Effects of a Flipped Classroom with Computer-Assisted Instruction to Enhance Basic Research Knowledge of Fourth-Year English Major Students, College of Liberal Arts, Rangsit University

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Abstract

The objectives of this research were to 1) develop computer-assisted instruction (CAI) for the flipped classroom, 2) evaluate the effectiveness of the developed CAI in the flipped classroom, 3) compare students' achievement before and after studying with the CAI in the flipped classroom, and 4) ascertain students' satisfaction. The study's objectives were accomplished with the use of a mixed-methods approach and an integrated quasi-experimental methodological design. One hundred and eleven undergraduate students participated in this research. The CAI, the student achievement exam, the student outcomes evaluation form, and the satisfaction assessment form were employed as research tools in this study. The sample was created using a straightforward selection technique. The study's results indicated that the flipped classroom's CAI achieved an efficiency of 82.43/93.25, above the stated efficiency requirement of 80/80. At 0.05, achievement after learning increased statistically substantially as compared to before learning. Student satisfaction with the created CAI lesson was an average of 4.35, which was judged excellent, and 80% of all learner work was of high quality. For pedagogical purposes, it is critical to evaluate instructors' competence to create instructional materials utilizing videos on their own, both in terms of teacher and student access to digital resources.

Keywords: *Flipped classroom, CAI, Academic writing skills, EFL*

1. Introduction

Without a doubt, English has developed into a worldwide language that is spoken and understood by people from all walks of life and serves as the major mode of communication. Learners should be able to utilize the English language to further their education since it has historically served as a significant criterion for entrance to higher education. Additionally, since English has been included as a component of the national entrance test, the value of English writing has increased.

It offers approximately 719 programs in Thailand via 130 institutions. Additionally, 160 schools provide 1,806 bachelor's degree programs and 72 colleges offer 296 doctorate programs. Graduates must be able to publish articles in English. As a result, it is essential to possess fundamental to advanced research capabilities in addition to academic writing abilities.

Despite the critical role of academic writing in learning and teaching, learners face a range of difficulties when it comes to academic writing, including organizing ideas, citing secondary sources, dealing with language concerns, and determining what to write for each paragraph or subject. Additionally, some study results indicate that the insufficiency of EFL learners' writing abilities is a result of a lack of English teacher training, insufficient student practice, and a lack of focus on English.

As previously said, fundamental research skills and academic writing abilities benefit graduate degree students for several reasons. Being proficient in fundamental research knowledge and abilities may assist learners for a variety of reasons. To begin, the ability to write an essay in English is critical for success in today's jobs and life, particularly in business and higher education. Additionally, writing is the technique through which knowledge is transmitted from one person to another. This will have an effect on changes in numerous disciplines, thus it is vital for the author to know and comprehend what they are writing to enable learners to study and seek information independently.

According to Qasem (2019), some learners may encounter internal constraints, such as motivation, while others may encounter external constraints, such as proficiency in L2, comprehension of research techniques, experience, and motivation. Because research proposals and projects are written in L2, a good command of the language and a deep grasp of the topic of study are necessary for the formulation of effective research proposals and projects.

To enhance fundamental research knowledge and academic writing abilities, technology advancements and knowledge transformations in the digital world may contribute to the importance of the digital learning environment in an educational setting. The potential for how a digital learning environment might help EFL students improve their writing abilities and how instructors can utilize it. To write well, learners must engage in active practice and acknowledge their weaknesses rather than dismissing them to generate writing tasks more effectively using a well-designed digital learning environment. As a result, instructors must examine other methods for teaching fundamental research skills and academic writing.

Over the years, the literature has repeatedly explored the ways and tactics used to build academic writing abilities. As a result, it is vital to investigate practical methods to enhance fundamental research knowledge in academic contexts to promote optimum practices.

When implemented in an EFL environment, the flipped classroom enables learners to solve issues by successfully expressing their own ideas. Additionally, the technique is appropriate for the current period, in which learners may learn to write independently and, if they do not understand, can seek clarification from teachers in a face-to-face situation. There will be a corpus of information and concepts prepared for academic writing. This may help learners make fewer mistakes provided they have sufficient knowledge and have gotten a clear explanation from the instructor.

By incorporating computer-assisted language learning (CALL) into the flipped classroom approach, it has been shown that relocating the learning process to any place with an Internet or Wi-Fi connection may aid instructors' training (Alhasani, Masood, & Wan, 2018). According to Webb & Doman (2020), a flipped classroom that incorporates CALL promotes student autonomy and learning control.

Therefore, to improve their basic research knowledge and their ability to write successfully, learners must actively practice and consider their weak points rather than ignoring them to create more effective writing tasks through the use of a well-designed flipped classroom and CAI.

2. Purposes

The goals of this study were to 1) develop computer-assisted instruction (CAI) for the flipped classroom, 2) investigate the effectiveness of the developed CAI for the flipped classroom, 3) compare learners' achievement before and after using the CAI in the flipped classroom, and 4) investigate student satisfaction.

3. Materials and Methods

3.1 Samples and Data Collection

A mixed-methods methodology was used to triangulate qualitative and quantitative data collected in this research. Dörnyei (2007) asserts that mixed-methods research has various advantages: the ability to integrate qualitative and quantitative research results; the complementary nature of qualitative (words) and quantitative (numbers) data; enhanced validity due to the convergence of findings; and a broader appeal than a single-method study.

In this research, purposive sampling was employed. The data were collected during the administration of the questionnaires, and the data from the distributed questionnaires were used to interpret, classify, and complete the data in the following ways:

Table 1 Basic information of the respondents

Variable		Number (person)	Percent
Sex			
	Male	23	20.72
	Female	88	79.28

Variable	Number (person)	Percent
Age		
20-21 years	46	41.44
22-25 years	65	58.56
GPA		
2.00 – 2.99	44	39.64
3.00 – 4.00	67	60.36

According to Table 1, the majority of respondents (79.28 percent) were female, whereas the majority of students (58.56 percent) were between the ages of 22 and 25. Additionally, 60.36 percent of respondents had a GPA of 3.00–4.00, while 39.64 percent had a GPA of 2.00–2.99.

3.2 CAI Development

Because the development of computer-aided education is required to be consistent with multiple theories, this section recognizes several researchers, educators, and academics for their work, thoughts, and ideas.

Roblyer and Hall's model (1985) was employed in the study. It was divided into three phases:

1) design
2) development
3) evaluation

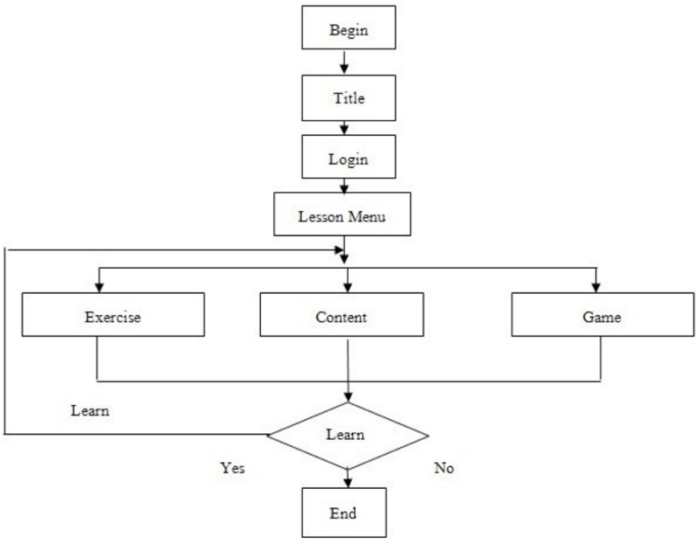

Figure 1 CAI Flow Chart

According to Figure 1, Roblyer and Hall's model is similar to Alessi and Trollip in that it emphasizes collaboration between design experts with experience and knowledge of courseware design, content specialists with experience and ability to teach, and programmers with experience and knowledge of CAI lesson writing.

3.3. Data Analysis Procedures

For context, the data were analyzed in terms of frequency and percentage. After identifying existing concerns, data were analyzed using frequency, percentage, and mean. SPSS 22.0 was used to analyze the

gathered data. The acquired data were then analyzed in terms of frequency, percentage, and mean concerning the satisfaction of five educational technology professionals. SPSS 22.0 was used to analyze the gathered data.

4. Results

This section discussed the design of the one-group pretest and posttest. The paired sample t-test was performed to determine if there was a significant change in EFL students' performance before and during the implementation of the flipped classroom. Following that, the paired sample t-test was performed.

Table 2 Effectiveness of Computer Assisted Instruction

Test	N	Full Score	$\bar{x}$	Effectiveness
During Class	111	30	18.1	82.43
After class	111	30	21.32	93.25

According to Table 2, the sample group of 111 persons who utilized the researcher's computer-assisted teaching classes earned an average score of 18.11 out of a possible 30 points, or 82.43 percent, which was greater than the requirements. After the sample group completed the accomplishment exam, the average score was 21.32 out of a possible 30 points, or 93.25 percent, which was higher than the final 80 criteria listed with an efficiency of more than 80/80.

Table 3 Mean differences of a Flipped Classroom with CAI

Test	Full score	$\bar{x}$	SD	t	Sig.
Pre-Test	80	41.24	20.23		
Post-Test	80	50.48	24.36	3.441181482	.000*

*p < .05

According to Table 3, the paired sample t-test findings indicate that the Sig. (2-tailed), in each test (p=.000, p<.05), indicating that there is a statistically significant difference in students' basic knowledge before and after the flipped classroom.

Table 4 Satisfaction of Students towards a Flipped Classroom with CAI

Topics	$\bar{x}$	SD	Level
1. Lessons	4.1	0.68	Much
2. Topic separation	4.3	0.71	Much
3. Content presentation	4.3	0.67	Much
4. Quantity of content	4.2	0.75	Much
5. Introduction	4	0.75	Much
6. Style of the presentation	4	0.81	Much
7. Readable letters	4.2	0.78	Much
8. Illustration	4.1	0.77	Much
9. Buttons	4.2	0.69	Much
10. Usability	4.1	0.84	Much
11. CAI presentation	4	0.72	Much
12. Background music	3.8	0.8	Much
13. Video	4.2	0.74	Much
14. Exercise	4.2	0.72	Much
15. Time	4.3	0.64	Much
16. Knowledge gained after taking CAI lessons	4.4	0.67	Much

When analyzing each item in Table 4, it was discovered that respondents were most satisfied with the information obtained after taking the CAI lesson ($\bar{x}$ = 4.4), followed by subject division. The mean score

for material presentation and length was ranked the highest, while the background music received the lowest rating ($\bar{x}$=3.8).

4. Conclusion and Discussions

Despite the advancement of educational technologies, a flipped classroom has proven to be effective in reinforcing English language skills for a variety of reasons. The results of instructional management that incorporate a flipped classroom and proactive learning principles may help students improve basic research knowledge and their academic writing abilities, particularly in the area of paraphrasing while applying to chosen paragraphs to continue from scholarly writings in which the classroom's learning management system is inverted to encourage students to practice asking questions prior to joining the classroom, recording essential information and summarizing the notes according to their own understanding. It is also to encourage pupils' growth and self-learning with the application of information to build skills, boosting self-learning and fostering the development of critical thinking abilities

Also, It is primarily suggested that during in-class activities, the instructional design with technology must be carefully planned to ensure the learners' learning experience. After the interview with one of the teachers, he observed that

"My answers are based on the overview of students ' performance in classes so far. Each individual has a different issue that requires special attention from the teacher. However, their common problems seen in classes would be not being familiarized with complicated vocabulary and on an academic level, not knowing alternative words or using good word choices appropriate to the register (The reason why it takes them a long time to write), and doing research as a completely new thing for them. I think focusing on writing strategies needed for academic writing (as in the new curriculum) would help equip students with necessary skills they'll use in writing their own research papers."

Additionally, it was discovered that a flipped classroom assists learners in learning independently by being capable of scheduling time for learning and investigating knowledge independently via the use of media and online classrooms. There are films and educational resources available for study. When learners do not understand, they may examine and review at any moment and utilize their data searching abilities to obtain further information. Consequently, learners can grasp and draw their own inferences from the knowledge. The results may be presented in several ways, including an online summary exercise conducted outside of the classroom. There is an initial stage during which the instructor summarizes newly learned material by focusing on reflection through online learning questions and replies. The teacher's major focus is on assuring understanding. by evaluating learners' responses to questions regarding video content through Q&A for further information and a summary of extracurricular learning (Lai & Hwang, 2016; Huang & Hong, 2016; Grypp & Luebeck, 2015).

In an EFL lesson, a flipped classroom with CALL was shown to increase student autonomy, improve teaching and learning processes, and provide more time for practice and feedback. Finally, practicing allows for more self-centered instruction. Students are free to choose the solution that best meets their academic requirements. As a result, according to Mehring (2016), learners will think about the subject much more, which will motivate students to participate in problem-solving.

The following are the study's limitations: To begin with, no comparison group was used in this investigation; hence, using a control group in future studies is strongly advised. The second criterion is that learners who learn using game applications may accomplish higher levels of learning than those who do not. They may also be content with the teaching and learning method. The following recommendations for further research are offered based on the findings and conclusions of this study: Inferential statistics should be used in a future study to examine the acquired data to get more details on the outcomes and reach a conclusion.

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7. References

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