

Original Paper

Effects of English Teaching with Interactive Whiteboards in the Elementary English Classrooms

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Abstract

The purpose of the study was to probe the effectiveness of English language teaching through Interactive Whiteboards (IWBs). Three specific factors were probed: (a) the results from immediate test and retention test; (b) students' perceptions related to the utilization of IWBs; (c) the advantages and disadvantages of the technology-supported instruction. Forty-three students from Grade 3 students in Sahes Elementary School in Taiwan were engaged in either technology-supported group or none technology-supported group. The results revealed that the experimental group through technology-supported instruction significantly outperformed the control group on students' immediate test and retention test. Moreover, students' perceptions related to the IWBs indicated that most of them enjoying learning English in the technology-supported classrooms. Finally, the results also showed the advantages and disadvantages through the IWBs instructions. The study revealed that teaching through technology was an effective way to help students in English learning.

Keywords

interactive whiteboards, instructional differences, immediate and retention tests, perceptions

1. Introduction

English is regarded as a foreign language in Taiwan. Over the past decades, English teachers usually instruct their students with traditional materials, such as chalks, blackboards and textbooks. Even though they use some illustration pictures to teach the students, their achievement has not been improved obviously up to the present. On the other hand, they rarely rely on modern or up-to-date materials in their classrooms. According to Mayer's (2001) Cognitive Theory of Multimedia Learning (CTML), learning from distinct channels leads to a general improvement in learning. Recently, more and more teachers and students are favor of using the interactive whiteboards (IWBs) in the English as a Foreign Language

(EFL) classroom. Additionally, the IWBs are often utilized to support the linguistic learning in Taiwan. It not only increases the students' motivation, but facilitates teachers to instruct them more efficiently. International research reports that most of the learners are happy and enthusiastic when they are learning English with the IWBs. According to Jung and Shun (2012) stated that "technology components such as an interactive whiteboard can develop active learning environment by providing engaging and repeated learning opportunities" (p. 322).

One way to help English learners acquire new vocabulary and develop language skills is to use visible and audio aids (Britsch, 2010; Hickman, Pollard-Durodola, & Vaughn, 2004; O'Bryan & Hegelheimer, 2007). Although technologies have inaugurated a promising future, it is questionable that their applications achieve parallel degrees of pedagogical benefits in EFL learning and teaching (Lin, 2014). In spite of wide availability of technology, little research has probed the effective of integrating these arising tools in elementary EFL classrooms. Therefore, four research questions were addressed in the study: (1) Does the technology-supported group significantly outperform the control group in the immediate test? (2) Does the technology-supported group significantly outperform the control group in the retention test? (3) How do the elementary school students perceive English learning through interactive whiteboards? (4) What are the advantages and disadvantages of the technology-supported instruction?

2. Literature Review

2.1 Enhance Student's Learning by Using Technology

By using the world of media and modern technology, efficient learning can be approached (Barboza, 2010). According to the literature review implemented by Cheung and Slavin (2012) of 85 studies which evaluated the influences of technology for enhancing reading comprehension, teaching technology has more advantages for closing capability and language crack for students with disadvantage and those who are EFL. Actually, technology itself cannot enhance student learning. It's an important issue that how technology is carried out into the lessons that makes changes in how students learn (Berkowitz, 1999). Respondents have confidence that all students get benefits from the technology-supported classrooms, including subjects having academic requirements and English language learners (Walden University, 2010).

Because of technology's major role around the globe, students can relate much more to an instructor utilizing technology in the classroom (Spears, 2011). When students approach technology devices such as computers in their classrooms, particularly in rural and poverty areas, it improves academic accomplishment (Becker, 2006). Teachers' instruction by using technology observed the more advanced levels of learning and participation in their students' learning patterns owing to the high release level of the students with technology (Walden University, 2010). As Badrul Khan (2005) states, "a well-integrated e-learning program can provide numerous features conducive to learning. These features should be meaningfully integrated into an e-learning program to achieve its learning goals" (p.

10).

Patterson (2001) probed computer-supported language learning. The author came to a conclusion that the CAM (Computer Integrated Manufacturing) could be a significant supplement to the language class because it increased discourse abilities, an integration of language acquisition. Despain (1997) had an initiative study, and the primary discoveries and conclusions made by Despain can be summarized as follow students were likely to learn more efficiently utilizing the computer-supported delivery system, students who accomplished more practice using computers learn more; it's advantageous to save the time by using the computer, students who finished the exercises through computer had a more positive attitude in accordance with the listening comprehension exercises, and students utilizing computers had a more positive attitude related to language learning in general.

Technology was beneficial in SLA, because students were more concentrated and had more chances to exercise the target language in a more flexible and released environment (Barboza, 2010). Instructors can help learners realize ideas and acquire knowledge too complicated for oral explanation by utilizing instructional technologies including powerful pictures, sounds and words. Nowadays, we confirm the effectiveness of deliberately designed, high quality teaching media utilized as an essential part of the classroom instruction.

Both teachers and learners should make good use of the instructional technology (Barboza). The researcher Oliver (1999) indicated that "learning activities in technology-based environments play a fundamental role in determining learning outcomes... they determine how the learners will engage with the course materials and the forms of knowledge construction that will take place" (p. 246).

Language is a living thing, so the best way to learn a language is in an interactive and authentic environment. Computer technologies and the Internet are powerful tools for assisting these approaches to language teaching (Wang, 2005, p. 2). These tools related to the technology, such as multimedia, word processors, Internet, drill and practice programs, and others can assist students to participate voluntarily in respective instruction designed to meet their particular requirements (Butler-Pascoe, 1997). Li (2007) uncovered students have interests in technology and believed technology probably is efficient in learning.

2.2 The Use of Interactive Whiteboards

According to Bell (2002), the IWB is an excellent tool for the constructivist educator. The pedagogy of action also comes to the front, since the new devices offer new possibilities for this learning approach. On the other hand, another approach that might be referred to in connection with the new device is sensual pedagogy. It meant that the environment had to affect the children through their own senses. The instructors' tasks are to present the world to the children in the richest and fullest way with the utilization of diverse pedagogical devices and methods.

Students would feel like working with a laptop in each lesson and they would like to have and IWB which is connected to their computers in every classroom (Biro, 2011). It's very important for instructors to collaborate and help each other, especially in the beginning. Besides the IWB, other

supplements will be distributed to assist the teachers' work, too (Liang, Huang, & Tsai, 2012). IWBs are regarded as a revolutionary instructional strategy for different level students. Actually, educational institutions had tried hard to provide more sufficient and better teaching environment related to the teaching technology. Although many countries have the higher penetration rate in class, the average rate in Asia is still lower than other ones. Numerous studies indicated that IWBs can facilitate the functionality of modern ICT (information and communication technologies), like overhead projectors and computers by increasing activities to these media that have it definite from traditional PowerPoint presentation (Hall & Tirotta, 2010).

Taking the advantages of IWBs into consideration, teachers can enrich their instruction with diverse teaching strategies and techniques and, therefore, it can increase students' interests, motivation, cooperation and concentration (Levy, 2002; Beauchamp & Parkinson, 2005; Hall & Higgins, 2005; Glover, Miller, Averis, & Door, 2007). Teachers' perceptions and attitudes related to the IWB utilization were explored at three primary themes: instructional effects, motivational effects, and usability. Similar to the results of previous IWB studies (Beelan, 2002; Saltan, Arslan, & Gok, 2010), it is distinct that teachers have positive perceptions (3.79/5.0) about the use of IWBs in general.

2.3 Students' Engagement and Students' Retention

Students only concentrate on course for an average of roughly 10-20 minutes during a teacher-centered instruction (Bunce et al., 2010; Sousa, 2006). According to the study, it is important for the teacher to maintain students voluntarily participated and motivated by integrating changes in the course or integrating different teaching accessing to be a way to keep student attention (Bounce et al., 2010; Johnstone & Percival, 1976). Campbell (2007) wanted to recognize the effectiveness of age and technology utilization on course retention. While using involving technology, younger students are more victorious in class. Moreover, student success can result in student retention; this study examined the promise of clickers, an involving technology uncovered to improve student success to affect course retention rates. The student's engagement in the classroom can influence his (her) decision to continue during a course or program (Arbona & Nora, 2007; Rendon, 1994). Tinto (1997) indicated that the significance of student engagement based on a student capability to learn.

3. Methodology

3.1 Participants

This study recruited 43 third graders from two classes in the elementary school in southern Taiwan. Based on the students learning experiences (at least six months), their language proficiency level was considered the beginner. Besides, none of the classes were significantly superior to the others in their English ability according to an assessment of their first monthly test results. The subjects consisted of the normal classroom and technology-supported classroom. Each class had two credit academic hours for one class every week. English classes took place in the normal classroom and the technology-supported classroom. Participants in two classes were taught by the same instructor. The

purpose of English classes was to develop their English abilities and improved their English efficiency.

3.2 Instruments

To complete the goal of this study, the primary instruments in this study were adopted as follow.

- (1) Teaching materials: textbook “Dino on the Go!” (Book Two)
- (2) IWBs: including a projector, a laptop, a sensitive-touched screen, and wireless devices equipped with the laptop.
- (3) An immediate test and a retention test: The tests are designed by the instructor.

Both tests had the same test form to evaluate the students’ comprehension. Each test contained three main parts; listening, reading and writing comprehension. The students have to complete the test in accordance with the descriptions presented on the quiz. In other words, students had to finish the tasks according to the instructors’ descriptions and choose the correct answers from the options.

- (4) A questionnaire

A questionnaire related to the students’ perceptions on teachers’ using technological devices in their English courses. The questionnaire consists of several parts: perceived learning contribution, motivation, perceived efficiency and satisfaction. The questionnaire was designed to be evaluated using a five-point Likert scale. The students chose the proper answers from the questionnaire among strongly agree (5 points), agree (4 points), neutral (3 points), disagree (2 points), and strongly disagree (1 point). Consequently, an open-ended question was given to elicit the participants’ views about the advantages and disadvantages of the technological devices. The participants had to write something related to the advantages and disadvantages about the modern devices.

3.3 Procedure

The study adopted an experimental research design. The two classes of the same English teacher were randomly assigned to IWBs-supported group (experimental group), and IWBs-free group (control group). The experimental group was assigned to learn the target English vocabulary and sentences in the technology-supported classroom. After each instructional session lasted 8 weeks, the two groups received an immediate test. It meant that two months after the experiment, an immediate test consisting of listening, reading, and writing items was administered without prior notice. The scores were collected: the result of the immediate test. This study was also conducted through the third graders filling out the questionnaires. The survey was anonymous, and was finished in their classrooms during the semester. In order to analyze the data collected by the questionnaires, descriptive statistics such as frequencies and means were reported. Moreover, the questionnaires contained the quantitative data (20 questionnaires) and qualitative data analyses (an open ended question). One more week later, the two groups received the retention test without notice in advance.

4. Results and Discussion

4.1 Results

4.1.1 Does the Technology-Supported Group Significantly Outperform the Control Group in the Immediate Test?

In order to evaluate whether different instructions influenced students' performance on immediate test, independent t-test were computed for both treatment effects. Comparisons of the scores of the two groups available from immediate test items were presented in Table 1. Table 1 showed scores for the immediate test. The mean of immediate scores in the technology-supported group ($M = 85.51$, $SD = 15.24$) was higher than that of the control group ($M = 65.13$, $SD = 23.16$). There was a significant difference between the two groups ($t(41) = 5.072$, $p = .000 < .05$).

Table 1. Independent t Test on Immediate Test (n = 43)

Groups	Mean	SD	t	Sig.	df
Technology-supported (N = 21)	85.51	15.24	5.072	.000	41
Control (N = 22)	65.13	23.16			

4.1.2 Does the Technology-Supported Group Significantly Outperform the Control Group in the Retention Test?

In order to evaluate whether the means of the technology-supported and control groups were significantly different, an independent t-test was implemented. For the scores on the retention test, the results showed that the mean of the technology-supported group ($M = 88.61$, $SD = 17.74$) was higher than that of the control group ($M = 76.11$, $SD = 21.30$). In addition, there was a significant difference between both groups ($t(41) = 2.37$, $p = .022 < .05$). The data was presented in Table 2.

Table 2. Independent t Test on Retention Test (n = 43)

Groups	Mean	SD	t	Sig.	df
Technology-supported (N = 21)	88.61	17.74	2.37	0.22	41
Control (N = 22)	76.11	21.30			

4.1.3 How do the Elementary School Students Perceive Learning English through Interactive Whiteboards?

In order to probe different perceptions toward technology-supported instruction, questionnaires were given. To answer the research question, the mean scores of each item were computed by calculating each student's points. From the results, all the items for the technology-supported group obtained mean

scores from 4.65 to 4.28. The results of technology-supported group's questionnaire scores were presented in Table 3.

The item 12 got the highest mean (mean = 4.65) among the twenty items. The item 7 was the second (mean = 4.63) one among them. However, the item 6 got the lowest mean (mean = 4.28) among them. Analysis of items 1, 2 revealed that the technology-supported group showed high agreement percentages for each item (93%).

Table 3. Students' Perceptions of the IWB Instruction

Rank	Items	Mean	SD	Agree (%)	Unsure (%)	Disagree (%)
1	I like going to the front of the class to use the IWB.	4.65	1.10	91	9	0
2	English teachers' using IWBs make me comprehend the materials more easily.	4.63	1.05	91	9	0
3	IWBs make learning English more interesting.	4.58	1.23	93	5	2
4	I like English teachers to use IWBs during the English classes.	4.58	1.34	93	7	0
5	I like to use IWBs to take English activities with my classmates.	4.58	1.31	88	10	2
6	IWBs make the teachers' vocabularies easier to see.	4.56	1.50	88	12	0
6	IWBs make the teachers' English contexts easier to see.	4.56	1.20	88	12	0
6	IWBs make the teachers' English practicing examinations easier to see.	4.56	1.31	86	13	0
9	English teachers using audio and visual materials with IWBs help me understand the lesson better.	4.53	1.26	85	15	0
9	My learning experiences in English courses are positive.	4.53	1.27	88	12	0
11	I like the courses using IWBs better.	4.51	1.18	88	10	2
11	Learning English in a IWBs classroom is enjoyable.	4.51	1.22	88	7	5
13	The course using IWBs is effective for my English learning.	4.49	1.15	86	12	2
14	IWBs make the teachers' English sentences easier to see.	4.47	1.11	85	13	2
15	I prefer lessons that are taught with IWBs.	4.37	1.48	80	18	2
16	English teachers' using IWBs increase my interest in the English lesson.	4.33	1.12	77	18	5
16	English teachers' using IWBs is a good method for me to learn English.	4.33	1.28	85	15	5
18	I concentrate better when my teacher uses IWBs.	4.30	1.33	77	23	0
19	I learn more when my English teacher uses the whiteboard.	4.28	1.06	80	18	2
19	English teachers' using IWBs make me memorize vocabularies more easily.	4.28	1.25	74	21	5

4.1.4 What Are the Advantages and Disadvantages of the Technology-Supported Instruction?

When participants were required to write down the advantages and disadvantages through the technology-supported instruction, the results were presented in Table 4 and Table 5. 37% reported that the IWBs had more effective functions than the blackboards. Moreover, 22% indicated that IWBs had diverse instruction. According to Table 4, the participants' also reported they (22%) were satisfied with the IWBs, and 19% indicated that they could have better achievement eventually.

On the other hand, according to Table 5, 49% reported that IWBs had some advantages, such as equipment. 43% indicated that the screen sometimes had some trouble and it couldn't work after all.

Table 4. The Advantages by Using the IWBs for Students' English Learning

Rank	Category	<i>f</i>	%
1	The more effective functions of IWBs	19	37
2	Diverse instruction	11	22
2	Increased motivation	11	22
3	Improved academic performance	10	19
Total		51	100

Table 5. The Disadvantages by Using the IWBs for Students' English Learning

Rank	Category	<i>f</i>	%
1	The computer technical failure	23	49
2	The quality of IWBs	20	43
3	Spending more time operating	4	8
Total		47	100

4.2 Discussion

The purpose of this section was to review the results and to present findings related to previous research. The discussion of the findings was presented in accordance with each of the four research questions.

Research Question 1

Does the technology-supported group significantly outperform the control group in the immediate test? The research question sought to probe whether different instructions affect students' English performance. As the result reported, the participants who were in the technology-supported group showed better than the control group in the immediate test ($t(41) = 5.072$, $p = .000 < .05$). The results suggested that learners' English performance benefited from the instruction with technology-supported environment. Such learning activities truly motivated the learners' interest and active engagement in the classroom, and enhanced the interaction between the teachers and students (Glover & Miller, 2001;

Golover et al., 2005). Kalanzadeh (2015) revealed that most students agreed that when audio and visual materials are utilized with IWBs, they can realize lessons much better than the traditional one without IWBs. In addition, the learners feel that they can learn more than before. In Levy (2002) and Lee and Boyle (2004), the instructors indicated that IWBs make it easier to have learners concentrate on a large number and wider variety of information and learning materials. Furthermore, these sources can be utilized spontaneously and flexibly according to different pedagogical needs.

Research Question 2

Does the technology-supported group significantly outperform the control group in the retention test?

This research question aimed to assess the influence of two types of instructions on English language acquisition and retention. The results found that there was a significant mean difference between the technology-supported group ($M = 88.61$, $SD = 17.74$) and the control group ($M = 76.11$, $SD = 21.30$) on the retention tests. That is, the statistical significance of the technology-supported instruction on English proficiency was inspected. For the technology-supported group, students got more diverse instruction through IWBs, and in the control group, learners just learned from the teacher-centered instruction through blackboards. Therefore, the better performance in the technology-supported group was consistent with the argument that language learners who performed higher levels of attention performed significantly better in recognition and written production assignments than students who were not involved (Leow, 1997). It also reported that the combination of these technologies not only help students concentrate on the class, resulting in better test scores, but also encourage teachers to create positive and pleasant learning environment through IWBs (Hur & Suh, 2012), particularly in the rural elementary school. The students in the rural region usually don't have sufficient impact related to the technology. Therefore, the learners in rural schools have much more interests and engagement in class through the technology instruction than the one in urban schools. It truly benefited them from the technological learning environment.

Moreover, from Table 1 and Table 2, we could found that the mean in the technology-supported classroom was changing from 85.61 to 88.61. However, the mean in the traditional classroom was changing from 65.13 to 76.11. It meant that the progress in the control group was larger than the technology-supported group. We could indicate that teachers always require students to revise their answers after each test, and students would realize and memorize better through the revision. Because technology-supported group had performed much better than the control one from the immediate test, the progress wasn't distinctly changing a lot. On the other hand, the control group had a larger significance between the immediate test and retention test through the revision required by the instructors. Therefore, it indicated that it's essential for students to revise their quizzes after each test.

Research Question 3

How do the elementary school students perceive English learning through interactive whiteboards?

This research question aimed to explore learners' perceptions with IWBs instructions. From the data of the questionnaire, the technology-supported group gained mean scores above 4.28 at least in each

question. In particular, the highest one ($M = 4.65$) was in question 19, “I like going to the front of the class to use the IWB”. It indicated that the learners liked to interact with the teacher and to operate the modern systems by themselves. It was proved by cognitive-developmental theory (Jean Piaget, 1896-1980). According to the theory, the primary school students are in the “concrete operational stage” (age 7 to 11). They felt like operating something by themselves, and they also acquired something new through visual and concrete materials better. It also proved that more than two third (70%) of the students described their responses to go to the front of the class to use an IWB because the IWB, makes it simpler for them to be stimulated during the curriculum (Öz, 2014). On the other hand, the lowest one ($M = 4.28$) was in question 4 “I learn more when my English teacher uses the whiteboard.” and question 6 “English teachers’ using IWBs make me memorize vocabularies more easily”. In order to have better language acquisition, learners not only rely on the instructors at school, but also rely on their own learning at home after all. Therefore, utilizing the modern systems truly could enhance the students’ positive learning, but they themselves had to practice and kept on learning to achieve better scores after school.

The study reported that utilizing IWBs provides pleasant atmosphere for language learning, stimulates students on the way to acquire the most from their learning through increased interaction (Öz, 2014). Current study presented that students have awareness that the pedagogical advantages of IWBs (Celik, 2012). They feel that teachers utilize IWBs to assist them learn more and understand the curriculum better when the audio and visual materials are showed in a jointed styles. Most of them had positive attitude related to teachers’ utilizing IWBs.

Research Question 4

What are the advantages and disadvantages of the technology-supported instruction?

The students in the technology-supported group were required to write down something related to the advantages and disadvantages of IWBs. The research question was divided into two sections, the first one was the advantage of IWBs, and the second one was the disadvantage of IWBs. According to Table 4, 37% students agreed that IWBs had more effective functions. Moreover, 22% students reported that IWBs had diverse instruction and they were satisfied with the IWBs. 19% students indicated that IWBs could enhance their achievement. In a word, most students had positive attitude during the technology-supported instruction. Biró (2011) indicated that “Based on their positive reactions they appreciate the new equipment since it makes the lessons more interesting, more enjoyable, more fun and easier to understand the material” (p. 35).

On the other hand, the disadvantages of IWBs also presented at Table 5. 49% students reported the computer equipments often had trouble. These findings of the qualitative data are widely in line with Schmid and Schimmack (2010) who also discovered that, teachers, in spite of having full access to the technology; do not have the essential skills and knowledge of how to utilize ICT generally. Therefore, instructors should have sufficient knowledge and training opportunities to utilize the modern systems well. Türel and Johnson (2012, p. 362) also argue that teachers need training on using effective

instructional strategies for IWB-assisted courses so that they will be able to transform their pedagogy into more student-centered, social and interactive learning.

5. Conclusion

From the study, three pedagogical implications were determined. First, IWBs could provide interactive opportunities and they were also the best advantages for the students (Hur & Suh, 2012). Students in the technology-supported group like English learning and liked to interact with the instructors. Students' ideas related to the IWBs were generally positive. They liked utilizing. They also found the more opportunities provided to interact with classmates and instructors through the instruction. Second, the instructors should try to find the innovative ways to help students learn in EFL classroom. We even could conclude that the integration of IWB through the teachers' instruction truly enhanced the instructional presentation (Liang, Huang, & Tsai, 2011). Öz (2014) indicated that one of the advantages of IWBs is the opportunity to incorporate various types of materials into teaching process (p.175). Third, administrators had the responsibilities to support the technological devices equipped in the classroom. It not only assist teachers create well-designed learning environment but also help students practice English in class positively (Hur & Suh, 2012). Consequently, high-engaged learners always show positive attitudes in learning whereas low-engaged learners seldom do. If instructors adjusted their teaching design, successful language class would run smoothly.

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