & Rybska, 2018).

A call for students to have a deeper understanding so that they can make sense of and apply their learning to authentic situations urged educators and policymakers to embrace contextualization as a constructivist

approach to bridging the gap between concepts and real-life experiences <sup>[10]</sup>(Rivet & Krajcik, 2008). Thus, recognizing this problem motivated the researcher to explore the use of cognitive strategies as a vocabulary learning strategy alongside a contextualized material in improving the learners' performance.

## RESEARCH OBJECTIVES

To unlock the potential of using cognitive strategies, this study endeavors to investigate the effectiveness of supplementary materials in improving Thai learners' conceptual understanding of animal classification and vocabulary acquisition in a science classroom.

Specifically, to achieve the general objective, this study aims to:

1. Develop a contextualized material to be used in applying cognitive strategies to improve Thai learners' vocabulary acquisition and conceptual understanding of animal classification.
2. Assess the level of acceptability of the developed contextualized material among subject matter experts in terms of the following criteria:

2.1 Design

2.2 Content

2.3 Appropriateness

2.4 Purpose

## RESEARCH METHODOLOGY

### 3.1 Research Design

The present study is anchored on R & D (Research and Development) by <sup>[11]</sup>Gall et al. (2007). It utilized a quasi-experimental one-group pretest-posttest design with qualitative support. The qualitative part of the research used a questionnaire to generate data from the science teachers on the level of acceptability of the developed contextualized material.

### 3.2 Research Participants

Convenience and purposive sampling determined the study's participants. They were selected based on three criteria: (1) they belong to the researcher's science class; (2) they share the same education history: they have been studying in the English program since they were in Grade 1 up to their current grade level; (3) and they are nine or ten years old. There were twenty-five of them, thirteen boys and eleven girls. The teachers who validated the instruments were Grade 4 science teachers in Thailand with at least one year of teaching experience.

### 3.3 Research Setting

The study was done in two neighboring provinces of Central Thailand, Phra Nakhon Si Ayutthaya and Pathumthani. The pre-implementation phase of this study took place at a private school in Bang Pa-in, Phra Nakhon Si Ayutthaya, Thailand while the final implementation phase was at a private school located at Samkhok, Pathumthani, Thailand during the first semester of the school year 2023-2024. Both schools cater to learners from nursery to grade six. They possess a safe, healthy, and intellectually stimulating learning

environment.

### **3.4 Research Methods and Collections**

#### ***3.4.1. Research and information collection***

The researcher assessed the current methods of instruction and the current needs and problems encountered in the teaching-learning process. The researcher observed that learners have poor English vocabulary acquisition and understanding of concepts in the science classroom due to lack of exposure to science vocabulary in English.

#### ***3.4.2 Planning***

After the problem was identified, the researcher planned to develop a contextualized material to be used in delivering the cognitive strategies. The supplementary learning material and vocabulary learning strategy were used to appropriately mitigate the deficiencies of Thai learners. Moreover, the multiple-choice test and questionnaires were used to gather pertinent data about the study. Simultaneously, the researcher asked the school administrators for permission to conduct the preliminary and main field implementation of the study. Additionally, the researcher sent a letter to the parents of the students for ethical considerations.

#### ***3.4.3 Developing a preliminary form of contextualized material***

In this stage, the researcher developed the contextualized material using the pictures in their textbook to reinforce familiarity. Science experts evaluated the developed contextualized material's design, content, appropriateness, and purpose through a questionnaire. This stage included:

##### ***3.4.3.1 Selection of the key terms***

The researcher selected sixteen vocabulary words. Each term has an associated picture to reinforce vocabulary meaning. Based on their English abilities, the words are neither much nor little and the key terms chosen comprehensively reviewed the topic.

##### ***3.4.3.2 Contextualized Material Design***

The front page contains the pictures from their textbook to aid mastery. The back page contains the science vocabulary words in English translated into Thai. The content of the material was strategically printed on both sides of an A4 paper and laminated to ensure durability.

##### ***3.4.3.3 Validation of the contextualized material***

After the completion and before the actual use of the contextualized material, four science teachers from different schools in Thailand validated the learning material. The researcher sent the instruments through email and Google Form. The researcher took note of the comments and feedback of the validators to improve the learning material.

#### ***3.4.4 Preliminary field-testing***

The learners took the pretest before the developed contextualized material and cognitive strategies were implemented in a science classroom of a private school in Phra Nakhon Si Ayutthaya, Thailand. They also took the posttest and answered the open-ended questionnaire after the lesson delivery using the contextualized material and cognitive strategies.

### 3.4.5 Main revision of the contextualized material

The learners' perception of the contextualized learning material from the preliminary field-testing were considered to improve the contextualized material and the lesson delivery using cognitive strategies.

### 3.4.6 Main field-testing

After the revision, the researcher utilized the contextualized material and the ten-step exercises for the Grade 4 science class enrolled for the first semester of the academic year 2023-2024 in a private school in Samkhok, Pathumthani. This class was both the control and the experimental group. In the science class, the researcher administered the pretest to determine the level of conceptual understanding. The contextualized material was used alongside cognitive strategies in this research setting using the ten-step exercises to aid mastery.

After the application of the treatment, the researcher administered a posttest to evaluate the learners' level of conceptual understanding. The researcher's observations during the implementation and the learner's perception on the contextualized material were noted for the final revision.

### 3.4.7 Final revision of the contextualized material

In this stage, final revisions were made based on the feedback from the main field-testing implementation. The final contextualized material is shown in Figures 1 and 2.

Figure 1



Figure 2





### 3.4.8 Dissemination of the result of the study

The researcher will submit the final manuscript to a publisher who assumes commercial distribution. This sequence of eight steps will yield an educational product based on research, which is fully ready for operational use in schools.

## 3.5 Data Analysis

Upon gathering all necessary data, the statistical analysis will use the following techniques:

### 3.5.1 Weighted Average and Likert scale

The researcher used the weighted average and Likert scale to determine the level of acceptability of the contextualized material among the science teachers. Weighted averages are calculated from Strongly Agree=5 to Strongly Disagree=1. A Likert scale is the simplest and most practical way to measure the strength of opinion.

### 3.5.2 Coding

Coding qualitative data to find common themes from subject matter experts' comments and suggestions of the contextualized material. The themes were general, content, and appropriateness.

## RESEARCH FINDINGS

The contextualized material contained sixteen vocabulary words and pictures that were chosen to comprehensively review the content of animal classification.

Four science teachers in various places in Thailand subjected the learning material to expert validation. The evaluators were provided a questionnaire via Google Forms, and the contextualized material was emailed. The results are shown in Table 1.

**Table 1:** Comments and Suggestions of the SMEs

Characteristics	Comments
General	"Good job."
Content	"For Grade 4, review the topic before using the learning material."
Appropriateness	"It is an accurate strategy that will benefit the learners." "It is an excellent animal classification exercise and gives students meaningful learning."

The evaluators commented on the learning material's appropriateness in improving Grade 4 Thai learners' English vocabulary acquisition and conceptual understanding as stipulated in Table 1. [12] Nordengren (2022) stated that supplemental resources are an additional student benefit. These can motivate them on a particular topic. Teachers can add extra resources to assist students who need corrective action to succeed. Furthermore, [13] Rodriguez (2023) declared that when used effectively, these resources help students get involved, engaged, and connected with the content of the learning area.

The contextualized material, which was assessed for its (1) design, (2) content, (3) appropriateness, and (4) purpose, was strongly agreed upon by the validators and was recommended to be utilized in the present study.

**Table 2:** Level of Acceptability of the Contextualized Material

Statement	Mean	SD	Mean Interpretation
<b>Design</b>			
1. The design is captivating.	5	4.47	Strongly Agree
2. The resolution and colors are fitted for viewing and reading.	5	4.47	Strongly Agree
3. The material is durable.	4.5	4	Strongly Agree
4. The material is handy.	5	4.47	Strongly Agree
<b>Content</b>			
1. The content presented is easy to understand.	4.5	4	Strongly Agree
2. The content presented is relevant to the lesson.	5	4.47	Strongly Agree
3. The content presented is not lengthy.	4.5	4.06	Strongly Agree
<b>Appropriateness</b>			
1. The material is an appropriate tool for cognitive strategies.	4.75	4.24	Strongly Agree
2. The material is appropriate for their language abilities.	5	4.47	Strongly Agree
3. The material is appropriate to reinforce the concept.	4.75	4.24	Strongly Agree
<b>Purpose</b>			
1. The material helps to understand the lesson.	4.75	4.24	Strongly Agree
2. The material helps to improve vocabulary acquisition in a science classroom.	4.75	4.24	Strongly Agree
3. The material gives a positive impression of the lesson through a non-traditional approach.	4.5	4	Strongly Agree
4. The material helps improve English language skills.	4.75	4.24	Strongly Agree
5. The material allows mastery of the concept through individual practice.	4.75	4.24	Strongly Agree

*Legend: 4.20-5.00 Strongly Agree*

*3.40-4.19 Agree*

*2.60-3.39 Moderately Agree*

*1.80-2.59 Disagree*

*1.00-1.79 Strongly Disagree*

The total score is 4.77, which implies that the level of acceptability of the contextualized material was strongly agreed by the experts as shown in Table 2.

## CONCLUSIONS

The evaluators validated the learning material’s appropriateness in improving Grade 4 Thai learners’ English vocabulary acquisition and conceptual understanding. Additionally, the contextualized material, which was assessed for its (1) design, (2) content, (3) appropriateness, and (4) purpose, was strongly agreed upon by the validators and was recommended to be utilized in the present study.

With all these, the significant findings of the present study contributed to the body of knowledge in utilizing

contextualized material as supplementary instructional material, which was proven effective in improving students' conceptual understanding of animal classification.

The present study also opened room for improvement to maximize the full potential of the developed supplementary instructional material and the utilization of cognitive strategies in learning different concepts in the science classroom.

## RECOMMENDATIONS

Based on the results and conclusions of the study, which found that Thai learners accepted the contextualized material suitable for the application of cognitive strategies based on their abilities. Hence, the researcher would like to recommend the following:

1. For the EFL learners' community, this study highlights the potential benefits of incorporating contextualized materials and cognitive strategies in EFL contexts. Exploring engaging and realistic ways to enhance learning outcomes among EFL learners is essential.
2. For teachers, this study provides proof of the effectiveness of contextualized materials as supplementary resources and vocabulary learning strategies suitable for learners' abilities to enhance conceptual understanding and vocabulary acquisition in a science classroom. Teachers may incorporate these materials into their teaching practices to provide engaging and meaningful learning experiences for their students.
3. For future researchers, this study can build upon these findings to investigate the effectiveness of contextualized material and vocabulary learning strategies and explore the impact of these interventions on other learning areas and in different EFL contexts.

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