

# Implementation of Interactive Whiteboards into the Educational Systems at Primary and Secondary Schools in the Slovak Republic

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## Abstract

The contribution describes interactive whiteboards, their fundamental advantages and disadvantages, types, their deployment in practice in the frame of pedagogical innovations in the system of education in Slovakia and also their possible implementation in primary and secondary schools based on the previously executed researches and studies.

**Keywords:** interactive whiteboards, competencies of teachers, deployment of IWBs at PS and SS in the SR.

## 1. Pedagogical Innovations in the Slovak Educational System

Contemporary educational system in Slovak Republic is in accordance with the government law on education and upbringing (school act 245/2008) which has been valid from September 1, 2008. System of reforms has caused some changes in education and upbringing at the level of regional education. One of the major changes is the implementation of interactive systems into all levels of education. As a result, a new school act on education supported by the ICT was

passed. It is described in the State Educational Programme ISCED 1. Implementation of the interactive whiteboards into our educational system is one of the crucial phenomena of the abovementioned reform.

## 2. Interactive Whiteboard (IWB)

IWB is an electronic device that enables interactive work with computer directly from the board itself through clicking on the projected picture, interactive pen or a human finger [3]. IWB can be considered to be a core of an interactive classroom, the system consisting of PC, data-video-projector and board. It represents the first type of educational technology suitable for interaction in the frame of whole classroom. [4]

The main advantage of IWB lies in the simplification of teachers' preparation for particular lesson, in better visualization of presentations, in possibility to be connected on-line and also in active remote participation. Such board serves not only as a tool for presentation, but also as the input equipment of the whole system. When compared to the traditional presentation of a new educational content, in this case a teacher can react much more flexibly directly in the course of

presentation, for example to activate more information sources from the net, add information on-line, etc.

## 2.1. Contemporary Advantages and Disadvantages of IWBs

IWB represents important overturn in the classroom teaching all over the world and the outcomes of recent studies of numerous authors (Torff and Tirota, 2010, Amolo and Dees, 2007, Moss et al., 2007, Wall et al., 2005, Beeland, 2002, Bell, 1998,) prove that they have positive effect on students' outcomes when used correctly. Since the IWB can be used in the front part of a classroom, it enables more frequent deployment of electronic didactic means that demonstrate huge potential of alternative ways of providing information. Among basic pros of IWB belong:

- Faster and easier reception of information by pupils;
- Increment in visualization of teaching, motivation and activity of students;
- Students can participate in group discussions and presentations, since they do not have to make notes;
- Students can cooperate in the process of solving various tasks;
- Quick feedback when used for interactive testing;
- Possibility to use additional plug-in devices (tablets, voting apparatuses).

Most frequent cons of IWB are:

- IWB is more expensive than traditional blackboard, or even more than the combination of projector and projecting screen;
- Surface can be easily damaged, expensive service and spare parts;

- In the course of front projection the surface of the board can be shadowed by a user, especially in case of mobile IWBs;
- If the remote access is allowed, sometimes happens that pupils try to send various spurious messages, pictures or comments onto the desktop;
- One potential disadvantage is a fact that such whiteboard enables teachers to add too much information to students what easily may lead to the overload of pupils.

## 2.2. Types of IWBs

Currently there are seven different principles or technologies of IWBs operation: Electromagnetic, Analogue-resistant, Technology of infrared rays, Technology of laser beams, Ultrasound technology, Optical technology and Capacitive technology.

From the point of view of a mass deployment of IWBs in schools, the most frequently used are the touch-based, electromagnetic and infrared IWBs. In case of digitizers it is a combination of infrared rays, optics and ultrasound.

When choosing the IWB it is important to consider various criteria of function, meaning e.g. what classroom shall be the IWB placed in (traditional, vocational, specialized), how do we want to master the IWB, does the board enable parallel work of more users at once, what is the principle of functioning of the IWB, what diagonal dimension of the desktop do we need, if there is any other way of deployment of such board, what is its way of installation, software equipment, guarantee, price.

From the point of view of projection, we can distinguish 2 types of IWBs, those with the front projection and the other group with a rear projection. According to the way of their attaching and placing,

they can be divided into static, mobile and portable. Connection of the board can be provided either via USB cable or wirelessly.

Competition between producers of various types of IWBs is extremely escalated nowadays. The new producers have decided to build on already verified principles and the first-rate software support in their effort to integrate all the so far deployed technological elements.

### **3. IWBs in the Slovak Educational System**

The idea of implementation of the IWB into education is nothing that surprises nowadays. Various studies have been done to analyse contemporary deployment of the IWB at primary and secondary schools in the Slovak Republic, their influence on the quality of teaching process and last but not least on the development of pupils' competencies but only one of these studies offers a complex and real picture about IWB in Slovakia. Such a complex study was recently elaborated by M. Pigova reacting on a concrete suggestion of the Educational Institute of Information and Prognoses of the Slovak Republic.

The study shows a real picture of contemporary state of using IWBs at primary and secondary schools in Slovakia shortly after the new school reform has been put into effect. From the total number of 649 participating schools, 464 have got at least one or more IWBs. An interesting fact has appeared that even the basic demographic data more or less significantly influence possibilities of schools to get the IWB. From the point of view of overall equipment, the leaders are secondary grammar schools, schools with more than 500 students and schools in towns with more than 5000 inhabitants. The total number of IWBs at schools varied from 1 up to 13. 35 per cent of

schools own just 1 IWB, 57 per cent have 2-5 IWBs and 8 per cent of schools use 5 and more IWBs. There was the rule observed that the higher level of project activities at schools the higher probability of having the IWB. The most used types of IWBs have been e-Beam (50%), Promethean ActivBoard (30%), QOMO (16%), and Interwrite (14%). All the other types of boards have been used in less than 10 per cent of schools. The most common place for IWBs is a vocational classroom what was confirmed in 56 per cent of teachers. 33 per cent of participating schools use their own financial sources when buying IWB. The other schools use the sources as follows: Infovek (15%), EU funds (14%), projects of the Ministry of Education, Science, Research and Sport (13.6%). All the other forms of financial support (founder, loan, present) were used in less than 10 per cent of schools. The schools which do not have any IWB see the most common reason of such situation in the lack of money. Financial situation is a huge problem for more than 94 per cent of all schools.

Positive finding was that from the total number of 937 asked teachers, almost 70 per cent use the IWB in the lessons. Those who do not use it state the reason of its absence (50%) and 30% do not work with IWBs since they are places in such room where there is restricted or limited access granted for them. The other reasons (lack of time, experience, or they do not need it) were marked by less than 8 per cent of teachers. M. Pigova was in her study dealing also with the time intervals of using the IWB by teachers. More than 50 per cent of teachers use the IWB more than 1 year and 27 per cent more than 2 years. Almost 22 per cent use IWBs less than half a year. More than 44 per cent use the IWB on a daily basis and almost 37 per cent at least once a week. More than 18

per cent of teachers use it less frequently. Mathematics is the leader in implementation of IWBs with 20 per cent, followed by foreign languages (18%), Slovak language (13.5%) and vocational subjects (8%).

Interactive materials needed for adequate deployment of IWBs prepare teachers themselves (83%); meanwhile only 14 per cent do not use other materials but their own. The Internet as a source for materials is being used by 75 per cent of teachers and ready materials prepared by other colleagues are used by 38 per cent. Original IWB sources are used by almost 30 per cent of teachers. 71 per cent of teachers who attended the IWB course and learnt how to use IWBs in particular subject use the IWB nowadays. Only 20 per cent of teachers use the board as a projecting screen, 37 per cent use also interactive display of computer and 50 per cent use the interactive software. [6] The fact is that hand in hand with the rising number of computer equipment rises the number of schools that use IWBs. The most frequent problems in work with IWBs are of technical character, lack of information on possible deployment of IWBs, low level of skills and even mistrust towards digital technologies. Other disadvantages mentioned by the teachers were blocking the view (shadowing) by their bodies, eye tiredness, impossibility of parallel work of 2 or more students (in case of older types of boards), unsuitable number of boards, obstacles in accessibility to the IWB, lack of teaching materials. Especially the lack of materials as a serious problem was confirmed in another study orientated on the research of pedagogical innovations by Bagalova. [7] One specific obstacle in the process of implementation of IWBs into education is the discipline of students. Interactive methods enabling better participation of students are more difficult to be mastered

from the point of view of class management. Here is required self-discipline and adequate communication abilities from the side of students. [7] On the other hand, the respondents are fully aware that interesting interactive lessons increase the motivation of students which leads to the decrement of disciplinary problems.

Among the most frequently stated advantages in work with the IWB belong dust-free environment, cleanliness in classrooms, support of individual work of pupils, increment in attractiveness of lessons, direct feedback, possibility of simulations of various phenomena which usually stay invisible in everyday life, simplification of preparations for the lessons and the like. Obtained data from the answers in a questionnaire by Pigova for pupils of primary and secondary schools are extremely significant for practice (221 pupils at 72 schools in Slovakia). 16 per cent of pupils confirmed deployment of the IWB in one school subject, 34 per cent use the IWB in 2-3 subjects and 26 per cent stated more than 3 subjects. Unfortunately, 24 per cent mentioned that they have not been using the interactive white boards at all.

Among interesting and important outcomes belong the obtained opinions of students on their perception of changes after implementation of the IWB into their lessons [6]. Up to 71 per cent of students feel that thanks to the IWB deployment they are able to memorize new study content in a more effective way and 69 per cent think they can concentrate much better on the new study content. 58 per cent believe that the IWBs can help them better present their knowledge and finally, 35 per cent are of an opinion that thanks to the IWB they are forced to search for more new information to solve various types of tasks, and they appreciate it. [6]

#### 4. Conclusion

Based on the previously stated outcomes of the studies we dare say that the usage of IWB has become a part of everyday education at the majority of Slovak schools. It seems to be more than obvious that both teachers and pupils have got familiar with the IWBs, especially because of the abovementioned advantages.

We positively perceive the fact that not only the informatics itself, but the overall development in the area of information of society and of technological policy has become one of the crucial priorities of the Ministry of Education and the Government of the Slovak Republic.

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