THE USING OF IWBS BY PRIMARY SCHOOL TEACHERS IN MATHEMATICS CLASSROOMS

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ABSTRACT

This study aims to explore potential answers to the question of how and why IWBs are used during mathematics classes organised by teachers in a primary schooL. Qualitative data was obtained from primary school teachers through the use of observation forms and semi-structured interviews. The results of this study indicate that despite some large class sizes, the IWBs were deemed to be successful in motivating students. However, according to findings of this study, it is highly possible to be argued that teachers used their boards for a restricted range of functions. Although they did use the IWB frequently, they encountered a series of difficulties. For instance, calibration problem of IWBs and restricted training can just be samples. Despite of these kinds of problems, most participants valued the use of IWBs overwhelmingly positively. The study concludes with some recommendations for future practice and research.

Keywords: Interactive white board, ICT, primary mathematics, technology,

SINIF ÖĞRETMENLERİNİN MATEMATİK DERSLERİNDE ETKİLEŞİMLİ AKILLI TAHTALARI KULLANIMI

ÖZ

Etkileşimli akıllı tahtaların (IWBs); öğretim programlarının hedeflenen amaçlarını ve eğitimsel kazanımları desteklediği dünya çapında yürütülen birçok araştırma sonucunda ortaya konmuştur. Buna rağmen, Türkiye'de yeni öğretim teknolojilerinin etkililiği üzerine ve bunların sınıf öğretmenleri tarafından nasıl kullanıldığına yönelik çok az sayıda yürütülmüş çalışma vardır. Bu bağlamda bu çalışmanın amacı; Türkiye' de ki bir ilkokulda sınıf öğretmenlerince yürütülen matematik derslerinde, etkileşimli akıllı tahtaların öğretmenler tarafından niçin ve nasıl kullanıldığı sorularına yanıt aramaktır. Bu araştırmada nitel veriler, yarı yapılandırılmış mülakatlar ve gözlem formları kullanılarak, çalışmanın yürütüldüğü ilkokuldaki sınıf öğretmenleri aracılığıyla elde edilmiştir. Araştırma sonucunda, gözlem yapılan sınıfların bazılarının sınıf mevcudunun fazla olmasına rağmen, etkileşimli akıllı tahtaların öğrenci motivasyonlarını artırma konusunda etkili olduğu; öğretmenlerin akıllı tahtayı genellikle görsel sunum aracı olarak kullandıkları ve akıllı tahtaların sadece sınırlı sayıdaki özeliklerini kullanabildikleri gözlemlenmiştir. Kullanımın sınırlılıklarına neden olarak; güneş ışığının tahtaya düşmesi gibi kontrol edilemeyen çevresel sorunlar ve kalibrasyon problemleri, zorunlu eğitim gibi farklı türdeki problemler örnek gösterilmiştir. Yürütülen bu araştırma sonucunda, karşılaşılan bütün bu sorunlara rağmen, katılımcıların birçoğunun etkileşimli akıllı tahtaların kullanımını oldukça yüksek bir oranla olumlu olarak değerlendirdiği ortaya konmuştur.

Anahtar Kelimeler: Etkileşimli akilli tahta, BİT, matematik öğretimi, teknoloji.

1.INTRODUCTION

This research is about the use of interactive whiteboards (IWBs) in a primary school in Turkey. According to Uçar (1998), one of the most important problems to be solved in the educational system of Turkey is its failure to realize and facilitate efficient teaching methodologies. In education, when teaching activities are not appropriate for modern education technology, students are led into a passive-receiver position.

Bell defined a computer as an instrument that creates revolution in education (Bell, 1998). In addition, Bell indicated that students will be nested with the education process, interacting with computers instead of receiving information given by teachers passively and hence more motivated to learn (Bell, 1998). Could this be the case for the IWB? In Turkey, the IWB has the potential to be one of the most powerful educational tools used in educational environments due to features such as permanency, multidirectional use, high speed, reliability, and mutual interaction (Painter *et al.* 2005). However factors such as poor software, deficiency of infrastructure, and high cost constrain the wide use of IWBs in Turkish schools (Beauchamp & Parkinson, 2005).

The use of IWBs for teaching has been subject of much research abroad and it has been claimed that the IWBs make a positive contribution to teaching in those countries. This study is crucial to determine whether the use of IWBs is successful in the same way in the conditions of Turkey.

The main aim of the study is to explore potential answers to the question of how and why IWBs are used during mathematics classes organised by teachers in a primary school where appropriate technologic conditions are provided. In addition, subquestions are as follows:

- How the teacher use IWBs in teaching mathematics in primary school?
- Whether or not teachers encounter problems while teaching a lesson through an IWB?
- What are the characteristics of IWBs that are useful for teaching and learning?
- What encourages and discourages teachers to use the IWB?
- An outcome of the research will be to suggest more effective ways of developing the use of IWBs in primary schools.

1.1.What is an IWB?

What is meant by the word "Interactive Whiteboard"? In the literature, terms include "Electronic Board", "Digital Whiteboard" and "Smart Board". These confusingly similar terms are defined differently by some commentators. Therefore, it is possible to say that an IWB for one person might not be an IWB for another person (Clyde, 2004). Throughout this article, the term IWB will be used instead of others.

An IWB is a display panel that is large, touch-sensitive and shows the characteristics such as computerized projector screen where an ordinary white board, a projector screen, an electronic copy board or a vision on the

computer without using a keyboard can be controlled only by touching the surface of the board (Kennewell and Morgan, 2003).

The system of the IWB consists of three main parts (Preisig, 2007), namely:

- Computer
- Projector
- An interactive board

The working principle of the IWB (Gillen *et al.* 2006);

- The computer sends the image of the application to the projection machine.
- The projection machine reflects the image to the interactive board.
- To the user is able to control the activity created by simply touching the

IWB, acts like both the entry unit and the monitor of the computer.

The boards are either wall mounted or can stand on their base (Beeland, 2002). The surface of the IWB is touch sensitive and acts like a large touch screen. The computer sends the electronic image to the board and the projector machine reflects the image to the board (Painter *et al.* 2005).

1.2.The key features of the IWBs

Becta (2004) has listed these features as; Scrapbook Work Page, Screen, Spot lamp, Pen and Highlighter Pens, Interactive Activities, Templates and Backgrounds, Shapes.

According to Grabarek (2003), the computer and the projection machine develop the presentation and note taking skills of the students. Teachers and the students studying in groups may present the presentations that they have prepared in the PowerPoint program with the computer and the projection machine. In addition by reflecting on the information on the screen, students may take notes. For students that missed the class, notes can be recorded on a CD or can be sent through an e-mail. Some teachers also use the computer and the projection machine to brainstorm with students, explain the subject, and allow them to watch a movie on the subject, give recommendations, and visit websites (Asmawi, 2004).

2.LITERATURE REVIEW

Their first uses of IWB were for small groups in numerical settings for example, as a good remote interview tool (Bell, 2002). In 1990s, the IWB started to be used in schools (Beeland, 2002) and their use quickly took off.

There were 2700 IWBs found in UK schools in 2002 alone, it is seen that this number has increased to 57,000 in recent times (Beauchamp and Parkinson, 2005). In Turkey, the IWB has shown penetration with the Ministry of National Education including the IWB to classes built in the schools under. Phase two of the Educational

Framework Project supported by the World Bank. This was started in 2002 (Ministry of National Education, 2002).

2.1.Why use the IWB?

IWBs affect learning in many further aspects. In the class, the use of IWB increases students" interest in the lesson and their spirit for learning; motivates the students. IWBs support many learning techniques. They also create suitable learning environments for hearing and visually impaired students. Researchers claim that note - taking is more effective from a presentation given at the IWB. Higgins *et al.* (2005) mentioned that students learned better and they could maintain their attention to the lesson. Higgins and others argued that students liked the versatility and diversity of its resources, the capacity of multimedia (colour, action, voice, and touch), entertainment and games of the IWB interface.

2.2.The Effects of IWB on Motivation

To show the effects of the use of the IWB in teaching mathematics, Oleksiw (2007) conducted a further study. He argued that paper-pen, game and group activities are applied lately in recent years in mathematics education and pointed to the fact that students were always at fixed levels in all cases in national examinations. It was reported that students who had never seen or used an IWB before were very excited and motivated as they left their seats when time for solving the mathematical problem arrived. When data acquired from the pre-test and the post-test were analysed, it was observed that all students passed the exam and five students got points in the advanced level category. It was suggested that the IWB is an effective tool in mathematics lessons in increasing the motivation to learn and towards understanding the topic.

2.3.The Effects of IWB on Interaction

From the view point of Gillen *et al.* (2006), the IWB was a very beneficial environment in presenting educational texts. Their research results claimed that the use of IWB encouraged students in going to the board; it kept the presentation lively and ensured the participation of the students also; it maintained the balance between the flow of the lesson together with the reactions of the students and the lesson plan.

In addition, Smith *et al.* (2006) stated that IWBs are becoming a pedagogic tool in literacy teaching with the interaction of the whole class. In a time period of two years, teachers were observed in using or not using the IWBs. It could be said that the lesson taught were had a better pace when using the IWB and less time was spent on group studies.

2.4.The Effects of IWB on Achievement

Preisig (2007) conducted research to investigate whether using the IWB increased the motivation of the students in learning the topic of fractions, whether it improved their thinking skills, whether it is effective and

promote understanding of the relationship between numbers. He applied a pre-test and post-test, to the control and the test groups and administered the questionnaire to students to measure their motivation.

2.5.Considerations and Disadvantages of IWBs

When teachers and students collectively use an IWB to support in-class activities, they undoubtedly face some problems and difficulties. The biggest problem is that both teachers and students need proper training in order to benefit from the full potentials of the IWB. From the results of their interviews in a study by Levy (2002), training to use the IWB effectively did not go beyond the training presented on how to use the board after the board was set up by the representatives of the company that sold the board.

Many teachers complain about the positioning of the IWB or the projector machine. Especially when the board is not permanently fixed, it will require to be calibrated frequently (Bell, 2002). When more than one student worked on the IWB the shadows of the students may cast on the board from the projector machine. This problem may be solved by rear type projector machines even though they are more expensive compared to the other types (Levy, 2002; Higgins *et al.* 2005).

The IWB used with pen inhibits the use of it by more than a student at the same time. Some students may also have difficulties in using the IWB pen. Some technical changes should be made for students with special requirements to use the IWB (Somekh *et al.* 2007: 160).

According to the literature, some of the problems that arise can be categorised as technical challenges. The use of IWB has a positive effect on the use of different learning styles. Furthermore, it might be said as a common inference that for effective use of IWBs, teachers have to be trained too. According to Miller and Glover (2006) if teachers use the learning-teaching strategies such as critical A thinking and cooperative learning they will get the most from the IWB.

3.METHODOLOGY

This is a case study aimed at providing a description of how the IWB is used in a particular context. It seeks to explain the attitude and behaviour of teachers" with respect to the adoption, use and application of IWB and its likely impact on students" motivation and academic achievement. This research has descriptive characteristics and it describes a situation (event, person and object), current or past in their own terms. The event, individual or object, subjects of the research are tried to be defined in their own terms and as they are. It is undertaken in a natural setting with participants (Eroğlu, 2006).

3.1.Sample

This case study took place in a primary school in Melikgazi district, Kayseri province. It took place between 16th of April and the 11th of May 2012. It focused on the use of IWBs in the teaching of mathematics. The aim

was to focus on a single subject in this case rather than the more general research. All mathematics teachers were chosen in an attempt to explore those teachers" perspectives and relationship between the use of IWBs and mathematics classrooms. The IWBs have been used in each classroom in sample school for two years. The use of IWBs is co-ordinated by the head of school. Within the school maths is taught by the class teachers. The school has 478 pupils at the different level and 25 teachers. Teachers of the sample group were selected so that each year group was represented. All five had been volunteered to take part.

3.2.Data Collection and Analysis

This was a multi method study using observation data and interviewed data. The multi method approach is suited to small scale studies. Observation of 30 lessons hours took place, six lessons for each of five teachers in the study. One to one interviews were made with five teachers including the principal. The observation form was divided into three sections. The first of the sections focused on the determination of teacher name, subject of lessons and class size. The second section was used to note what teachers were doing and what students were doing at two minute intervals. And the third section of observation form was to observe which features of the IWB were used during lessons by teachers and students in two minutes intervals.

4.FINDINGS

4.1.Observation Findings

A comparison between the largest and smallest class sizes shows that teachers with the highest class size had some difficulties with classroom management. Teaching was influenced by the size of the class. For example, although a teacher who had class size of 21-25 preferred activities which required individual attendance, another teacher had class size of 31-35 used group activities which were possible to do it with whole classroom. Because, when they focused on individual activities it took too much time. Another example is that, during an observation of a class, a teacher who used question and answer teaching method could not ask students to work on the IWB due to time constraints. It might be claimed that the class size has an impact on the use of IWB in classroom.

According to observation findings the most used function was mathematical games. All observed teachers used this feature most of the time. In all mathematics classes, teachers used mathematical games which were provided by publishers who supply source textbooks, specially, after introducing a topic in a textbook. According to the observation results, all teachers rarely asked questions to pupils when writing on the board and also just a few pupils asked questions. In observing the lessons pupils seemed frustrated that they were not being asked questions to discuss what teacher said. This was because the teacher just invited a few pupils to response. Here the teacher explained that because of time limitation they had to move another question as there was not enough time for everyone to contribute. It was observed that when

teachers applied colorful materials and moving video on the software in their demonstration lessons, students focused on lesson more strongly. This was a deduction based on pupils perceptual selectivity.

4.2.Teachers' Views

They argued that students' attention levels increased with the use of the IWB compared to classical and conventional teaching and learning methods. Teachers also suggested that when they used the IWB, it was difficult to see from the back of the classroom because of some obstacles, such as sunshine. Therefore, many pupils who sit in the back of class would come to front of class.

According to the responses given in the interviews three teachers suggested that the use of IWBs be made more efficient while one teacher advocated more school-parent collaboration. And another respondent suggested/recommended to makes mathematics more tangible and spare more time to its activities.

Further, some of the respondents mentioned its contribution to the mental development of children while one respondent said that he/she aimed that children would develop an inquiring personality as this would help them to develop their problem solving ability. It should be noted that all teachers except one were happy with the use of IWBs in teaching mathematics. They also claimed that it was helpful for reinforcing learning.

On the other hand, especially the calibration problem of the board was a difficult issue for teachers. In addition, unable to intervene with the technical issues like deviance of the cursor was another reason for teachers to dislike the board. Genarally, the responses of teachers argued that technical issues caused them to waste teaching time. Although they agreed with that the IWB has more positive benefits than negative, many problems what they encountered affected the use of IWBs in a negative way.

5.DISCUSSION

From the results we obtained, the findings of the study clearly argued that despite some large class sizes, the IWBs were deemed to be successful in motivating students. However, according to findings of this study, it can be argued that teachers used their boards for a restricted range of functions, and for largely presentational purposes. Although they did use the IWB frequently, they encountered some difficulties such as: restricted training calibration problems and uncontrolled environment problems such as, sunshine. Despite of these kinds of problems, most participants valued the use of IWBs overwhelmingly positively.

In the case of the first purpose of the study; it was observed that although a few teachers sometimes used the IWBs for small group teaching, all participants mostly used the IWBs for whole class teaching. Likewise in the literature, Cogill (2002) and Rudd (2007) showed that IWBs were more acceptable, applicable and common in primary schools because IWBs contain more resources for primary education programs and whole class teaching. In this study teachers usually used publisher prepared materials and software on the board. This was supported in interviews.

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When more than one student worked on the IWB the shadows of the students may be cast on the board from the projector machine. Higgins *et al.* (2005) and Levy (2002) offered that this issue might be solved by rear type projector machines even though they are more expensive compared to the other types.

It might be claimed that the use of IWBs supported better class management. On this point Asmavi (2004) also felt that there are numerous software programs that support the interaction between the user and the board.

The results of interviews as distinct from observation results revealed another encountered problem in the use of IWB in a natural environment as sunshine might make the board difficult to see. Despite the fact that it had never been observed during the study conducted, many teachers reported it. It is also backed up with Smith *et al.* (2005). One of the most common issues from the interviews was that all participants agreed that they needed training to use IWBs more effectively. Although they had training, it might be argued that the training was just presentation on how to they use the basic features.

It seems possible to say that teachers were encourage to use the IWBs because they made teaching mathematics easier as they supported class management and teacher explanation. . Also teachers gave each other informal support for technical issues. In this context, the interviews showed that in this study, most participants used the IWBs because they felt that they enriched the content of lessons. Observation results supported this assertion the IWB was used willingly for displaying materials and presentations, supporting explanations at the board. Teacher behaviour changed from when they used textbooks only, for example they seemed to provide more questions for students to practice by access publisher software. The literature, such as Rudd (2007), too notes that the IWB could enrich teaching.

On the other hand, although there were many positive impacts of the use of IWBs, there were some issues which discouraged teacher use of the IWBs. All participants agreed with that they needed training as an implementer. Otherwise, it could be asserted that teachers may not use the IWBs effectively.

6.RECOMMENDATIONS FOR FURTHER RESEARCH

Results obtained at the end of the study show that IWBs were largely used effectively by primary school teachers and are seen as useful in motivating students. However, use was restricted. In the light of these findings some recommendations could be suggested to school leaders, teachers and policy makers.

For example teachers who intend to use IWBs should be trained periodically on the technical aspects of the technology. In-Service trainings could be organized on teaching techniques to be used with IWBs and on how

to ensure that students would be active in using IWBs. An on-thejob training for teachers could be useful too.

In order to solve technical problems that may occur during in-class activities, classes or courses could be opened under Computer and Instructional Technologies Program. Courses to raise awareness of multiple-intelligence which are prepared in relation to IWB could be introduced to the undergraduates of the Faculty of Education. IWB programs could be prepared as touch display to enable more than one student to use the screen at the same time.

IWB should be installed in a mobile way so that it can be adjusted according to the height of the student, as this will make all students to access any part of the board. Furthermore, with this feature, students who sit at the rear desks can have the opportunity to see the board better.

7.RECOMMENDATIONS FOR RESEARCHERS

The present study was conducted with teachers who work in a primary school. Views of junior high or high school teachers where interactive boards are used would be valuable. In this context, it might be said that, contribution of IWB to the success of students could be investigated through experimental and longitudinal studies. Views of children on the use of IWBs during in-class activities could be useful for a comparison with teachers" views. A study could be designed to investigate the impact of the IWB technology on students with learning disability. A study that investigates the impact of using boards with different instructional theories on students could be designed. In addition, Studies with larger sample groups and/or on use of IWB in other schools from different socioeconomic background may be conducted.

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GENİŞ ÖZET

Bu çalışmanın amacı, Türkiye'deki ilkokullarda matematik derslerinde sınıf eğitimcilerinin akıllı tahtaları niçin ve nasıl kullandıklarını incelemektir. Araştırmadan elde edilen bulguların, öğretmenlerin ve diğer ilgililerin dikkatini akıllı tahta kullanımına çekmek ve konuyla ilgili daha kapsamlı araştırmalara temel oluşturması bakımından yararlı olacağı düşünülmektedir. Bu amaç doğrultusunda: öğretmenlerin akıllı tahta kullanımına ilişkin görüşleri nelerdir? Akıllı tahtanın matematik derslerinde en etkili kullanımı konusunda ne gibi faktörler vardır? Akıllı tahta kullanacak öğretmenlerin, kullanım amaçlarına yönelik görüşleri nelerdir? Sorularına yanıt aranmıştır.

Sınıflarda IWBs kullanımı birçok öğrenme tekniklerini destekler. Bu bağlamda, sınıflarda IWB kullanımı öğrencilerin derse olan ilgileri ve motivasyonları üzerinde olumlu etki oluşturmakta ve aynı zamanda öğrenme için onları güdülemektedir. Bu özellikler aynı zamanda görme ve işitme engelli öğrenciler için de uygun öğrenme ortamları oluşturur. Yapılan alan yazı çalışmalarına bakıldığı zaman görülüyor ki; öğrencilerin not alma konusundaki fikirleri IWBs kullanılan derslerde daha rahat not almaları için uygun ortam oluşuyor. Bu bağlamda, Higgins ve ark. (2005), öğrencilerin daha iyi öğrendiklerini ve onlar derse dikkatlerini muhafaza olabileceğini belirtti. Higgins ve diğerleri IWB kullanımının öğrencilerin öğrenme durumları üzerinde, derslerin daha disiplinlerarası işlenmesine ve kaynakların daha kapsamlı olması, multimedya (renk, eylem, ses ve

dokunma), eğlence ve IWB arayüzünün oyunları kapsaması boyutuyla etkili olduğunu söylemektedir.

Bu çalışma nitel araştırma paradigmasına uygun olarak tasarlanmış betimsel bir çalışmadır. Çalışmada nitel araştırma deseninin tercih edilmesinin nedeni, bu paradigmanın akıllı tahta kullanımı konusunda, öğretmenlerin benimsedikleri ve kullandıkları özel yöntemler, programlar ve uygulamalar üzerinde durup, onları ortaya çıkarmaya ve anlamaya uygun olmasıdır. Bu durum araştırma bağlarının bütüncül bir görünümünün elde edilmesine ve bu bağlamda içinde çözümleme ve örüntüler oluşturulmasına olanak sağlamıştır. Araştırma yaklaşımlarının, amaçlarının ve ortamlarının gösterdikleri büyük çeşitlilikten ötürü, örneklem oluşturma stratejilerinin büyük oranda araştırmaya rehberlik eden amaç ve sorularla ilgili olduğunu belirten Punch (2005: 183-184), araştırma tasarımının bütünsel gerçekliği ve örneklemin diğer öğelerle uyuşması ilkesinin, çeşitliliğin altındaki kabullerden olduğuna işaret etmektedir. Bu doğrultuda, Miles ve Huberman (1994: 34) tarafından niteliksel örneklem plan için yol gösterebilecek sorulardan hareket edilerek, kavramsal çerçeve ve araştırma soruları ile ilgili, ilgilenilen olguları ortaya çıkarabilecek, gerçek hayata uygun betimleme üretebilip, ulaşabilirlik ve zaman açısından uygun bir örneklem planı geliştirilmiştir.

Araştırmada amaçsal örneklem kapsamında, cinsiyete bakılmaksızın her sınıf düzeyinden birer tane seçilmek üzere 2 farklı ilköğretim okulunda görev yapmakta olan 5 sınıf öğretmeni araştırmanın katılımcıları olarak belirlenmiştir. Araştırma etiğine uygun olarak, katılımcılara kod isimler verilmiştir. Bununla beraber, katılımcıların çalıştıkları okullar il milli eğitim müdürlüklerindeki ilgililerin de görüşleri alınarak kent merkezinde olup, öğretmen ve öğrenci sayıları bakımından kent ortalamasına yakın olan okullar içerisinde rastgele seçilmiştir. Çalışmanın İngilizce metninde okulun ve şehrin, ismi verilmiş. Araştırmada, veri toplama yöntemi olarak yarı yapılandırılmış görüşme tekniği ile bire bir görüşmeler yapılmış ve gözlem formu oluşturularak araştırmacı tarafından her bir sınıf öğretmeni 6 ders saati olmak üzere 5 hafta süreyle toplam 30 ders saati gözlem yapılmıştır. Yarı yapılandırılmış görüşme tekniği yöntemi, araştırmacıya çalışmada esneklik ve ortam üzerinde kontrol sağladığı için tercih edilmiştir. Görüşmelerin tamamı araştırmacının kendisi tarafından yapılmıştır. Toplam 5 sınıf öğretmeni ile yapılan görüşmeler 16 Nisan 2012 – 11 Mayıs 2012 tarihleri arasında yapılmıştır. Görüşmeler sırasında araştırmacı, görüşmecilere ifade serbestliği sağlayarak, görüşmeyi belirli bir süreyle sınırlandırmayarak ve anlaşılmayan soruları açıklamak suretiyle derinlemesine bilgi toplamaya çalışmıştır. Görüşme formunda yer alan soruların oluşturulmasında ilgili literatürler dikkate alınmıştır. Görüşme formu, soruların birbirini desteklemesi ve istenilen bilgiyi davet etme bakımından yeterli olup olmadığı konusunda uzman görüşleri alınmıştır. Alan uzmanlarının incelemeleri sonrasında görüşme formu 4 ana tema üzerinde toplam 20 sorudan oluşturulmuş ve gözlemlerde kullanılmıştır. Gözlemler mülakat yapılan öğretmenlerin sınıflarında gerçekleştirilmiştir. Gözlem her bir sınıf öğretmeni için bir haftalık ders programı içerisindeki 6 matematik dersinin gözlemlenmesi ile tamamlanmıştır. Gözlem formu 5 ana sütundan oluşmaktadır. 4' er dakikalık zaman dilimlerine ayrılmış ilk sütun, araştırmacıya detaylı gözlem yapabilmesini sağlamak amacıyla oluşturulmuştur. 2. Sütun, öğretmenin bu zaman dilimleri içerisinde, uyguladıkları etkinlikler, durum ve tutum davranışarının gözlemlenebilmesini amaçlamaktadır. Buna paralel olarak, 3. Sütun da araştırmacı, sütun 2 de elde ettiği gözlem verilerine bağlı olarak, öğrenci davranışlarını gözlemlemeyi

amaçlamaktadır. Kısaltmalar adı altında oluşturulan 4. sütun ise 1. sütundaki zaman dilimlerine paralel olarak, öğretmenler ve öğrenciler tarafından, 5. sütunda belirtilen temel akıllı tahta uygulamaları ve özelliklerinin kullanımlarının gözlemlenebilmesini amaçlamıştır. Araştırmacıya kolaylık sağlamak amacıyla 5. sütunda akıllı tahta uygulamaları ve özellikleri için "öğretmen tahta etkileşimi = TI" örneğinde olduğu gibi kısaltmalar kullanılmıştır. Akıllı tahta uygulamalarının gözlemlenmesi amacıyla gözlenecek olan 8 farklı faktör belirlenmiş ve bu faktörler alan uzmanları tarafından uygun bulunmuştur.

Betimsel bir çalışma olan bu araştırmada görüşme ve gözlem yoluyla elde edilen verilerin çözümlenmesinde betimsel analiz tekniği kullanılmıştır. Bu tür analizde amaç, elde edilen bulguları düzenlenmiş ve yorumlanmış bir biçimde okuyucuya sunmaktır. Bu amaçla elde edilen veriler, öncelikle mantıklı bir biçimde betimlenmiş sonra da yorumlanarak neden sonuç ilişkilerine ulaşılmıştır (Miles ve Huberman, 1994; Yıldırım ve Şimşek, 2005). Ayrıca görüşmecilerin verdiği yanıtların analizinden yola çıkarak sonuçları açıklamak geçerlilik için önemlidir (Wolcott, 1990). Gözlenen bulguların paralelinde, görüşülen öğretmenlerin görüşlerini çarpıcı bir biçimde yansıtarak gerçekliği artırmak amacıyla elde edilen bulgular alan yazında bulunan benzer nitelik taşıyacak çalışmalar ile desteklenmiştir.

Bu çalışmanın sonucu; gözlem yapılan sınıfların bazılarının sınıf mevcudunun fazla olmasına rağmen, etkileşimli akıllı tahtaların öğrenci motivasyonlarını artırma konusunda etkili olduğu, buna rağmen, öğretmenlerin etkileşimli akıllı tahtayı genellikle görsel sunum aracı olarak kullandıkları, ayrıca, akıllı tahtaların sadece sınırlı sayıdaki özelliklerini kullanabildikleri söylenebilir. Sınırlılıklara neden olarak; güneş ışığının tahtaya düşmesi gibi kontrol edilemeyen çevresel sorunlar ve kalibrasyon problemleri, zorunlu eğitim gibi farklı türdeki problemler örnek gösterilebilir. Yürütülen bu araştırma sonucunda, karşılaşılan bütün bu sorunlara rağmen, katılımcıların birçoğu etkileşimli akıllı tahtaların kullanımını oldukça yüksek oranda olumlu olarak değerlendirdiği ortaya konulmuştur.