



Online Learning Versus In-Person Learning for Kindergarten-One Students

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Abstract

Online learning has been increasingly popular due to the coronavirus pandemic. However, the effectiveness of online learning on children ages three to four years old has yet to be sufficiently explored. The literature hopes to venture into this world and showcase a glimpse of the online learning effects versus the in-person learning effects of this age group by studying Kindergarten One students at a private Thai school in Samut Prakan, Thailand. Several literatures prior have found that online learning with students a few years older than this age group yields varying successes. Many studies found that the successes of students in online learning depended largely on the students' learning behaviors and environment: the number of interruptions and distractions the students had and allowed. In order to level the playing field, this literature intends to limit the number of interruptions and distractions by using video responses of students watching lessons. Using video responses encourages parents to stay with students in order to keep them on task instead of letting students just watch lesson videos by themselves. The resulting video responses are then compared to Contact Time performances, which are in-person, one-on-one questioning of topics previously learned in a traditional class. This study intends to note the students' knowledge of vocabulary words, English pronunciation, and overall well-being in the comparison. If this study finds a statistically significant outcome which favors online learning, then future studies can benefit from exploring similar strategies in order to improve online learning. If the situation is reversed, then schools and policy makers should consider whether or not formal instruction is even necessary at this age. If there is no statistically significant outcome, then parents can have peace of mind and not worry too much about the difference between the quality of online learning and in-person learning.

Introduction

Oftentimes parents worry about the quality of education that their children are getting. This worrying ritual intensifies more with changes in teaching methods, particularly online learning instead of in-person learning. Due to the COVID-19 outbreak, most parents have their hands forced in accepting this new method of education despite disagreeing or having a negative attitude towards it (Cui et al., 2021; Dong et al., 2020). Not only parents show concerns but also educators, themselves, are concerned with their own effectiveness as teachers with online learning (Kim, 2020). To worsen the matter, students who are the most technologically inept, face the most difficulties in learning. Particularly, younger children who can barely hold a mouse are negatively impacted across the board whether or not technology is available to them. Thus, students who are of ages three through four years old are at a great disadvantage during the start of their education amidst COVID-19 (Fedynich, 2014). Parents then inevitably take on the role of substitute teachers at home since their children are unable to operate individually, resulting in their overload (Kolak et al., 2021). Policy makers are also perplexed at the educational crisis facing younger students and are thoroughly confused with what to do. For older students, policymakers around the world agree that education is vital and should continue via online platforms (Ozer, 2020). In terms of preschoolers, however, questions like these often arise: do we invest in online learning for younger students or is it even necessary to have formal education at this age? The purpose of this paper is to explore the effectiveness of online learning in comparison to in-person learning with children ages three through four years old learning English as a Foreign Language (EFL). This paper aims to alleviate some concerns of parents, suggest ideas to educators, provide insight on potential technological improvements to educational policy makers, and highlight general challenges of online learning faced by younger students. More specifically, in our research, we try to answer

the question, “what is the effect of in-person learning with students versus online learning with students on their knowledge of the content, English pronunciation, and overall well being?”

We hypothesize that online learning is not as effective as in-person learning in all areas of EFL learning for this age group. This is due to two main reasons: 1) the students’ needs for tactile objects and 2) the parents’ availability and financial status. Children ages three through four years old need a more play-to-learn environment with learning objects that they can touch (Honing, 2006). They need something tactile in order to fully immerse themselves in learning. Hence, with online learning, students in this age group are limited to actions, or more well-known as Total Physical Response (TPR), and to objects around their homes (Asher, 1966). Secondly, the parents’ availability and financial status are a huge concern. Many parents work, and having someone actively stay with the student throughout a lesson is a crucial part of helping this age group’s online behavior. Parents who normally both work are subjected to either finding a capable sitter, which increases financial burden, or rearranging their schedules. Low-Income students are known to be at a disadvantage when it comes to having the proper technology at home (Jaggars, 2011). They are even more so with this age group due to scheduling. Additionally, low-income parents with more than one child would sometimes be required to share technological devices due to insufficient resources at home (Kim & Padilla, 2020 ;Reynolds, 1989). This makes it harder if they were required to use said devices at the same time. With having to choose between an older child’s and a younger child’s education, parents tend to choose the older child as they are closer to college-admission-related classes (Jaggars, 2011). Hence, due to the availability and financial status of the parents, students of this age group many times forgo live online lessons. In addition to those two main factors, other factors include the ability for the teacher to read the students and react to

them online in the same manner as they would in a classroom situation as well as the absence of elements of social interaction and peer-to-peer learning.

If we find a statistically significant outcome in which online learning is better than in-person learning, then future studies can look into similar techniques in order to further develop online learning. If the situation is reversed, where our hypothesis is correct, then educational decision makers should contemplate whether or not formal instruction is even required at this age. Educational decision makers might have to model countries that start students late in formal education but still achieve great success. If there is no statistically significant outcome, then parents can decrease their concerns about the difference between the quality of online learning and in-person learning. Parents can be more sure that their children are getting a quality education regardless of the mode of learning. Moreover, this study can open new possibilities to future research of different types of online learning that might be better suited for younger students.

To accurately judge our hypothesis, we compare online versus in-person responses from the students. Firstly, verbal responses; are they improved when the student can actually see the teacher? Then physical responses (TPR); are the students more willing and/or more enthusiastic to react in the presence of a teacher? Physical production, such as drawing a picture, is this improved? Finally, are the students more or less enthusiastic online (regardless of success)? Factors that need to be taken into account include, first and foremost, the adult support that the student receives in online class. How computer literate are they and how good is their English? Does the student have access to the necessary equipment? What is the student's existing level of English? What is the socioeconomic status of the family? These factors are collected via a questionnaire, either a physical one or online.

Based on a meta-analysis comparing different examples of distance education and online learning (Bethel & Bernard, 2010), we decided to conduct video lessons with video responses instead of live online instruction in order to try to equalize in-person learning and online learning. The resulting video responses are then compared to Contact Time performances, which are in-person, one-on-one questioning of topics previously learned in an in-person lesson. Some limitations occur with using video responses and using Kindergarten One students from a single private school in Samut Prakan, Thailand. Nevertheless, we hope that our research can serve as a stepping stone to further research for online learning with younger students.

Below is an overview diagram of our conceptual framework:

Stage 1:			
Step 1	Step 2	Step 3	Step 4
Collect video responses (online learning) scores of individual students in memorization, pronunciation, TPR, and enthusiasm	Convert each individual scores to individual percentages for each memorization, pronunciation, TPR, and enthusiasm	Find the average percentages for each memorization, pronunciation, TPR, and enthusiasm	Compare and contrast averages of video responses percentages against averages of Contact Time performances percentages for each memorization, pronunciation, TPR, and enthusiasm (Y ₁ - Y ₄)
Collect Contact Time performances (in-person learning) scores of individual students in memorization, pronunciation, TPR, and enthusiasm			

Stage 2:

Step 1: Collecting Data on Our Independent Variables ($X_1 - X_5$)	Step 2: Data Entry	Step 3: Multiple Linear Regression Analysis	Step 4: Recommendations
Paper survey parents after Stage 1 of:	Convert data from paper survey into the Statistical Package for the Social Sciences (SPSS)	Perform Multiple Linear Regression Analysis of each of our variables, including F-test	Recommend to policy makers and researchers to control factors ($X_1 - X_5$) with the highest coefficients, which has the most effects on our dependent variables ($Y_1 - Y_4$)
1. Number of supporting adults at home			
2. Computer literacy of supporting adults at home			
3. English literacy of supporting adults at home			
4. Number of hours of access of required technology of supporting adults			
5. Parents' total income			

Chapter II

Review of Related Literature

As noted previously, there is limited literature studying this particular age group. Most studies related to this topic are conducted with older students and have yielded mixed results (Montiel-Chamorro, 2018). There is still much research to be conducted in this topic since online education only surged after the recent COVID-19 pandemic outbreak (Paudel, 2021). Although many schools have opted-in for online education, due to limited research in this area, most schools still lack clear strategies to optimise learning students' outcome via online learning (Pandey et al., 2020).

The majority of the studies are also qualitative in nature. Furthermore, much of it is more subjective than objective. Particularly, studies that are concerned with this kindergarten population are mostly individual case studies (Ahmad & Zabadi, 2020). For instance, one research highlights parents who feel that they cannot replace a teacher (Garbe et al., 2020). Lack of time due to work-related duties, poor English skills, lack of access to sufficient devices when parents need them for work and multiple kids need to study at the same time are common issues observed in many households (Novianti et al., 2021; Weaver & Swank, 2020). It must be stressed that public health education and support systems for parents can serve as a relief for these issues and can in turn have a positive effect in the home-based learning of their young children (Cahapy, 2020; Li et al., 2020).

There is a number of literatures concerning how three-year-olds learn. The primary way they learn is through play (Honing, 2006). They are developing fine and gross motor skills and learning about the world surrounding them (Marrus et al., 2018). This would appear to be a disadvantage for online learning. They are also learning to play cooperatively with other children

rather than relying on individual parallel play (Whitebread et al., 2009); another area where online learning will be of limited utility. Finally, their language skills are limited. They cannot read and their usable vocabulary will be around three hundred words – though they should be able to understand more than that. A study observing over five-hundred educational districts in the United States has demonstrated that fluency in reading and oral skills has significantly dropped since students transition to online learning (Domingue et al., 2021). In the context of learning English as a foreign language, the general decline in student's oral skills can be attributed to the decrease in opportunity for students to practice their pronunciation with native speakers, which in this case are the teachers (Tejeda & Santos, 2014). All of these evidences present great challenges for an educator teaching this age group via online platform, particularly in teaching pronunciation in the context of English as a foreign language.

However, there are positive examples as well. Some children can learn in an online environment by trial and error and discussion, without an expert's presence (Bienvenuti et al., 2021). Their academic performance can also be improved with online games. Their perception of utilizing online resources and online games is positive, because they can learn in a fun and exciting way, by creating the atmosphere of learning like playing (Parreno & Eamoraphan, 2017) . This study is particularly useful in our setting since it is conducted using a Thai student population. Online education, moreover, fosters self-learning, something that is essential in the 21st century (Yu, 2014).

We also have to elaborate on kindergarten teachers' utilization of online resources. Many of them do not have the motives and desires to do so, and even if they do, frequency and efficiency is low. This is all because of their beliefs. As one study shows, they can not overcome these obstacles,

and thus do not utilize information and communication technology to the fullest (Magen-Nagar & Firstater, 2019). A constructive way forward may be to encourage teachers to participate in ICT-related professional training. As also stated by one research, interactive technology can serve as an effective tool for early childhood institutions, but its success relies heavily on the educator's ability to integrate them into the lesson.

Chapter III

Research Methodology

Our research design embodies a cross-sectional, non-experimental design. We compare a group of students' performance in two different situations: online learning versus in-person learning. We are testing kindergarten one students' knowledge of the content (cognitive), pronunciation (cognitive), ability to follow directions (psychomotor), and enthusiasm (affective) during in-person learning with students and online learning with students. We intend to achieve this by evaluating video responses as well as Contact Time performances. Video responses are when parents submit recordings of their children watching the lesson videos, repeating the vocabulary words in the lesson videos, and pointing to the answers in the lesson videos. These represent our online-learning performances. Contact Time is when students are asked questions one-by-one of the topics previously learned via in-person learning. This includes conversation questions, vocabulary words, and writing. Contact Time performances represent our in-person learning performances.

In order to get a better understanding of the school system as well as the socio-economic status of these students, we would like to note that the students that we are studying are Kindergarten One students at a private Thai school called Sriwittayapaknam School in Samut Prakan, Thailand. Kindergarten in Thailand has three levels, where Kindergarten One is the lowest grade. In this particular Kindergarten One class, these students have not gone through preschool at Sriwittayapaknam School. Only six students have gone through the school's nursery school prior to Kindergarten One. Hence, these students are all considered "new students" to the school. Additionally, these students are ages three years and eight months old to four years old when they start Kindergarten One. We will be studying them in Term 2, where most would have turned four

years old already. It is also typical for middle-income Thai parents to choose private school for their children. This school teaches students this age three languages: Thai, Chinese, and English. This class is considered an Intensive English Program (IEP) class, which means that the class has a Thai homeroom teacher as well as a fluent English-speaking homeroom teacher. Samut Prakan is also a province that is next to Bangkok, which means that living costs are comparable to the outskirts of Bangkok (Barahona & Chulaphan, 2017).

The reason that we chose this location and this particular group of students is due to three main reasons. Firstly, the students at this school have some experience learning online before in Term 1. They have had three months of different styles of online learning prior to our study in Term 2. Thus, this lowers any factors that the students are nervous of online learning. Secondly, these students also have the least amount of experiences in a classroom setting compared to mixed classes at other schools, where students that have gone through pre-school are mixed with students that have not gone to pre-school. Although the students do not have completely the same number of months in experience between online learning and in-person learning, by picking a class that has not gone through the school's pre-school before, we intend to decrease the gap between students being used to online learning and students being used to in-person learning. Lastly, since most students at this school are middle-income students, we can limit the effects of the low-income factor of not being able to afford certain technologies or not being able to find a proper caretaker. Even though we still plan to survey the parents for their socio-economic statuses, by trying to limit the effects of the low-income factor, we can focus more on this specific age group difficulties in online learning versus general difficulties in all age groups.

Our sample size is 26 students. Although our sample size is small, we hope to represent typical middle-class Thai students in this age group by limiting the stated factors. However, there

will undoubtedly be some variations in non-responses. Parents who will not submit video responses are most likely not able to understand the homework for their students due to an English barrier. Even though there is a Thai co-teacher to help out the parents, parents may not be inquisitive or certain things may get lost in translation.

By doing video lessons instead of lives, we intend to decrease the degree of the effects of mainly the low-income gap. As stated earlier in this paper, someone needs to actively stay with students in this age group during lessons. This means that we have provided the flexibility for students and, consequently, their caretakers to watch the videos at any time of the day. Parents no longer have to rearrange their schedules to any lives or find and spend on a technologically capable caretaker to sit with their children during these lives. As a second part to this solution, we also have decided to do video responses. In this age group, students are less inclined to participate unless instructed by their immediate caretaker. According to Piaget, this behavior of egocentrism is commonly seen in this preoperational stage of cognitive development (Heo, 2011).. In order to rectify the problems of the needed interactions with students, we have decided to get video responses from students repeating after the vocabulary words. By assigning video responses, we allow the caretakers to directly help the students focus. Using video responses encourages caretakers to stay with students in order to keep them on task instead of letting students just watch lesson videos by themselves (Tunstall & Bull, 2012). Moreover, the caretakers are now the only ones in control. If we were to do live online lessons, some caretakers would leave some behavior controls to the teacher, which is not ideal in this preoperational stage byways of confusion of authority. By being the sole controller, the caretakers feel like they are the ones responsible for a student acting out. Because the caretakers view these video responses as homework, they are also more inclined to have the students repeat properly. Finally, by doing video lessons and video

responses instead of live instructions, we intend to limit the number of interruptions and distractions that normally occur during live instructions. Studies have found that the successes of students in online learning depended largely on the students' learning behaviors and environment: the number of interruptions and distractions the students had and allowed. In this research, due to the age group, it would be the number that the caretakers had allowed. For example, toys and food are very common distractions that are not normally allowed during in-person instructions but parents allow during live online instructions. Hence, with video responses, parents are obligated to limit any distractions and interruptions in order to complete those assigned tasks.

The resulting video responses are then compared to Contact Time performances, which are in-person, one-on-one questioning of topics previously learned in an in-person lesson. In this particular school, Contact Time is routinely done in person everyday anyway, so students are used to this routinized questioning. Hence, we have eliminated a bias of not answering due to uneasiness of a new routine. Four days of Contact Time performances will be compared to two video responses. Similar types of questions from Contact Time are to be observed from video responses and to be transcribed in order to begin the comparison. However, the questions are not exactly the same. Instead, each student will be given a score of memorization of vocabulary words, a score of pronunciation, a score of TPR, and a score of enthusiasm for the applicable questions. By utilizing this strategy, we focus on how a student learns rather than what they have learned. The total scores from each category for each student are totaled up for both Contact Time performances and video responses. Then the total scores for Contact Time performances and video responses are compared with each other.

Score evaluations are as follows for both Contact Time performances and video responses:

Rubric				
Possible Points	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
2	Able to answer in a full sentence	N/A	N/A	N/A
1	Unable to answer in a full sentence/some words are missing from the taught phrase/unable to remember a vocabulary word without the teacher sounding out the first letter	Said the ending sounds and the v sounds in words	Performed given commands/performed actions associated with taught phrase	Did not cry/did not resist assignment
0	Unable to show comprehension	Did not say the ending sounds and the v sounds in words	Did not perform given commands/did not perform actions associated with taught phrase	Cried/Resisted assignment
Note:		Thai students often have difficulties pronouncing ending sounds and the letter "v."		Enthusiasm is determined once per day & not for each question.

Here are the questions from our Contact Time and their highest score from each category:

Contact Time: Day 1				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
1. What is your nickname?	2	1	N/A	N/A
2. What number are you?	2	1	N/A	N/A
3. How old are you?	2	1	1	N/A
4. What word is this? (BAT)	2	1	N/A	N/A
5. What word is this? (RAT)	2	1	N/A	N/A
6. What word is this? (MAT)	2	1	N/A	N/A
7. What word is this? (HAT)	2	1	N/A	N/A
8. What word is this? (CAT)	2	1	N/A	N/A
Total Possible Scores:	16	8	1	1

Contact Time: Day 2				
	Cognitive: Score	Cognitive: Score	Psychomotor:	Affective: Score

	of Memorization	of Pronunciation	Score of TPR	of Enthusiasm
1. How are you?	2	1	1	N/A
2. How do you feel?	2	1	N/A	N/A
3. What number are you?	2	1	N/A	N/A
4. How old are you?	2	1	1	N/A
5. Write the word, "AN," in capital letters.	2	N/A	1	N/A
6. Write the word, "AT," in capital letters.	2	N/A	1	N/A
Total Possible Scores:	12	4	4	1

Contact Time: Day 3				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
1. What is this? (ear)	2	1	N/A	N/A
2. What is this? (nose)	2	1	N/A	N/A

3. What letter is for nuh nuh nose?	2	1	N/A	N/A
4. What is this? (tail)	2	1	N/A	N/A
5. What letter is for tuh tuh tail?	2	1	N/A	N/A
6. Write the word, "CAN," in capital letters	2	N/A	1	N/A
7. Write the word, "AT," in capital letters	2	N/A	1	N/A
Total Possible Scores:	14	5	2	1

Contact Time: Day 4				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
1. Count to 20.	2	1	1	N/A
2. What shape is this? (square)	2	1	N/A	N/A

3. What shape is this? (rectangle)	2	1	N/A	N/A
4. What shape is this? (star)	2	1	N/A	N/A
5. What shape is this? (triangle)	2	1	N/A	N/A
6. What shape is this? (circle)	2	1	N/A	N/A
7. What shape is this? (oval)	2	1	N/A	N/A
8. What shape is this? (pentagon)	2	1	N/A	N/A
9. Write the word, "BAT," in capital letters	2	N/A	1	N/A
10. Write the word, "MAT," in capital letters	2	N/A	1	N/A
Total Possible Scores:	20	8	3	1

Total Possible Scores for Each Contact Time Day				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
Day 1:	16	8	1	1
Day 2:	12	4	4	1
Day 3:	14	5	2	1
Day 4:	20	8	3	1
Total Possible Scores from Contact Time	62	25	10	4

Here are the questions from our video responses and their highest score from each category:

Video Responses #1				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
1. Let's say: Space	N/A	1	1	N/A
2. Let's say: Sun	N/A	1	1	N/A
3. Let's sound it out: SUN	N/A	1	1	N/A
4. What color is the sun? (Orange	2	1	N/A	N/A

and yellow)				
5. Is the sun big or small?	2	1	N/A	N/A
6. Let's say: moon	N/A	1	1	N/A
7. Let's spell "moon."	N/A	1	1	N/A
8. What color is the moon? (white)	2	1	N/A	N/A
9. Let's say: alien	N/A	1	1	N/A
10. What letter is for ah ah alien?	2	1	N/A	N/A
11. What color is the alien?	2	1	N/A	N/A
12. Let's say: star.	N/A	1	1	N/A
13. What letter is for sss sss star?	2	1	N/A	N/A
14. What color is the star?	2	1	N/A	N/A
15. How many stars can you see?	N/A	1	1	N/A

Let's count! (Count from 1-18)				
16. Let's say: Earth	N/A	1	1	N/A
17. What letter is for eh eh Earth?	2	1	N/A	N/A
18. What color is the Earth?	2	1	N/A	N/A
19. Let's say: rocket.	N/A	1	1	N/A
20. What letter is for ruh ruh rocket?	2	1	N/A	N/A
21. What color is the rocket?	2	1	N/A	N/A
22. Let's say: astronaut	N/A	1	1	N/A
23. What letter is for ah ah astronaut ?	2	1	N/A	N/A
24. What color is the astronaut ?	2	1	N/A	N/A

Total Possible Scores:	26	24	11	1
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Video Responses #2				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
1. Let's spell: CAT.	N/A	1	1	N/A
2. Let's sound it out: CAT.	N/A	1	1	N/A
3. How many cats can you see?	N/A	1	1	N/A
4. Let's spell: RAT.	N/A	1	1	N/A
5. Let's sound it out: RAT.	N/A	1	1	N/A
6. What color is the rat? (white and brown)	2	1	N/A	N/A
7. Let's spell: HAT.	N/A	1	1	N/A

8. Let's sound it out: HAT	N/A	1	1	N/A
9. What color is the hat? (yellow and red)	2	1	N/A	N/A
10. Let's spell: BAT.	N/A	1	1	N/A
11. Let's sound it out: BAT.	N/A	1	1	N/A
12. What color is the bat? (black, white, pink, and yellow)	2	1	N/A	N/A
13. Let's spell: MAT.	N/A	1	1	N/A
14. Let's sound it out: MAT.	N/A	1	1	N/A
15. What color is the mat? (blue)	2	1	N/A	N/A
16. Point to "BAT."	2	N/A	1	N/A
17. Point to "RAT."	2	N/A	1	N/A

18. Point to "MAT."	2	N/A	1	N/A
19. Point to "CAT."	2	N/A	1	N/A
20. Point to "HAT."	2	N/A	1	N/A
Total Possible Scores:	18	15	16	1

Total Possible Scores for Each Video Response				
	Cognitive: Score of Memorization	Cognitive: Score of Pronunciation	Psychomotor: Score of TPR	Affective: Score of Enthusiasm
Video Response # 1:	26	24	11	1
Video Response # 2:	18	15	16	1
Total Possible Scores from Video Response s	44	39	27	2

These are the instructions to the parents for them to turn in a video response to the online video lesson posted via Google Classroom:

1) Video Lesson & Video Response #1:

“Please watch the lesson video about space, counting, sight words, and CVC words.

Then create a video response only for the space vocabulary part.

✦✦✦✦The 4 minute-video response is from 11:07 - 15:07 ✦✦✦✦

Please submit here! Thank you.”

2) Video Lesson & Video Response #2:

“Please watch the lesson video about space, counting, sight words, and CVC words.

Then create a video response only for the -AT Family vocabulary part.

✦✦✦✦The 4 minute-video response is from:

6:22 - 10:22 ✦✦✦✦ (CAT, RAT, BAT, HAT, MAT,....)

Please submit here! Thank you.”

The scores of each student's Contact Time performances and video responses are then converted into percentages. Then the average of all the students' percentages from Contact Time are compared with the one from video responses. Here, in the first part of our study, we can see whether online learning is better than, worse than, or roughly the same as in-person learning in the four areas of memorization, English pronunciation, TPR, and enthusiasm. As a second part of our study, we also plan to utilize the Statistical Package for the Social Sciences (SPSS) to compute our multiple linear regressions of other factors of online learning, including using the F-test to see how much variance there is. Supporting factors that need to be taken into account are the number of adult support at home, the level of computer literacy of adult support (no problems with Google Classroom, some problems, or unable to do assignment at all due to technology), the level of English competency of adult support based on the Common European Framework of Reference for Languages (CEFR), number of hours of access to required technology that the adult support has, and income level of the parents. These are to be taken via a paper survey to be sent home with the students in order to avoid technological incompetence through filling out online forms. A Thai translation will be written under each of the questions and choices by a qualified translator in order to limit any language barriers in answering these questions.

Here is the survey for the second part of the study:

1. How many people are there to support your child at home? Please include grandparents, other relatives, and friends of the family who were willing to help take care of your child. _____
2. Please write the names of those supporting your child and circle their level of computer literacy and level of English. Please refer to the Common European Framework of Reference for Languages (CEFR) guide. Then please fill out the number of hours per day that supporting adult have to any necessary technology like smartphones, tablets, and computers.

Name:

Computer Literacy: A) no problems with Google Classroom
 B) some problems with Google Classroom
 C) unable to do assignment at all due to technology

English Competency: A1 A2 B1 B2 C1 C2

Number of Hours with Access to Required Technology (maximum 24 hours): ____hours

Name:

Computer Literacy: A) no problems with Google Classroom
 B) some problems with Google Classroom
 C) unable to do assignment at all due to technology

English Competency: A1 A2 B1 B2 C1 C2

Number of Hours with Access to Required Technology (maximum 24 hours): ____hours

Name:

Computer Literacy: A) no problems with Google Classroom
 B) some problems with Google Classroom
 C) unable to do assignment at all due to technology

English Competency: A1 A2 B1 B2 C1 C2

Number of Hours with Access to Required Technology (maximum 24 hours): ____hours

Name:

Computer Literacy: A) no problems with Google Classroom
 B) some problems with Google Classroom
 C) unable to do assignment at all due to technology

English Competency: A1 A2 B1 B2 C1 C2

Number of Hours with Access to Required Technology (maximum 24 hours): ____hours

3. What is the total income level of the student's parents? _____ baht

By doing a multiple linear regression analysis on these factors, we intend to differentiate the degree of impact of these factors. Hence, policy makers can decide what are the most important things they should support and fund parents and schools working with this age group first on top of deciding whether online learning is even essential for this age group. Now, even if online learning (video responses) turns out to be not as effective as in-person learning (Contact Time performances) as determined by the first part of our study, we can still go look factor by factor. Thus, even if only one of these factors are controlled, such as having parents be all computer literate, online learning can have a chance of being on the same level of effectiveness as in-person learning. Therefore, policy makers can put effort in those priority areas, such as giving parents a centralized technological support system if adult support's computer literacy is

the most impactful supporting factor (as determined by the highest coefficient from our multiple linear regression analysis). In the case that in the first part of our study, online learning is on the same level of impactfulness as in-person learning, there is still room for improvement for online study, which signifies that online learning has the potential to be superior to in-person learning with the help of policy makers rectifying the factors with the highest coefficients. In the last case, where in the first part of our study, online learning is better than in-person learning, policy makers and other researchers can focus on whether in-person learning is even needed and on improving online learning by limiting the factors with the highest coefficients as a priority.

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