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presents:

# STUDIES EVALUATING THE EFFECTIVENESS OF IWB ON STUDENTS' AND TEACHERS' OUTCOMES



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The Future of Education



# Paper goals



## Main aim:

This study aimed to analyze the current research focused on investigating the impact of interactive whiteboard IWB use on students' and teachers' outcomes. There are identified two categories of studies:

one related to **assessment of the influence of IWB integration on students' outcomes** and another

**to study the effect of IWB use on teachers' outcomes under various aspects, focusing on pedagogical issues.**

**Keywords: interactive whiteboards; pedagogical competencies; pre-service teachers; primary and pre-school education**

# Paper contents

- Context of the research
- Research approach/question
- Theoretical framework
- Research methodology
- Findings
- Implications for teacher education

# Context of the research

Acces **ENO LMS**

utilizator demo : **ana**  
parola : **parola**



[www.enoeducation.ro](http://www.enoeducation.ro)

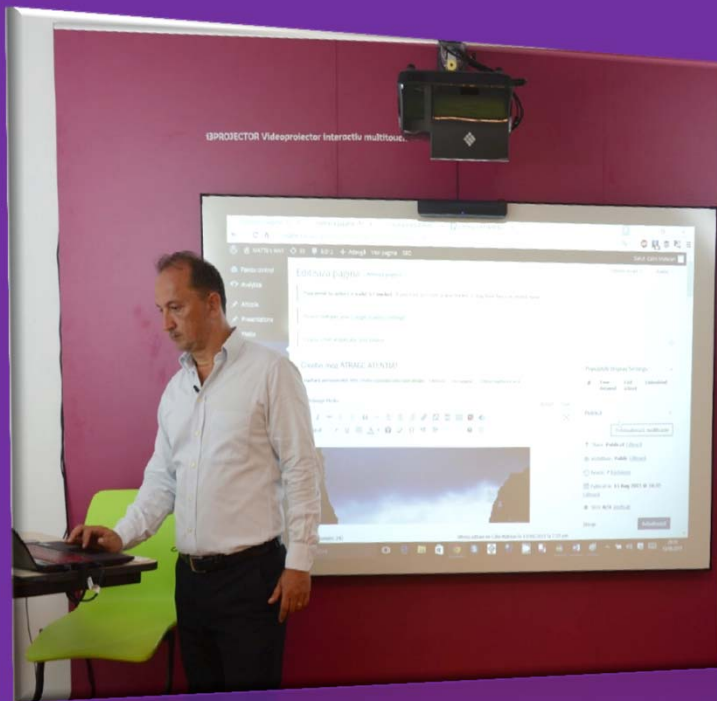
Proiectul face parte din PN II  
PARTENERIAȚE ÎN DOMENIUL ÎNSUȘIRII  
și este cofinanțat de  
*Uefixedi*  
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An important way of running teaching-learning activities is to use modern technologies with innovative teaching tools and a pedagogical purpose.

But technology itself cannot influence students' performance if teachers are not able to create a learning environment pro-active, collaborative and based on assuming self-responsibility of the learning process

# The interactive whiteboard with integrated sound (ēno)



- ❑ allow users to operate the PC from the front projection on the board;
- ❑ compatible with all the software installed on PC;
- ❑ on the ceramic surface the users can write with an whiteboard marker;
- ❑ the integrated sound add a new dimension in the communication process;
- ❑ can be used in science experiments, with sensors and data logger, so the science data can be displayed and controlled from the board.

# Context of the research



The interactive whiteboard (IWB) (Mata, Lazar and Lazar, 2016: 278) is a modern technological tool which can be successfully used in the education process in order to increase or improve various skills needed for a future teacher (Davies, Jindal-Snape, Digby, Howe, Collier and Hay, 2014: 34).

The IWB's pedagogical role is increasingly emphasized both in terms of improving students' achievement (Chen, Chiang and Lin, 2013: 173, Hennessy, Deaney, Ruthven and Winterbottom, 2007: 283), but also in the optimal teachers' training (Campbell and Kent, 2010: 447, Minor, Losike-Sedimo, Reglin and Royster, 2013: 1, Winkler, 2011).

It is obvious that technology itself could not help increase students' performance if teachers could not create a learning environment which stimulates students to be active, it is based on cooperation (Dobber, Akkerman, Verloop and Vermunt, 2012: 609) and on taking responsibility in the learning process (Smeets and Mooij, 2001: 403).

# Context of the research



The interactive whiteboard (IWB) is a modern technological tool successfully used at class, but also can be used to increase or improve various skills needed by pre-service teachers [4].

The **main pedagogical benefits** offered by the use of IWB are captured by Smith et al.: flexibility; effectiveness in the use of multimedia; support in teaching design; diversity of resources; developing ICT operating skills; increased interaction and participation of students in lessons.

# Context of the research



The interactive whiteboard (IWB) is a modern technological tool successfully used at class, but also can be used to increase or improve various skills needed by pre-service teachers [4].

There are also **negative effects** of using IWB, such as restructuring students' autonomy and restoring the teacher-centred classroom.



# Context of the research



The extent to which teachers use these new tools and the degree of interactivity mainly depend on the individual teachers' teaching styles. As Gatlin emphasizes, there are factors which are important to be taken into account in applying the new technologies, such as student motivation, educational changes, professional learning needs and the ability to effectively integrate technology in curriculum design.

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Considering the last factor, teachers' ability of integrating IWB, Winkler notes that teachers do not benefit from training programs focused on providing best practice examples on the effective use of IWB.

# Studies investigating the effects of using IWB

*on students' and teachers' outcomes*

There has been an increasing interest in science education in relation to valorisation of the modern technologies in recent years, with a growing number of studies based on the integration of IWB in teaching and learning activities in order to improve academic results and other psychological development processes (creativity, motivation, attitudes, etc.).

## Studies investigating the effects of using IWB

Some of these studies have mainly aimed at determining the impact of IWB use on various components of the educational process and most of the results highlight the positive effect of the use of IWB on the students' progress.

## Studies investigating the effects of using IWB

The studies focused on investigating the effects of IWB use are structured in the present study on two main directions: researches focused on assessing the influence of IWB integration on students' outcomes in terms of learning, creativity, attitudes etc. and studies focused on studying the effect of IWB use on teachers' outcomes under various aspects.

# Research methods

## 2.1. Researches focused on assessing the influence of IWB:

The influence of IWB integration on *students'* outcomes is demonstrated in literature from the perspective of different aspects of psychological development: improvement of the cognitive outcomes; skills' development; school motivation development; stimulation of the creativity; memory development.

Most of the studies predominantly focus on the use of IWB as modern technology to improve student learning informative aspects, and less on developing formative aspects of student learning, such as boosting school motivation and students' creativity, as it can be seen from Table 1.

# Research methods

Table 1. Studies focused on the assessment of the influence of IWB integration on students' outcomes

Categories	Author(s)	Objectives	Methodology	Results
improving the cognitive outcomes	Amolo & Dees [11]	assessing the influence of IWB on the learning of students specializing in social studies	- participants: 26, 5th grade students; - research tools: survey, content analysis of students' journals	- students' perception towards IWB was influenced positively. - students' learning and their commitment also increased
	Riska [12]	determining the impact of using IWB on the growth of mathematical performance	- participants: 175 gifted students in the fourth grade; - research tools: pre-test and post-test	- no significant increase among gifted students
	Yang & Wang [13]	exploring the efficiency of IWB integration on the learning outcomes in Biology	- participants: 54, 7 <sup>th</sup> grade students; - research tools: pre-test and post-test	- significant differences in the effectiveness of learning in Biology.
developing skills	Chen & Tsai [14]	determining the effectiveness of using IWB on reading skills	- participants: primary school students; - research tools: attitudes questionnaire	- increase in the students' interest in reading - improvement of their literacy level.
developing school motivation	Huang et al. [15]	investigating the impact of IWB use on students' learning motivation	- participants: 6 <sup>th</sup> grade students; - research tools: attitudes questionnaire	- a significant difference in terms of the motivation towards learning Mathematics.
stimulating creativity	Behzadi & Manuchehri [16]	-measuring the creativity level of high school students who learn in a learning environment based on using IWB compared to the traditional learning environment	- participants: 62 high school students; - research tools: creativity test	- significant differences between the creativity of students who learn Mathematics by using IWB and students who learn Mathematics by the traditional method.
developing memory	Norouzi et al. [17]	identifying the impact of IWB use on the retention level of the new words learned by EFL learners	- participants: 50 secondary school students; - research tools: English language skills test	- no significant difference in retention of new words when teaching vocabulary using IWB.

# Research methods

## 2.2. Studies focused on studying the effect of IWB use on teachers' outcomes under various aspects

IWB use effect on *teachers'* outcomes can be noticed in some research conducted in the development of professional skills categories: development of specialized competences, scientific concepts; improvement of technological skills.

The research that have as an objective to determine the IWB integration effect on the development of teachers' professional skills are very few and mainly aim at improving technological skills as it can be seen in Table 2.

No studies were found in the literature to highlight the role of new technologies on training and practicing teachers' pedagogical skills. According to Coyle et al., it is a priority for teacher training programs to focus on developing teachers' interactive teaching, as well as on technological skills.

# Research methods

Table 2. Studies focused on studying the effect of IWB use on teachers' outcomes

Categories	Author(s)	Objectives	Methodology	Results
developing specialized competences	Emre et al. [18]	- exploring the impact of IWB use on the results of future Science teachers on the topic of cell membrane structure	- participants: 42 students; - research tools: knowledge test, attitudes scale	- no significant difference in terms of students' performance on the topic of cell membrane structure.
improving technological skills	DeSantis [20]	- measuring the effects of professional development by using IWB on technological self-efficacy	- participants: 46 teachers; - research tools: IWB technological self-efficacy questionnaire	- no statistically significant difference between the results of teachers from experimental group and control group.
	Akyuz et al. [19]	- investigating the IWB use effect centered on micro-teaching activities on teachers' technological pedagogical content knowledge (TPACK)	- participants: 48 future teachers; - research tools: TPACK Self-confidence Scale; Interactive Whiteboard Student's Perception Survey	- positively influences the TPACK Self-confidence level. The experiment did not alter the positive perceptions of future teachers towards IWB.



# Conclusions

The present study analysed the main pedagogical approaches of using modern techniques and explores the latest research focused on evaluating the effectiveness of IWB on students' outcomes, but especially on teachers'.

# Conclusions

The studies focused on measuring the effects of using IWB were divided into two main directions: studies focused on assessing the influence of IWB integration on improving student learning informative aspects, and the formative aspects of student learning (developing skills, boosting school motivation and students' creativity) and studies focused on studying the effect of IWB use on the development of teachers' professional skills.

# Conclusions

These studies revealed the preference of the researches which aim at investigating the impact of IWB use on student learning outcomes. Also we notice that the development of teachers' professional skills who use modern technologies are a few.

There is a lack of research related to valorising IWB in order to develop teachers' pedagogical skills.

## EXPLORING INTERACTIVE WHITEBOARDS IMPACT ON PEDAGOGICAL COMPETENCES DEVELOPMENT

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### ABSTRACT

The study presents an educational experiment investigating the impact of interactive whiteboards on the development of pedagogical competencies of primary and pre-school teachers. Students with different ages were randomly divided into two equal groups: first group participated in the interactive teaching training learning program and the second received the traditional teacher training program. The use of the interactive whiteboard on development of pedagogical competencies at pre-service teachers influenced the development level of pedagogical skills differently for young and mature students. The results of the comparative analysis on school performances showed that young students with the same initial knowledge obtained significantly higher post-test results than the adults. The young students from the experimental group got better results in terms of the development level of pedagogical skills compared to the students from the control group. For mature students development level of pedagogical skills did not depend on the training means used.

### KEYWORDS

ANCOVA; interactive whiteboards; pedagogical competencies; pre-service teachers; primary and pre-school education

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***Thank you for attention!***