

STUDENTS' VIEWPOINTS AND FACING PROBLEMS TOWARD THE USE OF INTERACTIVE WHITEBOARDS

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Abstract

The main purpose of this study is to investigate the students' viewpoints and facing problems toward the use of Interactive Whiteboard (IWB). In this study, the data was collected through the "IWB Survey Questions ("Student Views). This research has been applied on 202 students in primary school and high schools in Ankara. To identify any significant differences through gender and duration of using IWB use for students' views, t-test and one-way ANOVA were used. No significant differences were found in terms of gender. There is a clear difference between primary school and high school students' views about the use of IWBs by teachers, student engagement and environment dimension. Students often express that IWBs make the understanding easier and enrich images in the learning process. The majority of students said that the lack of adequate e-content affected negatively their achievement and engagement. Students concerned about the possible harmful effects of radiation, the board warming, finger irritation and eye health caused by IWB in their classroom. IWBs' calibration problems led to the lack of concentration on students and loss of time in teaching process.

Keywords-Interactive whiteboards (IWBs), Education technologies, E-Learning.

1 INTRODUCTION

An interactive whiteboard (IWB) is an interactive display system that is commonly used in educational applications. The IWB forms a link between a teaching surface and a digital projector and computer. A large wall mounted panel is the most commonly used 'teaching surface' that allows the user to operate the computer via interacting with the projected image. There has been a considerable increase in the number of IWBs installed in schools in the world. There has been an increasing awareness of the need to understand the match between technology and pedagogy in the development of interactive learning supported by the IWBs in schools around the World [1]. In this context, IWBs have great potential for learning-instruction process.

IWBs are generally perceived by students and teachers as a positive asset for the classroom learning environment. The researchers indicated that IWB raises not only children's study motivation but also teacher's teaching efficiency. Classes supported by IWBs had a faster pace and less time was spent during group work [1, 2, 3, 4, 5, 6]. It has been initially developed in the 1990's by IWBs for use in the corporate sector, IWBs have been used only within the last several years as educational instructional tools in classrooms. There are three key potential benefits of IWBs that are most frequently discussed in the literature: increases in student engagement, more effective visual representation, and learning through greater classroom interaction [7, 8, 9, 10].

Since 1997, the government of United Kingdom has greatly invested in Information and Communications Technology (ICT) for education, including interactive whiteboard. The government believes that IWB will raise children's learning efficiency. Australia and America have also introduced IWB into elementary education. Many existing studies showed that IWB can increase interaction between teachers and students as well as students motivation and enjoyment [11]. However, it is hardly found studies on IWB from children's viewpoints [12]. We are still lack of studies regarding to IWB made from childs' point of view.

Qualitative research and field research confirms that the use of IWBs has a positive effect on student engagement and can have constructive effects on teacher attitudes. The findings of studies which stated that using IWB in lessons has increased students' motivation and class participation teaching-learning process. In generally, the results of studies stated that both students and teachers have generally positive attitudes toward the use of IWBs in learning process and are aware of the potential

uses of this technology. The statistical analysis revealed that the more teachers use IWBs, the more they enjoy this technology. It was also found that as the number of hours of IWB exposure increases, students' awareness of the distinctiveness of IWB technology increases. The use of IWB as an instructional tool has a beneficial effect on student engagement in classroom lessons and led to improved student behavior. Teachers and students believe that IWB had high impact on revitalizing the classroom. The IWB has been welcomed enthusiastically by a large number of primary school teachers and its take-up in schools has proceeded with unprecedented rapidity. Pupils are universally enthusiastic about the interactive whiteboards, because of their clear visibility ("We can see!"), the easy access they give to ICT through touch, and the added variety they bring to lessons. Students and teachers strongly preferred to use interactive whiteboards in the classroom. Using an IWB led to a faster pace of instruction. Using IWBs led to increased student engagement, primarily because of the visual aspects of the interactive whiteboards. IWBs manufacturers have documented the positive themes of student engagement, motivation, and appeal to students with different learning styles [6, 7, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 11].

New technologies in teaching have never been greater and with the recent addition of the IWBs, teachers are able to integrate this tool into their lessons. The IWB is not only an innovative tool which meets cognitive and learning styles, but also different intelligences in a group class. This recent technology has inspired many teachers to further their expertise in teaching and facilitate learning [24]. Bearing in mind the increase of IWB technology investments, there is a strong need for the evaluation and thus, improvement of actual IWB use in schools [25]. Although the newness of the technology was initially welcomed by pupils any boost in motivation seems short-lived. Statistical analysis showed no impact on pupil performance in the first year in which departments were fully equipped. IWBs are mainly being used: as a data projector which can navigate to multiple Screens. Pupils were far more cautious about the impact of IWBs on behaviour. Some were reluctant to go out to the front of the class to use the board [26, 27].

In the studies, childrens also showed technical problems and lack of skill in using IWB. Students also highlighted, however, technical problems, teacher and students' information and communication technology skills and students' lack of access to the technology as negative aspects. The findings suggest that IWBs appear to be having some impact on the discourse moves used in whole class teaching, but this impact is not so extensive as that claimed by the advocates of IWBs. Lessons which used IWBs had a faster pace and less time was spent on group work. Student engagement behaviors increased significantly when the IWB was used for instructional purposes. IWBs play a vital role in stimulating student interactivity in classroom instruction [4, 11].

There are many researches showed that IWB can raise teaching efficient. Children are motivated in lessons with IWB and the motivation can raise the interest for children's study [4, 28].

1.1 Purpose of study

Introducing the IWB into teaching is not only a current trend but also a major policy of education. Many studies indicated that IWB can increase the interaction between teachers and students as well as students' motivation and enjoyment from teachers' viewpoints. However, a study to understand and describe the opinion from children's view is hardly found [28]. The main goal of this study is to evaluate both students' perceptions and their use of IWBs. Because of the increasing usage of IWB, it is necessary to study children's viewpoints on the IWB.

The main purpose of this study was to investigate the students' viewpoints and facing problems toward the use of IWB. This study aims to answer the following question;

- What are the most commonly used features of IWBs by the students?
- Is there a difference in students' viewpoints students between males and females with use of the IWBs?
- Is there a difference in students' viewpoints between duration of using IWBs?
- Do the students viewpoints about IWB show differences between primary and high grade students?

2 METHOD

2.1 Sample

The survey has been applied on 202 primary school (98 students) and secondary school (104 students) students in classes equipped with IWB. In this study, students who have actively used IWBs for instruction, were selected from various different classes (from grade 6 to 19).

2.2 Instrument and Data Analysis

The research hypothesis is to determine whether there were differences about gender, school type and duration of using IWB use in the classroom setting or not. In the study, the data was collected through the “Student Interactive White Board Survey Questions” which was developed by Aytaç and Sezgül [23]. The questionnaire consisted of questions about demographics, usage, and students’ perceptions related to IWBs. The questionnaire consisted of 26 statements with a Likert-scale response and a ranking exercise of the importance of various aspects related the IWB. The survey final form is composed of 26 items, which divided into three domains. The results of factor analysis have created three dimensions; teacher, student engagement and environment;

- Teacher dimension composed of knowledge and competences using of IWBs, presentation of lessons, classroom management, developing content and using material, the application consists of blended learning subjects.
- Student engagement dimension composed of students' use of the IWB, enjoyable environment, active participation, cooperative learning, learning achievement, student-teacher interaction fields.
- Technical dimension composed of the number of students, technical, health, light and image quality issues.

The questionnaires’ cronbach alpha reliability is .82. To identify any significant differences between gender and duration of using IWB, t-test (two groups), one-way ANOVA and Scheffe tests were used. To compare the middle and high grade groups on the viewpoints about interactive whiteboard scale, the quantitative analysis of the collected data was conducted through one-way ANOVA.

3 RESULTS

Teachers use IWBs for presentation. The results regarding preferred features of IWBs were in parallel with the results of a previous study conducted by Türel [29], which examined students’ perceptions about IWB use in Turkey. The features of an IWB used by students are given below (Fig. 1.);

- Watching presentations,
- solving problem,
- connecting the problem and writing.

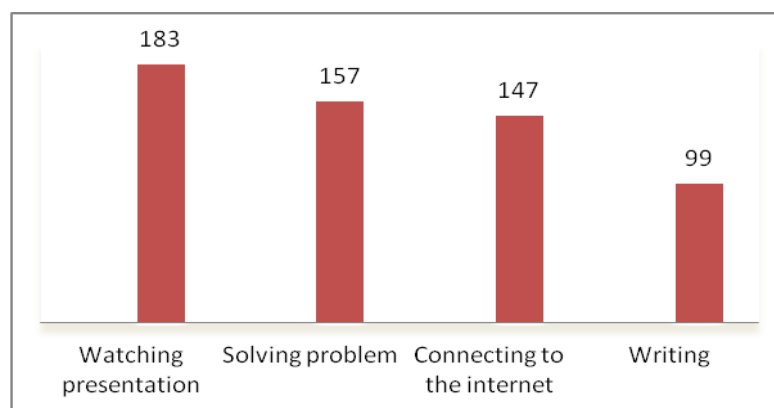


Fig. 1. The features of an IWB used by students

Students' point of views on using IWBs are given below (Table 1).

Table 1. Students Views Feedback on the Use Of IWBs

Opinions about IWB		Strongly disagree	Disagree	Neither Agree nor disagree	Agree	Strongly agree	Mean (\bar{X})	The level of participation
1) My teachers' writings and drawings on the IWB is clear.	f	11	11	20	56	104	4.14	Agree
	%	5,4	5,4	9,9	27,7	51,5		
2) I dont learn enough when IWB used in class because of the crowd.	f	62	48	55	21	16	2.37	Disagree
	%	30,7	23,8	27,2	10,4	7,9		
3) Lessons becomes more enjoyable and fun when IWB used in the teaching-learning process.	f	10	12	24	40	116	4.18	Agree
	%	5	5,9	11,9	19,8	57,4		
4) I can easily present my presentations and contents using IWB	f	11	11	44	58	78	3.90	Agree
	%	5,4	5,4	21,8	28,7	38,6		
5) I am having trouble using the IWB.	f	70	48	37	23	24	2.36	Disagree
	%	34,7	23,8	18,3	11,4	11,9		
6) I am very about IWB's emitted radiation, heat and fingerprints irritation.	f	18	15	46	57	66	3.50	Agree
	%	8,9	7,4	22,8	28,2	32,7		
7) My teachers use an IWB in lessons.	f	5	13	25	49	110	4.04	Agree
	%	2,5	6,4	12,4	24,3	54,5		
8) Using in the IWB is increasing the interest and engagement towards the course.	f	8	17	29	52	96	3.87	Agree
	%	4,0	8,4	14,4	27,8	47,5		
9) My teacher is lecturing too fast progression with IWB, I can not keep up.	f	10	19	24	56	92	3.85	Agree
	%	4,9	9,5	11,9	27,9	45,8		
10) My teacher use IWB in the teaching activities I can not make eye contact with the teacher.	f	64	38	37	33	30	2.62	Neither Agree nor disagree
	%	31,7	18,8	18,3	16,3	14,9		
11) The contents which is displayed in IWB is sufficient.	f	74	29	31	43	25	2.48	Disagree
	%	36,6	14,4	15,4	21,3	12,4		
12) I learn faster and easier when IWB used in the classroom.	f	10	11	39	50	92	3.88	Agree
	%	5,0	5,4	19,3	24,8	45,5		
13) My knowledge does not become permanent when IWB used in lessons	f	55	34	38	7	48	2.70	Neither Agree nor disagree
	%	27,2	16,1	18,8	13,1	23,8		
14) My teacher doesn't use effectively IWB in lessons.	f	12	12	42	45	91	3.84	Agree
	%	5,9	5,9	20,8	22,3	45,0		
15) Student interaction is reduced when teachers used IWB.	f	59	30	36	32	45	2.71	Neither Agree nor disagree
	%	29,2	14,8	17,8	15,8	22,4		
16) Using IWB doesn't increase collaboration and communication among students.	f	27	27	45	44	59	3.38	Strongly agree
	%	13,4	13,4	22,3	21,8	29,2		
17) Without IWB the course would be more difficult to understand	f	27	21	66	33	55	3.26	Neither Agree nor disagree
	%	13,4	10,4	32,27	16,3	27,2		
18) My teacher usually shows the content which is prepared yourself on the IWB	f	9	16	30	54	93	3.92	Agree
	%	4,5	7,9	14,9	26,7	46,0		
19) My teacher encourages us to use IWB.	f	13	21	41	50	77	3.76	Agree
	%	6,5	10,4	20,3	24,8	38,1		
20) I find to opportunity to learn from different sources using IWB.	f	13	11	36	50	76	3.58	Agree
	%	6,4	5,4	17,8	24,8	37,6		
21) I like to use an IWB in front of the class.	f	12	25	33	45	82	3.72	Agree
	%	5,9	12,4	16,3	22,3	40,6		
22) I'm having trouble using the IWB in lessons.	f	53	43	48	17	42	2.63	Neither Agree nor disagree
	%	26,2	20,7	22,8	8,4	20,8		
23. Using IWB in teaching-learning process increases my academic performance.	f	20	22	47	41	73	3.46	Agree
	%	9,9	11,1	22,2	20,6	36,5		
24. My eyes are tired and my head hurts after I constantly look at the IWB screen.	f	43	34	31	57	37	2.94	Neither Agree nor disagree
	%	21,3	16,8	15,3	28,2	18,3		
25. My attention disperses in lessons because of using IWB technical problems (calibration settings, software etc.).	f	28	33	30	55	56	3.27	Neither Agree nor disagree
	%	13,9	16,4	14,9	27,2	27,7		
26. We are using IWB to realize common activities and cooperative learning in the classroom.	f	86	25	23	18	50	2.59	Disagree
	%	42,6	12,4	11,4	8,9	24,8		

Students think that the use of IWB gives them opportunity to present content in class. In addition the use of IWB facilitated teaching-learning process and makes more enjoyable and fun. Most students agreed that using an IWB is motivating, engaging, and enjoyable. This result is parallel with other studies [8, 15, 20, 21, 23, 29]. The results of this study showed that the use of the IWB can enhance the learning process and influence learning styles as well as increase students' motivation. Students think that the use of IWB increases their achievements but some research does not support it very much [30]. The students usually complain about technical problems, they do not like when IWB does not work properly in the processing courses. From a pedagogic point of view, the technical problems (very sensitive panel, calibration settings) lead to slow down teaching process, concentration problems and loss of time. Teachers said that when they used of the IWB more often in class, the students have become passive day by day and also they had difficulties in creating social learning environments [23]. Students said that IWBs seems like enriches the teaching process actually weakens the interaction between student-student. Students said that when teacher used IWB more often in class, they became passive. The results of the study showed that the use of the IWB in a constructivist frame doesn't provide a positive contribution to student-student communication. However, results indicate that teachers were not able to design a collaborative learning process using IWBs. Most students believed that IWBs provided time efficiency for their instruction. Likewise, researchers suggest that using an IWB reduces the time spent recreating instructional materials and content [31].

Students said that teachers have experienced a lack of technical skills and lack of materials regarding the effective use of IWB. It can be explained by the fact that teachers use only IWBs as a data projector. In this sense, IWBs too often simply supports applications of traditional pedagogies.

Table 2. The Results of T-Test on the Use of IWB According to School Type

	n	$\bar{\chi}$	ss	t	sd	p
Primary school	98	3.11	0.38	-1.102	200	0.27
High school	104	3.22	0.56			

P>0.05

The average scores of high school students' opinions about use of IWB ($\bar{\chi} = 3.22$) were found to be slightly higher than primary school students ($\bar{\chi} = 3.11$). However, as shown in Table 2, there was no significant difference in according to the variable type of school about students' views on the use of IWB ($t_{(200)} = -1.102, p = 0.27 > 0.05$). The views of students on the use of IWB are generally positive. In addition, it can be said that these views differ according to the type of school.

Table 3. The Results of One way Anova According to Duration of Using IWB

Source of Variance	Sum of Squares	df	Mean Square	F	Sig.	Sig. Diference
Between Groups	32,964	3	10,898	14,838	,000	4-1,2,3 group
Within Groups	1789,89	2437	,734			
Total	1822,58	2440				

There is a difference in student's viewpoints engagement between duration of using IWB during one week ($F(3-2437) = 14,838, p < .01$). The results of One way Anova for demonstrating between the duration of IWB using of the students in a week and students viewpoints significant differences are given Table 3.

According to Scheffe test results, there is a significant difference student engagement between using IWB in 11 hours and above group (4. group, $\bar{x} = 3.82$) and the others; 1-2 hours (1.group $\bar{x} = 3.37$), 3-5 hours (2.group, $\bar{x} = 3.14$), 6-10 hours (3. Group, $\bar{x} = 3.50$). The more the hour rises within using IWB in class, the more students' viewpoints positive. This result supported the finding of the study which is stated by Aydinlı and Elaziz [20].

Table 4. The Results of T- Test According to Gender Variables

Gender	N	Mean	F	SS	df	t	P
Male	88	3.66	4.175	.89	200	2.325	.04
Female	114	3.74		.82			

There aren't any differences in student viewpoints between males and females with use of the IWB ($t(2437)=2,325$, $p > .01$ (Table 4)). IWBs were a technology where engagement boys and girls was noted equally. In all of the OECD countries, there appear to be differences in boys' and girls' attitudes (engagement, self attainment and motivation) towards ICT. Boys have a more positive attitude towards computers, less computer anxiety and more computer confidence than girls [32].

Table 5. The Results of T- Test about Teachers' use of IWB

School Level	N	Mean	F	S	df	t	P
Primary School	98	3.12	13.75	.46	200	15,074	.00
Secondary School	104	2.81		.55			

There is a clear difference in primary school (6-14 age) and secondary school (15-19 age) students views with Teachers' use of the IWB ($t(2517)=15.074$, $p < .05$). Primary school teachers used IWB during classes more than secondary schools teachers (Table 5). If teachers lack confidence and ability, perceptions can change, and IWBs can be perceived as just another presentational 'gimmick' [12]. This result indicates that, the students will have a positive attitude if the teachers use it in an effective way. Finally the result indicated the need to change the school culture, classroom pedagogy to support enthusiastic and innovation in teaching and learning [12, 32]. They relate this to the fact that IWBs can be perceived as easy to use, visual, interactive, immediate, and matching the students' digital culture. Lastly, students are aware of a teacher's confidence and ability using an IWB [25].

Primary school students thought that teachers used IWB as "Internet-based projection device in comparison with secondary school students.

Table 6. The Results of T- Test according to the Students views on Technical Dimension

School Level	N	Mean	F	S	df	t	P
Primary School	98	3.22	49.71	.86	200	26,620	.00
Secondary School	104	4.05		.66			

The results of this study indicated that there were significant differences of viewpoints on IWB between primary and high grade students. There is a clear difference in primary school and secondary school students' views on technical dimension on usage of IWB ($t(2430)=26,620$, $p < .05$ (Table 6)). Students are concerned about the possible harmful effects of radiation, the board warming, finger irritation and eye health caused by IWB in your classroom. IWB's calibration problems lead to concentration problems on students and loss of time. This results supported teachers' views about using IWB [23].

Table 7. The Results of T-Test according to the Students Views on Engagement Dimension

School Level	N	Mean	F	S	df	t	P
Primary School (6-14)	98	3.26	63.20	.86	200	26,85	.00
Secondary School (15-19)	104	4.09		.66			

There is a clear difference in primary school and secondary school students views on engagement dimension on usage of IWB ($t(2416)=26,85$, $p < .05$ (Table 7)). Primary school students view on engagement dimension lower than high school students' view. It can be cited that different education materials and instruction methods besides IWBs used in secondary school level. According to the results, the use of IWBs is suitable for secondary school classrooms because IWB can support

independent learning where the students take responsibility for their own learning. Secondary school students can easily find for the course materials needed and they can form their presentation creatively with the help of IWBs tools. IWBs can enhance collaborative learning where each students of the class can participate in the activities such as discussion, exams, and presentations by using the IWB.

Studies have shown that collaboration, active participation, and a student-centered approach benefit students' learning needs, particularly with middle education students [9]. Student engagement behaviors increase significantly when the IWB is used for instructional purposes. As well as, IWB play a vital role in stimulating student interactivity in classroom instruction.

In terms of engagement, the most common positive comments made about IWBs by pupils were that they facilitated learning and worked well in taking different learning styles into account.

There is some agreement that IWBs have a positive effect on student motivation. Some caution that that heightened motivation correlated with IWBs may be due to the novelty factor and may decrease over time especially if the IWB is overused [28, 33].

The interactive whiteboard study found that interactive whiteboards make a difference to aspects of classroom interaction. There is a faster pace (number of interactions between teachers and students) in the whiteboard lessons compared to the non whiteboard lessons [14].

4 DISCUSSIONS AND CONCLUSION

Although students' adverse opinion of the IWB, the new device generally use in the schools. Student engagement increased significantly when the IWB was used for instructional purposes. This study show general improvement in student's behavior which translates into improved student engagement. No significant differences were found between the variables gender and improved student viewpoints about using IWB. Results indicate that use of the IWB as an instructional tool has a beneficial effect on student engagement in classroom lessons. The more the hour rises within using IWB in class, the more students' engagements increases. Students are engaged in learning more active when IWB is used. Use of IWB has been associated with improved student engagement, capabilities for presenting content information and concepts effectively using multimedia and multiple sources. As a result of the extensive literature review, a suggested framework is comprised of sets of variables: Technical Factors, IWB Usage, and Student Outcomes.

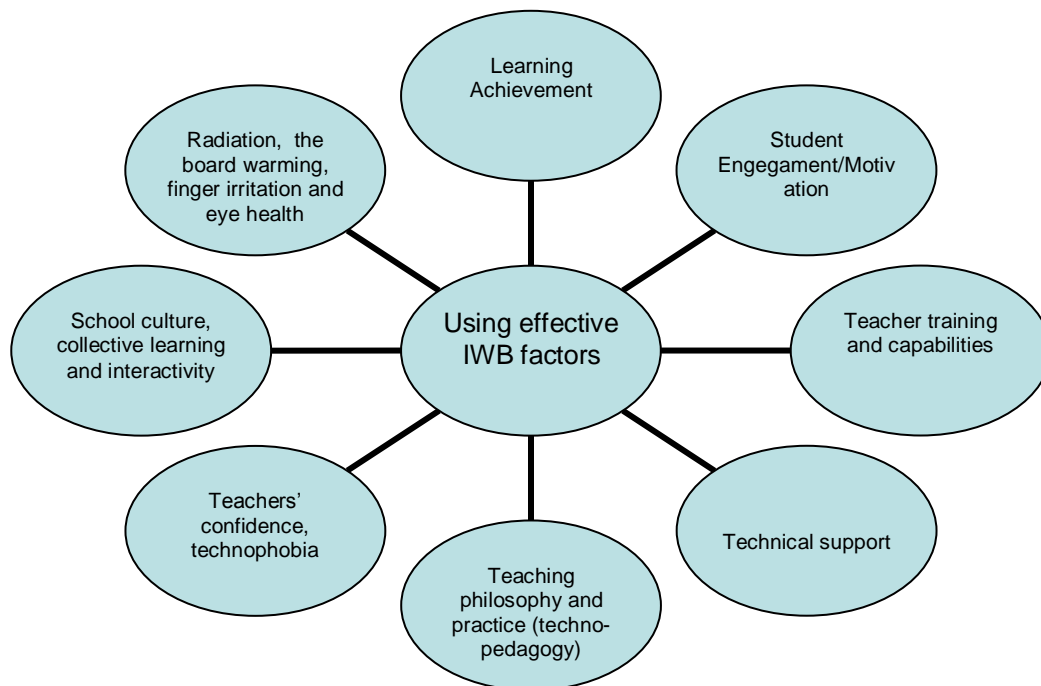


Fig. 2. Using effective IWB factors

One of the most common findings from this research has been an association between IWB use and improved student motivation and engagement. Similar findings were reported by earlier reviews of the research literature. The most widely claimed advantage of IWBs is that they motivate pupils because lessons are more enjoyable and interesting, resulting in improved attention and behaviour. Pupils report that their lessons are faster paced, more fun and exciting [11, 13, 31]. Students must be allowed to use IWBs themselves.

The interactive whiteboard study [28] found that interactive whiteboards make a difference to aspects of classroom interaction. There is a faster pace (number of interactions between teachers and students) in the whiteboard lessons compared to the non whiteboard lessons [14].

According to the research, use of IWBs stimulates student interest and attention leading to increased motivation and engagement during lessons. Student engagement, as evidenced by behavior during lessons, is an essential component of learning. Incorporation of technology into classroom instruction not only kindles student attentiveness, satisfies the accommodation of student needs, and utilizes instructional strategies consistent with the current technological tools available, but also complies with state and federal technology mandates [9].

The British Educational Communications and Technology Agency (BECTA) report indicates that interactive whiteboards enhanced the overall classroom experience [15, 16]. This research results support the Becta reports data. Some of the benefits are highlighted below. Usage of IWB as an instructional tool, IWB increases the level of students' engagement in learning activities. In addition to the observed positive impacts on student engagement, research shows that using of IWBs helps teachers streamline their preparation, be more efficient in their Information and Communication Technology (ICT) integration.

Primary school students are more satisfied than high school students in terms of student engagement and IWB learning environment. Primary school and secondary school students' point of view show that their teachers don't use IWB efficiently. According to these results;

- Teachers will be taught how to use IWB effectively,
- Teachers should be encouraged more and more to use IWB,
- Students should be participated in using IWB with teachers,
- IWB should be one of the important alternatives while implementing new education programmes. Additional lesson materials are required. More electronic lesson materials should be developed, such that the whole curriculum and student age range is covered.

The results of this research support that IWBs affect learning in several ways, including raising the level of student engagement in a classroom, motivating students and promoting enthusiasm for learning. As a result of this research showed that the main actor is teacher who is using IWBs effectively. The teachers has got a very important role integrating ICT into their classrooms. Because the IWB is not a magic device, but an exemplary teacher might do magic if they use IWBs in the right way and select the proper teaching methods.

Teachers require continuing professional development in higher level use of interactive whiteboards to bring about the kind of pedagogical changes that are possible with interactive whiteboards [15]). Teachers must provide opportunities for students to access, interact with, and become e-skilled users of technology as part of ICT society. The IWB is a tool that satisfies all of the requisites of today's education life. Especially, Tablet PC and IWBs technologies enliven the classroom environment. As IWBs are becoming more and more prevalent in schools, we discuss implications and make recommendations for teachers and manufacturers.

5 SUGGESTIONS

IWBs are generally perceived by students as a positive addition to the classroom learning environment. In addition, the research suggests that these effects are related to variables such as teacher training, technological leadership, school culture, technical support, and lesson preparation and practice time. Further research needs to be carried out to discover when and how the IWB should be used to facilitate more active pupil involvement and achievement. It is resolved the concerns of students about radiation, eye health, heat, headache, irritation of the finger. It is concerned about

these factors which are technical problems, radiation, light, heat, and eye health use of IWB eliminated for students. Students said that when teacher used IWB more often in class, they became passive.

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