

# Development of Virtual Flipped Classroom with Online Collaborative Learning to Enhance the English Reading Comprehension of Students in 10<sup>th</sup> Grade

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## Abstract

This research article is about the development of a virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade. The objectives of this research were: 1) to develop the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade to good quality and 2) to study the effects of using the virtual flipped classroom with the online collaborative learning as a tool to enhance the English reading comprehension of students in 10th grade. The sample in this research study was selected by cluster random sampling. The research followed an experimental approach by using the following research instruments: 1) a virtual flipped classroom with online collaborative learning, 2) a reading comprehension pretest and posttest, and 3) an evaluation form of quality. Moreover, the data were analyzed using statistics, including mean, standard deviation, and dependent t-test. The results of the research study were as follows: 1) the quality of the virtual flipped classroom with online collaborative learning to enhance English reading comprehension was rated at the excellent level (mean=4.82), and 2) the students' posttest scores on reading comprehension were significantly higher than the pretest at .01 level.

**Keywords:** Virtual Flipped Classroom, Online Collaborative Learning, English Reading Comprehension

## Introduction

The world has changed significantly, with technology becoming essential to daily life. The rapid expansion of technology has led to increased internet usage, with people relying on smartphones, tablets, and computers for learning and communication. Technology serves both teachers and students in education, enhancing teaching methods like flipped classrooms and facilitating communication. According to Raja and Nagasubramani (2018), it is believed that technology has revolutionized lifestyles, improving quality of life. In classrooms, technology fosters student engagement, facilitates quick knowledge transfer, and enables access to educational resources like tutorials. It

also connects people globally through video conferencing, which is vital in distance learning and online education, making learning accessible from anywhere, anytime.

Unfortunately, in 2019, the global COVID-19 pandemic forced widespread changes worldwide. According to the World Health Organization (WHO), COVID-19 is a disease-causing symptoms like fever, cough, and breathing difficulties, with severe cases potentially leading to pneumonia and fatalities. To prevent the virus's spread, people were advised to stay home, leading to global closures of workplaces and schools. WHO's guidelines emphasized creating safe, supportive environments for children and adolescents during the pandemic, stressing the importance of continuing education through online learning, home study assignments, and utilizing media platforms such as radio and television for educational content. This shift changed from traditional face-to-face and blended classes to fully online learning (Harrison, 2021), challenging teachers to adapt quickly to maintain educational quality.

Not only did the COVID-19 pandemic highlight challenges beyond this study, but the lack of reading comprehension skills among students was another problem that triggered this research study. According to the result of the PISA (Programme for International Student Assessment) test, it was found that the test results indicated a decrease in average scores worldwide between 2018 and 2022. Also, when focusing on the reading literacy section, it is shown that the PISA scores tended to decrease repeatedly. PISA Thailand (2022) claimed that the assessment results declined due to the educational challenges faced by every country during the COVID-19 pandemic. Furthermore, PISA Thailand (2021) argued that reading remains a weakness among Thai students, regardless of whether PISA scores are high or low. As a result, enhancing reading competency poses a significant challenge for the Thai education system.

Meanwhile, when grade 9th Thai students did the Ordinary National Educational Test or O-NET exam (the national Exam that displayed the students' accomplishment results after finishing secondary school), it was found that during the COVID-19 pandemic periods (2019 - 2020), the mean percentage scores of 9th grade students from all over the country in reading comprehension is not over 50 percent. The average percentage scores for students across the country in the reading comprehension section are approximately 32.17 percent, while students at Sarawittaya School achieve around 41.82 percent. (Source: Registration and Evaluation Department, Sarawittaya School, 2021). These findings underscore ongoing challenges in enhancing reading skills.

According to these problems, the researcher had the idea to develop a virtual flipped classroom with online collaborative learning to enhance students' English reading comprehension. This teaching pedagogy combines the flipped, virtual classroom, and online collaborative approach. Unlike the traditional flipped classroom model, where

students study at home, and complete activities at school, the virtual flipped classroom enables students to learn lessons at home and engage in interactive activities via a synchronized virtual classroom environment, akin to a traditional classroom setting (Ismail & Abdulla, 2019). In addition, online collaborative learning facilitates students' engagement in group activities, similar to traditional classroom settings. Research suggests collaborative learning enhances students' learning outcomes compared to individual activities (Harasim, 2002).

In conclusion, due to COVID-19, education shifted from face-to-face to entirely online, posing challenges for students, especially in reading comprehension. Thai students' PISA scores show declining reading skills. This study focused on developing a virtual flipped classroom with online collaboration to enhance 10th graders' reading comprehension, helping teachers adapt to disruptions. It aims to equip teachers with practical tools and strategies to facilitate their adoption of various teaching models, enabling them to manage their classrooms effectively in unforeseen circumstances.

### **Objectives of the Study**

The objectives of this research were:

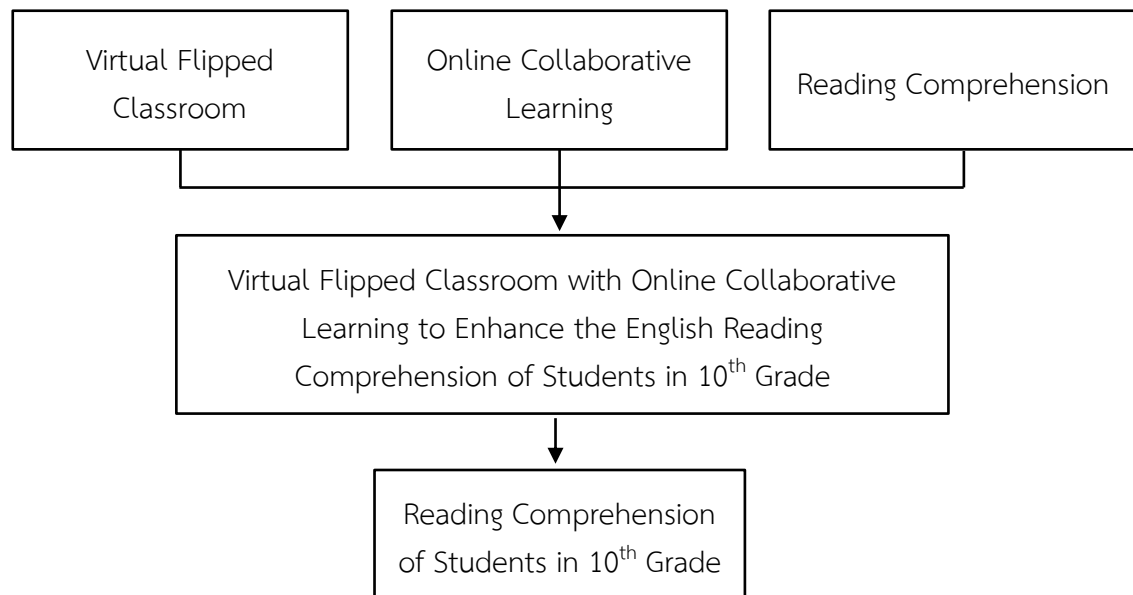
1. to develop the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade
2. to study the effects of using the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10<sup>th</sup> grade.

### **Hypotheses**

This research contains two hypotheses:

1. The virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade is likely to have good quality.
2. After learning in the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension, the students' English reading comprehension posttest scores will be higher than the pretest scores at the significance level of 0.05.

### Research Framework



### Methodology

The experimental research study of the development of a virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade was conducted as one group pretest-posttest design, and it was organized as follows:

#### 1. Participants

This study included 384 students from 12 classes at Sarawittaya School, Bangkok, Thailand, during the academic year 2023.

The samples were from the cluster random sampling of 10th grade students of Sarawittaya School, Bangkok, Thailand, in the academic year 2023, which consisted of 42 students from Matthayom 4/11.

#### 2. Research Design

This research study is an experimental research study that was conducted as one group pretest-posttest design (Cohen, Manion, & Morrison, 2007 as cited in Boonsathit et al. 2018), and it was illustrated in Table 1 below.

**Table 1** One group pretest-posttest research design

| Group        | Pretest        | Treatment | Posttest       |
|--------------|----------------|-----------|----------------|
| Experimental | O <sub>1</sub> | X         | O <sub>2</sub> |

Note: O<sub>1</sub> = Pretest, X = Virtual flipped classroom with online collaborative learning, and O<sub>2</sub> means Posttest

#### 3. Research Instruments

3.1 The virtual flipped vlassroom with online collaborative learning which contained:

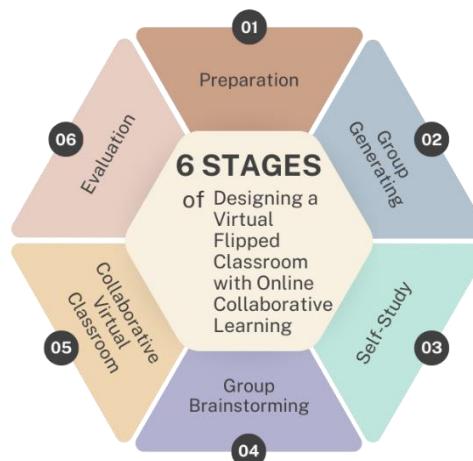
1) The teaching videos which were recorded and prepared by the teacher.  
 2) An online collaborative learning website that allows students to answer questions and share and brainstorm ideas with their groups.

3) An online collaborative learning website that supports students in concluding the reading passages collaboratively through the online platform.

3.2 The reading comprehension pretest and posttest that had 20 multiple-choice choices and three reading passages.

3.3 The evaluation form of quality which contained the evaluation form of quality of the development of a virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade on the topic of ‘What’s in Space?’ for media experts under the evaluation topics of videos, font, pictures, sounds, and media.

#### 4. Learning Activity Design



**Figure 1:** Six Stages of Designing a Virtual Flipped Class with Online Collaborative Learning

Figure 1 illustrates the six stages of designing a virtual flipped class with online collaborative learning. This learning activity is based on a blend of these models: the VFC Models by Ismail and Abdulla (2019), the Virtual Flipped Classroom model by Bhardwaj & Rathee (2021), and the Effective Online Collaboration Design methods by Engellant (2014). The virtual flipped classroom with online collaborative learning in this research consists of six steps: 1) Preparation, 2) Group Generation, 3) Self-Study, 4) Group Brainstorming, 5) Collaborative Virtual Classroom, and 6) Evaluation. The six stages of designing the learning activities on a virtual flipped classroom with online collaborative learning are represented on the Table 4.

**Table 2:** The design of the learning activities on a virtual flipped classroom with online collaborative learning

| Learning Design Stages             | Learning Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Learning Environment |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1. Preparation                     | <ul style="list-style-type: none"> <li>- The teacher selects appropriate software and tools for conducting learning activities.</li> <li>- The teacher prepares students by guiding them in using the virtual flipped classroom and online collaborative learning to improve their reading comprehension through videoconferencing.</li> <li>- Students then complete a pretest before starting the activities.</li> </ul>                                                                                                                   | Virtual Classroom    |
| 2. Group Generating                | <ul style="list-style-type: none"> <li>- The teacher uses a random number generator to form groups of students consisting of either four or five members.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         | Virtual Classroom    |
| 3. Self-Study                      | <ul style="list-style-type: none"> <li>- Students viewed instructional videos created and uploaded by the teacher in the virtual classroom from their homes.</li> <li>- Students completed quizzes using the interactive features while watching these instructional video clips.</li> </ul>                                                                                                                                                                                                                                                 | Study at home        |
| 4. Group Brainstorming             | <ul style="list-style-type: none"> <li>- Students discuss unclear parts of video lessons by posting notes on a brainstorming website with their group mates. They also use group chat for communication.</li> </ul>                                                                                                                                                                                                                                                                                                                          | Study at home        |
| 5. Collaborative Virtual Classroom | <ul style="list-style-type: none"> <li>- Students and the teacher discussed notes posted on a brainstorming website.</li> <li>- The teacher answered students' questions about the video lessons and pointed out important points before the activity.</li> <li>- Students worked together on group assignments using an online platform for collaborative learning.</li> <li>- The teacher supported and guided students as a mentor.</li> <li>- The teacher checked the group assignments and gave feedback after the activity.</li> </ul> | Virtual Classroom    |

| Learning Design Stages | Learning Activities                                                | Learning Environment |
|------------------------|--------------------------------------------------------------------|----------------------|
| 6. Evaluation          | - Students completed an online posttest for reading comprehension. | Virtual Classroom    |

### 5. Data Collection Procedures

This experimental research used a one-group pretest-posttest design to develop a virtual flipped classroom with online collaborative learning aimed at improving 10th-grade students' reading comprehension. The duration of the study was 4 weeks. It took 2 periods, 2 per week. The steps of the research procedure were as follows:

5.1 The teacher initiated a Google Classroom and Line Group for student enrollment and communication.

5.2 In the first session, the teacher outlined the research plan, conducted a pretest using Google Forms, and explained the study procedures.

5.3 Students were randomly grouped into teams of 4-5 and instructed on using the virtual flipped classroom with online collaborative learning.

5.4 During sessions 2, 4, and 6, students viewed instructional videos on Edpuzzle at home and collaborated on Jamboard.

5.5 Sessions 3, 5, and 7 involved group tasks on Google Slides after video viewing.

5.6 In the final session, students completed a posttest via Google Forms, followed by a comparison of pretest and posttest scores to assess learning outcomes.

5.7 The researcher analyzed data and compiled findings for the study report.

### 6. Data Analysis

The data were analyzed using Google Sheets and the SPSS program. The statistical formulas that were used in this research study were as follows: 1) Finding mean ( $\bar{X}$ ), 2) Finding standard deviation (S.D.), 3) Finding an index of item objective congruence (IOC) from the experts, 4) Finding the item difficulty and discrimination power of the pretest and posttest, and 5) Finding the result of the hypothesis test by using the dependent t-test.

### Results

The results of the research study 'Development of Virtual Flipped Classroom with Online Collaborative Learning to Enhance the English Reading Comprehension of Students in 10<sup>th</sup> Grade' were analyzed and interpreted by the researcher which were as follows:

**Part 1:** The result of the evaluation on the quality of the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10<sup>th</sup> grade

**Table 3:** The result of the evaluation on the quality of the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10<sup>th</sup> grade in the topic of 'What's in Space?' for three media experts

(n=3)

| Evaluation Lists                                                                                            | $\bar{x}$   | S.D.        | Quality Level    |
|-------------------------------------------------------------------------------------------------------------|-------------|-------------|------------------|
| <b>Videos</b>                                                                                               |             |             |                  |
| 1. The duration of each video is appropriate.                                                               | 5.00        | 0.00        | Excellent        |
| 2. The videos are interesting.                                                                              | 5.00        | 0.00        | Excellent        |
| 3. The videos can attract students' attentions.                                                             | 5.00        | 0.00        | Excellent        |
| 4. The contents on the videos are organized orderly which can lead students understand the contents easily. | 5.00        | 0.00        | Excellent        |
| 5. The messages on the videos are expressed clearly.                                                        | 4.67        | 0.58        | Excellent        |
| <b>The average score of the Videos</b>                                                                      | <b>4.93</b> | <b>0.12</b> | <b>Excellent</b> |
| <b>Font</b>                                                                                                 |             |             |                  |
| 1. The font styles are easy to read.                                                                        | 5.00        | 0.00        | Excellent        |
| 2. The colors of the fonts are used appropriately.                                                          | 5.00        | 0.00        | Excellent        |
| 3. The font sizes are perfectly readable.                                                                   | 4.67        | 0.58        | Excellent        |
| <b>The average score of the Fonts</b>                                                                       | <b>4.89</b> | <b>0.19</b> | <b>Excellent</b> |
| <b>Pictures</b>                                                                                             |             |             |                  |
| 1. The pictures' sizes are easy to be seen.                                                                 | 5.00        | 0.00        | Excellent        |
| 2. The resolutions of pictures are clear.                                                                   | 4.67        | 0.58        | Excellent        |
| 3. The pictures match the contents.                                                                         | 4.67        | 0.58        | Excellent        |
| 4. The pictures can help for memorizing the contents.                                                       | 4.67        | 0.58        | Excellent        |
| <b>The average score of the Pictures</b>                                                                    | <b>4.75</b> | <b>0.43</b> | <b>Excellent</b> |
| <b>Sounds</b>                                                                                               |             |             |                  |
| 1. The narrator's voice goes together with the displayed pictures.                                          | 5.00        | 0.00        | Excellent        |
| 2. The videos' sounds are clear.                                                                            | 4.67        | 0.58        | Excellent        |
| 3. The levels of the videos' sounds are suitable.                                                           | 4.33        | 0.58        | Excellent        |
| 4. The level of the narrator's voice can be heard clearly.                                                  | 4.00        | 0.00        | Excellent        |
| <b>The average score of the Sounds</b>                                                                      | <b>4.50</b> | <b>0.29</b> | <b>Excellent</b> |
| <b>Media</b>                                                                                                |             |             |                  |
| 1. The media that are used in the study can support the virtual flipped classroom activity.                 | 5.00        | 0.00        | Excellent        |

| Evaluation Lists                                                                                              | $\bar{x}$ | S.D. | Quality Level |
|---------------------------------------------------------------------------------------------------------------|-----------|------|---------------|
| 2. The media that are used in the study are appropriate for using in virtual flipped classroom activity.      | 5.00      | 0.00 | Excellent     |
| 3. The media that are used in the study are appropriate for the online collaborative learning activity.       | 5.00      | 0.00 | Excellent     |
| 4. The media that are used in the study can enhance the English reading comprehension.                        | 5.00      | 0.00 | Excellent     |
| 5. The media that are used in the study are suitable for conducting the English reading comprehension lesson. | 5.00      | 0.00 | Excellent     |
| 6. The media that are used in the study can enhance the online collaborative learning activity.               | 4.67      | 0.58 | Excellent     |
| <b>The average score of the Media</b>                                                                         | 4.94      | 0.10 | Excellent     |
| <b>Total</b>                                                                                                  | 4.82      | 0.21 | Excellent     |

Table 3 found that the overall mean score of the media evaluation is 4.82, and the standard deviation is 0.10. The results show that the overall quality of the media of the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade is excellent so that it can be used in the learning activity. Also, it accepted the first hypothesis: the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10th grade is likely to have good quality.

**Part 2:** The result of the scores on the reading comprehension pretest and posttest before and after using the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension

**Table 4:** The result of the comparison between the pretest and posttest scores before and after using the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension

| Test     | N  | $\bar{x}$ | Max | Min | S.D. | t-value | Df | p-value |
|----------|----|-----------|-----|-----|------|---------|----|---------|
| Pretest  | 42 | 9.98      | 17  | 4   | 2.86 | -7.568  | 41 | .000    |
| Posttest | 42 | 14.24     | 18  | 9   | 2.02 |         |    |         |

\*\* p<.001

Table 4 compares pretest and posttest scores before and after using the virtual flipped classroom with online collaborative learning to enhance the English reading comprehension. The results show that there were statistically significant differences in the mean scores of pretest and posttest ( $t(41) = -7.568$ ,  $p < .001$ ). The pretest mean score was

9.98 (S.D.=2.86), while the posttest mean score was 14.24 (S.D.=2.02). According to this, the posttest mean score was significantly higher than the pretest mean score. Therefore, it accepted the research hypothesis that after learning in the virtual flipped classroom with online collaborative learning, the students' posttest scores on the English reading comprehension posttest will be higher than the pretest.

## Discussion

This section presents the results regarding the development of the virtual flipped classroom with online collaborative learning, which is outlined as follows:

1. The virtual flipped classroom with online collaborative learning was developed to enhance English reading comprehension in 'What's in Space?' It was designed by the Virtual Flipped Classroom model by Bhardwaj & Rathee (2021), and the Effective Online Collaboration Design methods by Engellant (2014). Evaluation by media experts showed the virtual flipped classroom's quality, with an overall mean score of 4.82 and a standard deviation of 0.10 ( $=4.82$ , S.D.= 0.10). These findings indicate that the development of this learning environment, utilizing the virtual flipped classroom with online collaborative learning, was of high quality, offering precise content suitable for students' needs. Its online nature proved especially beneficial during crises like the COVID-19 pandemic, enabling learning and teaching flexibility. This approach also promoted self-learning and collaborative skills among students. Furthermore, the results align with many previous studies, such as the study from Bhardwaj and Rathee (2021), which mentioned the strength of a new pedagogical approach, the virtual flipped classroom. They stated that the virtual flipped classroom offers an adaptable and active learning environment that uses less time to deliver the content. The learning activity will be more accessible because the students study the contents before joining the class. Likewise, Sharma and Chowdhry (2020) argue that online learning offers engaging experiences for students. In a virtual flipped classroom, students study materials and complete assignments before class, promoting self-paced learning and fostering critical thinking and responsibility. Li and Zhou (2021) found that implementing the flipped classroom with MOOCs and virtual platforms like Zoom and Blackboard during COVID-19 allowed students to explore digital resources, collaborate remotely, and interact effectively with peers and teachers. However, Bhardwaj and Rathee (2021) identified challenges with the virtual flipped classroom, including the need for devices and internet access, technical proficiency among users, and variability in student preparation, which could impact its effectiveness. Active student engagement, peer interaction, and teacher support are crucial to overcoming these challenges in virtual learning environments. Additionally, the findings are consistent with Altowairiki's (2021) research, which demonstrated that implementing online collaborative learning with social,

pedagogical, and technical support can enhance student engagement. Engellant (2014) further emphasized effective strategies for online collaborative learning, including prepping students beforehand, defining roles within teams, designing engaging activities, optimizing group size for effective communication (e.g., groups of 3 or 4), randomizing group composition to foster diverse learning, and selecting appropriate software for seamless communication in both synchronous and asynchronous settings.

2. The analysis of pretest and posttest scores for reading comprehension before and after implementing the virtual flipped classroom with online collaborative learning revealed statistically significant differences ( $t(41) = -7.568$ ,  $p < .001$ ). The mean score on the pretest was 9.98 (S.D.=2.86), whereas on the posttest, it was 14.24 (S.D.=2.02). This shows a significant increase in posttest scores compared to pretest scores. Moreover, the finding supports the research hypothesis, which states that students' posttest scores on English reading comprehension would be higher after learning in the virtual flipped classroom with online collaborative learning. The result of the study displays that using the virtual flipped classroom with online collaborative learning can enhance the students' learning because it consists of various exciting learning materials such as the video lessons on Edpuzzle, the website that allows students to share and brainstorm ideas like Jamborad, the platform that will enable students to perform the online collaborative assignments synchronously, and the video conference which let students and teacher have an interaction between each other. Also, it has a particular breakout room to let students communicate only in their group, like Google Meet. Moreover, it encourages responsibility, collaboration, creativity, critical thinking, and problem-solving skill-building in students. Because of this, this new pedagogy can attract the students' attention, making them willing to learn and pay more attention to completing the assignments individually and collaboratively. This is associated with the study of Ismail and Abdulla (2019), which indicated the result of the student's learning achievements and motivation after using the virtual flipped classroom as a tool for teaching. The result revealed a significant difference in learning achievement and motivation before and after using the VFC model ( $p < 0.05$ ). This considerable difference suggests that the VFC model positively impacts student outcomes. Furthermore, further analysis indicated that the new model specifically contributed to improving the performance of students who initially had lower achievement levels.

## Recommendations

### Recommendations for the Application of the Research Study Results

According to the result of the development of a virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10<sup>th</sup> grade, the researcher has introduced the recommendations which are as follows:

1. Experts evaluated the virtual flipped classroom and found its materials and media to be of excellent quality, suitable, engaging, and capable of capturing students' attention. Therefore, the researcher suggests other teachers across subjects consider adopting this method to enhance student engagement.

2. Research on students' performance in English reading comprehension pretests and posttests showed significant improvement with the virtual flipped classroom and online collaborative learning. This suggests potential benefits for educators in various fields who may wish to explore similar teaching approaches.

### **Recommendations For Further Research**

The researcher has listed the recommendations for the development of a virtual flipped classroom with online collaborative learning to enhance the English reading comprehension of students in 10<sup>th</sup> grade as follows:

1. In the virtual flipped classroom, it can cause boredom for the students when they have to learn from the same method as watching the lessons on the videos. Therefore, the teachers should not only use video lessons as learning materials, but they can also develop and present the lessons through the E-Book, infographic, Metaverse or shrink them to a bite-size like micro learning videos to let the students confront the various materials to make them not bored and encourage them to a learning interest.

2. There are a lot of attractive websites that allow students to perform online collaborative group work. In this research, the researcher used Google Slides to be the place for letting students do the group activity. However, the interface and tools for decorating the assignments on Google Slides are simpler than those on collaborative websites like Canva. As a result, if the teachers use Canva, they will benefit more because Canva offers a bank of styles and pictures for decorating the assignments. Thus, the students will enjoy working because they can use their ideas and creativity to do assignments and submit better ones.

3. The lessons should be arranged from easy to complex topics to encourage the students to learn. If the teacher does not organize the classes, the students will lack motivation to learn because they find that the lessons are too hard for them.

4. If no emergency incident occurs, and the class can continue like usual, the other teachers can apply the virtual flipped classroom with online collaborative learning teaching pedagogy to their face-to-face class. They can combine their classes between flipped classroom and online collaborative learning. With this teaching method, students will study at home and perform online collaborative learning at school. The benefits of doing the assignments online collaboratively are the work will not disappear because they are kept online on the cloud, the students will pay more attention to the study, and they will help each other complete the tasks.

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