

The Impact Of Interactive Whiteboards In EFL Classes

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Abstract

Interactive whiteboards (IWBs) are amongst the most widely used technology in education around the world. Technology is playing a crucial role in our lives, and it is becoming increasingly important for future generations to be digitally savvy. The 21st century students are digital natives in terms of technology and they are able to manipulate many screens at the same time. The study's ultimate goal was to assess external criteria such as perceived ease of use, perceived usefulness, students' attitudes toward technology, behavioral intention to use technology, and actual integration of IWBs in EFL classes.

Moreover, the author wanted to discover more about how students interact and study in classes with interactive whiteboards. The study's primary focus is on what occurs when Albanian teachers incorporate use ICT into their English lessons to help their students learn the language more effectively. This study attempted to shed some light on the frequency of IWBs' usage, skills taught through IWBs, students' perception of EFL classes when IWBs are used.

The findings of classroom-based research regarding the effective use of Interactive White Boards are presented in this paper (IWB).

More teachers should be encouraged to use the IWB on a regular basis as a result of the study's findings. When an interactive whiteboard is used in combination with additional instruction on how to use and integrate the IWB successfully, for example, it has a positive impact on students. Students should be encouraged to use technology at all times. However, in order to effectively incorporate IWBs, school administrations should consider providing constant

technical assistance for teachers in the event of difficulties, as well as teaching them on how to use new softwares that go along with IWBs.

Keywords: Interactive Whiteboards (IWBs), EFL classes, language acquisition, technology integration

Introduction

Computers' explosive growth in schools, workplaces, and families is a phenomenon that has progressed swiftly and is expected to continue in the future years. As a result, technology can and should be introduced further thoroughly in schools and into the teaching styles of many teachers who have been reluctant to 'give it a shot' with computers as a teaching tool. Teachers can use interactive whiteboards to teach utilizing the most up-to-date technology, including access to the internet, movies, and other instructional apps (Fernandez & Luftglass, 2003). This allows students to use technology to learn and explore new topics, resulting in a much more interactive learning opportunity.

Interactive Whiteboards (IWBs) are new generation touch-sensitive boards that are operated by a computer and connected to a digital projector (Saltan and Arslan, 2009). Although they were originally designed for office workers (Greiffenhagen, 2002). Teachers

around the world are increasingly using Interactive Whiteboards (IWBs) (Smith, Higgins, Wall and Miller, 2005).

Teacher and the student's roles have changed as a result of the introduction of interactive whiteboards in classrooms. Instead of absorbing information solely from textbooks or teacher lectures, students have more opportunity to participate actively in their learning. Lessons conducted with the aid of IWBs enable students have a better perspective and sense of ownership. Students will be encouraged, differentiated instruction will be emphasized, and critical thinking and problem-solving abilities skills will be strengthened using IWBs.

Every year, teachers are challenged to meet performance criteria while also raising student educational progress. Teachers are supplied with a variety of educational techniques, all of which, when applied correctly, promise to improve student learning. Schools frequently buy

resources and employ techniques in the expectation that they would increase effectiveness in the classroom. Thankfully, numerous tools and techniques have shown to be effective.

There are numerous types of tech tools that teachers might integrate in their class. The interactive whiteboard is a touch screen that enables users to interact instantly with apps. Interactive whiteboards can facilitate with classroom teaching that play a crucial role in the learning process of the students. IWBs can be used for whole class activities which might be saved and replayed at the convenience of teachers and students. The interactive whiteboard can be used to offer educational support when teaching students that are of various learning types such as visual, auditory, or tactile (Beeland, 2002).

Research questions

The purpose of this research is to identify answers to the following questions:

1. How often and in what ways are interactive whiteboards utilized in EFL classes?
2. What skills are mostly taught by implementing IWBs in EFL classes?

3. What are students' perception of EFL classes when IWBs are used?

Literature review

Over the last several decades, interactive whiteboards have gained popularity, and it appears that this trend will continue in the next years. Electronic whiteboards, digital whiteboards, smart boards, and interactive whiteboards are some of the terms used to describe them. These terms may connote different things to different people, but for the sake of this study, this tool shall be referred to as an interactive whiteboard. The whiteboard, without the interactive capability, has only been around for a few years and initially looked quite similar to a chalkboard. The whiteboard, on the other hand, was liked and used more than the traditional blackboard since it added color to presentations and eliminated the problem of chalk dust (Lee, 1992).

Interactive whiteboards began to offer unique features in the early 1990s, when it became feasible to transfer written records to a hard disc and to project material on the screen. In 1991, universities started to equip their classes with IWB. at the same time IWBs were used in conference halls and

business meetings. The whiteboard was later acknowledged as an effective learning/teaching tool in 1993. (Filipczak, 1993).

The existing research on interactive whiteboards is minimal and growing slowly, although there are a few reports and summaries of limited research initiatives performed by teachers, schools, and higher education institutions in the United Kingdom, the United States, Canada, and Australia (Smith, Higgins, Wall & Miller 2005). The fact that IWBs are 'interactive' is one of its best features as a teaching tool. Learners are also more motivated in EFL classes where IWBs are used. (Smith, Higgins, Wall, & Miller, 2005) because due to 'the high level of commitment, students enjoy working directly with the board, editing texts and graphics' (Becta, 2003, p3).

As Johnson & Kress (2003) state, IWBs are quickly becoming one of the most extensively used teaching aids in many classrooms. In Albania, for example, where IWB integration in classes is still in its early stages, there is no clear proof of the exact number of IWBs available in the public and private educational sectors. Based on my personal observations, the majority

of private schools in Tirana are equipped with IWBs, particularly in their language and IT labs. This academic year, the Faculty of Foreign Languages at the University of Tirana has seen a lot of changes in terms of the technology used in the classroom. Currently, ten classes have IWBs that will be used in FL classes, and this is just the beginning.

IWBs are becoming increasingly common in schools around the world, making it imperative to explore their impact in teaching-learning processes. Harlow, Cowie, & Heazlewood (2010) found that teachers used IWBs in a variety of methods to help students learn. As stated in their studies (Mercer et al., 2010; Twiner et al., 2010) IWBs had the ability to promote a diverse range of multi-modality, boost the quality of students' work (Wikan, Mølster, Faugli, & Hope, 2009), or enabling more interactional approach to education (Mercer et al., 2010). Similarly, IWBs play a crucial role in increasing the motivation of both teachers and students (Yinghui et al., 2012; Serow & Callingham, 2010).

Gillen and colleagues (2007) investigated how interactive whiteboards (IWBs) perform as interactional and didactic tools in

classroom discourse, how teachers use them to achieve their teaching goals, and how they are used as sharing tool for teachers and students. Data was gathered in urban primary schools in the south of England and four teachers which were observed and interviewed were part of the study. Compared to previous technology used in the classroom such as use of a video player followed by teachers writing on a blackboard, then allowing children to manipulate pictures on a magnetic screen, and then using the video player again, the study's findings indicated that the IWB appears to enable a faster, smooth classroom routine.

Blamire and Kefala conducted a study in 2006 which indicated that, when applied effectively, IWBs can be a powerful tool for improving student learning. In this context, the key term is 'applied effectively'. What this indicates is that once the innovative technology is integrated in the classroom, English teachers must begin to think in innovative and creative ways; not just use the new technology for technology sake and to do things that are simply a digital version of the old ways of teaching, but to develop new things that have not

been doable with the old pedagogical approaches.

A case study was initiated by Hennessy and his colleagues (2007) to see how competent teachers are beginning to use the technology's features to facilitate scientific instruction. Two teachers and their pupils were part of the study along with focus groups from four secondary science departments, as well as lesson observations and interviews with interested parties. Teachers used the interactive, easily controlled parts of combined reference and annotative tools offered by the IWBs to foster learners' cognitive, social, and physical involvement in whole-class activity, and they expressed differentiating techniques to create and encourage activities in which pupils conveyed, assessed, and boost ideas using the IWB, according to the findings.

Methodology

The purpose of this study is to shed light on how students engage and study in classes where interactive whiteboards are used. The study's major focus is on what happens when Albanian teachers integrate ICT in their English classrooms to assist their pupils acquire the foreign language better. In

Albanian public schools, interactive whiteboards are still a rarity, whereas in the private ones, they are broadly utilized. Due to this, it was a bit hard to find public schools that do have IWB and integrate them in their daily classes. We identified 4 public schools in Tirana that had one IWB each but they were not operational. So, for the purpose of this study we selected a private school in Tirana which is fully equipped with IWBs in every class.

Instruments for data collection

Survey forms are considered to be one of the most reliable data collection methods. Gilliam (2000), believes that using questionnaires as a data collection instrument puts less stress on participants, avoids being biased, data is well organized and are easily analyzed even by the help of different apps. As a result, questionnaires are the primary data gathering instruments for this study. The researcher chose to focus on students' questionnaire for this article and the teachers' questionnaire will be subject for another study.

This study's instruments focus on quantitative methods. Questionnaires were provided to all

students of the school with the help of the School Principal. She sent the Google Form through a link to their school email. Students were informed about the aim of this study and they were encouraged to fill in the form. The types of questions included in the questionnaire were:

- General information regarding Gender and Grade of the participants;
- Likert-type scale ones ranging from 'strongly agree' to 'strongly disagree' when students were asked questions regarding their likeness of using IWBs in their EFL classes;
- Likert-type scale ones ranging from 'never' to 'always' when students were asked questions regarding their opinions on the frequency of using IWBs for different activities;
- Likert-type scale ones ranging from 'not at all helpful' to 'extremely helpful' when students were asked questions regarding their opinions on the effectiveness of using IWBs for different activities;

- Open-ended questions so students had a chance to express their ideas freely.

The goal was to find out what they thought about using interactive whiteboards in their English classes and to further investigate how they used them in their daily routines in a foreign language class. They were clearly instructed on the way how they had to complete before they set for filling in the questionnaire. They were assured that their answers would only be used for this specific study or others related to the same topic and conducted by the same researcher.

The independent variables were interactive whiteboard use, attitudes and perceptions of interactive

whiteboards integrating in EFL classes. The dependent variables examined were attitudes and perceptions of interactive whiteboards integrating in EFL classes. The language of the questionnaires was in Albanian, so that we could ensure more reliable data.

The study was conducted in a private school in Tirana with 157 female students and 102 male students. The sample of this study was selected after the questionnaire was distributed to every student in the school. The questionnaire was sent to 259 students and we got 145 replies out of which 81 were females and 64 males.

DATA ANALYSIS

Figure 1 shows the data obtained from the responses of the students regarding the gender and the grade

they

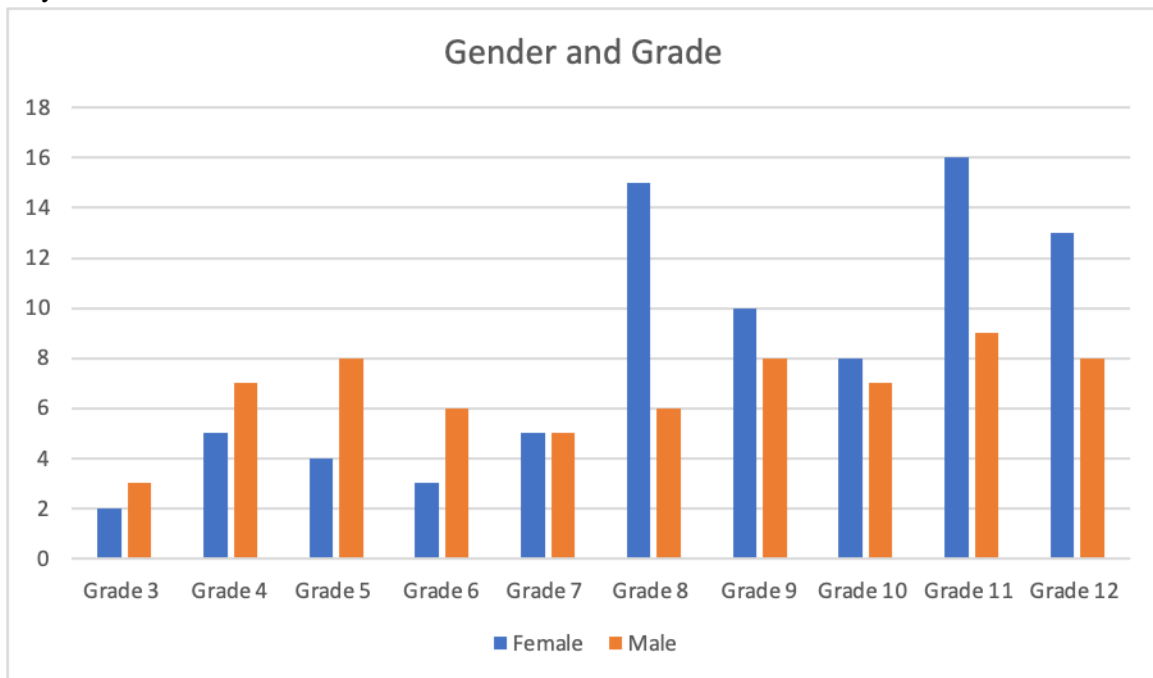


Figure 1

Out of 145 responses, 81 were females and 64 were males, distributed in grade 3-12, as illustrated in Figure 1. The majority of the respondents were students from High school and Middle school. A potential reason for this outcome could be that these students have been in school for a longer period of time compared to

the other grades meaning that the educational system has played a part in helping these students form strong opinions based on their backup information, in this case the previous knowledge that they might have had on IWB.

The responses gathered for Question 1 regarding the way students think they learn better is illustrated in Figure 2.

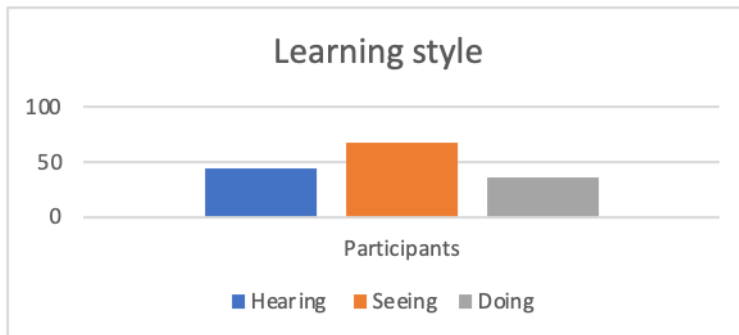


Figure 2.

So, out of 145 responses, 44 participants think that they learn new things when they hear them; 68 participants learn new things when they see them and 36 learn new things by having a hands-on experience or actively engaged in their learning. IWBs can be utilized to enhance the learning experience of the students who ranked themselves as auditory, visual and kinesthetic learners, who might use them for hearing songs, stories, You Tube videos, PPTs, using E-Books, play games etc.

Figure 3 shows the number of participants that when learning English prefer to use IWBs (88 participants), the white board (11 participants), PowerPoint Presentations (20 participants) and You Tube videos (26 participants). Due to attending this private school, the majority of the participants were exposed since an early age to the IWB and this is shown even in the number of respondents that prefer using IWBs when they learn English.

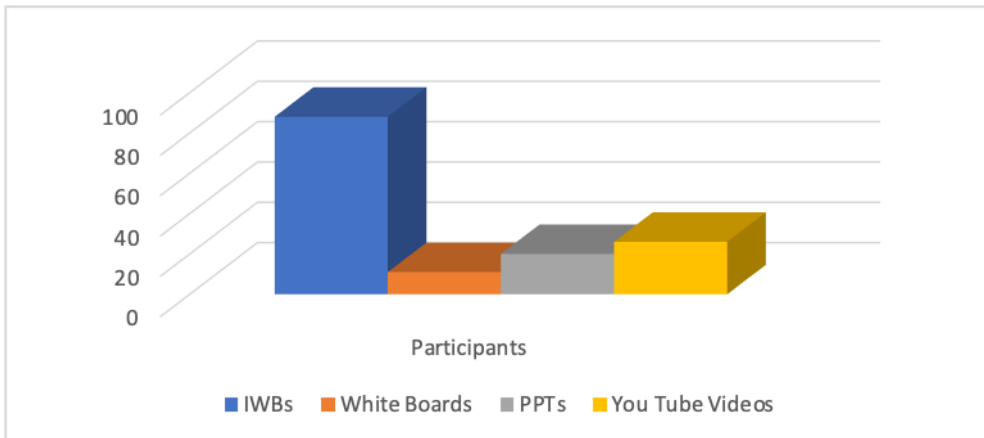


Figure 3

Data gathered from Question 3 where students were asked to rate from ‘strongly disagree’ to ‘strongly agree’ the enjoyment they felt when learning English through IWBs is illustrated in Figure 4. So, 2 participants strongly

disagree, 6 participants disagree, 15 participants are neutral, 70 participants agree and 52 out 145 strongly agree that they enjoy learning English through IWBs. Again, the majority of the participants agree that they enjoy learning English through IWBs.

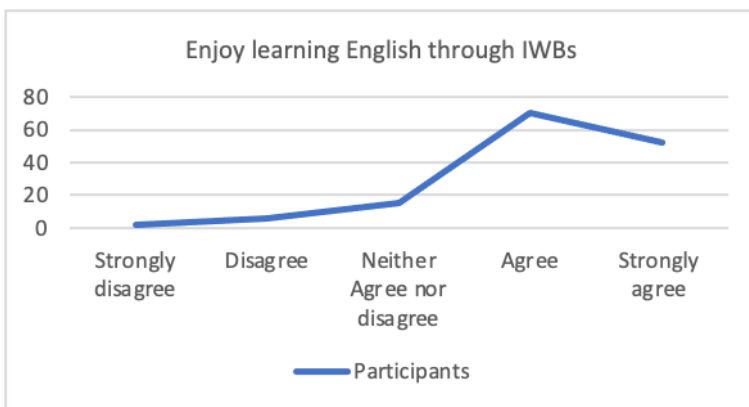


Figure 4

Question 4 provides information on the likeness of the participants when their teachers use IWBs in their EFL classes. Out 145 participants 0 participants strongly disagree and disagree, 13 participants are neutral, 30 participants agree and 102 strongly agree that they like when their teachers use IWBs in EFL classes.

Being exposed every day to IWBs not only in English classes it's not a surprise that none of the respondents strongly disagreed or disagreed when asked if they like when EFL teachers use IWBs. The majority of the respondent, 102, strongly agree that they like when their EFL teachers use IWBs in their daily classes.

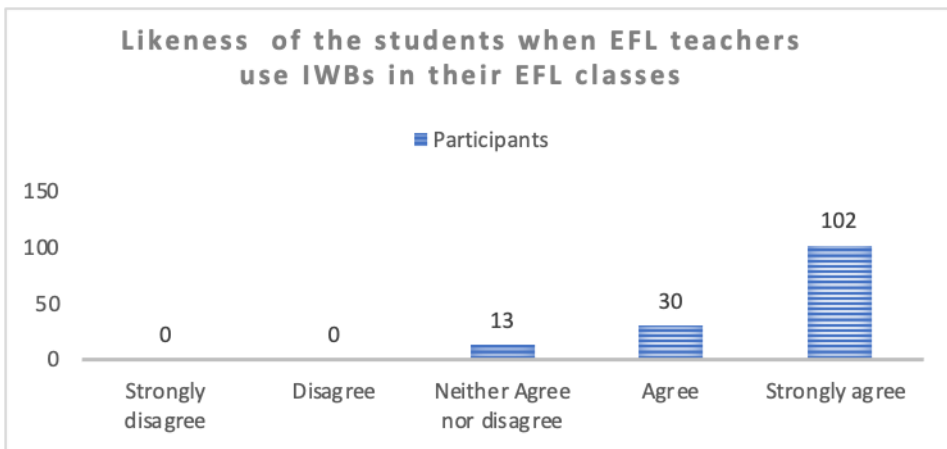


Figure 5

The information provided on the frequency of the usage of IWBs in EFL classes is illustrated in Figure 6, where none of the participants chose the options Never and Rarely, whereas 33 of them said

Usually and 112 Always regarding the usage of IWBs in EFL classes. As indicated by the data the majority of the respondents, 112, responded that their English teachers always integrated IWBs in EFL classes.

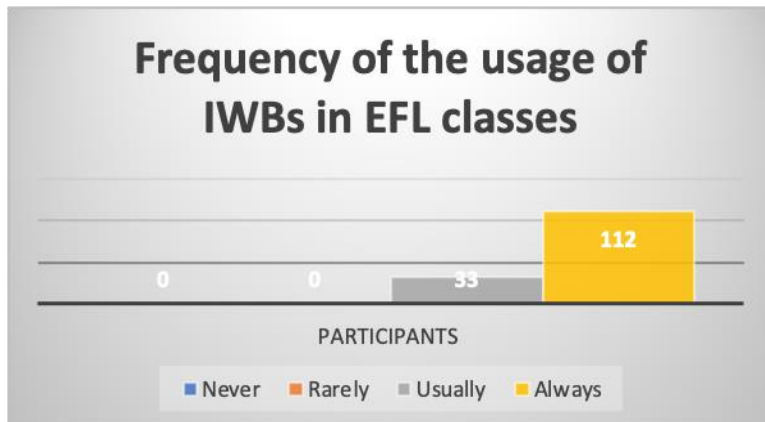


Figure 6

Figure 7 illustrates data gathered for the participants' opinions on the frequency of using IWBs for Listening, Reading, Writing and Speaking activities. None of the respondents stated that their EFL teacher never used IWBs in their classes. Whereas only 2 respondents stated that their teachers rarely used IWBs for Speaking activities but none of them stated that their teachers rarely used IWBs for activities related to Listening, Reading and Writing. 15 respondents stated that their teachers usually used IWBs for Listening activities; 11 stated

that their teachers usually used IWBs for Reading activities; 41 participants stated that their teachers usually used IWBs for Writing activities and 75 participants admitted that their teachers used IWBs for Speaking activities in EFL classes. The majority of the participants admitted that their teachers always used IWBs when they did activities related to Listening (130 respondents), Reading (134 respondents), Writing (104 respondents) and Speaking (68 respondents). As illustrated by the chart, activities related to Reading prevail when IWBs are integrated in EFL classes.

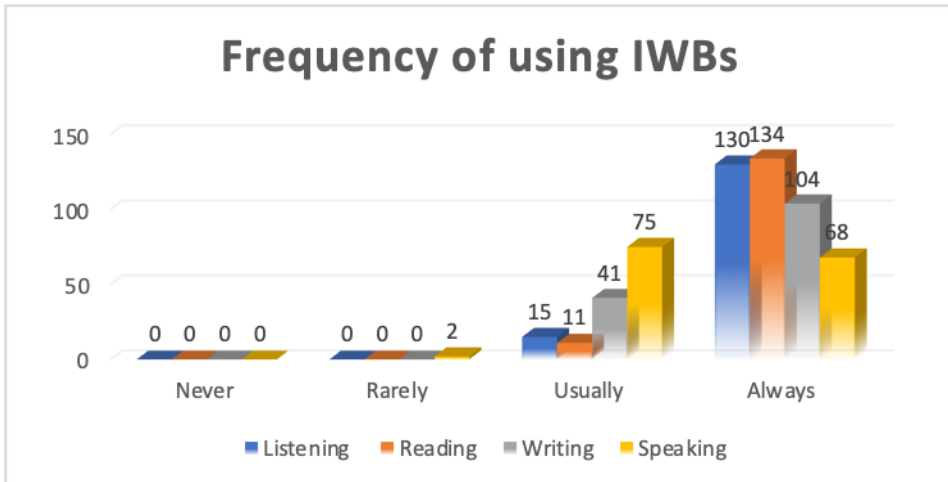


Figure 7

Figure 8 illustrates data gathered for the participants' opinions on the frequency of using IWBs for Storytelling, Roleplays, Group work, Games, You Tube videos and E-Book. Participants that stated that their teachers never used IWBs for storytelling were only 2, whereas 10 for Roleplay and 12 for group work. As per games, You Tube videos and E-books there were 0 responses. The teachers of 8 respondents rarely used IWBs for storytelling, whereas 28 and 31 respondents stated that their teachers rarely used IWBs for groupwork and roleplays. As it is easily observed by the chart, there is an increase in the frequency of

usually using all the activities through IWBs, specifically, Storytelling (39 respondents), Roleplays (93 respondents), Group work (78 respondents), Games (23 respondents), You Tube videos (12 respondents) and E-Book (17 respondents). The last option of the question that rates the frequency of IWBs usage in EFL classes, always, as observed in the chart is dramatically increased compared with the other options. For example, the frequency of the usage of IWBS for Storytelling is almost tripled (96 participants), whereas for activities such as roleplays (14 respondents) and group work (36 respondents) there is a slight decrease compared with the other option, usually.

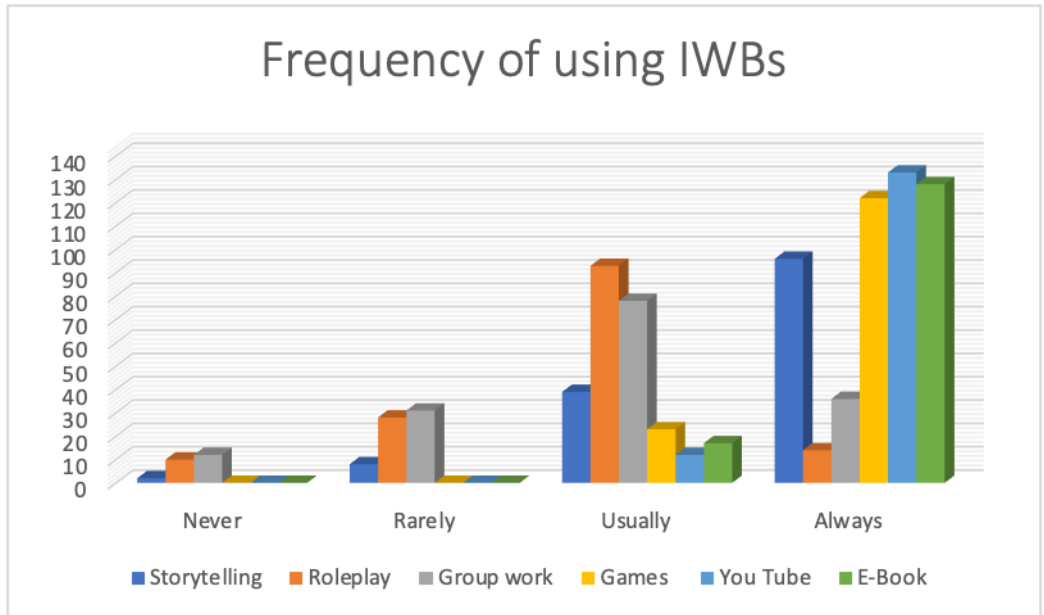


Figure 8

Figure 9 illustrates data gathered by Likert-type scale question ranging from ‘not at all helpful’ to ‘extremely helpful when students were asked questions regarding their opinions on the effectiveness of using IWBs for different activities related to Listening, Reading, Speaking and Writing. The graph shows that the majority of the respondents find IWBs helpful respectively: 55 respondents find IWBs helpful when are used for listening activities, 82 respondents find IWBs helpful when are used for reading activities, 46 respondents find

IWBs helpful when are used for speaking activities and 55 respondents find IWBs helpful when are used for writing activities

And yet there is a slight change in the graph for the option extremely helpful respectively 76 respondents find IWBs extremely helpful when are used for listening activities, 51 respondents find IWBs extremely helpful when are used for reading activities, 49 respondents find IWBs extremely helpful when are used for speaking activities and 56 respondents find IWBs extremely helpful when are used for writing activities.

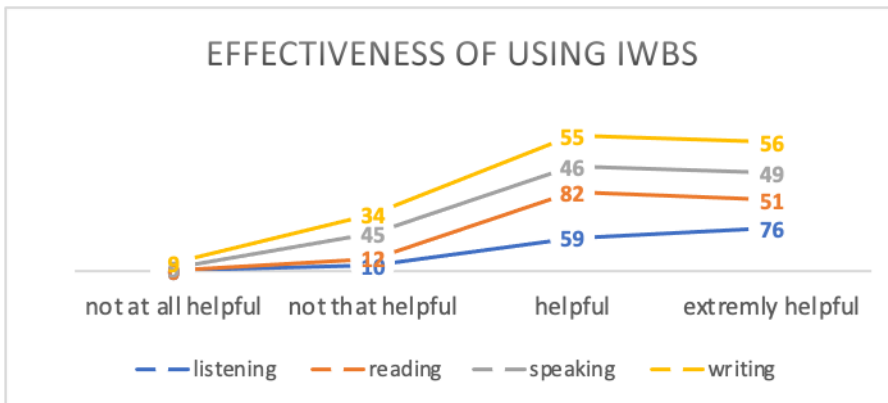


Figure 9

Data gathered on the influence of the IWBs on the improvement of English acquisition is illustrated on Figure 10. From the pie chart it is

clear that the 66% of the respondents state that IWBs improved their abilities in the acquisition of EFL in, 24 % participants agree whereas 10 % of the respondents are neutral.

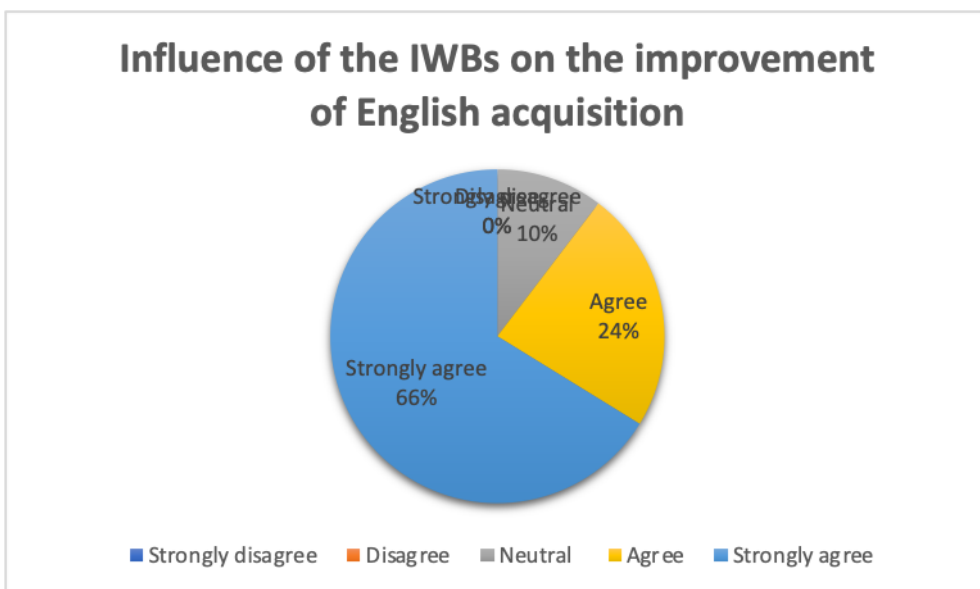


Figure 10

The last two questions were open ended questions so participants were free to share their own ideas regarding things that they liked and

disliked (Table 1 and Table 2) in EFL classes where IWBs were used.

What participants liked in EFL classes where IWBs were used.	Number of respondents
No chalk is used	20
Everything is in the same place	41
Good sound quality	35
Classes are fun	87
Information is well organized	65
I can play games online, Kahoot, Quizlet	61
IWBs are connected to Internet	90
Revision of the lesson is easier	34
Everything is online	19
I am more focused	99
More teacher-student interaction	44

Table 1

What participants disliked in EFL classes where IWBs were used.	Number of respondents
Lack of electrical power	87
No reliable internet	56
Teachers need more resources and trainings	98
More E-books	78
More time to play with IWBs	114

Table 2

Discussion

Data gathered from the questionnaires distributed to students from grade 3 to 12 to investigate students'

perceptions, beliefs and attitudes regarding the integration of IWBs in EFL classes and the way they affect the acquisition of English and how they boost students' confidence provide a good starting point for

novelty studies in Albania such as this one. Most of the teachers define themselves as digital immigrants and are intimidated by the computing skills of their digital native students, who have their brain in their fingertips (Dudeney, Hockly and Pegrum, 2013). Unlike most Digital Immigrants, Digital Natives live much of their lives online, without distinguishing between the online and the offline environment (Palfrey & Gasser, 2008). It's a great challenge for teachers to become digital ones although they were not digital students themselves. Teachers are expected, by the school administrators, parents and students, to use the technology made available to them. They are expected to integrate them within their teaching practices. The younger generation prefers to use mobile phones for many activities such as: Facebooking, twittering, recordings, photo shootings e-mailing, reading books etc. (Thornton and Houser, 2003).

Many teachers consider the interactive whiteboard (IWB) technology to be highly beneficial and can't imagine teaching without it. It appears to lighten their weight. It appears that, after some initial effort, the technology reduces the teacher's work. The lessons can be

saved and used again and again. Teachers believe that teaching has become more innovative and entertaining, and that classic teaching methods have altered (Bennet & Lockyer, 2008). The majority of teachers do not find IWBs hard to integrate in their classes. And yet, a few struggled at first or are still finding them hard and use them for their primary use, as a whiteboard (Šumak at al., 2017; Chen at al., 2020).

This study attempted to shed some light on the frequency of IWBs' usage, skills taught through IWBs, students' perception of EFL classes when IWBs are used. These research questions got answers from the questionnaire, which was filled in by 150 respondents.

As for the frequency we can say that the majority of the respondents, 112, responded that their English teachers always integrated IWBs in EFL classes to assist and improve the teaching-learning process and make it more engaging for teachers and students. All the teachers, especially EFL teachers are obliged to use the IWBs in their daily classes not only with additional apps but even as a simple whiteboard, but with more features. This explains the high number of

the respondents that admitted that their teachers always used IWBs.

The skills that prevailed when used with IWBs are Listening and Reading, whereas Writing and Speaking were slightly low in number compared with the two previous ones. Probably teachers that use IWBs focus more on these skills because of the textbooks they use or because of the learning style of their students. Bearing in mind that the majority of the students that participated in this study were visual learners (68 respondents), followed by auditory (44) the teachers should use a range of strategies and teaching approaches to fit with the needs of the students the requirements of as many students as possible, and the interactive whiteboard proved to work well in classrooms with a diverse set of students. Many visual learners benefit from watching short videos related to the lesson or listening to authentic materials such as real-life conversations, dialogues, short stories or short movies related to the topic of the lesson. Moreover, they may use it for charts, graphs, diagrams, maps, and images that serve a purpose related to the material covered in their classes. Auditory learners, who prefer to listen to lessons being taught by their teachers might

benefit from whiteboard exercises to help them learn more effectively in the classroom. Teachers can use the whiteboard to present videos or podcasts for auditory learners to listen to. Teachers used strategies for kinesthetic learners such as inviting pupils to come to the board to drag items around the board, play games, and even create role plays.

So, within a normal class, the teacher can ask her students to play games and activities in which kinesthetic learners can go to the whiteboard and write down auditory learners' responses or draw pictures to represent what they're learning. What is seen on the board can be used to teach visual learners. The same lesson plan is followed by everyone! So there plenty of strategies and techniques or activities that can be used to integrate IWBs for different learning styles.

When students were asked about the activities that their teachers less or mostly used, the majority of the students admitted that You Tube, E-books, Games and Storytelling and are always used by their teachers. All the activities mentioned correlate with the students' learning styles.

The way the IWB are integrated in EFL classes plays a crucial role in the way classes are conducted (Shi et al., 2021). It is not very effective when the IWB is primarily integrated as a presentation tool by the teacher to provide all information that students passively receive. However, when interactive elements of the IWB are used to keep students actively involved in learning, the integration of IWB serve a purpose. (Shi et al., 2021). The majority of the participants agree that they enjoy learning English through IWBs. strongly agree that they enjoy learning English through IWBs. Again, the majority of the participants agree that they enjoy learning English through IWBs and less than half of them strongly agree about this statement.

Whereas when they were asked to rank their approval for the integration of IWBs in EFL classes by their teachers the vast majority strongly agreed. We believe that the exposure since an early age and belonging to 21 century learners they appreciate more their teachers when technology is integrated in EFL classes. Generally, students found very helpful the integration of IWBs for all four skills. Nevertheless, what prevailed among four skills were Listening

and Reading where the majority of the students found IWBs useful when integrated in EFL classes.

The way students acquire a foreign language is influenced even by the way how IWBs are integrated and as such the majority of the respondents strongly agree that IWBs helped to improve their English-speaking skills. They internally realized that IWBs play a role in EFL acquisition.

The two last questions, open ended questions, bring out things that students liked and disliked in regard to the usage of IWBs. There were many respondents that provided several ideas which we can summarize as advantages of using IWBs such as: good organization of classes; interactivity, being more focused and enjoying the classes, reusing material discusses in the class. Whereas for things that they disliked we can emphasize lack of teachers' knowledge on ways/techniques how to integrate IWBs. Many teachers lack the necessary insight and expertise to use an interactive white board in their EFL classroom on a regular basis, rather than simply using it as a projector or a white board.

Schmid and Whyte (2014) show in their book a number of case studies

where the IWB is used with positive effect, to give other teachers inspiration. Another helpful resource in this area is the iTILT website (<http://www.itilt2.eu/pages/default.aspx>) iTILT is a project where teachers post examples of how to use the IWB interactively in language teaching, as to show the possibilities that this tool provides. As long as IWBs are not only used as simple black boards or for the purpose of projecting PowerPoint Presentations but as a tool which helps teachers and students to have more enjoyable and interactive classes through different apps. Otherwise, it is not worth the money (Dudeney & Sharma, 2013) to invest in such expensive tools. Almost half of the respondents mentioned that they like to play games such as Kahoot! and Quizlet where the IWBs can be connected with an iPad to make the experience more attractive.

Conclusions

The study indicates that there are approaches and techniques that can be adopted in order to use the IWBs in a more effective way in order to encourage students to collaborate and interact with each other and with their teachers.

As a result of the findings of the study, more teachers should be encouraged to use the IWB on a regular basis. The usage of an interactive whiteboard, for example, has a good impact on students when it is supported by further training on how to use and then integrate the IWB effectively. Students should always be encouraged to use technology. Yet, in order to integrate IWBs effectively, the schools' administrations should think of continuous technical support for teachers in terms of glitches but at the same time training them how to use new apps that go along with IWBs.

It is important to remember that IWBs do not improve teaching and learning by itself, and that just installing IWBs in classrooms does not ensure success in the EFL classes. Rather, it is the way in which the IWBs are integrated in the learning process that makes the difference. Teachers that like to integrate technology find IWBs a very helpful tool that supports and facilitates the learning process. It is not just a matter of using technology for the sake of technology, but having a purpose and integrating IWBs with a purpose means to boost the learning of the students.

The ultimate success of IWBs is established by how teachers learn to use and then integrate them in their classrooms and whether they use them interactively and involve students and make the learning experience more enjoyable. Based on the author's personal experience and the findings of this study, IWBs appear to be a worthwhile investment for the future.

References

1. Balanskat, A, Blamire, R, & Kefala, S, The ICT impact report: A review of studies of ICT impact on schools in Europe, European Schoolnet, Brussels, Belgium, 2006. [Online].
2. Becta (2003) What the research says about interactive whiteboards. Available at: <http://www.becta.org.uk/research>. Accessed 15th June 2003.
3. Beeland, W. D. (2002). Student engagement, visual learning and technology: Can interactive whiteboards help? Retrieved December 15, 2009, from <http://chiron.valdosta.edu/a>re/Art-manscript/vol1no1/beeland_am.pdf.
5. Bennett, Sue & Lockyer, L.. (2008). A study of teachers' integration of interactive whiteboards into four Australian primary school classrooms. *Learning, Media and Technology*. 33. 289-300. 10.1080/17439880802497008.
6. Chen, I.-H., Gamble, J. H., Lee, Z.-H. & Fu, Q.-L. (2020). Formative assessment with interactive whiteboards: a one-year longitudinal study of primary students' mathematical performance.
7. *Computers & Education*, 150, 103833. doi:10.1016/j.compedu.2020.103833
8. Cutrim Schmid, Euline & Whyte, Shona. (Ed). 2014. *Teaching languages with technology*:
9. *Communicative approaches to interactive whiteboard use*. New York: Bloomsbury Academic.
10. Dudeney, Gavin, Hockly, Nicky & Pegrum, Mark. 2013. *Digital literacies*:

- research and resources in language teaching. Harlow, England: Pearson
11. Dudeney, Gavin. & Sharma, Pete. 2013 <https://sites.google.com/site/iwbforlanguageteachers/library/iwb-debate>
 12. Fernandez, J. & Luftglass, M. (2003). Interactive whiteboards: A Powerful learning tool. *Principal, The Embattled Principal, Tech Support*, 83, 63.
 13. Filipczak, B. (1993, April). The latest gizmos at INFORM.Training.
 14. Gillham B. (2020). Developing a questionnaire (real world research). London: Continuum, 2000.
 15. Gregorcic, B., Etkina, E., & Planinsic, G. (2017). A new way of using the interactive whiteboard in a high school physics classroom: A case study. *Research in Science Education*, 1-25.
 16. Greiffenhagen C. (2000) Interactive whiteboards in mathematics education: possibilities and dangers paper Presented at WGA 11 (ICME-9): 2. The Use of Technology in Mathematics Education.
 - I. H. Chen, J. H. Gamble, Z. H. Lee, and Q. L. Fu, 'Formative assessment with interactive whiteboards: a one-year longitudinal study of primary students' mathematical performance,' *Computers & Education*, vol. 150, 2020.
 17. Harlow, A., Cowie, Bronwen & Heazlewood, M. (2010). Keeping in touch with learning: the use of an interactive whiteboard in the junior school. *Technology, Pedagogy and Education*, 19(2), 237-243.
 18. Hennessy, S., Deaney, R., Ruthven, K., & Winterbottom, M. (2007). Pedagogical strategies for using the interactive whiteboard to foster learner participation in school science. *Learning, Media and Technology*, 32(3), 283–301.

- doi:10.1080/17439880701511131.
19. Lee, Y. (1992, November 16). Whiteboard helps users collaborate. InfoWorld, 3.
20. Mercer, Neil & Hennessy, Sara & Warwick, Paul. (2010). Using interactive whiteboards to orchestrate classroom dialogue. Technology, Pedagogy and Education. 19. 195-209. 10.1080/1475939X.2010.491230.
21. Saltan, F. & Arslan, K. (2009). A New Teacher Tool, Interactive WhiteBoards: A Meta Analysis. Soccity for Information Technology& Teacher Education. Charleston, South Carolina
22. Palfrey, J., & Gasser, U. (2008). Born digital: Understanding the first generation of digital natives. Basic Books.
23. Schmid & S. Whyte (2014). Teaching Languages with Technology: Communicative approaches to interactive whiteboard use (pp. xii–xiv). London: Bloomsbury Academic. Retrieved May 6, 2022, from <http://www.bloomsburycollections.com/teaching-languages-with-technology-communicative-approaches-to-interactive-whiteboard-use/foreword-interactive-whiteboards-against-the-odds>
24. Serow, Penelope & Callingham, Rosemary. (2011). Levels of use of Interactive Whiteboard technology in the primary mathematics classroom. Technology. Pedagogy and Education. 161-173. 10.1080/1475939X.2011.588418.
25. Shi, Y., Zhang, J., Yang, H., & Yang, H. H. (2021). Effects of interactive whiteboard-based instruction on students' cognitive learning outcomes: A Meta-Analysis. Interactive Learning Environments, 29, 283–300. <https://doi.org/10.1080/10494820.2020.1769683>

26. Shi, Yinghui & Yang, Zongkai & Yang, Harrison Hao & Liu, Sanya. (2012). The impact of interactive whiteboards on education. *ACM International Conference Proceeding Series*. 213-218. 10.1145/2382336.2382397.
27. Smith, Higgins, Wall & Miller (2005), Interactive whiteboards: boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning* 21, pp91–101
28. Šumak, B., Pušnik, M., Heričko, M. & Šorgo, A. 2017. Differences between prospective, existing, and former users of interactive whiteboards on external factors affecting their adoption, usage and abandonment. *Computers in Human Behavior*, 72: 733–756. <https://doi.org/10.1016/j.chb.2016.09.006>.
29. Šumak, Boštjan & Sorgo, Andrej. (2016). The acceptance and use of interactive whiteboards among teachers: Differences in UTAUT determinants between pre- and post-adopters. *Computers in Human Behavior*. 64. 602-620. 10.1016/j.chb.2016.07.037.
30. Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning*, 21, 217-228. <http://dx.doi.org/10.1111/j.1365-2729.2005.00129.x>
31. Twiner, Alison & Coffin, Caroline & Littleton, Karen & Whitelock, Denise. (2010). Multimodality, orchestration and participation in the context of classroom use of the interactive whiteboard: A discussion. *Technology Pedagogy and Education*. 19. 10.1080/1475939X.2010.491232.
32. Wikan, G., B. Faugli, T., Mølster & Hope, R. (2009). Does MS Photo Story 3 make a difference? The view and experience of a group of Norwegian secondary school teachers. *Media*,

Technology & Lifelong
Learning, 6(1), 136-147.