ATTITUDES OF INTERACTIVE WHITEBOARD USERS

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Abstract: Thanks to the applications more and more IWBs are available for the institutions in Hungary. The most active and enthusiastic teachers who are ready for the latest challenges start to use the technical devices at once, they learn to use it and apply it in their everyday education. The aim of the research is to get a picture of active IWB users' opinions. 50 randomly selected teachers were asked whose schools have got several IWBs available. So, the results below reflect experienced teachers' opinion, since they have been using IWB from 1 to 5 years.

1 INTRODUCTION

The presence of the new ICT devices resulted in the renewal of content and methodology in education. The appearance and fast development of Information Technology in our everyday life and consequently in schools and in education has contributed a lot to the fact that teaching does not focus only on one subject but involves all the segments of education.

In the process of modernising education emphasis has shifted from traditional content based, theoretical teaching to providing practical knowledge which students can use in their everyday life and developing competences.

ICT devices in education have provided the chance for the innovation of digital competences by the EU. First the use of computers spread in school, mainly in IT lessons, but nowadays we can find a wide variety of ICT devices in other classrooms, too.

This way students do not only use this equipment in the IT lessons but it was given an important role in other subjects for example: mathematics, history, geography, English etc.

In the teaching of the so called digital generation this is an appropriate device, since the students use it with confidence, throughout a number of hours; so via the different digital contents their learning process can be assisted.

The use of IWB is getting more and more widespread in Hungary in both primary and secondary schools. It has even appeared in nursery schools as well. Teachers have started to embed this device into their everyday teaching process and use it successfully, and they are exploring the possibilities of IWB, they hold interesting, interactive, visually impressive and colourful lessons.

International researches prove that the use of IWB has positive effect on education and elevates it into another dimension providing several other possibilities in the field of visualising and arising students' interests (Syh-Jong, J. 2010; Glover et al., 2007; Hall&Higgins, 2005; Hennessy et al, 2007; Higgins et al., 2007; Schmid, 2008; Ruth K., 2010, Gillen et al., 2008; Jewit et al., 2007; Kennevell & Beauchamp 2007; Somekh et al., 2007, etc.).

Nine case studies have been prepared for the EUN Interactive White Board Working Group in order to look at experience, policy and innovation in the use of IWBs in Europe (Karl L. et al, 2010). The group has concluded the following key common findings, which are learner and teacher benefits:

1. positive impacts on student engagement, involvement, content retention, and motivation;
2. greater flexibility in responding to different learning styles (including team learning) as well as varying ability levels;
3. "renewal" and innovation capacity for teachers as they re-visit their own teaching styles, methodologies, and content;
4. curricular enrichment through wider and easier access to learning materials and objects;
5. the contribution of IWBs to improved digital competence amongst learners and teachers;

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6. impacts on learning management, in particular regarding an increase in time required for lesson preparation, how learning materials are stored and shared;

7. the concomitant risks of excessive or inappropriate use of a new technology or of reverting to more traditional teaching styles; in other words, the central importance of sound pedagogy.

The results of almost every international research focusing on the use of IWB highlight the most important benefits which are motivation, arising and keeping up interest.

2 RESEARCH AND EVALUATION

2.1 Research Questions and Methods

The aim of the following research is to get a picture of the present situation relying on the opinions of the experienced teachers who use the IWB actively.

For example: how they have experienced the positive benefits of IWB during its use, what the students reaction to it was, in addition what kind of difficulties they had to face when they introduced and started to use IWB and which are the ICT devices needed.

Quantitative test: questionnaires about active users, the teachers' attitude about using IWB at secondary and primary schools.

Statistical analysis: data processing with using SPSS and Microsoft Excel.

2.2 Analysis of Data

2.2.1 The Sample

50 randomly chosen teachers were asked form 10 primary and secondary schools in Debrecen. All of the teachers in the sample are IWB users, they teach with ICT devices every day. The youngest is 24 years old and the oldest one is 57. The average age of the teachers in the sample is 43. Having a look at the gender distribution, Figure 1 suggests that 87% of the teachers are women and 13% are men. It is not surprising for me, because there are more female teachers, in Hungary and in Europe, too.

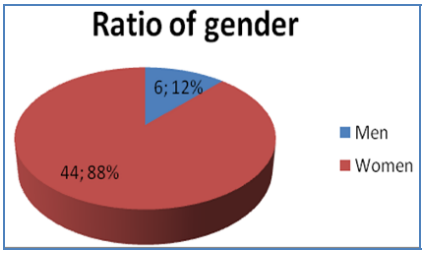

Figure 1: Ratio of gender.

According to the length of time devoted to teaching, we can say that the average period of experience among the teachers in the sample is 19 years. This number shows that the teachers have a great experience. These teachers have a wider perspective of the methods they can use to integrate the ICT devices to their everyday teaching.

2.2.2 The Teachers and Their Subjects Taught

Figure 2 shows that the teachers asked teach mainly Mathematics, Literature, IT, English and Social History.

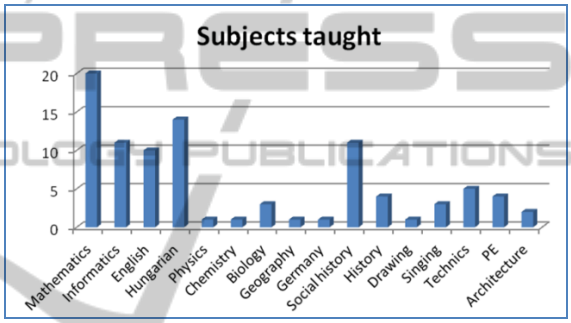

Figure 2: Subjects taught.

These results refer to the fact that basically math teachers use IWB in the institutions enquired.

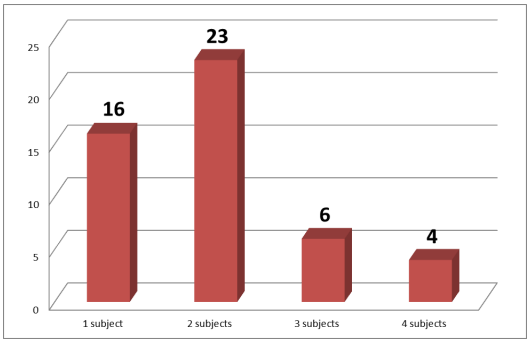

Figure 3: Number of subjects taught.

Figure 3 reflects the number of subjects taught. Two thirds of the teachers in the sample teach at least two subjects.

2.2.3 Using Computer

All of the teachers asked can use the computer and they have it at home, too. The average time of using computer is 3 hours and they use the internet 2 hours

per day.

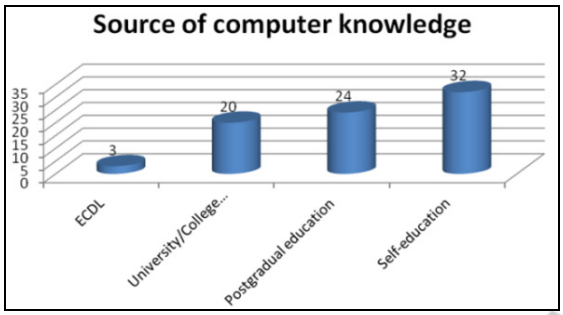

Figure 4: Source of computer knowledge.

The teachers were also asked about the sources of their computer knowledge. The alternative answers were the following: ECDL – European Computer Driving Lessons, University/College, Postgradual education, Self-education. Figure 4 shows that most of them chose Self-education. Furthermore, it is observable that the teachers are open to new technology and most of them try to develop and upgrade their knowledge by self-education. Self-education is essential for teachers, since it is the base of their continuous development and indispensable for keeping pace with digital generation. If there are ICT devices available it is important to use them. Students tend to claim its use at the lessons. If there is an IWB in the classroom, they ask their teachers why they do not use it.

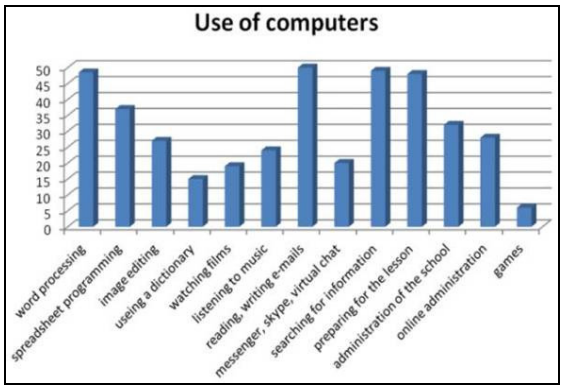

Figure 5: Use of computers.

In Figure 5 shows what teachers in the sample use computers for. Four outstanding values can be observed, these are word processing, reading, writing e-mails, searching for information and preparing for the lessons. These results are in connection with each other and they are the base of preparing for lessons.

Figure 6 shows the frequency of the usage of the different ICT devices among the teachers from the

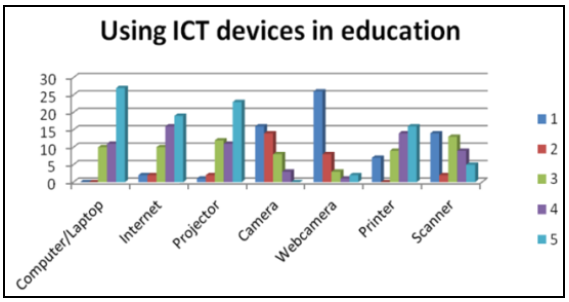

Figure 6: Using ICT devices.

sample. 5 point Likert scale was used to give the answers, where the value 1 meant never using ICT devices in teaching and number 5 meant that they often use them. As we can see the most popular devices are the computer.

2.2.4 Using Interactive Whiteboard

On average there are 6 IWBs in the institutions in the sample, but this number ranges from 1 to 10. 100% of the teachers asked use IWB 1 hour per day. 48 teachers (96%) confirmed that the IWB has positive effects on students' achievement while only one teacher disagreed and another did not give an answer.

The teachers were asked if they had taken part in any IWB trainings. They could choose from the following alternative answers: yes once, yes several, no, recently going and there will be soon.

The results of the question above (which we can see in 7a and denotes Biro P. 2011) are compared to those given by Tar Zs. 2009.

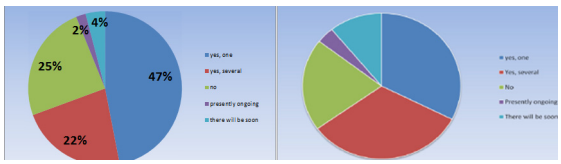

Figure 7: a) Biro P., 2011 b) Tar Zs., 2009. Participation in IWB training.

Figure 7a shows that 69% of the teachers asked have already taken part in an IWB training course, which help them a lot in their work every day, since these courses teach them how to use different methodological techniques that they can use in their lessons. Moreover, these courses make it possible for communities to evolve and professionals in these groups can share their material and experience and they can find solutions to their problems. It is important for teachers using IWB to take part in such a course because these occasions may help teachers to avoid problems at the beginning.

According to Tar Zs.'s survey (Figure 7b) 32% of teachers participated in in-service training organized in their own school only once, while another 32% participated on more occasions. In 3% of schools, training was in progress, while in 9% of schools IWB in-service teacher training was to be organized soon. 17% of users reported that there had been no training, and in 38 institutions vendors (who delivered the IWBs) had not carried out training on IWB usage. (Tar Zs., 2009)

There are different types of IWBs in the institutions, what is more certain schools have several types of IWBs, which makes teachers' work more difficult. Using IWB independent software might be a solution to this problem. In the institutions involved in the sample there are Mimio, Polyvision and Smart boards.

2.2.5 Digital Curriculum

Teachers spend 1,5 hours preparing digital material. The majority of them spend a lot of time preparing material first, but later they need less time because they can reuse their previously made material. So it is worth spending time with. There was only one teacher who said that preparing material does not take a long time. However, he has been using the IWB for 4 years, which also supports the idea that as time goes by preparing material takes less and less time. Teachers who chose the first answer are mainly teachers having used ICT devices for only one year and they use the computer less so it takes more time and energy for them to prepare the appropriate material. In Figure 8 we can see the teachers' attitudes to the time of preparation.

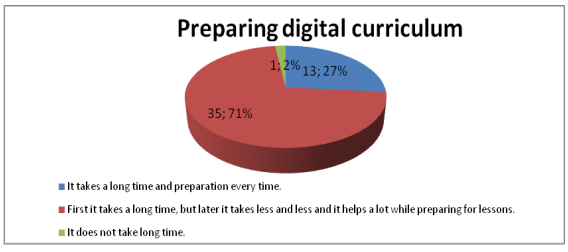

Figure 8: Preparing digital curriculum.

45 of the teachers asked use digital material, 1 does not use any and 4 of them gave no answers.

Compared to Tar Zs.'s survey (2009), we can see in Figure 9, which was part of a European case study (Karl L. et al, 2010), it can be concluded that the results are similar among the teachers asked. There was a slight fluctuation in the questions "Writing, making notes, drawing, text italics with digital pens" (66% - 83%) and "Other digital contents curricula" (46%-29%). The most popular digital curriculum is SDT (Sulinet Digital Knowledgebase). In the above mentioned survey (Tar Zs., 2009) 65% of the teachers marked that they use it, this percentage seems to be increasing since 72% claimed to use it while teaching whereas Realika is less popular: 32% teachers use it. This difference may be caused by the fact that Realika contains only material for science subjects.

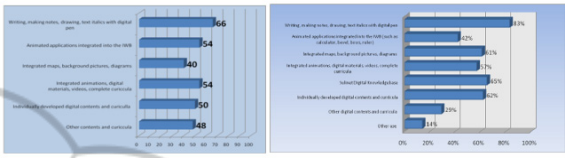

Figure 9: a) Biro P., 2011 b) Tar Zs., 2009. Applications on IWBs

None of the teachers marked that they use voting systems which suggests that they do not have one. The electronic register is not at all widespread either, since it is used in only one of the institutions. As more and more parents use the computer on a daily basis, presumably this application will also be popular, so that parents can check their children's achievement at school. It also makes teachers administrative work much easier.

2.3 Factor Analysis

The statements below were evaluated on a 5 point Likert Scale by teachers using the IWB, where 1 means that they do not agree with the statement and 5 means that they totally agree with it.
The reliability is analysed by the Split-half method and the so called Cronbach's alpha coefficient. To examine validity a Rotated Varimax Principal Component factor analysis was applied.

1. The motivation of the students increased.
2. The achievement of the student increased.
3. Students' interactivity in the lesson increased.
4. Using IWB helped improve their ICT skills.
5. Using IWB helped improve their visual skills.
6. Making more progress in the material.
7. Students understood the material more easily.
8. Weaker students could more easily catch up.
9. Students were easier to involve in work in the lessons.
10. Lessons were more organized.
11. The material was more professional.
12. It was easier to revise.
13. Students thought more in the lessons.

2.3.1 Reliability Analysis (Polit and Hungler, 1995)

The reliability of our measure scales were characterised by measuring precision. We meant by this that the scale can measure that process punctually and correctly. There are several methods to define reliability. In this case an attempt was made to determine the internal consistency. Internal consistency is meant by the characteristic of our scale to measure only a given case (teachers' attitudes to IWB), and every segment measures the same thing. The Split-half method was used to calculate the Cronbach's alpha coefficient, which defines the internal consistency. To achieve a punctual estimation we used the alpha coefficient suggested by Cronbach (1990), which is the most accepted measure number of the internal consistency.

This method examines all the possible combination of every component automatically, and on the basis of this it determines a value between 0 and 1. The closer this value gets to 1, the more reliable the scale is. As Cronbach-alpha=,918 we can say the our scale is reliable. (Table 1)

Table 1: Reliability statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,918	,921	13

2.3.2 Validity Analyses (Sajtos L., Mitev A., 2007)

The factor analysis examines the correlation between several variables. In the investigation 15 variables were used two of which were excluded since their MSA value in the main diagonal of the anti-image correlation matrix was below 0,5.

Principal Component Analysis

Using the Principal component analysis the number of variables were put into two groups.

The SPSS uses a correlation matrix to determine the principal components. One of the characteristics of the method is that it explains all the components, the observed variance of the variables with the order of the eigenvalue. Factor number 1 contributes to the Total Variance with a bigger extent, while the remaining factors with a decreasing extent.

KMO and Bartlett's Test

The applicability of the data was examined by with Kaiser-Meyer-Olkin (KMO) criterion which is one of the most important measures to decide whether the variables are suitable for factor analysis. The KMO value is the mean of the MSA values in the anti-image matrix.

Table 2: KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,865
Bartlett's Test of Sphericity	Approx. Chi-Square	355,040
	df	78
	Sig.	,000

The KMO>0,8 (=0,865) which means that the variables are suitable for factor analysis. (Table 2)
The Bartlett-test examines the correlations of the variable with population (null hypothesis – H0), it tests that the components outside the principal diagonal within the correlation matrix deviate from 0 only randomly. Obviously in this case we would like to reject the H0 so that the variables can correlate. In the above table we can read that the Null Hypothesis of the Bartlett test can be rejected, since the level of significance is lower than 0,05, in our case Sig=0,00, so the variables can be submitted to the factor analysis, because there is correlation between them.

Variance Ratio Test

The number of factors can be determined on the basis of the percentage of the cumulative variance, that is so many factors were defined that we can reach a minimal total variance level. In the social sciences a 60% of variance is acceptable. The variance described by the factors can be seen in the table below. (Total Variance Explained – Table 3)

Table 3: Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6,728	51,751	51,751	6,728	51,751	51,751	4,101	31,547	31,547
2	1,255	9,650	61,401	1,255	9,650	61,401	3,881	29,855	61,401
3	,948	7,294	68,696						
4	,829	6,378	75,074						
5	,714	5,489	80,563						
6	,581	4,471	85,034						
7	,473	3,637	88,671						
8	,374	2,879	91,550						
9	,314	2,418	93,968						
10	,243	1,871	95,839						
11	,228	1,751	97,590						
12	,171	1,319	98,909						
13	,142	1,091	100,000						

Scree-test

The Scree Plot below (Figure 10) helps determine the number of factor dimensions. The Scree Plot figure shows the delineated eigenvalues in the order of factors, where axis *y* contains the eigenvalues and the axis *x* the number of factors. According to the Scree-test the number of factors needs to be maximised where the rise of curve suddenly changes and continues as a line. On the basis on the Scree Plot we can see that the choice of the two factor

groups is the most accurate.

Maximum-likelihood Method

The fitting of the model was investigated with Maximum-likelihood method which calculates a Good-of-fit Test fitting index for a given factor

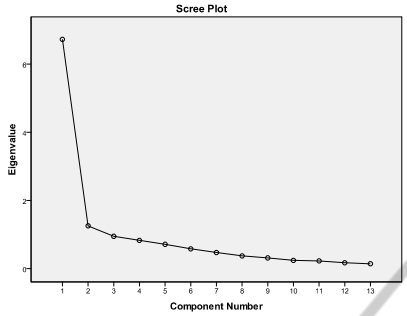

Figure 10: Scree Plot.

number.

After defining the 2 factors the significance level was Sig=0.165 (Table 4), which means that the model fits the observed data very well.

Table 4: Goodness-of-fit Test.

Chi-Square	df	Sig.
62,944	53	,165

All of the above mentioned methods indicated that the selection of the 13 variables must be put into two groups.

2.3.3 Interpretations of Factors

The Rotated Component Matrix divided the variables into two groups as shown in the Table 5.

Table 5: Rotated Component Matrix.

	Component	
	1	2
The motivation of the students increased.	,851	,075
Using IWB helped improve their ICT skills.	,768	,222
Students' interactivity in the lesson increased.	,737	,328
Weaker students could more easily catch up.	,674	,506
Students understood the material more easily.	,624	,450
Using IWB helped improve their visual skills.	,619	,297
The achievement of the student increased.	,618	,307
The material was more professional.	,284	,851
Lessons were more organized.	,107	,774
Making more progress in the material.	,222	,686
Students thought more in the lessons.	,477	,670
It was easier to revise.	,322	,667
Students were easier to involve in work in the lessons.	,405	,625

Analysis of Factors

On the basis of rotated factor matrix the factors – i.e. the functional attributes – got the following names.

Factor 1: *Interactivity and improvement of students' achievement*

In this group it is obvious that the emphasis is put on students' interactivity. It is easier for the teacher to involve students to participate in the lesson. Students are more active in a lesson using ICT devices, what is more they also improve students' ICT skills. The most important benefit of the IWB is the better achievement of the students. Owing to the motivation students are more interested and curious about the material, which might seem to be easier for weaker students and this way they can easily catch up with the others.

Factor 2: *Lesson planning and demonstration*

Planning and organizing lessons change, the teacher uses interactive material, thus it is easier to handle the material which is more professional and fits to modern expectations.

The material of the lesson is easier to understand and recall or revise. A great advantage of demonstration is that students can remember material better if they are visual type and another benefit of the IWB is that we can gain a lot of time and can cover more material with it at the same time, so there is more time of practicing the problematic parts.

2.4 Opinions about IWB

Teachers using the IWB are very positive above it, they gave much fewer negative opinions. The positive opinions were categorized into there groups.

2.4.1 Positive Opinions

Motivation

- *the material can be made more interesting and colourful, visualization makes it easier to understand and revise;*
- *the most modern device which is used now.*

Teachers Work (methods and preparation)

- *it is possible to revise material easily and quickly;*
- *helping homework assignments;*
- *it makes lessons more variable;*
- *we can save the material for future use, it can easily be organized, students are more motivated;*
- *it is very good for revision;*
- *it makes explaining complicated material and showing examples easier.*

Benefits for Students

- *students take part in the lesson more often, they gain more knowledge, the lessons are more organized;*
- *group work becomes more active;*
- *it is easier for students to understand the material;*
- *makes weaker students take part too;*
- *the children are of visual type, they remember new information better if they see it;*
- *it is an efficient device for improving competences;*
- *it is possible to involve students with different abilities in the lesson with the help of correctly chosen and varied tasks;*
- *they can also acquire knowledge through experience; they get immediate feedback after finishing the task.*

2.4.2 Negative Opinions

- *colleagues being less susceptible to technology or having little knowledge of ICT are less ready to use it. At the beginning it requires lot of time and energy to prepare material, but later you can reuse it;*
- *it slows down the pace of the lesson;*
- *it is forced on schools, its installation and maintenance is very expensive;*
- *only one student works at a time, it takes up a lot of time, students do not concentrate on the task;*

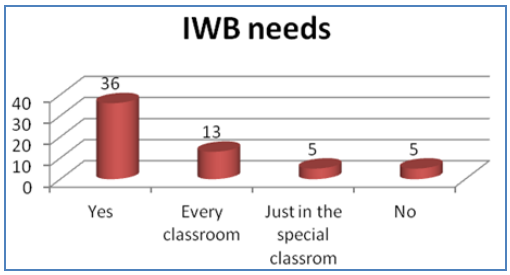

Figure 11: IWB needs.

In Figure 11 we can see that 72% of the teachers would like to have more IWBs in their schools. The opinions below show that the IWB will be a basic and indispensable part of a future classroom.

2.4.3 Future School

The teachers' expectations of the futures schools are the following:

- *there will be a computer which is suitable for group work, traditional and interactive whiteboards, projectors, internet access in every classroom, and other equipment: printer, scanner;*
- *digital curriculum and teaching aids (IWB, laptop, voting systems) and single desks which can be fitted together for group work;*
- *looking at the Hungarian educational policy I do not dare to "dream of improvements";*
- *IWB, laptop, projector, Tablet PCs, digital camera, printer, scanner, TV, DVD player, voting systems;*
- *spacious, air conditioned classrooms where there is enough room for traditional equipment too, small groups of 16 students, computer for each student;*
- *I think students will have their own laptops an they will solve their tasks with the help of them, at least 50% of the teaching process will involve these devices;*

2.4.4 Teachers' other Remarks

- *it is a useful device which is very good for raising interest and catching attention, but it is important to state that it is remarkably helpful in certain lessons, for particular topics but its use should not be forced when it is superfluous;*
- *it is indispensable for teachers to use it to keep the competitiveness of their school;*
- *students learn how to use it very quickly and they also like using it, and they praise a teacher who can use it: "We didn't think that you can use it";*
- *there are only a few IWBs in the school, so it is a problem that sometimes we have to change classrooms. I am not prepared enough and I do not understand English;*
- *we need more digital material related to the curriculum and trainings on how to use the IWB;*
- *it is an up-to-date facility;*
- *it would be more effective if every student had a mouse and they could be assessed individually;*
- *there should be one in each classroom, there should be more trainings for teachers;*

3 CONCLUSIONS

The above research which is based on the opinion of the teachers using IWB shows that the IWB has a positive effect on student achievement, their motivation increased, the lessons became more organized and the material is more interesting.

It is important to keep up the situation and provide something new to our students using the facilities of the IWB so that it will not only be a

"short-term" first impression, but keep the students interested in the long run and increase their achievement.

To sum up the opinions we can conclude that the IWB has a positive effect on every day education; both teachers and students are enthusiastic about using the new devices.

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