

## Interactive Whiteboards in Higher Education: Instructors First Impressions

Cihad DEMİRLİ\*

Yalın Kılıç TÜREL \*\*

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### Abstract

*Problem Statement:* Recently, in the context of the technology integration in school settings, the importance and the portion of interactive whiteboard (IWB) use have been increased gradually in all over the world. As the costs of IWBs have declined and their features have been improved, the availability of IWBs in schools has become pervasive. This situation arises several questions such as “how instructors effectively use IWB in their classrooms” and “how the potential and effective use of IWBs can be improved.” For relatively a new technology being used by instructors in schools, the perceptions and perspectives of instructors are considered essential to answer such questions.

*Purpose of the study:* Most research studies indicate that IWBs have potential to facilitate instruction and also have positive effects on students’ learning and motivation in general, when they are used appropriately in instruction. In other studies, teachers’ perspectives were also examined in terms of a variety of dimensions of IWB use including teachers’ attitudes, competencies, necessities, knowledge, and skills regarding IWB use by means of various methods and tools. However, there are few studies mainly focusing on IWB use in higher education. In this study, believing in the importance of the first impression and opinions of teachers, as main users of IWB technology, we aimed to focus on instructors’ views and suggestions to make IWBs more productive and effective instructional tools in higher education classrooms. We think that based on the instructors’ first impressions and suggestions, instructors and administrators in higher education as well as researchers who are interested in the use of IWB in education may develop new and effective strategies regarding IWB

\* Corresponding Author: Assistant Prof.Dr., Istanbul Commerce University, Department of Educational Sciences, cdemirli@iticu.edu.tr

\*\* Assistant Prof.Dr., Firat University, Department of Computer Education & Instructional Technology, yturel@gmail.com

use and also evaluate the effects of IWB on learning and instruction in higher education.

*Method:* In total, 39 instructors were participated. They were provided eight-hour IWB orientation, a CD that includes information about IWB use, strategies and techniques for IWB use, and the essential parts of the recorded face-to-face IWB training session. The instructional materials were designed to cover what each instructor (faculty member) would have taught in 9<sup>th</sup> and 10<sup>th</sup> week of the semester. Then, instructors piloted the materials with the support of assigned instructional designers. At the end of this implementation, teachers filled up an online questionnaire which **consists of teachers' demographic information as well as their perceptions and impressions about the IWB use.** Teachers also asked to clearly reflect their perceptions about the positive and negative aspects of the IWBs via open-ended questions. Descriptive analysis (i.e., frequencies and percentages) were used for the presentation of the quantitative data. In addition, **we have performed the content analysis via QSR Nvivo 8 for teachers' comments to open-ended questions.**

*Findings:* Regarding the main findings of this study, we can conclude that instructors develop positive attitude about IWB use. Almost all instructors had strongly positive attitudes towards the use of that technology after the implementation. Particularly for instructors who were in the second decade of their professions, their perceptions can be regarded as more valuable. Only few instructors were undecided on using an IWB while others were planning to use it in their future courses. Another satisfactory finding is that instructors did not have any negative experiences in terms of classroom management during their IWB use. Furthermore, they expressed that they enjoyed during the implementation process and also observed similar reactions from their students while IWBs were being used. In addition, instructors stated that IWBs were more suitable for courses like Science and Mathematics rather than Language and Social Studies. Despite all positive aspects of IWB use, instructors highlighted some technical issues and a need for re-organizing physical conditions of classroom settings as prominent problems that are to be solved for the success of IWB use.

*Conclusion:* This study raised critical issues in terms of IWBs use in classroom settings. First of all, instructors stated that Science, Mathematics and similar courses can be taught with IWBs support. However, IWBs can be used in various contexts and with various instructional methods and techniques. There are many functional tools in the IWB software that comes with the IWB package for a wide range of course content such as Music and Social Sciences. **It is clear that instructors' awareness regarding the existence of these tools was insufficient.** Future research is needed to examine the reasons behind their selections of courses in which IWB could be used effectively. In addition, instructors thought that IWBs could be used with a variety of instructional methods and techniques and this idea

provides a basis for the notion of using IWBs in various types of courses. In general, these findings reveal a better understanding of usability of IWBs for instructors who are from different fields and are planning to use IWBs in their courses. Another remarkable advantage of IWB use is that this technology helps instructors present their course content in more interactive, enjoyable, and visual ways. Despite all positive aspects of IWB use, there are still some problems requiring solutions for an optimum instruction. Need for better physical conditions of classroom settings and technical support are the prominent issues arising from IWB use. Thus, in order to provide an effective use of this technology, classroom settings need to be re-designed based on the basic requirements of the technology use (i.e., appropriate illumination of classroom, sitting plan, position of the projector and the IWB). In addition, teachers should be provided a solid technical support both before and during the instruction. In that way, instructors could merely focus on the use of technology instead of giving their time to arrange physical conditions or overcome technical issues.

*Keywords:* Interactive whiteboard, instructors' perceptions, higher education, technology integration

Recently, in the context of the technology integration in school settings, the importance and the portion of interactive whiteboard (IWB) use have been increased gradually in all over the world (BECTA, 2003; Torff & Tirota, 2010; Türel, 2010). As the costs of IWBs have declined and their features have been improved, the availability of IWBs in schools has become pervasive. This situation arises several questions such as "how instructors effectively use IWB in their classrooms" and "how the potential and effective use of IWBs can be improved." For relatively a new technology being used by instructors in schools, the perceptions and perspectives of instructors are considered essential to answer such questions.

Most research indicate that IWBs have potential to facilitate instruction and also have positive effects on students' learning and motivation in general, when they are used appropriately in instructional settings (BECTA, 2003; Beeland, 2002; Glover, Miller, Averis, & Door, 2007; Moss et al., 2007; Smith et al., 2005; Türel, 2010, 2011a/b; Türel & Johnson, 2012). In some studies (i.e., Türel & Johnson, 2012; Wall, Higgins, & Smith, 2005), teachers' perspectives were also examined in terms of a variety of dimensions of IWB use including teachers' attitudes, competencies, necessities, knowledge, and skills regarding IWB use by means of various methods and tools. However, there are few studies mainly focusing on IWB use in higher education (i.e., Holmes, 2009; Türel, 2011a).

In this study, believing in the importance of the first impression and opinions of teachers, as main users of IWB technology, we aimed to focus on instructors' views and suggestions to make IWBs more productive and effective instructional tools in higher education classrooms.

## Methods

### *Research Design*

In this study, a quantitative descriptive research method was employed to examine the first impressions of instructors regarding the IWB use in higher education. It is known that descriptive research methods are effective methods to reveal the **participants' perceptions and beliefs about a particular issue or phenomenon** (Gall, Gall, & Borg, 2003). Thus, we have preferred this design for our study.

### *Participants*

In this study, we present the results of a part of an IWB project conducted in a state university in Turkey in 2009. In total, 39 instructors, who were teaching in diverse courses from several departments and units in a state university in eastern part of Turkey, were participated in this project. Demographics of participants were given in Table 1 in detail.

### *Research Procedure and Data Collection Tools*

Before instructors used an IWB in their courses, they attended to eight-hour IWB orientation and training session as well as the IWB material design process for their course content. Teachers were also provided a CD that includes information about IWB use, strategies and techniques for IWB use, and the essential parts of the recorded face-to-face IWB training session. In order to help participants design instructional IWB materials, junior students who were enrolled in the Computer Education and Instructional Design department were selected. Note that the term *instructional designers* in this study refers to those students. Instructional designers were assigned for this particular study to design each participant-instructor's course-content in small groups (2-4 person in each group). All participants were provided technical and pedagogical support by instructional designers and project administrators before and during the implementation process.

The instructional materials were designed to cover what each instructor (faculty member) would have taught in 9<sup>th</sup> and 10<sup>th</sup> week of the semester. Then, instructors piloted the materials with the support of assigned instructional designers. During the implementation process, each faculty member used the designed-materials in their courses over the IWB for two weeks.

At the end of this implementation, teachers filled up an online questionnaire **which consists of teachers' demographic information as well as their perceptions and impressions about the IWB use**. This questionnaire was developed mainly based on the existing literature (i.e., Bell, 1998; Beeland, 2002; Beauchamp, 2004; Wall, Higgins, & Smith, 2005; Moss et al., 2007; Türel & Johnson, 2012) and the suggestions of five subject matter experts (two instructional designers, two educational sciences teachers, and one language teachers) in order to provide content, face, and language validities. The final version of the questionnaire included 29 Likert scale items, demographics and multiple-choices items. Likert scale items in this questionnaire were examined under three main categories called '*usabilities of IWBs (7-item)*', '*effectiveness and contributions of IWBs in terms of teaching and learning (13-item)*', and '*observed/perceived problems of using an IWB (9-item)*'. **With respect to reliability of these categories, Cronbach's Alpha coefficients were calculated as 0.68, 0.95, and 0.63, re-**

spectively. Teachers also asked to clearly reflect their perceptions about the positive and negative aspects of the IWBs via open-ended questions.

#### *Data Analysis*

Descriptive analysis (i.e., frequencies and percentages) and graphics were used for the presentation of the quantitative data. By combining 'strongly disagree' and 'disagree' as disagreement' and 'strongly agree' and 'agree' as 'agreement' levels, we have presented the results of 5-point Likert scale under two main categories to clearly demonstrate instructors' tendencies. Regarding the criteria for reliability, Cronbach's Alpha coefficients were interpreted based on the rules provided by Murphy & Davidshofer (1991) (.9 = high level, .8 = moderate, .7 = low level, .6 = acceptable level, and <.6 = unacceptable level). In addition, we have performed the content analysis via QSR Nvivo 8 for teachers' comments to open-ended questions.

## Results

### *Demographics of Participants*

Although 39 instructors participated in the IWB project, only 31 (6 female and 25 male participants) of them completely filled the questionnaire. One instructor filled up the questionnaire partially; however, his responses were included in the frequencies when it was appropriate. Table 1 presents the general information about the participants.

Table 1  
*General Information about the Participants*

		Frequency	Percent (%)
Length of service	Less than 5 years	4	12.5
	6-10	5	15.6
	11-15	12	37.5
	16-20	8	25
	21+	3	9.4
Total course hours per week	< 10 hours	5	15.6
	11-16	6	18.8
	17-23	9	28.1
	24-30 hours	8	25
	30+	4	12.5
Internet use (hours per day)	< 1 hour	1	3.1
	1-3	16	50
	4-6	11	34.4
	7+	4	12.5
Frequency of projector use	1 (almost none)	6	18.8
	2	2	6.2
	3	8	25
	4	7	21.9
	5 (frequently)	9	28.1
	TOTAL	32	100

Almost 72% of instructors had more than 10 years of teaching experience and 84.4% of them were teaching more than 10 hours in a week, which reveals that the participants had an adequate experience on teaching. In addition, almost all instructors (N=32) stated that they spent more than one hour in a day on Internet and believed in the usefulness of ICT in classroom while 81.2% of them declared use of a projector in their courses. Thus, we can conclude that the participants were familiar with the use of technology in their classes. However, two instructors clearly stated they could not use projector since the physical conditions of the classroom was not appropriate for the use of projector. The instructors were also asked about their thought about usefulness of information and communication technologies (ICT) in classrooms. Almost all participants (%97) found it useful.

*Instructors General Attitudes towards IWB Use*

We asked 5-point Likert type questions to teachers in order to get their general attitudes towards the implementation. We had categorized items based on their themes such as usability of IWBs, effectiveness and contributions of IWBs in terms of teaching and learning, and problems of using an IWB in undergraduate courses. The first theme presents instructors' agreement to the items regarding usability of IWBs (see Table 2).

Table 2

*Usability of IWBs*

Statements	N	M	SD	% of teachers disagreeing/agreeing with each statement	
				Disagree	Agree
I am planning to use an IWB in my future courses	32	4.12	.751	0	78.1
IWB is a technology that must be used in class	32	4.22	.832	3.1	78.1
IWB can be used in all kinds of courses	28	3.39	1.474	28.6	46.4
I think my courses are not convenient to be taught with an IWB	31	2.26	1.094	61.3	12.9
IWB can be used effectively in courses like Science and Mathematics	30	4.13	1.212	0	96.7
IWB can be used effectively in courses like Language and Social Studies	30	3.66	1.45	13.3	70
IWB can be used effectively in practical-based courses like lab, Physical Education, and Music	29	3.25	1.437	13.8	58.6

Table 3

*Effectiveness and Contributions of IWBs in Terms of Teaching and Learning*

Statements	N	M	SD	% of teachers disagreeing/ agreeing with each statement	
				Disagree	Agree
IWB helps me to use the computer and projector more effectively than before	31	4.03	1.11	6.7	86.7
I believe using an IWB facilitates my <b>students' learning</b>	31	4.19	.749	3.2	87.1
I think the lessons become more effective with IWB	31	3.94	.892	6.5	71
Using IWB increases my students' interest in class	31	4.1	1.012	6.5	77.4
IWB makes my courses more enjoyable	31	4.13	.885	6.5	67.7
My students focus on my lessons more when I use an IWB	31	4.00	1.00	6.5	74.2
IWB helps my students learn in groups	31	3.68	.979	9.7	51.6
IWB facilitates the classroom management	31	3.52	1.061	12.9	45.2
Using an IWB makes it easier for my students to remember what they learned in class	31	3.94	.892	3.2	64.5
IWB can be used with various instructional methods	31	4.19	.703	3.2	90.3
IWB facilitates repeating and summarizing the course content	31	4.23	.805	3.2	83.9
IWB helps my lessons be more interactive	31	4.13	.806	6.5	87.1
IWB provides advantages to me to make course content more visual	31	4.39	.667	3.2	96.8

Table 4  
*Observed/Perceived Problems of Using an IWB*

	N	No		Partially		Yes		Do not remember		
		f	%	f	%	f	%	f	%	
Physical conditions of our classroom were adequate for using an IWB	32	8	25	9	28.1	15	46.9	0	0	
Finding and designing materials for IWB can be difficult	32	19	59.4	10	31.3	3	9.4	0	0	
I have difficulty in calibrating IWB	31	19	61.3	6	19.4	6	19.4	0	0	
I have difficulty in integrating IWBs into my curriculum/course activities	31	23	74.2	3	9.7	5	16.1	0	0	
When IWB is in use in class:										
There happens noise	32	23	71.9	7	21.9	2	6.2	0	0	
I cannot effectively manage the instructional time	31	26	83.9	2	6.5	3	9.7	0	0	
I have connection problems between the IWB and computer	32	16	50	10	31.3	4	12.5	2	6.2	
I have display problems (i.e., glistening, reflection, and low resolution)	32	17	53.1	10	31.3	4	12.5	1	3.1	
There happens classroom management problems	32	24	75	5	15.6	3	9.4	0	0	

We have also asked instructors about students' reactions towards IWB use in general. Instructors mainly pointed out that their students' reactions were mostly positive (N=21) or even very positive (N=7). While only one instructor reported that his students' reactions were negative, three instructors thought that there was no change.

In addition to the close-ended questions, instructors were asked several open-ended questions regarding the positive and negative aspects of the IWB use during the implementation. While conducting a qualitative data analysis for these types of questions, we grouped the instructors' responses considering their meanings, and associated them with appropriate themes. Table 5 presents the aforementioned themes and the number of statements loaded (loading number) to each theme.



Table 5

*Positive Aspects of IWB Use in Classroom*

<i>Positive factors</i>	<i>f</i>
Using IWB features (spotlight, playback, recording etc.) on instructional materials	18
Providing an interactive multi-media environment in classroom	16
Providing the opportunity to effectively manage the material	13
Providing more challenging and interesting classroom settings	13
Offering an easy-to-use structure	12
Managing time effectively	10
Providing an effective technology integration	9
Enabling reusability of instructional materials	7
Providing better understanding and remembrance	6
Facilitating a learner-centered environment	5
Enriching environment with enjoyable learning opportunities	4
Satisfying presentation of course content	3

According to Table 5, it is clear that instructors were mostly ( $f=18$ ) satisfied with the use of IWB features over the instructional materials. Also, there are several issues stated by instructors regarding the IWB use. Table 6 presents these issues and loading numbers for each issue.

Table 6

*Negative Aspects of IWB Use in Classroom*

<i>Negative factors</i>	<i>f</i>
Technical problems in general	18
Projector problems	11
Computer-IWB connection problems	9
Stylus (special IWB pen) problems	7
Need for skills for IWB use	14
Physical conditions (not appropriate for IWB use)	5
Need for designing IWB-compatible materials	2

When Table 6 is examined, it seems that technical issues are leading challenges for IWB use and instructors should handle with these challenges. Since an IWB works with a projector in classroom, the projector problems directly affect the presentation process. Most IWB models require calibration for the effective recognition of touching area. Some instructors defined the calibration problems as projector problems.

Five instructors mentioned about the need for convenient physical conditions of the classroom for the efficiency of IWB use. **Similarly, only 15 instructors' responses** to the first question in Table 4 (Classroom conditions were appropriate) were positive. That means more than half of the instructors participated in this study stated that their classrooms were either inconvenient or partially inconvenient for an IWB use.

### Discussion and Conclusion

Today, it is a well-known reality that benefiting from technology in learning process and environments is inevitable. From the point of this reality, there is a need for conducting more research on technology integration into classroom settings and adaptation process for such changes for instruction. As such, this study can be **considered as essential in regard to reflect instructors' perspectives and initial experiences** about an IWB use in a public university. Considering the transition process of the IWB technology, this study offers opportunities for instructors and administrators in higher education system to introduce new strategies and planning for an IWB use.

Regarding the main findings of this study, we can conclude that instructors developed positive attitude about IWB use, which is align with the results of the previous studies such as Slay, Siebörger, and Hodgkinson-Williams (2008) and Türel and Johnson (2012). Only few instructors were undecided on using an IWB while others were planning to use it in their future courses. It is essential that most of the teachers admitted that the IWB is a technology that should be used in classroom settings and the skills to use that technology can be improved by using it. Hence, almost all instructors had strongly positive attitudes towards the use of that technology after the implementation. Particularly for instructors who were in the second decade of their professions, their perceptions can be regarded as more valuable.

Instructors believe that IWBs can be used in courses like Science and Mathematics, verbal based courses like Language and Social Studies, and practical-based courses like Lab., Physical Education, and Music, respectively. In terms of **understanding instructors' views on technology integration, their votes for courses like Science and Mathematics as more convenient to use an IWB may be considered as another essential finding.** Türel (2010) **emphasizes that IWBs can** be used in various contexts and with various instructional methods and techniques. Moreover, there are many functional tools in the IWB software that comes with the IWB package for a wide range of course content such as Music and Social Sciences. It is clear that **instructors' awareness regarding the existence of these tools was insufficient.** Future research is needed to examine the reasons behind their selections of courses in which IWB could be used effectively.

Instructors thought that IWBs could be used with a variety of instructional methods and techniques and this idea provides a basis for the notion of using IWBs in various types of courses. In general, these findings reveal a better understanding of usability of IWBs for instructors who are from different fields and are planning to use IWBs in their courses. Another remarkable advantage of IWB use is that this technology helps instructors present their course content in more interactive, enjoyable, and visual ways.

Another satisfactory finding is that instructors did not have any negative experiences in terms of classroom management during their IWB use. Furthermore, they expressed that they enjoyed during the implementation process and also observed similar reactions from their students while IWBs were being used. In literature, many studies (i.e., Levy, 2002; Beauchamp & Parkinson, 2005; Hall & Higgins, 2005; Türel & Johnson, 2012) stress that appropriate use of IWBs has positive effects on students' attention, motivation, and also participation in classroom settings.

Participants of this study also emphasized that they felt their IWB skills were getting improved day by day. In similar, Hodge and Anderson (2007) suggest that teachers in their study progressively develop their IWB usage skills based on the frequency of their IWB use. Despite all positive aspects of IWB use, there are still some problems requiring solutions for an optimum instruction. Need for better physical conditions of classroom settings and technical support are the prominent issues arising from IWB use. Thus, in order to provide an effective use of this technology, classroom settings need to be re-designed based on the basic requirements of the technology use (i.e., appropriate illumination of classroom, sitting plan, position of the projector and the IWB). In addition, teachers should be provided a solid technical support both before and during the instruction. In that way, instructors could merely focus on the use of technology instead of giving their time to arrange physical conditions or overcome technical issues.

We can conclude that IWBs provide opportunities for instructors to both give an effective presentation and reuse the same materials over and over again. In addition, based on their statements, instructors believed that they could effectively manage the material and provide a challenging instructional environment to their students via an IWB. Besides, instructors thought that the usability of IWBs facilitated effective technology integration into classroom settings. Similarly, the type of IWB that we used in our project was a portable IWB and the calibration and the stylus problems are very common for those IWB models as stated by instructors. Finally, although the IWB is known as an easy-to-use technology, almost half of the participants ( $f=14$ ) stressed that they need IWB usage skills in order to use the technology effectively. In addition, four instructors stated that there was nothing wrong with IWB use. As a part of the project, we provided face-to-face IWB training and orientation sessions for instructors to develop their skills in IWB use. We also distributed the interactive CDs that included materials and samples regarding various subject domains. In addition, assigned instructional designers provided support for each instructor during the implementation. We know that the installation of the IWB into classroom is not sufficient alone for its effective use (Türel, 2010). Due to training sessions and technical

support that we provided, we met the demand of instructors regarding the basics of IWB use in classroom. However, instructors call attention to the need for training on material design and development compatible for IWBs. Thus, two instructors expressed the need for material design as an issue of IWB use. The need for designing and finding pedagogically sound IWB materials was also stressed by many researchers including Smith et al. (2005) and Türel and Demirli (2010).

This study indicates a good example of an IWB implementation that introduces the positive perceptions of instructors, who had no previous experience with IWB use. However, it is essential to provide a sustainable development for instructors to preserve these positive perceptions and also follow-up studies should be conducted to observe the improvements of IWB use in higher education.

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## Yükseköğretimde Etkileşimli Akıllı Tahta: Öğretmenlerin İlk İzlenimi

### Atıf:

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### (Özet)

#### *Problem Durumu*

Günümüzde tüm dünyada, okul ortamına teknoloji entegrasyonu sağlama bağlamında, Etkileşimli Akıllı Tahta (EAT) kullanımının önemi giderek artmaktadır. EAT'ların maliyetleri düştükçe ve özellikleri geliştirildikçe, okullardaki erişilebilirlik durumları da yaygın hale gelmiştir. Bu durum, "öğretmenler EAT'ları sınıflarında nasıl etkili kullanabilirler?" veya "EAT'ların etkili kullanımını ve potansiyeli nasıl geliştirilebilirler?" gibi birçok soruyu ortaya çıkarmıştır. Bu tür soruları yanıtlamak için, okullarda öğretmenler tarafından kullanılan ve nispeten yeni olan bu teknolojiye yönelik algıların ve bakış açılarının belirlenmesinin gerekli olduğu düşünülmektedir.

#### *Araştırmanın Amacı*

Çoğu araştırma EAT'ların, uygun biçimde kullanıldığında, öğretimi kolaylaştırmak gibi bir potansiyele sahip olduğunu ve aynı zamanda öğrencilerin öğrenmeleri ve genel olarak motivasyonları üzerinde olumlu etkileri olduğunu göstermektedir. Bazı çalışmalarda da EAT kullanım boyutlarına ilişkin öğretmen perspektiflerinin; kullanıma ilişkin tutumlar, yetkinlikler, ihtiyaçlar, bilgi ve beceriler bağlamında farklı yöntem ve araçlar yoluyla çeşitli açılardan incelendiği görülmektedir. Ancak, literatürde özellikle yükseköğretimde EAT kullanımına odaklanan çalışmaların azlığı dikkat çekmektedir. Bu çalışmada, EAT teknolojisinin temel kullanıcısı olan öğretmenlerin görüş ve ilk izlenimlerinin alınmasının önemine inanarak, yükseköğretim sınıflarında EAT'ları daha verimli ve etkili öğretim araçları yapmak öğretmen görüşleri ve önerilerine odaklanılmıştır. Öğretmenlerin ilk izlenim ve önerilerinin, yükseköğretimdeki öğretmen ve yöneticilerin EAT kullanımına ilişkin yeni ve etkili stratejiler geliştirmelerine ve yükseköğretimdeki öğrenme ve öğretmede EAT'ların etkisini değerlendirebilmelerine zemin oluşturacağı düşünülmektedir.

#### *Yöntem*

Araştırmada toplamda 39 öğretmen (öğretim elemanı/öğretim üyesi) yer almaktadır. Öğretmenlere, EAT'lara uyum sağlama, EAT kullanımı için strateji ve teknikler, EAT kullanımı ve kaydedilmiş yüz yüze EAT eğitim oturumlarının temel parçaları ile ilgili içeriğe sahip sekiz saatlik bir etkileşimli CD verilmiştir. Her öğretmen için dönemin 9. ve 10. haftada öğretimi yapılan konuları kapsayan öğretim materyalleri tasarlanmıştır. Daha sonra, öğretmenler kendilerine atanan öğretim tasarımcılarının desteğine ile bu materyalleri sınıflarında kullanmışlardır. Bu uygulamanın sonunda öğretmenler, demografik bilgilerinin yanı sıra EAT kullanımı ile ilgili oluşan algılarını ve izle-

nimlerini yansıtan bir çevrimiçi anket doldurmuşlardır. Eğitimden aynı zamanda açık uçlu sorular yoluyla EAT'ların olumlu ve olumsuz yönleri hakkındaki algılarını yansıtmaları istenmiştir. Betimsel analizler (frekans ve yüzde gibi) nicel verilerin sunumu için kullanılmıştır. Ayrıca, eğitimden açık uçlu sorulara yönelik yorumları üzerinde QSR Nvivo 8 yardımıyla içerik analizi gerçekleştirilmiştir.

### *Bulgular*

Bu çalışmanın ana bulgusu olarak öncelikle eğitimden EAT kullanımı konusunda olumlu tutum geliştirdiği sonucuna varılabilir. Hemen hemen tüm eğitimden uygulamaya sonrasında bu teknolojinin derslerde kullanılması gerektiğine yönelik kuvvetli olumlu tutum oluşmuştur. Özellikle mesleklerinin ikinci on yılını yaşayan eğitimden bu yöndeki algıları daha değerli olarak kabul edilebilir. Sadece birkaç eğitimden gelecekteki derslerinde EAT kullanmaya yönelik planlamalarında bir kararsızlık söz konusudur. Başka bir tatmin edici bulgu da eğitimden EAT kullanımını sırasında sınıf yönetimi açısından herhangi bir olumsuz deneyim yaşamamış olmasıdır. Dahası, EAT'ların kullanılmaya başlanmasıyla birlikte eğitimden uygulama sürecinden zevk aldıklarını vurgulamışlar ve öğrencilerde de benzer olumlu tepkiler gözlemlediklerini ifade etmişlerdir. Buna ek olarak, eğitimden EAT'ların Dil ve Sosyal Bilimler gibi sözel ağırlıklı derslerden ziyade Fen ve Matematik gibi sayısal ağırlıklı derslerde daha uygun olduğunu belirtmişlerdir. EAT kullanımının tüm olumlu yanlarına rağmen, eğitimden EAT kullanımının başarısı için; bazı teknik sorunların çözülmesinin ve fiziksel koşulların yeniden organize edilmesini içeren sınıf düzenlemelerinin yapılmasının gerekli olduğuna vurgu yapmışlardır.

### *Tartışma ve Sonuç*

Bu çalışma sınıf ortamında EAT kullanımı açısından bazı önemli noktaları ortaya koymaktadır. Öncelikle eğitimden EAT desteği ile Fen, Matematik ve benzeri sayısal ağırlıklı derslerin daha verimli öğretilabileceğini belirtmişlerdir. Ancak, EAT'lar çeşitli bağlamlarda ve çeşitli öğretim yöntem ve teknikler ile birlikte kullanılabilir. Müzik ve Sosyal Bilimler gibi farklı dersler için EAT paketi ile gelen EAT yazılımında birçok işlevsel araç söz konusudur. Bu araçların varlığı konusunda eğitimden farkındalık düzeyinin düşük olduğu açıktır. Örneğin, bazı öğretmenler sayısal bazı öğretmenler sözel ağırlıklı derslerde EAT'nin daha verimli kullanılabileceğini düşündüklerini belirtmiştir. Gelecek araştırmalarda eğitimden bu yöndeki tercihlerinin arkasındaki nedenler incelenebilir. Ayrıca eğitimden EAT'nin farklı öğretim yöntem ve teknikleriyle kullanılabileceğini düşünmesi aynı zamanda bu teknolojinin farklı derslerde de kullanılabileceği fikrini desteklemektedir. Bu bulguların, farklı alanlarda olup gelecekte de derslerinde EAT kullanmayı planlayan eğitimden EAT'nin kullanılabilirliği konusunda önemli bir referans olduğu söylenebilir. EAT kullanımının bir başka önemli avantajı bu teknolojinin öğretmenlere ders içeriğini daha etkileşimli, eğlenceli ve görsel bir şekilde sunmaya yardımcı olmasıdır. EAT kullanımının tüm olumlu yanlarına rağmen, ideal kullanım için hala çözülmesi gere-

ken bazı sorunların olduğu görülmektedir. Sınıf ortamının daha uygun fiziksel koşullara sahip olması için gerekli ihtiyaçların giderilmesi ve teknik desteğin sağlanması EAT kullanımında ortaya çıkan önemli hususlar arasında sayılabilir. Nitekim etkin kullanımı sağlamak amacıyla, sınıf ortamının bu teknolojinin kullanımının temel gereksinimlerine (sınıfın uygun aydınlatması, oturma planı, projeksiyon cihazı ve EAT pozisyonu gibi) göre yeniden tasarlanması gerekir. Buna ek olarak, eğitmenlere öğretim sürecinin hem öncesinde hem de süreç boyunca sağlam bir teknik destek temin edilmelidir. Böylelikle, eğitmenler fiziksel koşulları düzenlemek veya teknik sorunları aşmak için zaman harcamak yerine sadece teknolojinin kullanımına odaklanabilirler.

*Anahtar Sözcükler:* Etkileşimli Akıllı Tahta, Eğitmen Algısı, Yükseköğretim, Teknoloji Entegrasyonu