Teachers' Perception of Interactive White Boards:

A Case Study

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Abstract: Interactive whiteboards (IWBs) are touch-sensitive new generation boards controlled by a computer that is connected to a digital projector (Saltan and Arslan, 2009). In many countries, teachers have begun to use this instructional tool in primary and high schools. In order to investigate teachers' perceptions and acceptance towards IWBs, this case study was conducted in a primary school in Turkey. 34 teachers from different subject matters participated in the present study. Data were collected through a questionnaire consisting of three parts -- perceived usefulness, perceived ease of use and attitude towards interactive white boards. Descriptive statistic was utilized to analyze the data. Mainly frequencies and percentages were run on the likert-type questions. Results showed that teachers found interactive whiteboard relatively easy to use and useful, in addition they had a positive attitude toward the IWB. However means of the perceived ease of use and attitude toward IWB is lower than perceived usefulness.
Keywords: Interactive white board, Smart board, Teacher perceptions, Teacher acceptance

Özet: *Öğretmenlerin etkileşimli tahtaya yönelik algıları: Bir durum çalışması.*
Etkileşimli tahtalar bir bilgisayar tarafından kontrol edilen ve görüntünün bir projektör aracılığıyla yansıtıldığı yeni nesil dokunmatik tahtalardır (Saltan ve Arslan, 2009). Türkiye'de son yıllarda bu eğitim aracı, ilköğretimde ve lisede kullanılmaya başlanmıştır. Öğretmenlerin etkileşimli tahtaya karşı algılarını ve kabullenmelerini ölçmek için bir ilköğretim okulunda bu durum çalışması yapıldı. Bu çalışmaya değişik branşlarda 34 öğretmen katıldı ve veri üç kısımdan oluşan bir anket aracılığıyla toplandı. Bu kısımlar; algılanan faydalılık, algılanan kullanım kolaylığı, ve etkileşimli tahtaya karşı tutum dan oluşmaktadır. Veri analizi betimleyici istatistik yönetimi kullanılarak yapıldı. Sonuçlar öğretmenlerin etkileşimli tahtayı faydalı ve kullanımını kolay bulduklarını göstermektedir. Ayrıca etkileşimli tahtaya karşı olan tutumlarının olumlu olduğu saptanmıştır. Fakat algılanan kullanım kolaylığı ve etkileşimli tahtaya karşı olan tutumun ortalamasının, algılanan yararlılığın ortalamasından düşük olduğu saptanmıştır.
Anahtar Kelime: Etkileşimli tahta, etkileşimli tahta, Öğretmenlerin algısı, Öğretmenlerin kabullenmeleri

Introduction

Interactive Whiteboards (IWBs) are touch-sensitive new generation boards controlled by a computer that is connected to a digital projector (Saltan and Arslan, 2009). Although they were originally developed for office staffs (Greiffenhagen, 2002), there is an increasing use of Interactive Whiteboards (IWBs) by teachers all over the world (Smith, Higgins, Wall and Miller, 2005). While there has been increasing amount of Interactive Whiteboards activities in schools, little attention has been given in the literature to user acceptance of IWBs. Therefore, the researches on user acceptance of IWBs will be very important in providing useful information, especially at this early stage of development and implementation of Interactive whiteboard for educational aims. In order to examine teachers' perceptions toward IWBs, Technology Acceptance Model (TAM) was used that is widely accepted model and specifically designed Davis for explaining individual technology acceptance decisions across a wide range of technologies, user populations and contexts (Jen, Hu, Clark& Ma 2002). Ozdemir (2004) indicated that "*Using TAM can reveal information about computer anxiety, computer self – efficacy, task – technology fit, users' outcome*

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expectations about technology, technophobia, and some other concepts" (p3). The purpose of the study was to investigate the teachers' perception and attitudes towards the use of Interactive Whiteboards in school settings.

The study focused on three main constructs in the original TAM; Perceived usefulness (PU), perceived ease of use (PEU) and attitude toward technology (ATT). PU can be interpreted as the performance benefit that the teacher believes he/she will receive in using the IWBs. PEU is representative of the teacher's beliefs towards the amount of effort that is required to use the IWBs and ATT can be described as the teacher's emotional/effect regarding IWBs (Saadé and Galloway, 2005).

Literature

The academic literature about IWBs is limited, and has emerged very slowly, but there are a number of, reports and summaries of small-scale research projects conducted by teachers, schools and higher education institutions in the UK, USA, Canada and Australia (Smith, Higgins, Wall & Miller 2005). One of the major advantages of IWBs as a teaching tool is that they are 'interactive'. In addition, Students are motivated in lessons with an IWB (Smith, Higgins,Wall & Miller ,2005) because of 'the high level of interaction, students enjoy interacting physically with the board, manipulating text and images' (Becta, 2003, p3). Haldane (2007) stated that "*Traditionally, a teacher will be positioned beside a board of some kind or possibly a flipchart and will orchestrate the dialogue from the front of the class. It is the range of exchanges and interactions that occur between teacher, learner and IWB*" (p259.).

Kennewell and Morgan's study (2003) shows that;

> *Attitudes are broadly similar for both groups. All student teachers feel that an IWB is either useful to have available, essential for certain topics or essential for all teaching. The student teachers were clearly very positive about the IWB with 97% answering yes to the question 'Would you choose to have an IWB in your classroom?', even though 76% of student teachers felt that it would increase their preparation time a little or a lot. This can only be explained in terms of their perceptions that IWBs improve standards in the classroom and increase motivation. 90% of both groups who had observed lessons felt that the IWB had added value to those lessons. 95% of student teachers who had taught using the IWB felt that the IWB had added value to those lessons.*

The touch-sensitive nature of IWBs facilitates more professional and efficient delivery of multimedia resources (Boyle, 2002). Several teacher reports state the benefits of the IWBs which are also supported by scientific findings. Austin (2003) pointed out that IWBs are flexible and versatile teaching tools across age groups and educational settings. In another study, Wood and Ashfield (2007) investigated the effect of interactive whiteboards on literacy and numeracy. In the study, data were collect through in order to collect data, observations in whole-class lessons and individual interviews with teachers. The result of the study showed that IWBs facilitate the development of pupils' creative responses (Wood and Ashfield, 2007).

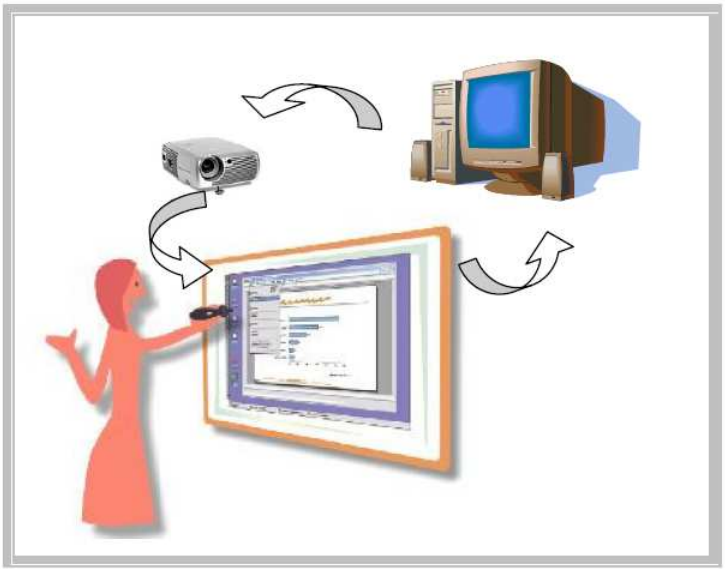

Figure1 Task Model of Interactive White Board

The studies on IWBs in the literature can be investigated under two main categories which are "*Interactivity and Participation*" and "*Effectiveness and Efficiency*".

Interactivity and Participation
One of the major advantages claimed with IWBs is that IWBs promote interactive learning. Becta (2003) states that students are motivated in lessons when used IWB because of that "*the high level of interaction, students enjoy interacting physically with the board, manipulating text and images*" (p3).
Also, Haldane (2007) indicated that

> *Traditionally, a teacher will be positioned beside a board of some kind or possibly a flipchart and will orchestrate the dialogue from the front of the class. It is the range of exchanges and interactions that occur between teacher, learner and IWB.*

In many lessons, interactive nature of the IWBs was used to provide students to capture key points within an otherwise transient dialogue (Haldane, 2007).

Gillen and his colleagues (2007) conducted a study to investigate how IWBs actually function as communicative and pedagogic tools in classroom interactions, how they are used by teachers to pursue their educational goals and how they are used to build shared frames of reference and knowledge between teachers and pupils. Researchers have collected observation and interview data from four teachers working within urban primary schools in the south of England. The results of the study indicated that the IWB seems to facilitate a speedy, smooth presentation compared with earlier technology (for instance, when a teacher would use a video-player, then write on a blackboard, then allow children to manipulate pictures on a magnetic screen and then use the video again).

In this regard, Armstrong and her colleagues (2005) conducted a case study and their paper discusses the results of a research project which aimed to capture, analyze and communicate the complex interactions between students, teachers and technology that occur in the classroom. The study, in three cases, three project teachers and their classes were analyzed which are Sarah Curran (Primary Science) with 6-degree-

students, Simon Mills (Primary Maths) with 6-degree-students and Ian Thompson, (Secondary English) with English, 8-degree-students. The research is situated within a theoretical perspective on teaching and learning which draws mainly from socio-cultural theories of learning. An important aspect of socio-cultural theory is the claim that all human action is mediated by tools and the study mainly showed that appropriate use of the IWB to promote quality interactions and interactivity.

Another case study conducted by Hennessy and his colleagues (2007) to investigate how experienced classroom practitioners are beginning to harness the functionality of this technology to support learning in science. Focus group interviews with four secondary science departments, lesson observations and interviews were conducted with two teachers and their pupils. Analysis of the data show that teachers used to exploit the dynamic, manipulable objects of joint reference and annotative tools afforded by the technology to foster the cognitive, social and physical participation of learners in whole-class activity and they demonstrated contrasting approaches to design and support activity in which pupils shared, evaluated and developed ideas using the IWB.

Effectiveness and Efficiency

In their study, Shenton and Pagett (2007) investigated the impact of IWB use on the teaching and learning of literacy in England. The study is focused on seven teachers in six primary schools in the south-west of England, all of whom had an IWB in their classroom and used it regularly to teach literacy. Four research questions are investigated which are;

- *How are IWBs being used in primary school literacy classrooms?*
- *How is IWB use being supported and resourced in primary school literacy classrooms?*
- *How is IWB use impacting on classroom literacy practice?*
- *On what area/s of literacy practice have IWBs had the most impact?*

In analyzing the first research question, the way in which IWBs were being used, three areas were apparent: use of prepared screens, use of a variety of multimodal texts and opportunities for integral assessment.

As for the second research question, the results showed that;

> Most of the teachers in this research project were learning ‘on the job’, spending considerable time preparing their own materials including PowerPoint presentations and downloading material from appropriate websites depending on their expertise. In only one school was there evidence of strategic planning to support the use of the IWB. In this school the coordinators for literacy, numeracy and ICT were going to attend a course together on using and evaluating new software for the IWB. (Shenton and Pagett, 2007, p132)

Furthermore, in this study, most of the teachers saw the IWB as an extra resource and powerful tool to support their teaching activities. Another study conducted by Smith and her colleagues (2005) to investigate the impact of interactive whiteboards (IWBs) on teacher–pupil interaction at key stage 2 in the teaching of literacy and numeracy. During the study, 184 lessons were observed over a two-year period. Using a computerized observation schedule, teachers were observed in literacy and numeracy lessons, with and without an IWB. Research questions are as follows:

- To what extent are there differences in classroom interaction when a teacher uses an IWB compared to when they do not? And is there an interaction effect with subject area?
- The IWBs were newly integrated into the classroom in 2003: would an extra year with an IWB change classroom interaction in any way?
- Are there any observable differences in classroom interaction between Year 5 and Year 6 pupils, when an IWB is being used?

The result of the study mainly showed that IWBs have some impact on the discourse moves used in whole class teaching, but this impact is not as extensive as that claimed by the advocates of IWBs.

To sum up, the potential benefits of IWBs can be summarized under eight titles.
These are:

- flexibility and versatility,
- multimedia/multimodal presentation,
- efficiency,
- supporting planning and the development of resources,
- modeling ICT skills,
- interactivity and participation in lessons,
- motivation and affect,
- multimedia and multi-sensory presentation (Smith, Higgins, Wall & Miller 2005).

Technology Acceptance Model

In 1980s, many studies have provided some theoretical frameworks for research in the acceptance of information technology and information systems but Davis's Technology Acceptance Model (TAM) is the robust, parsimonious , influential, and widely accepted model in Information Technology and Information Systems fields(Lu,Yu,Liu and Yao, 2003). Technology Acceptance Model differed from the others because of the factor in which TAM is specifically related with technology rather than behavior, and gives its reputation in technology related studies (Özdemir, 2004).Throughout the years, Technology Acceptance Model has received extensive empirical support though validations, applications and replications for its power to predict use of information systems (i.e. Davis, 1989, Davis et al., 1989; Davis, 1993; Davis and Venkatesh ,1996 ;Mathieson,1991; Taylor and Todd,1995; Venkatesh,1999; Venkatesh and Davis, 1996; Venkatesh and Morris,2000; Horton et al.,2001)" (Lu,Yu,Liu and Yao, 2003,p.207).

Methodology

The purpose of this study was to investigate teachers' perceptions and acceptance towards the use of Interactive Whiteboards in school settings. The study was conducted in a primary school in Ankara-Turkey with 12 male and 22 female teachers. Data was collected through a questionnaire which consist of three parts and 30 items; perceived usefulness (9 items), perceived ease of use (9 items) and attitude (12 items) .The items were measured by using a five point Likert-type scale ranging from "strongly agree" to "strongly disagree". The items in perceived usefulness and perceived ease of use sections were adapted from David's technology acceptance survey (1989) which was adapted to Turkish for the computer technologies by Ozdemir (2004) (Appendix A).The items in attitude part were adapted from an original attitude scale created by Çınar (2002) (Appendix B).Perceived usefulness (PU) can be interpreted as the performance benefit that the user believes he/she will receive in using the IWBs (Saadé and Galloway, 2005). The other main construct in the original TAM *is* perceived ease of use (PEU) that representative of the teachers' beliefs about the amount of effort that is required to use the IWBs. Finally Attitude in TAM (ATT) can be described as the users emotional/affect connection to IWBs. Data was analyzed descriptively.

Mean scores, standard deviations and percentages were counted to investigate the teachers' perceptions and attitudes towards interactive whiteboards.

Findings

Demographic data were collected from 34 teachers. 12 teachers are male and 22 are female Table 1 presents the gender profile of the participants. Teachers' teaching experience ranged from 3 to 30 years that is shown in table 2. Subject matter of the teachers is also summarized in Table3.

Table 1 Gender of teachers

Gender	N	P
Female	22	65%
Male	12	35%

Table 2 Years in teaching

Years	N	P
1-10	7	21%
11-20	12	35%
21>30	13	38%

Table 3 Subject matter of teachers

Years	N
Classroom	16
Mathematic	2
Exercise	1
Social Science	2
Chemistry	1
Morality	1
English	4
Turkish	3
Technology	1
Computer	1
Guidance	1

Teachers' perceptions and attitudes towards interactive whiteboards were measured in terms of the usefulness (PU), perceived ease of use (PEU) and Attitude toward technology (ATT). Almost all participants responded to all items in the survey. Table 4 presents the participants' mean scores with the standard deviations of the three subscales. The participants scored the lowest on the Perceived ease of Use (M = 3.24, SD=0.40) and followed by the Attitude toward technology subscale (M= 3.39, SD=0.33). The highest mean, the teachers scored on Perceived Usefulness (M= 4.38, SD=0.47)

The means suggest that participants were more positive about usefulness of Interactive white boards than their ease of use and attitudes toward them. In order to get deep information about the effectiveness of

IWB, a survey was performed and the results showed that, although teachers saw IWBs as very useful tool in educational area, they stated some usability issues. Therefore, attitudes scores of the teachers toward IWBs are not high as much as perceived usefulness.

Table 4 Mean score and standard deviation of subscales

Variables	N	Mean	SD
Perceived Usefulness (PU)	9	4.38	0.47
Perceived Ease of Use (PEU)	9	3.24	0.40
Attitude (ATT)	12	3.39	0.33

Descriptive analysis on items addressing Perceived Usefulness, Perceived Ease of Use and Attitude towards IWB indicate that 69 percent of the participants considered interacting with IWB is often frustrating. This percentage is very high. On the other hand, 91 percent of the teachers indicated that using IWBs improve educational quality, and enhance learning. Also approximately half of them (%56) find the IWBs easy to use and 21of the teachers have difficulties in using IWBs.

Conclusions

The study was conducted to investigate teachers' perceptions and acceptance towards the use of interactive whiteboards in school settings. In this regard, it was focused on the three main constructs in the Technology Acceptance Model (TAM), a widely accepted model designed by Davis, which are perceived usefulness (PU), perceived ease of use (PEU) and attitude toward technology (ATT). PU can be interpreted as the performance benefit that the teacher believes he/she will receive in using the IWBs.

PEU is representative of the teacher's beliefs towards the amount of effort that is required to use the IWBs and ATT can be described as the teacher's emotional/effect regarding IWBs. This case study was conducted in a primary school in Turkey with 12 male and 22 female teachers. Data was collected through a questionnaire which covers the three constructs of the TAM.

The results showed that, all of the participants find the interactive whiteboard easy to use and useful. Moreover, the results indicated that participants had a positive attitude towards the usage of the IWB in their field. However, the results also indicated that means of the perceived ease of use and attitude toward IWBs was lower that the means of the easy to use and usefulness. It gives same clues about usability problems of interactive whiteboards. Especially, mean score of the item, "Interacting with Interactive whiteboard is often frustrating" is very low (mean=2.29). 69 percent of the participants answer to this question "Strongly Agree" or "Agree" also only half of them find the IWBs are ease to use. Perceived usefulness has the highest mean.

To sum up, the study clearly showed that the teachers agree on the usefulness of interactive whiteboards in terms of gaining educational purposes however, they think that using interactive white boards in their courses is not so easy. In this regard, it can be indicated that if usability problems of IWBs is revolved, most of the teachers to be willing to use this instructional tools in their class.

Limitations

Using convenient sampling can be a limitation of the study because the researcher could not controlled the subjects' characteristic. Moreover sample size was limited with 34 teachers and the data were collected by only a questioner. Further studies can be conducted with more teachers from randomly chosen schools and more data collection method can be used.

References

Armstrong, V., Barnes, S., Sutherland, R., Curran, S., Mills, S., & Thompson, I. (2005). Collaborative research methodology for investigating teaching and learning: The use of interactive whiteboard technology. *Educational Review*, 57(4), 457–469.

Austin N. (2003) Mighty white. *The Guardian*, 7 January 2003.

Becta (2003) What the research says about interactive whiteboards. Available at: http://www.becta.org.uk/research. Accessed 15th June 2003.

Boyle J. (2002) Virtual magic. *Times Educational Supplement*, 26 April 2002.

Çınar, A. (2002). *Teachers' computer use at basic education schools: identifying contributing factors.* Masters' Thesis, Middle East Technical University, ANKARA.

Devrim Özdemir (2004). *The Effect of Educatıonal Ideologıes On Technology Acceptance*, Masters' Thesis, Middle East Technical University, ANKARA.

Gillen J., Kleine Staarman J., Littleton K., Mercer N. & Twiner A. (2007) A 'learning revolution'? Investigating pedagogic practice around interactive whiteboards in British primary classrooms. *Learning, Media and Technology* 32, 234–256.

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*.

Haldane, M. (2007) Interactivity and the digital whiteboard: Weaving the fabric of learning. *Learning, Media and Technology*. 32(3) Pages 283-301.

Heather J. Smith, Steve Higgins, Kate Wall & Jen Miller (2005), Interactive whiteboards: boon or bandwagon? A critical review of the literature, Journal of Computer Assisted Learning 21, pp91–101

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.

Paul Jen-Hwa Hu, Theodore H.K. Clark and Will W. Ma (2003), Examining technology acceptance by school teachers: a longitudinal study.*Information & Management* 41 (2003) 227–241

Saadé, R., & Galloway, I. (2005). Understanding intention to use multimedia information systems for learning. Issues in *Informing Science and Information Technology*, 2, 287-296. Available at http://2005papers.iisit.org/I23f15Saad.pdf

Saltan, F. & Arslan, K. (2009). A New Teacher Tool, Interactive White Boards: A Meta Analysis. *Soceity for Information Technology & Teacher Education.* Charleston, South Carolina - March 2 - 6, 2009.

Smith, Higgins,Wall & Miller (2005),Interactive whiteboards: boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning* 21, pp91–101

June L., Chun-sheng Y., Chang L.,and James E. Y. (2003), Technology acceptance model for wireless Internet. *Electronic Networking Applications and Policy*, Volume 13 Number 3 2003 pp206-222

Wood, R. & Ashfield, J. (2007) The use of the interactive whiteboard for creative teaching and learning in literacy and mathematics: a case study, *British Journal of Educational Technology*, Online Early Articles, DOI: 10.1111/j.1467-8535.2007.00703.

Genişletilmiş Özet

Etkileşimli tahtalar bir bilgisayar tarafından kontrol edilen ve görüntünün bir projektör aracılığıyla yansıtıldığı yeni nesil dokunmatik tahtalardır (Saltan ve Arslan, 2009). Etkileşimli tahta aslında ofis çalışanları için geliştirilmiş olmasına rağmen(Greiffenhagen, 2002), dünyanın her yerinde öğretmenler tarafından giderek artan bir kullanıma sahiptir (Smith, Higgins, Wall and Miller, 2005). Etkileşimli tahtaların okullarda kullanımı hızla artmakta iken, alan yazında bu eğitim aracının kullanıcılar tarafından kabullenilmesine ilişkin yeterince çalışma bulunmamaktadır. Bunda dolayı, etkileşimli tahtaya sahip okullarda görev yapan öğretmelerin bu tahtalara karşı olan yaklaşımlarını anlamak oldukça önemlidir. Özelliklede etkileşimli tahtaların yaygın olarak kullanılmaya başlamasının bu ilk evrelerinde kullanıcıların algılarını ve tutumlarını araştırmak büyük önem taşımaktadır. Bu çalışmada öğretmenlerin etkileşimli tahtaya yönelik algılarını ve tutumlarını anlamak için Davis tarafından geliştirilen ve yaygın bir şekilde kullanılan Teknoloji Kabullenme Modeli' nden yararlanılmıştır. Bu bağlamda, sunulan çalışmanın temel amacı etkileşimli tahtaya sahip okullardaki öğretmenlerin, bu araçlara yönelik algı ve tutumlarını araştırmaktır.

Etkileşimli tahtalarla ilgili alan yazın oldukça kısıtlı olmakla birlikte, gün geçtikçe bu konuyla ilgili çalışmalar yayınlanmaktadır. Bunun yanı sıra, etkileşimli tahta ile alakalı bir çok rapor, ve öğretmeler tarafından yürütülen okul içi çalışmalara ulaşmak mümkündür. Bu çalışmaların ortak noktası şu ki; Etkileşimli tahtaların en büyük avantajı öğrenci-öğrenci, öğrenci-öğretmen arasındaki sınıf içi etkileşim süreçlerini güçlendiriyor olması ve bunun yanı sıra öğrencilerin derse yönelik motivasyonlarını artırması(Smith, Higgins,Wall & Miller ,2005). Çünkü etkileşimli tahta, dokunmatik yapısı sayesinde öğrencilere tahtaya fiziksel olarak dokunarak bilgisayar yazılımlarının sunduğu olanaklardan yararlanma fırsatı sunmaktadır ve bu yüksek potansiyelli etkileşim sınıf içerisinde tüm öğrencilerin dersi takip ederken hayat bulmaktadır. Becta (2003) öğrencilerin etkileşimli tahtayı kullanarak resim ve metin üzerinde fiziksel olarak dokunarak işlem yapmayı eğlenceli buldukları belirtmektedir. Haldane(2007) ise şu noktalara dikkat çekmektedir; *"Geleneksel olarak, etkileşimli tahtayı kullanarak tüm sınıfın önünden iletişim kanallarını etkin bir şekilde yönetebilecektir. Bu iletişim kanalları öğretmen, öğrenci ve IWB arasında kurulur, bilgi değişimini ve etkileşimi sağlar"* (p259.).Etkileşimli tahtaların potansiyel yararları sekiz başlık altında özetlenebilir.
Bunlar;

- esneklik ve çok yönlülük,
- çoklu ortam kullanılarak sunum yapma
- verimlilik
- eğitim planlaması ve kaynakların gelişmesini destekleme
- BİT becerilerini örnek model yöntemi ile transfer etme
- etkileşim ve derslere katılım
- motivasyon ve etkinlik
- multimedya ve çok yönlü sunumlar (Smith, Higgins, Wall & Miller 2005).

Bu çalışmaya Ankara'da bir ilköğretim okulunda farklı alanlarda görev yapan 34 öğretmen katılmıştır. Öğretmelerin 12 si erkek 22 si kadından oluşmaktadır. Veriler 3 bölüm ve 30 maddeden oluşan bir anket yardımıyla toplanmıştır. Bu bölümler Teknoloji Kabullenme Modelinde yer alan "algılana yararlılık" (9), "algılanan kullanım kolaylığı" (9) ve "etkileşimli tahtaya karşı tutum" (12) dan oluşmaktadır. Ölçekte yer alan maddeler 5'li likert formatında yer almaktadır (Ek-A) (Ek-B). Veri analizi betimleyici istatistik yönetimi kullanılarak yapıldı. Sonuçlar öğretmenlerin akıllı tahtayı faydalı ve kullanımını kolay bulduklarını göstermektedir. Ayrıca etkileşimli tahtaya karşı olan tutumlarının olumlu olduğu saptanmıştır. Fakat algılanan kullanım kolaylığı ve etkileşimli tahtaya karşı olan tutumun ortalamasının, algılanan yararlılığın ortalamasından düşük olduğu saptanmıştır. Bu durum etkileşimli tahtayla alakalı olası sınıf içi kullanım problemlerinin olduğuna işaret etmektedir. Bu alanda yapılacak nitel çalışmalar bahsi geçen

konulara daha iyi ışık tutacaktır fakat bu çalışma kapsamında elde edilen bulgular göstermektedir ki; öğretmenlerin etkileşimli tahtayı kendi derslerinde kullanabilmeleri için bu teknolojik cihazların daha kullanıcı dostu olarak tasarlanmaları gerekmektedir.

Appendix A

Akıllı Tahta ile ilgili Algılanan Yararlılık (Orjinal Sorular – Davis (1989), Referans Sorular- Özdemir(2004))
1. Akıllı Tahta, eğitim ve öğretimin kalitesini artırmaktadır. **Orjinal Soru:** Using e-mail improves the quality of the work I do. **Referans Soru:** Bilgisayar, eğitim ve öğretimin kalitesini artırmaktadır.
2. Akıllı Tahta, eğitim ve öğretim ortamında daha fazla kontrol sağlamama yol açar. **Orjinal Soru:** Using e-mail gives me greater control over my work. **Referans Soru:** Bilgisayar işimin üzerinde daha fazla kontrol sağlamama yol açar.
3. Akıllı Tahta, derslere hazırlanma ve işleme konusunda işlerimi daha çabuk yerine getirmemi sağlar. **Orjinal Soru:** E-mail enables me to acomplish tasks more quickly. **Referans Soru:** Bilgisayar, görevlerimi daha çabuk yerine getirmemi sağlar.
4. Akıllı tahta üretkenliğimi arttırır. **Orjinal Soru:** Using e-mail increases my productivity. **Referans Soru:** Bilgisayar üretimimi artırır.
5. Akıllı tahta derslerdeki performansımı arttırır. **Orjinal Soru:** Using e-mail improves my job performance. **Referans Soru:** Bilgisayar iş performasımı artırır.
6. Akıllı tahta normalden daha fazla ders işlenmesini sağlar. **Orjinal Soru:** Using e-mail allows me to accomplish more work than would otherwise be possible. **Referans Soru:** Bilgisayar normalden daha fazla iş yapmamı sağlıyor.
7. Akıllı tahta derslerde etkinliğimi arttırır. **Orjinal Soru:** Using e-mail enhances my effectiveness on the job. **Referans Soru:** Bilgisayar işimde etkinliğimi artırır.
8. Akıllı tahta işimi kolaylaştırır. **Orjinal Soru:** Using e-mail makes it easier to do my job. **Referans Soru:** Bilgisayar işimi kolaylaştırır.
9. Genelde, eğitimde Akıllı tahtayı yararlı buluyorum **Orjinal Soru:** Overall, I find the e-mail system useful in my job. **Referans Soru:** Genelde işimde bilgisayarı yararlı buluyorum.

Akıllı Tahta ile ilgili Algılanan Kullanım Kolaylığı (Orjinal Sorular – Davis (1989), Referans Sorular- Özdemir(2004))
1. Akıllı tahtayı kullanmayı öğrenmek kolaydır. **Orjinal Soru:** Learning to operate chart master would be easy for me. **Referans Soru:** Bilgisayarda programları kullanmayı öğrenmek kolaydır.
2. Dersi Akıllı tahtayı kullanarak anlatmayı daha kolay buluyorum. **Orjinal Soru:** I find it easy to get the e-mail system to do what I want it to do. **Referans Soru:** Yapmak istediğim işlerde bilgisayarı kullanmayı daha kolay buluyorum.
3.Akıllı tahta ile uğraşmak genelde bezdirici bir iştir. **Orjinal Soru:** Interacitng with the e-mail system is often frustrating. **Referans Soru:** Bilgisayarla uğraşmak genelde bezdirici bir iştir.
3. Akıllı Tahtayı kullanırken sıkça hata yaparım. **Orjinal Soru:** I make errors frequently when using e-mail. **Referans Soru:** - EYS'yi kullanırken sıkça hata yaparım. (bayanın sorusu)
4. Akıllı tahta etkileşmek için esnek değildir. **Orjinal Soru:** The e-mail system is rigid and and inflexible to interact with. **Referans Soru:** Bilgisayarlar kendileri ile etkileşmek için esnek değildir.
5. Akıllı tahtada işlemleri nasıl gerçekleştirmem gerektiğini hatırlamam kolaydır. **Orjinal Soru:** It is easy for me to remember how to perform tasks using the e-mail system. **Referans Soru:** Bilgisayarda uygulama programlarını nasıl kullanmam gerektiğini hatırlamam kolay olmaktadır.
6. Akıllı tahta ile etkileşime geçmek çok fazla zihinsel çaba gerektiriyor. **Orjinal Soru:** Interacting with the e-mail system requires a lot of mental effort. **Referans Soru:** Bilgisayarla etkileşime geçmek çok fazla zihinsel çaba gerektiriyor.
7. Akıllı tahta ile etkileşimim açık ve anlaşılırdır. **Orjinal Soru:** My interaction with the e-mail system is easy for me to understand.

Referans Soru: Bilgisayarla etkileşimim açık ve anlaşılırdır.
8. Genelde, Akıllı Tahtanın kullanımı kolaydır. **Orjinal Soru:** Overall, I find the e-mail system easy to use. **Referans Soru:** Genelde, bilgisayarların kullanımı kolaydır.

Appendix B

Akıllı Tahtaya Karşı Tutumlar (Orjinal Sorular - A. Çınar)
1. Akıllı tahta ile çalışacak bir yapıya sahip değilim. **Orjinal Soru:** Bilgisayarla çalışacak bir yapıya sahip değilim.
2. Akıllı Tahta kullanımı konusunda kendime güvenirim. **Orjinal Soru:** Bilgisayar kullanımı konsunda kendime güvenirim.
3. Akıllı tahtanın yeni uygulamalarını öğrenmek bana zor gelir. **Orjinal Soru:** Yeni bilgisayar uygulamalarını öğrenmek bana zor gelir.
4. Akıllı tahta ile ders anlatmak motivasyonumu artırır. **Orjinal Soru:** Bilgisayarla çalışmak beni oldukça heyecanlandırır.
5. Akıllı tahta ile ders anlatırken kafam karışıyor. **Orjinal Soru:** Bilgisayarla çalışırken kafam karışıyor.
6. Akıllı tahta ile çalışırken zorlanıyorum. **Orjinal Soru:** Bilgisayarla çalışırken kafam karışıyor.
7. Akıllı tahtann etkin bir eğitim aracı olduğuna inanmıyorum. **Orjinal Soru:** Bilgisayarların etkin bir öğretme araçları olduğuna inanmıyorum.
8. Akıllı tahta ile Ders anlatmayı seviyorum. **Orjinal Soru:** Teknolojiyle çalışmayı seviyorum.
9. Derslerde Akıllı tahta kullanımı faydalıdır. **Orjinal Soru:** Sınıflarda bilgisayar kullanımı faydalı ve harcanan gayrete değerdir.
10. Akıllı tahtanın derslerde kullanılması için harcanan gayretler değerlidir. **Orjinal Soru:** Sınıflarda bilgisayar kullanımı faydalı ve harcanan gayrete değerdir.
11. Akıllı tahta kullanım becerileri öğrenciler için önemlidir. **Orjinal Soru:** Bilgisayar becerileri öğrenciler için önemlidir.
12. Akıllı tahta kullanım becerileri öğretmenler için önemlidir. **Orjinal Soru:** Bilgisayar becerileri öğretmenler için önemlidir.