GRADUATE SCHOOL OF
BUSINESS AND ADVANCED
TECHNOLOGY MANAGEMENT

Au Virtual International Conference 2021
Entrepreneurship and Sustainability in the Digital Era
Assumption University of Thailand
October 19, 2021

Co-hosted by

The Effect of Computer-Assisted Phonics Games on Thai Kindergarten Students' Listening Proficiency and English Phonics Achievement

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Abstract

Purpose: This study was aimed at comparing the Kindergarten 2 students' listening proficiency and English Phonics achievement before and after using computer-assisted phonics games in English Phonics class at an international school in Bangkok during the academic year 2020-2021. This research followed a one group pre-test post-test pre-experimental research design. One conveniently chosen class of 13 Kindergarten 2 students participated in this 8-week study. An instructional intervention was implemented in English Phonics class two sessions per week and 40 minutes per session. Statistical data analysis indicated that the difference between participants' listening proficiency before and after using computer-assisted phonics games in English Phonics class was significant, favoring the latter condition favoring the use of computer-assisted phonics games. Moreover, the participants' listening proficiency improved from good before using computer-assisted phonics games, to excellent after using such games. It was also found that there was a significant difference in participants' English Phonics achievement before and after using computer-assisted phonics games in English Phonics class, favoring the use of computer-assisted phonics games. Results from the data analysis also showed that Kindergarten 2 students' English Phonics achievement improved from a recommendation for English Phonics class support before using computer-assisted phonics games, to an excellent achievement after using such games. Based on the research findings, recommendations for students, teachers, administrators, curriculum developers and future researchers are provided.

Keywords: Listening Proficiency; English Phonics Achievement; Kindergarten Students; English Phonics Class; Computer-Assisted Phonics Games
JEL Classification Code: C12, I20, I21, N35

1. Introduction

The importance of learning foreign languages in Thailand is recognized in the Basic Education Core Curriculum B.E. 2551 (A.D. 2008), which emphasizes the need of Thai students to learn foreign languages at all school levels (Ministry of Education, 2008). In order to learn English as a foreign or a second language, students can benefit from a systematic instruction that emphasizes on phonological awareness (i.e., the ability to identify sounds in spoken words and hence recognize that a spoken word consists of a sequence of individual sounds), which is strongly connected to the development of language literacy (Swanson et al., 2005). Phonological awareness can be expressed through phonics skills and listening proficiency skills such as identifying and manipulating words and syllables, rhyming, matching initial consonants, and counting the number of phonemes existing in spoken words. Therefore, phonological awareness is an essential skill for helping learners in early childhood progress in their development of phonics skills and listening proficiency skills throughout early years, and has been proven to be linked to reading and spelling success at primary level, as well as to improve communication in general (State Government of Victoria, 2020). Phonics skills and listening proficiency skills can be developed by activities that promote sound skills, phonics songs, reading, and the use of technology that encourages the development of such skills (Walsh, 2017). There is a current increase in the use of computer-assisted programs for the purpose of education learning in Thailand. These computer-assisted games, especially online phonics games, are fun and beneficial to the learners to focus and engage in their language course (Philips, 2010). Nessy Learning and Starfall Education are among the several online platforms that provide computer-assisted phonics games and structured programs for the purpose of teaching and learning English language skills, including reading, listening, blending words, vocabulary and making sentences. The computer-assisted phonics games from these platforms are structured multisensory phonics teaching tools, and had shown to improve language learners' listening, reading and spelling skills while learning a first, second or foreign language (Nessy Learning, 2017, 2020; Starfall Education, 2021).

Despite of the many benefits of using computer-assisted phonics games on children' listening proficiency and English Phonics achievement, English language

education at kindergarten level in Thailand has been reported to be mainly provided in a traditional way (e.g., Lee & Eamoraphan, 2017; Parreno & Eamoraphan, 2017), which negatively impacts students' English phonics achievement, English listening proficiency and English speaking proficiency. With all this in mind, the researchers decided to develop a study to compare the Kindergarten 2 students' listening proficiency and English phonics achievement before and after the use of computer-assisted games in English Phonics class at an international school in Bangkok, Thailand.

2. Research Objectives

The researchers, concerned with the use of a traditional teaching method in the English Phonics class at an international school in Thailand, particularly in Kindergarten 2, designed a comparative study to address the following objectives.

1. To determine the levels of students' listening proficiency before and after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok.
2. To determine the levels of students' English Phonics achievement before and after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok.
3. To determine whether there is a significant difference between students' listening proficiency before and after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok.
4. To determine whether there is a significant difference between students' English Phonics achievement before and after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok.

3. Theoretical Framework

This study was conducted based on the following supporting theories: the emergent literacy theory, the constructivist theory, and the computer-assisted language learning (CALL) theory.

3.1. Emergent Literacy Theory

In young children, the progress of literacy is multifaceted and closely connected with reading and writing experiences in both at home and at school (Teale & Sulzby, 1986). The emergent literacy theory states that reading, speaking, listening, and writing abilities are interrelated and develop synchronously. Improvement in one area concurrently influences another; exposure to writing experiences are also working to enhance a child's reading skills and vice versa (Teale & Sulzby, 1986).

3.2. Constructivist Theory

The constructivist theory (or simply put as "constructivism") provides a framework to explain how students are able to build up their knowledge bases upon what they have already learnt. According to this theory, the effective approach for assembling new knowledge shall develop in making the lesson easy and creating new ways to present and shape the information (Bruner, 1986, 1990, 1996). Furthermore, this theory states that the instructor's responsibility is to simplify the information with the suitable materials for all the student's present state of understanding. The curriculum also should be established in a way that the learner can progress upon what they have studied.

3.3. Computer-Assisted Language Learning (CALL) Theory

Computer-assisted language learning (CALL) theory is a learning model for the digital age, in which computers are used for teaching and for learning languages. For example, computer technology can be employed for interactive learning as well as for presentation support during a language class. Critical thinking is encouraged during the computer-assisted language learning, and CALL has been seen to improve communicative competence (Vinther, 2005). The application and use of technology in language classrooms (e.g., the use of online or computer-assisted phonics games) are now being implemented since very early years (Nessy Learning, 2017, 2020; Starfall Education, 2021).

4. Conceptual Framework

The conceptual framework of this study is depicted in Figure 1. The independent variable of this study was the use of computer-assisted phonics games, while the dependent variables were the level of listening proficiency before and after using computer-assisted phonics games and the level of English phonics achievement before and after using computer-assisted phonics games.

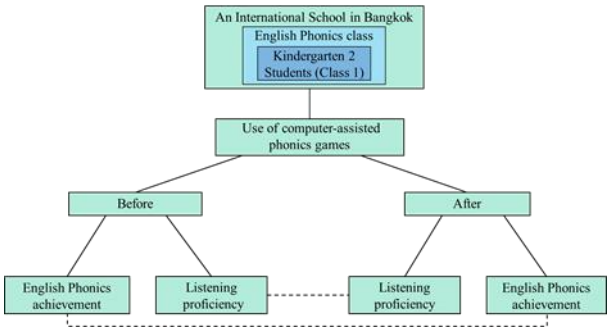

Figure 1: Conceptual Framework for the Current Study. (Dashed Lines Indicate Comparisons)

5. Literature Review

In this section, some previous studies related to the research variables addressed in this study are reviewed and summarized.

Parreno and Eamoraphan (2017) conducted a study to compare the Kindergarten 2 students' achievement in English Phonics before and after the use of English Phonics online games from the educational website Starfall, and to examine their perceptions toward such games. For this study, 11 Kindergarten 2 students of St. Mark's International School in the academic year 2015-2016 participated during the two-month study. The data analyses showed that there was a significant difference between the pre- and post-tests scores of Kindergarten 2 students before and after using English Phonics online games at a significance level of .05. The study found that Kindergarten 2 students' English phonics achievement was already good before the use of English Phonics online games, and increased to excellent after the use of such games.

Seesawat (2016) conducted a research focusing on the improvement of elementary school students' English comprehension through educational games. She carried out her case study with 39 students from Room 3 of Grade 3 students of the intensive English programs at Assumption College Ubonratchathani during the academic year 2015. The aims were to examine the situation of English comprehension of Grade 3 students from the target school, and implement and instructional development intervention (IDI) using educational games, in order to examine the initial impact of the IDI and improve the participants' English comprehension, including their reading comprehension, listening skills, reading skills, writing skills and speaking skills. The study found a significant difference in the participants' English comprehension between the pre- and post-IDI through educational games.

At Kirakira Kids International Kindergarten Thailand, Lee and Eamoraphan (2017) aimed to compare the progressive scores of the English listening proficiency and English speaking proficiency of Kindergarten 3 students. The collection of data was over a 3-month period, from April-July 2015, with 40 students. This research concluded that the students had lower progressive scores in the first period than in the second and third observation periods. The study showed that there was a significant difference in the students' English listening proficiency and the students' English-speaking proficiency before and after using various activities aimed to excite the participants' interest, such as songs, chants, games, and total physical response activities. The study also found that the students slightly improved in listening and speaking proficiency over a period of 3 months, as well as that there was a significant difference in the English listening proficiency and the English speaking proficiency, after using songs, chants, games, and total physical response activities.

6. Methodology/Procedure

In this section, details on the study's population, sample and research instruments are provided.

6.1. Population and Sample

This study was conducted in the academic year 2020-2021 at an international school in Bangkok, Thailand. The main focus group on this study was based upon Kindergarten 2 students, with a total convenience sample of 13 students out of a population of 26 students.

The instrumental scope of this study included an English Phonics test and a listening proficiency test, that were administered as pre- and post-tests before and after the instructional intervention.

The instructional scope was limited to two English Phonics lessons a week for over eight weeks, and the lessons consisted of 40-minute periods per class. There were two classes of Kindergarten 2 and the researchers chose one class, the first author's own class, to conduct the research. The other class was taught in the traditional way, but was not considered in this study, which followed a pre-experimental research design. During the experiment, several computer-assisted games from educational websites, such as Nessy Learning and Starfalls, were used in this study, and implemented by the first author to her own class. The students were engaged in the computer-assisted games after each lesson was introduced. Then, the students worked, either individually or as a group, to help complete the games and find the answers to them on the smartboard.

6.2. Research Instruments

Two research instruments were used for this study: the Listening Proficiency Test and the English Phonics Achievement Test. Both research instruments were administered as pre- and post-tests to the experimental group.

6.2.1. Listening Proficiency Test

This assessment tool was comprised of the sounds of chosen phonics words from those that participants have learned in English Phonics class during Kindergarten 1 and Kindergarten 2 Term 1 and Term 2, and were reinforced during the experimental period (which fell within Kindergarten 2 Term 3) using the Jolly Phonics Books 1-7, consonant-vowel-consonant (CVC) words and word families. The test items were chosen by the first author herself, based on some English Phonics tests administered in the target school in previous years. The Listening Proficiency Test assessed how the students hear and response by choosing the right choice after listening to the sentences or words in English as a foreign language accordingly. The Listening Proficiency test consisted of 9 multiple choice questions, giving the students three choices per item (a, b and c; see Figure 2).

Table 1 shows the scoring rubric used to assess participants' performance in the Listening Proficiency Test.

Score	Mean score	Interpretation
8-9	8.01-9.00	Excellent
6-7	6.01-8.00	Good
4-5	3.01-6.00	Satisfactory
≤ 3	≤ 3.00	Recommendation for English Phonics class support

6.2.2. English Phonics Achievement Test

The English Phonics Achievement Test was designed to assess students' demonstration of phonological awareness and understanding of the information learned in English Phonics class, both before (pre-test) and after (post-test) the

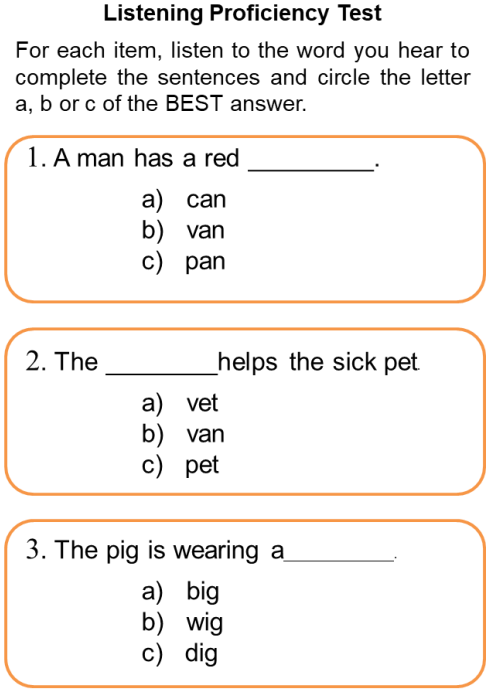

Figure 2: Sample Items of the Listening Proficiency Test

use of computer-assisted games. This test consisted of two parts: a "Matching" section (comprised of seven words) and a "Fill in the blanks" section (comprised of six words). The understandings and skills assessed by each word item were learned in English Phonics class during Kindergarten 1 and Kindergarten 2 Term 1 and Term 2, and were reinforced during the experimental period (which fell within Kindergarten 2 Term 3) using Jolly Phonics Books 1-7 as well as CVC words and word families.

Matching Section: This was the first section of the test. The Matching section had the same test format that the target international school in Bangkok has been using for many years with their Kindergarten 2 students. This section assessed students' understanding in forming seven words using the blending techniques that they learned in English Phonics class during the experimental period (see Figure 3). In this section, a maximum score of seven points was possible.

Fill in the Blanks Section: The second section of this research instrument required students to fill in the right letters to complete the word correctly. To complete each of the six words in this section, the students had to correctly fill in two letters. For each correct word, students were awarded 2 points, 1 point per correct letter (see Figure 4). Participants' English Phonics achievement was assessed by

students understanding of the meaning and choosing the correct spelling of the phonics from the given six words. In this section, a maximum score of 12 points was possible.

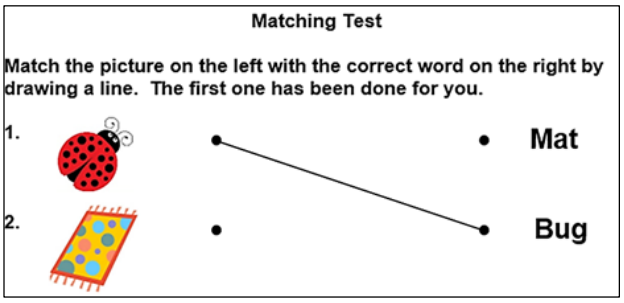

Figure 3: Sample Items in the Matching Section of the English Phonics Achievement Test

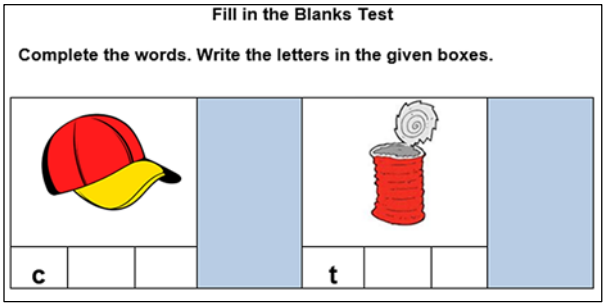

Figure 4: Sample Items in the Fill in the Blanks Section of the English Phonics Achievement Test

All the words appearing in the English Phonics Achievement Test were learned during kindergarten 2 English Phonics class Term 1 and Term 2, and were reinforced during the experimental period, which fell within Kindergarten 2 Term 3.

Table 2 shows the scoring rubric used to assess participants' performance in the English Phonics Achievement Test. This scoring rubric followed the grading standards of the target international school.

Table 2: English Phonics Achievement Test Scoring Rubric

Score	Mean score	Interpretation
18-19	17.50-19.00	Excellent
16-17	15.50-17.49	Good
14-15	13.50-15.49	Satisfactory
≤ 13	≤ 13.49	Recommendation for English Phonics class support

7. Research Findings

From the analysis of the collected data, the following findings were obtained.

7.1. Findings From Research Objective 1

Regarding to this research objective, the following findings were obtained.

• The level of students' listening proficiency before using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok was good, M = 7.77, SD = 1.36.

• The level of students' listening proficiency after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at the target school was excellent, M = 8.92, SD = .28.

• The difference between the means, from the pre-test to the post-test, showed an increase in mean outcome of 8.92 – 7.77 = 1.15 units.

7.2. Findings From Research Objective 2

Regarding to this research objective, the following findings were obtained.

• The level of students' English Phonics achievement before using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok was a recommendation for English Phonics class support, M = 12.69, SD = 4.17.

• The level of students' English Phonics achievement after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok was excellent, M = 18.45, SD = 1.33.

• The difference between the means, from the pre-test to the post-test, showed an increase in mean outcome of 18.45 – 12.69 = 5.76 units.

7.3. Findings From Research Objective 3

Regarding to this research objective, the following findings were obtained.

• From performing a dependent sample t-test, it was found that there was a significant difference between students' listening proficiency before and after using computer-assisted phonics games in Kindergarten 2 English Phonics class at the target school, favoring the use of computer-assisted phonics games, $t(12) = -3.09$, $p < .009$.

7.4. Findings From Research Objective 4

Regarding to this research objective, the following findings were obtained.

• From performing a dependent sample t-test, it was found that there was a significant difference between students' English Phonics achievement before and after using computer-assisted phonics games in English Phonics class in Kindergarten 2 at the target school, favoring the use of computer-assisted phonics games, $t(12) = -5.40$, $p < .001$.

8. Discussion

In this section, the findings obtained from this study are discussed, placing them in context with previous studies.

8.1. Kindergarten 2 Students' Listening Proficiency Before and After Using Computer-Assisted Phonics Games in English Phonics Class

The research findings showed that students' listening proficiency after using computer-assisted phonics games in English Phonics class was significantly greater than the students' listening proficiency before using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok. The result is similar with Seesawat (2016), who conducted research on improving English comprehension of 39 Thai Grade 3 students through educational games. Similarly to the current study, Seesawat (2016) found that after an appropriate implementation of an instructional intervention using educational computer games in the class, English listening proficiency, and English comprehension in general, were significantly greater than before using the games. The researchers believe that the children have a better motivation and show more interest through computer-assisted games. Once they are interested in the activities, they will also use the language, pay attention and focus through listening to instruction hence their listening skills will also improve. Computer-assisted games are interesting and engaging as for many students it is more stimulating than lectures and other teacher-centered learning activities.

An excellent level of the participating Kindergarten 2 students' listening proficiency after using computer-assisted phonics games in English Phonics class at the target school shows that, after the first author introduced and integrated the computer-assisted phonics games into the lesson plan, the children's English listening proficiency has improved. The researchers believe that the children learned through play, and they had fun with interactives games. This is in line with Warschauer and Healey (1998) who states that CALL allows students to access, practice, and learn the target language in an almost limitless variety of real-life situations and environments.

8.2. Kindergarten 2 Students' English Phonics Achievement Before and After Using Computer-Assisted Phonics Games in English Phonics Class

In the current study, the level of Kindergarten 2 students' English Phonics achievement after using computer-assisted phonics games in English Phonics class at an international school in Bangkok was excellent. This indicates that these Kindergarten 2 students demonstrated an excellent level of mastery of the phonological awareness and understanding of the information learned in English Phonics class. This result is similar with the one reported by Parreno and Eamoraphan (2017), who conducted a study to compare the Kindergarten 2 students' achievement in English Phonics before and after the use of English Phonics online games from the Starfall educational website (www.starfall.com). Based on their findings, the use of online games in English Phonics is recommended in teaching and learning English Phonics, especially for young learners. Within the classroom, learning should be student-centered and accomplished through active discovery learning (McLeod, 2018a) through computer-based programs. The researchers believe that the students were having fun and actively engaged with the games that they were not focused that they are learning. They are relaxed and getting to practice through structured programs set in the plans which helped them to increase their motivation and increase their willingness as well as readiness to participate which help in their learning. Phonics skills and listening proficiency skills can be developed by phonics songs, reading, activities that promotes sound skills as well as technology that encouraged the development of these skills (Walsh, 2017).

The research findings also showed that students' English Phonics achievement after using computer-assisted phonics games in English Phonics class was significantly greater than the students' English Phonics achievement before using computer-assisted phonics games in English Phonics class in Kindergarten 2 at an international school in Bangkok. Thus, the results from the current study show that the role of teacher is to encourage and facilitate, not to present unalterable facts. Vygotsky (1978) also argued that social interaction is crucial for cognitive development and

that a child's learning always occurs in a social context in co-operation with someone more skillful providing language opportunities with systematic programs (McLeod, 2018b). These can help explain the increase levels of the outcome of students' English phonics achievement after using computer-assisted phonics games, which were played and allowed interaction with their classmates in each lesson during the experimental period.

9. Recommendations

Based on the study findings, the following recommendations are provided for students, teachers, school administrators and future researchers.

9.1. Recommendations for Students

In this study, Kindergarten 2 students has been introduced to computer-assisted phonics games. Based on the study's results, the students' listening proficiency and English Phonics achievement had significantly improved after the use of computer-assisted phonics games. Students should create the habit of playing and interacting more with educational computer-assisted phonics games under their teacher's and parents' support, in order to develop by themselves their listening proficiency and enhance their English Phonics learning.

9.2. Recommendations for Teachers

Based on the results of this study, Kindergarten 2 teachers, especially English Phonics teachers and English teachers of young learners, can integrate or use English phonics computer-assisted games in classroom activities. They should also integrate suitable computer-assisted games as a teaching-learning tool. The English Phonics teacher should always be updated and seek new teaching and learning approaches that are best fit to increase motivation and effective learning environment for their students. The researchers believe that by integrating or using English phonics computer-assisted games in their classroom activities, students will be able to share ideas, build knowledge together and increase their motivation as well as making the class more fun and draw more attention from students in phonics and listening activities. By doing this, it will help the teacher to easily provide reflection on students' achievement before and after using English phonics computer-assisted games.

9.4. Recommendations for School Administrators

According to the research methods used by the researchers in this study and the results of students' listening proficiency and English Phonics achievement, the researchers believe that school administrators have some room for adjustment and changes to optimize the best learning environment for teachers and students. School administrators may install and get the license of computer-assisted games, not only the games used in this research, but also other educational online games for other subjects, as integrated teaching-learning tools in the classroom. School administrators could install and set up good tools such as interactive pens, projectors, interactive board to support the learning environment. Lastly, school administrators can purchase the monthly, termly, or yearly license of these interactive games for the teachers to use with their students.

9.5. Recommendations for Curriculum Developers

Curriculum developers can use this study to integrate the interactive games in textbooks for Kindergarten 2 English Phonics class. Curriculum developers can also work with English Phonics teachers of each kindergarten level to consider which interactive games are appropriate and suitable for each level and collaborate with school administrators to purchase the license and set up the tools in each grade level, according to the curriculum plan.

9.5. Recommendations for Future Researchers

Future researchers should further investigate the role of English Phonics computer-assisted phonics games in students' learning in a larger context. In this study, the researchers conducted an 8-week experiment, 16 sessions in total and students' listening proficiency and English Phonics achievement were found to have significantly increased after introducing and using computer-assisted phonics games in English Phonics class. The researchers suggest that future researchers can extend the experimental period for a longer period of time, preferable for a whole semester or school year, in order to get a clearer view of the influence of computer-assisted phonics games in kindergarten students' education. It would be suggested to consider bigger sample sizes and various student levels and backgrounds in normal class settings.

Lastly, future researchers may also consider conducting a quasi-experimental study instead of a pre-

experimental one, using another class of the same level as a control group for comparison. This could give more ideas and results on traditional and alternative methods for the teaching and learning of English language in early childhood education.

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