

Teachers' Views on the Educational Use of Interactive Whiteboards in the Dodecanese

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ABSTRACT

During the 2023–2024 school year, interactive whiteboards of new technology were installed in many schools across Greece. Although schools had interactive whiteboards before, the new ones offer greater technological capabilities, making it interesting to study their integration into the educational process and how they can enhance teachers' work. This study examines the views of primary and secondary school teachers in the Dodecanese prefecture regarding the educational use of interactive whiteboards. It explores how they are used, their benefits, disadvantages, difficulties, and training needs. A quantitative analysis was conducted using a questionnaire sent electronically to teachers in the prefecture. The analysis indicates that teachers extensively use interactive whiteboards in their teaching and perceive them as yielding positive learning results.

Keywords: Dodecanese, education, interactive whiteboards, teachers' views.

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1. INTRODUCTION

Interactive whiteboards (IW) have been used in education for several years, particularly in Europe and America. During this time technologies are changing rapidly, and the educational community is required to integrate them into teaching. In Greece, much has changed from the first interactive whiteboards used in the last decade to those being installed in schools this year [1], [2]. Teachers, as the main users of IWs over the years, have become largely familiar with their use in teaching, although the lack of training often leads to their rejection as an educational tool or the use of only part of their capabilities [3].

As a major investment has been made in recent years to provide all schools with IWs with modern technical features [1], this research aims to investigate whether this new technology meets the needs of teachers and has been accepted. Particularly in the Dodecanese prefecture with the characteristics of the many remote islands, the inclusion of a tool that can be used as a window to the world offers new possibilities to students. Teachers' views on the educational use of IWs can contribute to the evaluation of their integration and to the design of seminars and ancillary tools that will highlight their use.

2. THEORETICAL FRAMEWORK

2.1. IWs in Greek Schools

The introduction of IWs in schools in Greece has been gradual. Initially, IWs were mainly used by private schools [4], while individual IWs were also installed in various schools, mainly in computer laboratories. The first IWs installed consisted of an independent digital touch screen connected to a computer and a projector [4].

In 2010, the first major effort of centralized procurement of IWs was made with the Call 78 [1] of the Special Service for the Implementation of Educational Actions of the Ministry of Education, Lifelong Learning and Religious Affairs of Greece, Operational Program Education and Lifelong Learning, which provided the pilot introduction of interactive systems and related equipment in the classroom for a "digitally supported teaching". About 1,200 IWs were installed in secondary schools across the country.

During the 2023-24 school year, the second major procurement of IWs by the Ministry of Education is underway with a project that includes the installation of IWs in all primary schools for grades 5 and 6 and secondary schools. This is the project "Supply and installation of Interactive Learning Systems" of the action "Digital Transformation of Education" of the National Plan for Recovery and Resilience "Greece 2.0", which involves the supply and installation of 36,264 new technology IWs in all school units of the territory upon their request [2]. The project is



close to completion in the Dodecanese prefecture and IWs have been installed in most schools.

These IWs consist of an 85" touch screen with an integrated central computer unit and speakers. They have a multitude of interface ports (USB, HDMI, Ethernet) as well as wireless networking and Bluetooth [2]. They provide direct connectivity to mobile devices such as smart phones, tablets or laptops. They have pre-installed Windows10 and Android operating systems as well as a variety of applications and educational software.

It is a single standalone system that does not require connection to any external device (projector or laptop) to operate while providing the users (teachers or students) with the convenience of simply turning it on and interacting with it with their fingers as if they were operating a large tablet.

2.2. Pedagogical Use of IWs

IWs are a valuable resource for teachers and students offering dynamic ways to present content and collaborate during lessons. The way they are used in teaching varies and evolves as both teachers and students become more familiar with the technology. An account of the evolution of the use of IWs in teaching, according to Beauchamp [5], includes the following stages:

- *Use of the IW as a substitute for the classical black/whiteboard:* The IW is used as a classical chalk or marker board.
- *Apprentice user:* Utilizing more of the technological possibilities of the IW, presentations or searching for material on the internet. Students use the IW to write or draw something. The course continues to have a linear structure.
- *Initiate user:* More selected software and combinations of software are used to serve the teaching objectives. Teachers have a better understanding of the IW's capabilities, and students use it more frequently.
- *Advanced user:* The teaching becomes more complex, with the use of hyperlinks, elements such as sounds and graphics as essential to the teaching rather than just decorative, and peripheral devices are used. Students use most of the tools of the IW.
- *Synergistic user:* At this stage both teachers and students are familiar with the technology, which becomes the means to create a learning group according to the teacher's philosophy.

Although the simple, initial use of the IW may arouse students' interest, results in terms of learning are only evident when the potentialities of IWs are exploited, and they are integrated into the everyday educational process [3]. The IW is often used to access educational software linked to the textbook or developed by others [6].

A literature review of research on the effectiveness of using IWs suggests that they positively affect students' learning outcomes [7]. However, these effects depend on the year of the research and seem to be more pronounced in recent years, as technology evolves, and teachers have more experience in using IWs. The impact of IWs on learning seems to depend on the pedagogical approach used and is

more significant when an active and collaborative teaching approach is used.

Specific features of IWs, as the learner-response device, the use of visual representations and the reinforcer applications, have a positive impact on students' achievements [8].

A critical factor when using any medium in education is the role of the teacher. Technological knowledge, pedagogical knowledge and skills are required for the pedagogical use of technological media. Limited impact on learning and teaching has been observed when teachers do not link interactivity to a new pedagogical approach [3]. The use of IWs in the educational process changes the way the lesson is taught, but also the didactical approach of the teacher [9].

2.3. Related Work

The use of the IW by teachers in Greece has been studied to some extent in a qualitative research with primary school teachers [10]. The survey investigated the views and practices of primary school teachers regarding the educational integration of the IW in the learning process. Apart from the positive attitude towards the use of the IW, the main positive and negative points that teachers recognize were revealed. Among the advantages were better classroom management, saving teaching time, increasing students' motivation to participate and supporting different learning styles [10].

Another qualitative study with 8 primary teachers in Greece [12], highlighted among others the flexibility and adaptability that the IW possesses as a tool, the interactivity and the utilization of educational resources. The use of interactive whiteboards in the classroom can create incentives and foster interest among students. However, its effectiveness is facilitated by appropriate lesson planning as well as digital literacy of the teacher.

Difficulties have still been shown in creating a learning environment where students are actively involved with a combination of pedagogical approaches and technology, due to teachers' lack of training and opposition to the use of IWs [11].

As disadvantages of IWs in education have been reported their high cost, which makes them difficult to be purchased by individual schools and the preparation time which is longer especially in the early stages of their use [3].

As the previous studies refer to the use of older interactive systems, the present study contributes to the research on the field by impressing the current status of the integration of IWs in classrooms in a region of Greece and the attitudes of the teachers towards their use. The new technology of IWs makes them more user-friendly, and now more teachers are using them more frequently. By revealing the needs and the requirements of the users of IWs, more targeted and effective training programs can be designed.

3. METHODOLOGY

3.1. Purpose

The aim of this research is to examine how teachers in the Dodecanese prefecture use IWs and their perspectives

TABLE I: QUESTIONNAIRE

Groups of questions	Description
1 st group	Schools with IWs
2 nd group	Use of IWs
3 rd group	Advantages and disadvantages of using IWs
4 th group	Training needs
5 th group	Demographical data

on their pedagogical applications. Specifically, the research addresses the following questions:

- How do teachers in the Dodecanese prefecture use interactive whiteboards in their teaching?
- What are the teachers' views on the advantages, disadvantages, and challenges of using interactive whiteboards in teaching?
- What are the teachers' views on the need for training in the use of interactive whiteboards?

3.2. Data Collection Instrument

An electronic questionnaire was created in online survey platform of Google Forms to collect data and distributed to schools via e-mail at the end of the 2023–24 school year. Teachers who were serving or had previously served in schools with an IW were asked about its use.

The 1st group of questions included 7 questions related to the installation and operation of IWs in the school (Table I). Teachers who indicated that they did not use IWs in teaching in the current school year were asked about the reasons.

The participants who did use the IW responded to the 2nd group of questions related to the use of IWs. Specifically, this part included questions about how they learned to use the IW, how often and in which way they and their students use it.

The 3rd group consisted of 22 sentences expressing opinions about the utilization, advantages and disadvantages of using IWs with a four-point Likert scale, to which participants responded whether they agreed. In this part two open questions were used about the advantages and disadvantages, to allow the participants to freely express their opinions.

In the 4th group of questions there were questions related to training needs in relation to IWs. Finally, in the last part of the questionnaire some demographic data were requested. Descriptive statistics was used for the quantitative analysis of the data collected from the responses in the questionnaire.

3.3. Participants

Sixty-five teachers from primary and secondary schools in the Dodecanese prefecture participated in the survey. Approximately one third are male (35.38%), 44.62% serve in primary schools, and the remaining in secondary schools (Table II). In addition to primary school teachers, teachers of various specialties also participated.

Most of the survey participants are very (41.54%) or extremely (43.08%) familiar with the use of information and communication technologies and serve in a general

TABLE II: DEMOGRAPHICAL DATA OF THE PARTICIPANTS

Demographical data	%
<i>Gender</i>	
Female	64.62
Male	35.38
<i>Level of education</i>	
Primary	44.62
Secondary	55.38
<i>Years of experience</i>	
Less than 4 years	7.69
4 to 10 years	16.92
11 to 20 years	33.85
21 to 30 years	30.77
More than 30 years	10.77

education school. Two of the participants teach in a special education school, 1 in a vocational school and 2 in an experimental school. Regarding years of experience in education, 7.69% have less than 4 years, 16.92% from 4 to 10 years, 33.85% from 11 to 20 years, 30.77% from 21 to 30 years and 10.77% more than 30 years (Table II).

4. FINDINGS

4.1. Schools With Interactive Whiteboards

The majority of teachers (90.77%) reported that their current school has IWs. An equal percentage indicated they had previous experience using IWs at another school. All but five teachers reported that new IWs were installed in their school this academic year. However, in one third of these schools (33.9%), not all classrooms have IWs. In most cases where IWs have been installed, the marker whiteboard has also remained (81.36%). Additionally, the majority of teachers indicated that school management is very supportive (33.9%) or extremely supportive (55.93%) of their use of IWs.

Regarding support for using IWs, teachers primarily receive assistance from fellow teachers of Computer Sciences (27.12%), the school director (18.64%), or fellow teachers without specialized training (18.64%). However, many teachers (23.73%) reported that they learned to use the IW independently. Similarly, when asked how they learned to use the IW, most of the participants mentioned personal involvement as the primary method. Eighty three percent of the participants reported using the IW in the current school year. Those who did not use it cited the absence of an IW in their classroom as the main reason. Only two respondents felt that IWs did not aid in teaching or were not suitable for their subjects. Regarding the frequency of use, 71.42% of respondents stated they use the IW in every lesson or every day.

4.2. Use of Interactive Whiteboards

As illustrated in Fig. 1, IWs seem to be used in the classroom in a variety of ways. Most of the teachers who participated in the survey and use the IW in the classroom said that they frequently use the IW for accessing the internet (86%).

Moreover, there is an equally high proportion who use it to make use of interactive digital materials such as

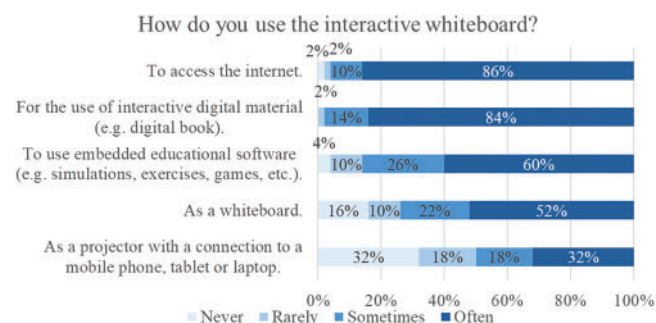


Fig. 1. Ways of using the interactive whiteboard.

digital books. Less frequently (60%) the IW is used for using embedded educational software such as simulations, exercises or games and simply as a whiteboard (52%). It further emerges that a relatively small percentage (32%) often connect a mobile, tablet or laptop to the IW during teaching.

Fifty-eight percent of the participants who use the IW interact with it using a special stylus, while the rest use their hands. Most teachers report that their students use the IW in every lesson or several times.

4.3. Advantages and Disadvantages of Using Interactive Whiteboards

The teachers in the study, as reflected in their responses to the suggestions raised, are positive about the use of the IW in their teaching methodology (92%) (Fig. 2). High percentages stated that using the IW makes it easier to access material in addition to what is planned (96%) and that it facilitates the organization of the teaching material (88%). They still mostly consider that the IW is suitable for all ages of students (86%) and that most students do not find it difficult to use it (86%). Regarding the classroom climate, several respondents said that better classroom management is achieved (68%), that teaching time is saved (70%) and that students pay more attention (86%). Moreover, most teachers believe that it enhances teaching (84%).

Although a quarter of the respondents did not answer the statement regarding whether the use of IWs causes confusion for students with special educational needs, half of the teachers disagreed with the statement.

Whereas most of the participants are familiar with technological tools, almost the half of them stated that the use of IWs requires support from technical staff (46%). One third of the teachers believe that students quickly get used to using the IW, so it is not interesting to them. Only 16% of the teachers believe the cost of IWs is high in relation to the benefits they have.

In an open-ended question about the advantages of using IWs in teaching, most teachers highlighted the increased student interest. A typical response was, "It focuses the interest of even the most indifferent students". Another significant advantage mentioned was the easy and dynamic access to educational material, which can be adapted according to the progression of the lesson and the interests of the students.

Among the most important disadvantages expressed in a similar open question were the technical problems that

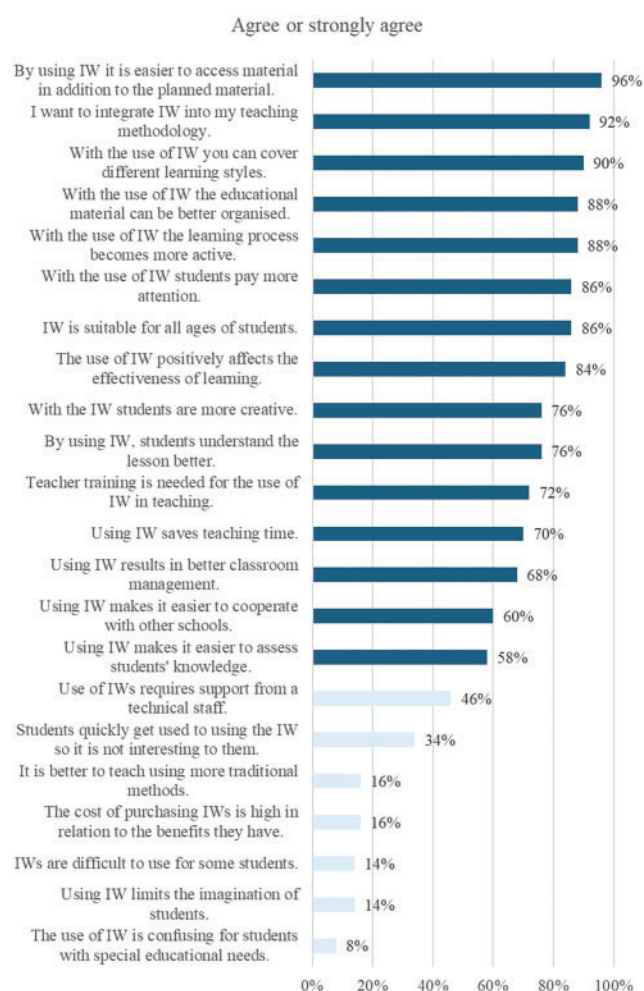


Fig. 2. Teachers' views on the use of IW.

can arise and the low speed of the internet connection, which can cause problems in the flow of the lesson. The teachers who participated in the survey do not seem to share previous research findings as they disagree (84%) with the statement "The cost of purchasing IWs is high compared to the benefits they have".

4.4. Training Needs

Only 31% of the survey participants have attended training on interactive whiteboards. Of these, one third reported attending two or more training sessions, and two thirds stated that the training helped them utilize the IW. Notably, no one indicated that the training helped them significantly in utilizing the IW. Most have attended training from external providers such as universities or training organizations (61%), while the rest have attended in-school training from colleagues. Regarding duration, two-thirds have attended less than two hours of training. Of those who have received training, one third are not aware of the information/training material sent to schools by the supporting team.

Regarding the scope of the desired training, 90% of the respondents said that they would like it to include suggestions for didactic use in specific teaching subjects, 62% would like it to refer to additional capabilities beyond teaching and 50% would like it to cover technical issues.

5. DISCUSSION

Regarding the first research question, the findings show that teachers in the Dodecanese prefecture use IWs in their teaching to a great extent and in various ways. It is apparent that IWs are used not only as whiteboards but also to access educational and interactive material that is available. Although the IWs have only been installed for a few months, most of the teachers in the study use them frequently. The results of the present study are largely consistent with those of previous ones, confirming the positive attitude of teachers towards the integration of IWs in the educational process [10]. Moreover, they are willing to take full advantage of the capabilities and opportunities that IWs offer in their teaching.

Concerning the second research question, teachers identify positive elements in the use of IWs, while the problems they describe are limited. Teachers recognize several advantages in the use of IWs in the learning process, such as easy and direct access to supplementary educational material during the lesson, better organization of their educational material and better use of teaching time. They also openly report that the use of IWs increases the interest and participation of students, even among those who are usually indifferent, resulting in improved classroom management.

On the other hand, they mentioned as disadvantages the technical issues that may arise when using IWs as well as speed problems in the internet connection which may significantly affect the flow of teaching. It is noteworthy that the teachers who participated in the survey do not endorse the view recorded in previous research as they consider that the benefit to the educational process is more important than the cost of procuring IWs.

It is also remarkable that in some cases the traditional blackboard has been removed from the classroom and the educational process relies solely on the IW. This perhaps indicates the confidence that a portion of teachers shows in the use of digital media in teaching. Nevertheless, this practice may cause problems in case of technical problem of the IW or of power outage.

With respect to the third question posed in the research, the present study records the need for teachers' training. The duration has not to be long, as it seems that a short, fast-paced training of less than 10 hours meets the needs of teachers. As for the level of training, they want it to be at the average level of a typical user and, in addition to technical issues, to include issues of use of IWs in teaching. For them, it is important that this training should include proposals for the use of IWs in teaching specific subjects.

Installing IWs in schools is not enough to transform the way of teaching and the quality of education. IWs may be used as a modern alternative to the classic chalkboard, framing a student-centered teaching approach. The key word of the educational use of IWs is interaction. Interaction between teachers and students, between students, between students and the subject matter, both at utilitarian and pedagogical level. However, in order to make the transition from the simple use of the IW to the effective use of the collaborative user with full exploitation of its potential, training is required not only in technical issues but mainly

in the way of interfacing with the content of teaching and the pedagogical use of the material and the medium. This is also evident from the participants' responses, as most of them stated that they would like training to include suggestions for educational use in specific teaching subjects.

Although the study is limited by the sample size of teachers and the geographical coverage, the findings suggest that IWs have already been part of everyday teaching in schools across Greece. Ease of use of the new IWs and the familiarity of teachers with information technology contribute to their acceptance. Besides conducting wider research with all schools included in the latest project for IWs of Ministry of Education, it would be interesting to further study the impact of IWs on teaching methodologies and learning outcomes.

It can be investigated whether the experience with the new all-in-one interactive state-of-the-art technology systems has changed teachers' views on their use in everyday teaching practice and how they ultimately interact with their students and the subject matter in the classroom [5].

From the results of the research, it is evident that IWs help in better time management in the classroom. It should be further investigated whether this time is transferred outside the classroom to the time needed for teachers' preparation before teaching.

6. CONCLUSION

The main advantage mentioned by teachers in both the closed and open-ended questions is access to educational material. They specifically highlighted the availability of additional resources beyond the planned curriculum, which can be useful in unexpected situations or to address the interests and needs of students.

Successful use of the IW requires first of all that teachers have the confidence that they can handle the IW [5]. Once they are familiar with its technical functions they can focus on the pedagogical features of its use. However, in addition to teachers, the teaching process also involves students who need to have some confidence in utilizing the IW in order to actively and collaboratively participate in the process and thus benefit learning.

The evolution of technology brings new devices that are easier to use. The inevitable daily use of such devices by all of us helps us to gradually overcome our digital fear and increasingly integrate IT into our daily activities. The educational process could not be unaffected, and this is reflected in the current survey where the vast majority of teachers request training in the utilization of IW above the average user level rather than introductory training. Another indication is the statement of the majority of teachers that they learned to use the IW mainly through personal involvement.

It seems that teachers have largely adopted interactive whiteboards in the educational process and wish to improve their utilization for the benefit of students. As the number of teachers using IWs increases and their interest shifts from simple usage to changing teaching practices, it makes sense to create an educational community around interactive whiteboards among teachers. Its purpose could be to solve problems related to their use, but mainly to

exchange views and good teaching practices among participants. Creating such a community of practice would allow for the categorization of topics, easier searching and cooperation between the teachers.

Let us not forget that today's students have grown up with a variety of technological stimuli and therefore developed technological skills. In schools, there are teachers who, as professionals, learned to use information technologies as adults and experienced the shift in education with the integration of ICT. On the other hand, there are younger teachers who take technology use for granted as they grew up surrounded by a plethora of technological stimuli [13]. In both cases, however, it should be stressed that there is a difference between the simple use of technologies and their pedagogical use.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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