Pakistan Journal of Distance and Online Learning
Volume: IV, Issue II, 2018, 213-224

Effect of Interactive Whiteboard on Academic Achievement of Higher Secondary School Students

Muhammad Rizwan[*]
Saddaf Ayub[**]
Saeed Khan[***]

Abstract

In this study the effects of using interactive whiteboards on the achievement of higher secondary students in respect of English vocabulary teaching were examined. The sample of the study comprised of 80 2nd year students of GCHSS No 1 Haripur District. The study involved two groups as the experimental group and control group. The subject of the study was three units of 2nd year English textbook, Unit 3 Battle of Uhud, Lingkuan Gorge, Unit 4 Determination, The Man Who Planted Trees and Unit 5 Technology and Society of the Future, Gender Inequality is Detrimental to Society. The vocabulary was taught to a control group using a traditional white board (TWB) and the experimental group was taught using an electronic or Interactive Whiteboard (IWB). An English achievement test as a pre- test and post- test was used to investigate the success of both groups. The results were evaluated by using the software SPSS. Findings and results disclosed that the experimental group outperformed the control group with respect to their achievements. The IWB appeared to have significant effects on the achievements of students for learning English vocabulary on higher secondary students. As a result, this study provides useful evidence for English teachers and students.

Keywords: interactive whiteboard, english vocabulary, textbook

[*] Ph. D Scholar, Department of Education, The University of Haripur.
Email: rizwanss2011@gmail.com
[**] Assistant Professor, Department of Education, The University of Haripur.
Email: missraja2007@yahoo.com
[***] Assistant Professor, Department of Education, The University of Haripur.
Email: saeedagha03@gmail.com

Introduction

Language teaching and learning was considered possible and promising through the mastery of vocabulary. Giltner (2012) stated that teaching / learning vocabulary is a vast and never-ending subject. It needs to be taken seriously as it is one of the factors affecting the phenomenon of language change.

Schmitt (2000) stated that English adds to its vocabulary due to this interest of the linguists and researchers in vocabulary teaching / learning. Vocabulary learning is generally related to the understanding of a word by another person but when analysed deeply it actually consolidates numerous activities and tasks. Vocabulary acquires a valuable place in learning the English language as its mastery enables the learners to proceed smoothly towards the development of language skills; after they have adopted a word, they can use it in their communication. Besides, learning vocabulary is a multi-facet type of learning where the learners are able to perceive the meaning of a word, to acquire a word and later to use it independently exhibiting their productive skills. Learning vocabulary involves a learner in the process of understanding, retaining and using a word in sentence. Barcroft (2015) stated that there are three important things that a learner must acquire for adopting vocabulary: the form of the word, its meaning and its etymology tracing back the use of the word in the English language.

Nation (2001) explained that the learners can easily extend their command over the English words by thinking, relating and analysing their meaning. We can understand the meaning of a word through its context; it can be done by matching it with its synonyms or by looking into a dictionary and learning the meaning by heart. Lessard-Clouston (2013) commented that it is true that, the more we put our efforts into developing our familiarity with a new word, the quicker we are able to inculcate it. We should use it in our spoken and writing so that we can retain it. This is what even a native strives for when adopting new words.

Noor and Aamir (2011) stated that 73% students use a dictionary to look up a meaning for a word, while 23% of them rely on the contextual meaning and only 10% pay attention to its grammatical form. Hurlock (2001) also delineated number of words learnt by a child at its early age through a graph. It depicts that a child is able to adopt ten words when it is of eighteen months and, at twenty-four months, masters twenty-nine words. Comings, Garner & Smith (2006) stated that, as compared with a child, an adult learner adopts the vocabulary fully in form, meaning and use.

IWB are electronic white boards that can be used for different purposes (Al-Saleem, 2013). International studies such as (Read, 2001; Solvie, 2004; Cogill, 2003; Gillen et al., 2007; Hennessy and Warwick, 2010) examine how the development of technological innovations are making their way into classrooms which promotes collaboration among individuals, in particular the use of IWBs. The IWB is a pedagogical tool which promotes creative teaching, facilitates discussion and motivates students in absorbing information for learning (Smith, Higgins, Wall, & Miller, 2005; Onal, & Demir, 2017). It helps teachers to accommodate a different style of learning by touching icons and using a menu on a bar which shows notes and allows learning material to be presented on the board. It works with projector and computers. Its large touch display enhances students' interest. Any image on the whiteboard may be operated by pen or fingers directly. It provides an interactive presentation platform for the presentation of information and to inform pedagogic strategies. IWBs have been found to offer innovative and powerful support for language acquisition in foreign language classrooms (Al-Saleem, 2013; Glover, Miller, Doughs & Door, 2007).

Moss, Jewitt, Levaaic, and Armstrong (2007), in an English study, found that IWBs affect learning in several ways, including raising the level of student engagement in a classroom, motivating students and promoting enthusiasm for learning. IWBs support different learning styles, including catering for students with hearing and visual impairments. A second English study by Cooper and Brna (2003) reported that students get good opportunities for learning assisted in part by the large screen. Kennewell and Morgan (2003), in an Australian study, stated that IWBs improve standards of the classroom and increase motivation of students. It creates greater attention and enthusiasm to participate and respond. An American study by Johnson (2004) investigated how an IWB can make learning more enjoyable and interesting, supported by Reardon (2002), who concluded that the IWB can entice students to learn. Latham (2002), in an English study, concluded that the use of IWB can play an effective role in the implementation of curriculum and, as shown in some of the other studies cited, enhance the interest of pupils.

Objective of the Study

The objective of the study was to determine the effects of using an IWB on the achievements of higher secondary students in teaching and learning English language vocabulary.

Research Hypothesis

For the achievement of objective, the following hypothesis were taken.

H_1 There is a significant difference in the achievement of students taught through traditional whiteboard (TWB) and interactive whiteboard (IWB) in teaching English Language vocabulary at higher secondary level.

H_2 There is no significant difference in the achievement of students taught through TWB and IWB in teaching English Language vocabulary at higher secondary level.

Methodology of the Study

Research Design

The study involved two groups (experimental and control) in pre-test post-test experimental research design. The experimental group was treated with IWB use and the control group was treated with TWB use with same unit of textbook. Both groups were taught through three vocabulary teaching strategies such as Concept Definition Map, Context Clues and Verbal and Visual Association.

Population

The population of study constituted Govt. Higher Secondary School (GHSS) No.1 Haripur with Interactive Whiteboard facility. Grade 12th students of age range from 17 to 18 years, were selected.

Sample

Purposive sampling technique was used for the study. GHSS, No.1 Haripur was the sample of the study because it had a required strength of students needed for study and facility to use IWBs. Students of 40 in each group were placed into two equivalent A and B groups on the basis of their scores in pre-test through random assignment. Group A treated as control and B as experimental group. Both were further divided as high achievers (above 33%) and low achievers (below 33%) on the basis of their mean score in pre-test. Students were taught by the same teacher because of non-availability of same calliper teacher.

Vocabulary enhancement strategies such as concept definition maps, context clues and Verbal and Visual Word Association, were selected for the vocabulary teaching for both experimental and control groups. Three units of 2nd year English textbook of Khyber Pakhtunkhwa were selected for the study. In each unit there are two lessons such as Unit 3 Battle of Uhud, Lingkuan Gorge, Unit 4 Determination, The Man Who Planted Trees and Unit 5 Technology and Society of the Future, Gender Inequality is Detrimental to Society.

Research Instrument

In this pre-test post-test research design, IWB was considered as independent variable, whereas the dependent variable was student learning.

Test Construction

The test consists of hundred multiple choice questions based on the three selected units of the English Textbook for 12th class which were made by teacher. Those were divided into three sections. Section A and B consist of 35 items each while section C of only 30 test items. In section A of the test, students were asked to fill in the blanks with correct words. In section B, they had to choose the word with the correct spelling. In section C, students had to select the appropriate meaning of a word indicated in bold. The researcher developed fifty (50) items of each section i.e. Section A, B and C included in the test. All the items were tested on the students of the 12th grade class of Govt. Higher Secondary School Sarai Saleh Haripur, other than the students selected for experiment and piloting. 50 items were rejected by analysing difficulty and discrimination level of each item from 0.25 to 0.7. After determining the difficulty level of each test item, only hundred (100) out of one hundred and fifty (150) items selected, 35 for section A and B each and 30 for section C.

Table 1

Category and distribution of marks of English Test

S.No.	Test Designing	No. of test items
1	Fill in the blanks	35
2	Choose the word with correct spellings	35
3	Select the appropriate meaning of the words	30
	Total	100

Data Collection

Data was collected through a teacher-made test at two different points. The pre-test was used to make the sample into two groups control and experimental group. When the treatment was over, after a 4-weeks teaching period, the post-test was administered (using the same 100 item pre-test instrument). The change from pre- to post-test scores were used to determine the effects of IWB compared to TWB on the achievements of students.

The treatment involved the following activities:

Activity I: Words and contrast - Teacher showed the picture to students on the IWB and asked them to guess the appropriate coloured words.

Activity II: Word and Match – showed the certain images and words on IWB; and assigned task to students to match the words with images.

Activity III: Word definition – asked the students to give definition of coloured words from paragraph on IWB.

These three activities lasted for 9 days each i.e. 1.5 weeks' time distribution spread over for one month. The control group was given the treatment through the use of TWB using the same content.

Data Analysis

The collected data by achievement tests (pre-test and post-test) was tabulated, analysed and interpreted. The collected data was analysed by mean score frequencies and t- test analysis by using computer software MS-Excel and SPSS.

Findings

Table 2

Academic Achievement of Students before treatment (Pre-test)

Group	N	M	SD	SE Mean	t	p	Effect Size
Experimental	40	41.50	11.49	1.82	0.177*	0.86	0.098
Control	40	41.10	11.30	1.79			

*Not significant

Table 2 reflects the details of students of both experimental (N=40), (M=41.50), (SD=11.49) and (SE=1.82) and control (N-40), (M=41.10), (SD=11.30) and (SE=1.79) groups with value of t=0.177 and p=0.86. Although the attainment was slightly higher in terms of the mean for the experimental group, there was a higher variance and the effect size 0.098 calculated as a result of the difference of English vocabulary achievement scores between experimental and control groups was concluded not to be statistically significant (as $p > 0.05$).

Table 3

Academic Achievement of Students after treatment (Post-test)

Group	N	M	SD	SE Mean	t	P	Effect Size
Experimental	40	74.70	8.96	1.41	5.984*	0.000	0.56
Control	40	59.57	13.24	2.09			

*significant

Table 03 provides the details of students of both experimental (N=40), (M=74.70), (SD=8.96) and (SE=1.41) and control (N-40), (M=59.57), (SD=13.24) and (SE=2.09) groups with value of t=5.984* and p=0.000. The difference of English vocabulary (contextual meaning, spelling and words meaning) achievement scores of experimental and control groups was statistically significant (as $p < 0.05$). The effect size of 0.56 on attainment for the experimental group was therefore significant.

Table 04

Difference of Experimental groups before and after treatment

Group	N	M	SD	SE Mean	t	P	Effect Size
Experimental (pre-test)	40	41.50	11.49	1.82	14.43*	0.000	3.29
Experimental (post-test)	40	74.70	8.96	1.79			

*significant

Table 04 depicts the students' details of experimental (pre-test) (N=40), (M=41.50), (SD=11.49) and (SE=1.82) and experimental (post-test) (N-40), (M=74.70), (SD=8.96) and (SE=1.79) groups with value of t=14.43* and p=0.000. The difference of English vocabulary achievement (contextual meaning, spelling and words meaning) of both pre and post-

experimental scores is statistically significant (as $p < 0.05$). The effect size of 3.29 represents the effect of the IWB on the experimental group's academic achievement.

Table 05

Difference of Control groups before and after treatment

Group	N	M	SD	SE Mean	t	p	Effect Size
Control (pre-test)	40	41.10	11.30	1.79	6.713*	0.000	1.50
Control (post-test)	40	59.57	13.24	2.09			

*significant

Table 05 displays that both control (pre-test) (N=40), (M=41.10), (SD=11.30) and (SE=1.79) and control (post-test) (N-40), (M=59.57), (SD=13.24) and (SE=2.09) groups with value of t=6.713* and p=0.000. The difference of English vocabulary (contextual meaning, spelling and words meaning) achievement scores of pre and post-control scores was therefore also statistically significant (as $p < 0.05$). However, the effect size of 1.50 reflecting the use of the TWB, means that the control group recorded a lower effect on their academic achievement than that for the IWB.

This data shows that the treatment, relevant to formal and lexical aspects of English Language learning at higher secondary level, was significant in terms of academic attainment in the tests as, if Table 3 is compared with Table 2, it can be seen that the experimental group performed statistically better than the control group (P value 0.000). There was shown to be a significant difference in the achievement of students taught with IWB compared with the TWB in. If Table 4 is compared with Table 5, an effect size of 3.29 (after IWB use) compared with 1.50 (after TWB use).

Discussion and Conclusion

On the basis of these findings, it was found that as the whole the students taught through the IWB out-performed those taught through the TWB. Thus, the use of Interactive Whiteboard in the teaching of English can be recommended as likely to be more effective for teaching English language, in terms of the formal and lexical aspects of English language learning at higher secondary level tested in this study.

The hypothesis, there is a difference between academic achievement of students taught through simple whiteboard and taught through interactive whiteboard in formal and lexical aspects of English Language learning at higher secondary level, was accepted. The experiment proved that the use of interactive whiteboard had a significant effect on the achievement of students in the teaching of English vocabulary. The results were found consistent with Solvie (2004) and Read (2001), whose studies supported that the IWB offers innovative support for language acquisition. British Educational Communication and Technology Agency (2003) also supported the evidence that Interactive Whiteboard improve the results of students. On the other hand, Onal, and Demir, (2017) supported their results that Interactive Whiteboard positively affected students' attitude and learning.

Limitations of the Study

In the absence of any standardized English test for class 2nd year, teacher made test and motivational scale which were used for assessment of students' performance and motivation. IWB was first time used by the research as slides of the lesson plan were prepared by the researcher with reference to English subject. When experiment was conducted, few science teachers intervene the experiment as they want to learn as how slides were prepared and used for teaching the content. Extraneous variable may affect the result of the study as students of other classes were also interested to enter in the class as it was a new concept of learning in the college. For understanding and use of colloquial and idiomatic expression, synonym for the purpose of irony and satire was ignored in the study.

Recommendations of the Study

In the light of conclusion, some recommendations have been made. It is recommended that English teachers at Higher Secondary level may be adopted the IWB for teaching vocabulary effectively. It is recommended that English language may be effectively learned by word and contrast, word and match and word definition activities with IWB. It is suggested that schools may be provided with IWB, multimedia and language lab facility to increase the potential for the teaching learning process to be more effective and fruitful in terms of student attainment. Workshops and refresher courses may be arranged by the district educational office to equip the English language teacher with the formal and lexical aspect of language learning on standard 1 (Pronunciation) standard 3 (grammar and structure). It is recommended that further studies on IWB may be conducted to use on the use: dictionary; colloquial idiomatic expression; irony; satire; interpersonal academic and workplace situation such as figurative and technical vocabulary.

References

Al-Saleem, B. I. A, (2013). The interactive whiteboard in English as a foreign language (EFL) classroom, *European Scientific Journal, 8*(3), 1857 –7881

Barcroft, J. (2015). *Vocabulary in language teaching*. New York: Routledge.

British Educational Communication and Technology Agency (2003). What the research says about interactive whiteboard? Millburn Hill Road, Science Park, Coventry. UK: ICT Research.

Cogill, J. (2002). *How Is the Interactive Whiteboard Being used in Primary School and how does this affect teachers and teaching?* (Doctoral Thesis) Kings College, University of London.

Comings, J., Garner, B., & Smith, C. (Eds.). (2006). *Review of Adult Learning and Literacy: Connecting Research, Policy, and Practice: A Project of the National Center for the Study of Adult Learning and Literacy*. (Vol. 4)*,* Mahwah, NJ: Lawrence Erlbaum Associates.

Cooper, B., & Brna, P. (2003). *The significance of affective issues in successful learning with ICT for year one and two pupils and their teachers*, Paper presented at The British Educational Research Association, Heriot-Watt University Edinburgh, UK.

Gillen, J., Kleine Staarman, J., Littleton, K., Mercer, N., & Twiner, A. (2007). A "learning revolution"? Investigating pedagogic practice around interactive whiteboards in British primary schools. *Learning, Media and Technology*, *32*(3), 243–256.

Giltner, L. (2012). Researching and analysing vocabulary. *TESL Canada Journal, 30*(1),1355. Retrieved from http://teslcanadajournal.ca/ index.php/tesl/article/view/1135/954

Glover, D. Miller, D., Averis, D. and Door, V. (2007) The evolution of an effective pedagogy for teachers using the interactive whiteboard in mathematics and modern languages: an empirical analysis from the secondary sector, *Learning, Media and Technology*, 32:1, 5-20, DOI: 10.1080/17439880601141146

Johnson, N. (2004). *Large Screen Computers vs. Electronic Whiteboards When Teaching Online Card Catalog Skills: Is one technology better than the other?* Wichita State University, USA.

Kennewell, S., & Morgan, A. (2003, July). Student teachers' experiences and attitudes towards using interactive whiteboards in the teaching and learning of young children. In *Proceedings of the international federation for information processing working group 3.5 open conference on Young children and learning technologies-Volume 34* (pp. 65-69). Australian Computer Society, Inc.

Latham, (2002). *Teaching and Learning Primary Mathematics: the Impact of Interactive Whiteboards.* http://www.beam.co.uk/pdfs/RES03.pdf. North Islington Education Action Zone

Lessard-Clouston, M. (2013). Word Lists for vocabulary learning and teaching. *CATESOL Journal, 24*(1), 287-304.

Moss, G., Jewitt, C., Levaaic, R., & Armstrong, V. (2007). *The Interactive Whiteboard Pedagogy & pupils performance evaluation: an evaluation of the school whiteboard Expansion (SWE) project: London challenges (Report No 816):* Institute of Education. *London* Retrieved from http://webarchive.nationalarchives.gov.uk/ 20130401151715/https://www.educati.

Nation, I. S. (2001). *Learning Vocabulary in Another Language*. Victoria University of Wellington: Cambridge University Press.

Noor, M. N., & Amir, Z. (2009). Exploring the vocabulary learning strategies of EFL learners. *Language and Culture: Creating and Fostering Global Communities. 7th International Conference by the School of Studies and Linguistics Faculty of Social Sciences and Humanities*, 313-327.

Onal, N., & Demir, C. G. (2017). The use of the interactive whiteboard in mathematics and mathematics lessons from the perspective of Turkish middle school students. *International Journal of Higher Education, 6*(3), 195-208

Reardon, T. (2002). Interactive Whiteboards in School: Effective Uses. *Media & Methods, 38*(7), 12-12.

Reed, S. (2001). *Integrating an Interactive Whiteboard into the Languages Classroom. Technology for E-Learning,* 1-4. Retrieved from https://www.pulib.sk/web/kniznica/elpub/dokument/Strakova4/subor/Majzlik.pdf

Schmitt, N. (2000). *Vocabulary in language teaching.* University of Nottingham: Cambridge University Press.

Smart Technologies Inc. (2006). *Interactive Whiteboards and Learning – Improving student learning outcomes and streamlining lesson planning* (SMART Technologies Inc. March). Retrieved from White Paper SMART Technologies Inc. website: http://downloads01.smarttech.com/media/education/pdf/interactivewhiteboardsandlearning.pdf

Solvie, P.A. (2004). The digital whiteboard: A tool in early literacy instruction. *Reading Teacher*, *57*(5), 484–7.

Smith, H. J., Higgins, S., Wall, K., & Miller, J. (2005). Interactive whiteboards: boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning*, *21*(2), 91-101.

Citation of this Article:
Rizwan, M., Ayub,S. & Khan, S.(2018). Effect of interactive whiteboard on academic achievement of higher secondary school students. *Pakistan Journal of Distance and Online Learning, 4*(2), 213-224.