

# Development of Reading Skills for Thai Grade 1 Students Through Smart Training Application Innovation

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## Abstract

This research aimed to create a smart training application innovation to develop Thai language reading skills for Thai grade 1 students, targeting an efficiency standard of 80/80. The study compared the reading abilities of Thai grade 1 students before and after using the application. These students were from the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University. Specifically, 13 students from Ban Na Si School were selected using purposive random sampling for the first semester of the academic year 2023. This school was intentionally selected due to its eagerness to implement this innovative approach. The study utilized two versions of the smart training application: one focused on words without tone marks and the other on consonant blend words. Four lesson plans were designed (two for each version), and a 20-question reading achievement test was administered. Through the  $E_1/E_2$  value calculation and a t-test, it was deduced that the application surpassed the 80/80 efficiency standard, scoring 81.15/86.15. Furthermore, students exhibited a significant improvement in their reading skills after using the application, as evidenced by a higher post-study performance at a 0.05 significance level.

**Keywords:** educational development, reading skills, Thai primary education, smart training application, innovation

## 1. Introduction

According to the fundamental principles of education management in the Basic Education Core Curriculum B.E. 2551 (2008 A.D.), the emphasis is placed on developing knowledge, critical thinking, abilities, ethics, the learning process, and social responsibility in order to promote a well-rounded individual. The learner is considered paramount, encouraging natural development, and maximizing potential within the Thai language learning domain. The focus is on teaching and learning management to equip students with proficiency in all four language skills: listening, speaking, reading, and writing, ensuring correctness, flexibility, precision, and interrelation. This is accomplished through fostering concurrent thinking processes, enabling effective language communication following language principles, nurturing linguistic awareness, recognizing the importance of the Thai language, appreciating its beauty and Thai literature, and cultivating a habit of reading and seeking knowledge independently (Phanoi, 2010; Vibulphol et al., 2021; Ra-ngubtook & Bhongsatiern, 2022).

Reading is essential to human life in today's rapidly changing world, encompassing various aspects such as material advancements, scientific discoveries, technology, and intellectual development. Seeking knowledge and experiences from various sources of information allows individuals to stay informed about news, knowledge, events, progress, and changes, aligning with the global landscape. It serves as a tool for effective communication, fostering understanding and positive relationships, enabling people to engage in business, work, and coexist happily in society (Ministry of Education, 2008). Reading is a key that unlocks knowledge and academic pursuits, one of the vital skills among the four language skills: listening, speaking, reading, and writing. Moreover, reading is not only a means of seeking entertainment but also a way to enhance speaking and writing skills through the knowledge acquired. Reading is a highly significant skill in daily life, as students utilize it to explore various scientific disciplines for entertainment and relaxation. Those with a love for reading and reading skills efficiently seek knowledge and excel in their studies. Additionally, they can effectively apply the knowledge gained from reading in their speaking and writing endeavors. Presently, there has been a significant promotion of reading skills, both at the primary and secondary education levels, as students with a solid

foundation in reading can use it as a tool to excel in their studies and acquire knowledge in other fields effectively (Pienchob & Inthamphan, 1995; Quigley, 2020; Chu et al., 2021)

Kumansit (2011) emphasizes that reading is a tool for learning, facilitating the development of knowledge, thoughts, understanding, and communication skills. It plays a crucial role in personal and societal development. Reading is essential for human life in today's Thailand, where there is an ongoing issue of children struggling to read even when they are in the third year of primary education. In the academic year 2007, the Ministry of Education reported that around 800,000 students aged 9 to 15, from grade 3 to grade 9, had difficulty reading, representing approximately 12% of students. This issue requires urgent attention because reading is a fundamental tool for seeking knowledge and understanding. If students cannot read, they will face difficulties in learning other subjects as well (Thanitwet, 2014). In response to this challenge, the Office of the Basic Education Commission (OBEC) declared 2015 as the "Year of No Student Left Unable to Read and Write" and set key objectives for national educational development, aiming to equip learners with critical thinking skills, desirable characteristics, and necessary skills for the 21<sup>st</sup> century. Developing these qualities, including reading, and writing skills, is considered crucial for self-improvement and higher-level learning, as well as literacy, which is a cornerstone for further subject-specific learning (Spires et al., 2019; Erickson & Koppenhaver, 2020; Dorn & Jones, 2023).

The inability of students to read may stem from various causes, whether originating from the students themselves, such as lack of interest, teachers who are not proficient in language instruction, inappropriate teaching methods not aligned with students' interests, or parents who do not prioritize promoting reading (Thong-art, 2014). Additionally, it may be influenced by cultural differences, as some children belong to families of migrant laborers who constantly relocate for work within Thailand. Another factor could be developmental delays and a lack of motivation for learning (Anuruthwong, 2013). A study on Thai children's reading problems pointed out that Thai children struggle with reading and pronunciation, partly because they are taught to read one syllable at a time, making it challenging for them to spell words. In summary, the causes of reading difficulties can be attributed to family attitudes that do not emphasize the importance of reading, as well as certain families' occupational instability, leading to interruptions in children's education and a lack of motivation and dedication to learning, ultimately resulting in a deficiency of reading skills (Tunmer & Hoover, 2019; Duke & Cartwright, 2021; Vernet et al., 2022).

The problem of students being unable to read arises from incorrect teaching methods or teachers lacking expertise in teaching reading. For instance, teaching by rote memorization of individual words or incorrect spelling instruction, such as spelling "Sia" (loss) as "Ae Sor E Yor" instead of "So Ia Sia" This leads to students lacking proper spelling skills, making it difficult for them to read. Based on past experiences in teaching the Thai language, it is found that grade 1 students have reading difficulties due to various reasons, including a lack of precision in Thai consonants and vowels, confusion when reading words with tone marks, mispronunciation due to consonants finales and inherent vowels, inability to spell words correctly, and lack of focus during learning (Septiyana & Aminatun, 2021; Demina et al., 2022; Stenner, 2022).

One of the primary reasons why students struggle with reading is their lack of spelling skills, often resulting from difficulties in recognizing Thai consonants and vowels or only being able to recall some of them, imprecision in dealing with diphthong vowel sounds, and the inability to distinguish vowel sounds within words (Arayawinyu, 2001). Additionally, confusion between monophthongs and diphthongs poses a challenge (Niyomtham, 2006). This affects students' ability to spell words correctly. The study of Thai language teaching methods in elementary schools has shown that the principles of teaching Thai reading from grades 1 to 3 are crucial since this is the period when students are learning to read. If teachers do not teach spelling during this early learning phase, students may lack the foundation for word composition, leading to confusion when reading, an inability to read accurately, and spelling errors. Furthermore, teaching spelling helps students build their reading skills and empowers them to read books independently.

Another effective method for teaching reading is to use multimedia teaching materials. An example of this approach is illustrated by Arayawinyu (2001), who discussed a teaching program implemented at the Alameda School in California for students in grades 1 to 3 with language learning difficulties. The program aimed to develop students' listening skills, sound differentiation, sequence-based sound recognition, identifying desired sounds amid noise, recognizing speakers, recognizing letter sounds in words and syllables, and remembering words within a lesson. The teaching materials included audio recordings and accompanying books. Experimental results showed significant improvements in students' skills across nine dimensions, consistent with the findings of Boonratsamee (2006) regarding the reading abilities of grade 2 students who used a teaching program focused on inherent vowel sounds. These examples demonstrate that multimedia teaching materials can greatly enhance

learning by stimulating students' interest and encouraging hands-on activities, resulting in improved memory, and learning outcomes.

The integration of technology in the classroom can take various forms, and using smart training applications is one such option that enhances students' interest in learning. Smart apps can serve as a medium for content delivery and revision, empowering students to learn independently and review their materials. Furthermore, collaborative learning through a centered approach fosters teamwork, which, as Withayawutthikul (1990) noted, is essential for social skill development, as humans naturally need to interact and grow together. Activity materials, equipment, tools, and media are essential components of these learning activities, as pointed out by Moolkam (2007). Researchers have also shown interest in using technology in centered learning by employing spelling apps instead of traditional teaching materials. These apps blend visual and auditory elements and incorporate games to make learning enjoyable and engaging. Several researchers believe that the root cause of children's reading problems lies in their listening skills deficiency. Children often struggle to differentiate various sounds within words, affecting their ability to read. The remedy is found in computer games, even though children may be having fun with vivid, colorful animations and receiving rewards for high scores without realizing that their reading issues are gradually being addressed. In reality, children's brains are being trained through slow, deliberate exposure to consonants and stress sounds to facilitate easy understanding, quick recall, and, ultimately, comprehension of those words through listening and reading.

Consequently, researchers are interested in utilizing a smart training application that can be used on smartphones or tablets for teaching spelling. The use of smart app-based teaching aims to empower learners to take active learning by engaging with educational content through activities aligned with the policy of Basic Education Core Curriculum B.E. 2551 (2008 A.D.). This policy emphasizes student-centered learning, promotes natural development, and focuses on the integration of knowledge and morality in the learning process. Centered learning shifts the teacher's role to that of a content provider who compiles various teaching materials and encourages students to self-study (Kaemmanee, 2002). Therefore, the use of the smart training application can effectively enhance the reading skills of primary school students, particularly those in grade 1, and yield positive results.

## 2. Method

This study is an experimental study using a one-group pretest-posttest design (Ketsang, 2006). The target group for this study consisted of 13 Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University, studying in the first semester of the academic year 2023. The school, selected through purposive sampling, was Ban Na Si School, under the Loei Primary Educational Service Area Office 1, selected because of its interest in becoming a pioneering school in using innovative instruments. The research instruments included: 1) Two sets of smart training applications—the first set focused on words without tone marks, and the second set on consonant blend words, and 2) Four lesson plans—the first two focused on words without tone marks, and the next two on consonant blend words, and 3) A 20-question reading achievement test. Data analysis involves calculating standard statistics such as the mean ( $\bar{x}$ ), standard deviation (S.D.), percentage (%), and  $p$ -values (Mishra et al., 2019). Additionally, it entails calculating the  $E_1/E_2$  value against the 80/80 efficiency criteria and conducting a dependent t-test using SPSS Statistics version 28 (Babbie et al., 2022).

### 3. Results

1) The analysis results for the efficiency of the smart training application innovation to develop Thai language reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University, based on the efficiency of the process/product ( $E_1/E_2$ ) according to the 80/80 criteria

Table 1. The efficiency of the smart training application innovation

Students	The process scores from each subject's learning ( $E_1$ )					Post-learning achievement ( $E_2$ ) (20)
	Set 1 (20)	Set 2 (20)	Set 3 (20)	Set 4 (20)	Total (80)	
1	15	17	16	18	66	15
2	15	17	19	19	70	17
3	9	13	15	19	56	19
4	13	15	17	19	64	20
5	13	16	17	15	61	19
6	15	16	14	19	64	15
7	15	16	15	17	63	17
8	14	15	17	18	64	17
9	18	18	19	20	75	16
10	14	15	17	18	64	18
11	16	18	15	17	66	17
12	15	17	15	16	63	16
13	15	16	17	20	68	18
Total	187	209	213	235	844	224
Mean ( $\bar{x}$ )	14.38	16.08	16.38	18.08	64.92	17.23
Percentage (%)	71.92	80.38	81.92	90.38	$E_1=81.15$	$E_2=86.15$
$E_1/E_2 = 81.15/86.15$						

Note.  $E_1$ = efficiency of process,  $E_2$ =efficiency of product.

The results above reveal the efficiency of the smart training application innovation to develop Thai language reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University. The average in-class process score is 81.15% ( $E_1 = 81.15$ ), and the average post-learning achievement score is 86.15% ( $E_2 = 86.15$ ), with  $E_1/E_2 = 81.15/86.15$ .

2) The comparative results of pre-learning and post-learning achievements for the smart training application innovation designed to develop Thai language reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University

Table 2. The comparative results of pre-learning and post-learning achievement tests for the smart training application innovation

Test	N	$\bar{x}$	S.D.	df	t	p - values
Pre-test	13	10.46	1.89	12	11.69*	0.0000
Post-test	13	17.23	1.53			

Note.  $p \leq .05$ .

The table above reveals the comparative results of pre-learning and post-learning achievements for the smart training application innovation to develop Thai language reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University. These reveal the pre-learning achievement test had an average score of 10.46 ( $\bar{x} = 10.46$ , S.D. = 1.89), while the post-learning achievement test had an average score of 17.23 ( $\bar{x} = 17.23$ , S.D. = 1.53). The post-learning achievement is statistically significantly higher than the pre-learning achievement at the .05 level.

### 4. Discussion

Based on the research findings regarding the development of reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University, the findings can be summarized as follows:

#### *4.1 The Efficiency of the Smart Training Application Innovation*

The research findings indicate that the average in-class process scores were 81.15% ( $E_1 = 81.15$ ), while the post-learning achievement score averaged 86.15% ( $E_2 = 86.15$ ), with  $E_1/E_2 = 81.15/86.15$ . This outcome can be attributed to the systematic approach in creating the smart training application innovation, involving a study of relevant documents and research related to skill development. The study integrated elements from the Basic Education Core Curriculum B.E. 2551 (2008 A.D.), the Thai language area, including principles, concepts, theories, documents, and research on Thai language reading. Moreover, the application was designed to be engaging, with colorful visuals, interesting activity sets, and a progression from easy to challenging content. This approach allowed students to learn through hands-on experiences, practice, and continuous learning, integrating various learning objectives. Continuous assessment by teachers throughout each activity set enabled students to identify their weaknesses and strive to improve them. Additionally, the developed Thai language reading smart training application innovation underwent review and received recommendations from relevant experts before implementation. Overall, the skill training program created by the researchers was of high quality and aligned with the principles outlined by Stratham and Torell (1996). Furthermore, incorporating technology into the learning process showed benefits such as reduced absenteeism and fewer breaks for students who used computers in their education. Moreover, students from schools that adopted technology in their teaching had a higher rate of university admission success compared to those from schools that did not integrate technology into their teaching methods.

The research on the development of reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University, using the smart training application innovation, revealed that the application was effective according to predefined criteria. This aligns with the study conducted by Thanasirikul and Lanchwathanakorn (2016), which investigated the results of using a Thai spelling application along with a learning center teaching approach on the reading and spelling abilities of grade 1 students with reading difficulties. The objective of this research was to study the results of using the spelling application along with a learning center teaching approach on the reading and spelling abilities of grade 1 students with reading difficulties. The sample group for this study consisted of 30 grade 1 students from Chulalongkorn University Demonstration Elementary School in the second semester of the academic year 2016. The research instruments used included pre-learning and post-learning tests, lesson plans, and a spelling app. Data analysis was performed using mean scores, standard deviation, and t-tests. The research results indicated that students with reading difficulties showed significantly higher learning performance after using the Thai spelling app along with a learning center teaching approach compared to their performance before learning, with a statistical significance level of .01. Additionally, Hayeeteh et al. (2021) conducted a research study on the development of an application to promote the learning of Thai-Malay proverbs. The objective of this study was to explore proverbs with similar meanings between the Thai and Malay languages, create a format for Thai-Malay proverbs with similar or related meanings, analyze categories of proverbs with similar or related meanings between Thai and Malay, and evaluate the efficiency of the application for learning Thai-Malay proverbs with similar or related meanings. The research revealed a total of 94 Thai-Malay proverbs with similar or related meanings. These proverbs could be categorized into two formats: those that were completely similar or partially similar and those that were similar in meaning but had differences in presentation. Furthermore, these proverbs could be grouped into nine categories, including animals, humans, metals and jewelry, language and culture, nature, organs, behavior, noun usage, and adjective usage. Experts rated the technical and content quality of the application at the highest level ( $\bar{x} = 4.61$ , S.D. = 0.26), and overall user satisfaction with the application's quality was high, with an average score of 4.19 and a standard deviation of 0.54.

#### *4.2 The Comparative Results of Pre-Learning and Post-Learning Achievements for the Smart Training Application Innovation*

The study revealed that pre-learning achievement had an average score of 10.46 ( $\bar{x} = 10.46$ , S.D. = 1.89), whereas post-learning achievement had an average score of 17.23 ( $\bar{x} = 17.23$ , S.D. = 1.53). This difference was statistically significant at the .05 level, as per the established hypothesis. This could be attributed to the students' high confidence in the reading skill test developed by the researchers, which was based on a comprehensive analysis of learning standards, indicators, content, and objectives. The researchers meticulously followed a systematic process to create an achievement test guided by principles of measurement and evaluation. This process included expert consultations and pilot testing with students resembling the sample group (Try-Out). The achievement test exhibited high quality, with an IOC score ranging from 0.67 to 1.00, a difficulty value between 0.57 and 0.71, a discrimination value between 0.29 and 0.86, and a reliability coefficient of 0.92, thus contributing to its effectiveness in development.

This may be attributed to the researchers' awareness of students' reading problems as evidenced by the reading tests. Upon identifying individual students' knowledge and problems, the researchers sought ways to enhance reading skills efficiently. They began by studying the Basic Education Core Curriculum 2008 (B.E. 2551), focusing on principles, concepts, theories, documents, and related research on Thai language reading. This served as the conceptual framework for creating an achievement test to assess reading proficiency, aligned with the standards and indicators of the Basic Education Core Curriculum B.E. 2551 (2008 A.D.). Following a systematic step-by-step approach, the researchers designed an analytical reading achievement test covering content and behavioral objectives. After completing the achievement test, the researchers had experts in the field review and provide recommendations for content validity, leading to necessary adjustments and improvements.

The study then conducted the achievement test with students who had a context similar to the sample group, aiming to determine the discrimination value, difficulty value, and reliability of each test item. Subsequently, the results were used to improve and refine the test, ensuring it was effective and suitable for grade 1 students and aligned with the standards and indicators of the Basic Education Core Curriculum 2008 (B.E. 2551). As a result, the achievement test effectively measured learning outcomes and met the specified criteria, as mentioned by the Ministry of Education (2008), which emphasized the importance of measuring and evaluating student learning outcomes to reflect important competencies and desired characteristics at all levels of education. Measuring and assessing learning outcomes is a process that enhances the quality of education by using assessment results as data and information to monitor progress, achievements, and potential for development and learning. This aligns with the definition of measurement by Nikommanon (1989), who states that measurement is a tool used to seek or verify meaningful information in place of behavior, characteristics, or the work each person demonstrates. Additionally, it is consistent with Ruetjaron (2001), who defines measurement as the process of assigning numbers or symbols to individuals, objects, or events in a standardized manner to obtain information representing the quantity or quality of the measured characteristics.

The research on the development of reading skills for Thai grade 1 students at the Network School of the Teacher Professional Experience Center, Faculty of Education, Loei Rajabhat University revealed that post-learning achievement results were higher than pre-learning, consistent with the hypothesis. This aligns with the research by Sangyuenyong and Pansri (2020) on the development of spelling reading skills for grade 4 students using the active learning 4-step skills with an application. The objectives of this research were: 1) to develop the active learning 4-step skills with an application to effectively enhance the spelling reading skills for grade 4 students to an efficiency of 80/80, 2) to compare spelling reading results before and after using the active learning 4-step skills with an application for grade 4 students, and 3) to study the satisfaction level of grade 4 students towards learning using the active learning 4-step skills with an application. The findings were as follows: 1) The efficiency of the active learning 4-step skills with the application in promoting grade 4 students' spelling reading skills was evaluated and overall deemed usable with an efficiency of 83.00/81.72, meeting the set standard of 80/80, 2) Comparative results of the spelling reading skill results before and after using the active learning 4-step skills with the application for grade 4 students, it was statistically significant at the .05 level that post-learning achievement results were higher than pre-learning, and 3) The satisfaction level of grade 4 students towards learning using the active learning 4-step skills with the application was very high ( $X = 4.58$ ,  $S.D. = 0.58$ ).

The mentioned research indicates that the smart training application innovation used in organizing learning activities adheres to a teaching principle based on students' needs. It allows students to actively participate in learning activities from listening, reading, and speaking, to writing and up to the point of work evaluation. Students learn with comprehension using more concrete media than abstract ones and are involved in activities independently. They collaborate with peers in groups to ensure experiential learning. The content is tailored to the perceptual abilities of primary school students, making the learning process enjoyable and engaging. This enthusiasm for their learning arises due to the interesting teaching methods, leading to improved academic outcomes.

Consequently, the researcher developed a smart training application innovation and an achievement test. They also employed a learning management process that focused on student-centered. Allowing learners the opportunity to create knowledge creatively, results in the improvement of Thai reading skills after learning compared to before, which aligns with the set hypothesis.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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No additional data are available.

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