

INTERACTIVE BOARD AND ITS POSSIBILITIES OF USAGE IN THE PRIMARY EDUCATION

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Abstract: *The usage of information and communication technologies in education at all types of schools becomes obvious nowadays. Information and communication technologies bring a great amount of positive effects that appropriately enrich and support education. Generally declared need for integration of new media and educational technologies in the educational process is a necessary condition of the further development of pedagogical sciences. As a result of that, it is necessary to promote new educational techniques and methods derived from them and thus there arises a question whether schools, teachers and teachers-to-be are ready for such a thing. Since the authors of the present study are not aware of an overall analysis dealing with this issue, we have decided, based on carrying out research, to identify the interest and preparedness of primary school or teachers in implementation of modern didactic tools into educational practice in form of interactive boards. The present study introduces the progress, process and result of this significant research.*

Keywords: *didactic tools, information and communication technologies, digital technologies, interactive board, multimedia, multimedia presentation, research.*

1. Introduction

Didactic tools (compare Prucha, 1995; Manák, 2003; Janis, 2006) are part of tuition since the beginning of cultural history of mankind and can be generally defined as "all means and features that provide, require and improve the efficiency of tuition and with the usage of appropriate educational methods and organisational forms; they assist in reaching the pedagogical-

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educational goals" (Prucha, 2009). The aim of didactic tools is especially to apply the principles of clearness (Nikl, 2002), as in tuition, if possible, all the senses should be involved in getting to know the reality. The recent researches relate to this fact and they have confirmed that the visual processing of information is more effective because we receive information in 87% by sight, 9% by hearing and 4% by other senses (Prucha, 2009).

In the days of boom, of information and communication technologies, modern didactic tools which are based on digital technologies and *multimedia* (Sokolowsky, Sedivâ, 2002), have become prominent for teachers. *"Multimedia is computer-integrated and time dependent or independent media that can be interactively, that means individually and selectively, developed or processed"* (T. Svatos, in Prucha, 2009). According to N. and J. Chapman (2001) it is possible to derive particular parts of multimedia presentations that *"are processed by demanding technical composition where computer technology plays the main role - it is the only way to transfer information from different sources into the same process called digitalisation"* (Chapman, Chapman, 2001). Multimedia presentation is thus "new" type of educational material that consists of several basic parts enabling the full usage of digital technologies in the educational process. The basic parts of multimedia presentation consist of (1) hypertext; (2) the graphics of images; (3) sound; (4) video; (5) animation (Chapman, Chapman, 2004) and can be defined as: *"one of new educational technologies which uses parallel effect of pedagogical information from various media sources in order to reach the educational intentions and these sources are intentionally and practically gathered (usually in an electronic form) and interactively offered to the tutor for the sensual perception and mental process"* (T. Svatos, in Prucha, 2009). Interactive boards are a suitable technological means of presentation for multimedia presentations created and structured in this way (Dostâl, 2011). These boards are in short called i-boards (Finney, England, 2002). An interactive board is thus one of the ways to innovate the teaching process and make use of all the possibilities of multimedia presentations. *"The word innovation is usually perceived as a development and practical implementation of new features into the educational and learning system. The aim of the innovation is to improve the quality of this system."* (Skalkovâ, 2007).

All the presented facts make new demands on teachers who have to be prepared to work with modern didactic tools and technologies and create any appropriate educational materials for such tuition. This need

stems not only from the practice but also from the necessity to accept modern paradigms of teaching where constructivism is its flagship (Prucha, Walterová & Mares, 2003) and it perceives the importance of student's inner conditions of learning as well as their contact or interaction with the environment. That is why in this modern teaching paradigm new demands are made on a teacher and even though the teachers do not necessarily need to be ICT experts they should be able to make use of them in tuition where their role should be, above all, students' advisor (Jonassen et al., 2003). We can define these demands from the TPACK model (Technological Pedagogical Content Knowledge) by L. Shulman (1986), in Czech - technological-didactic knowledge of content, according to Zounek and Sed'ová (2009) or Jamk (2005) who was further elaborated by P. Mishra and M. Koehler (Mishra, Koehler, 2006). This model uses three dimensions: (1) pedagogical dimension; (2) content dimension; (3) and technological dimension that all accept the fact that teaching is a complex activity requiring various types of knowledge (understanding, skills and attitudes), "*and understanding its principle means to penetrate into the complex net of their inter-relationships*" (Simonová et al., 2010).

According to Brdicka (B. Brdicka, in Sojka, Rambousek eds., 2009), integration of ICT in the tuition is possible only based on a real modification of teaching processes. Newly outlined content that educates teachers is composed of, according to above given TPACK, four parts, the first one being the earlier mentioned didactic knowledge of content (Pedagogical Content Knowledge - PCK) that stems from the original Schulman's concept. This concept, according to Mishra and Koehler, contains knowledge how to approach the educational content and organise it in order to be transmitted as effectively as possible.

The second part deals with the interconnection of teaching and technologies (Mishra, Koehler, 2006). As a result, technological knowledge of the content is formed there (Technological Content Knowledge - TCK), to be more specific, this knowledge describes which technologies are appropriate for the particular educational content. This means that the principle is not only in the knowledge of the taught subject or issue, but also in the way the subject is adjusted using the ICT.

The next part connects the field of didactic knowledge with the technological knowledge (Mishra, Koehler, 2006), which results in a new educational field, so called technical-didactic knowledge (Technological Pedagogical Knowledge - TPK). This field represents not only the knowledge of the existence of various technologies usable in education,

but also the knowledge of the fact that these technologies have various tools and possibilities applicable in tuition. This means that it is necessary for the teacher not only to know of the various technologies, but also be familiar with their possibilities and limits that can be brought in the tuition.

The last part is an intersection of the three above mentioned fields. Mishra and Koehler (2008) talk about so called technological-didactic knowledge of the content (Technological

Pedagogical Content Knowledge - TPCK) made by a new form extending significantly further than its three parts. Technological-didactic knowledge of the content is according to earlier mentioned authors (Mishra, Koehler, 2006, 2008) the foundation of effective education that requires from the teacher, above all, understanding the usage of technologies. "*Only the combination of all necessary knowledge (technological-didactic-subject) makes the teacher an unique and irreplaceable master of their field who is able to help transfer learning towards higher forms in the current world conditions.*" (Brdicka, 2009). One of the groups of knowledge required for execution of truly modern and effective tuition at schools is, indeed, multimedia presentation preparation and its usage in the educational process through an interactive board.

2. Interactive board in tuition

Interactive board is a touch-sensitive surface that enables active mutual communication between the user and the computer aiming at providing the maximal possible objectivity of the presented content (Dostál, 2009). It is usually used together with a computer and a projector and, with the help of the interactive board; the users are able to influence the computer and the running programs. Thanks to the projected image on the interactive board (especially, where the changes are in progress) it is possible to follow the current state on the computer output in the real time (J. Dostál, in Klement et al., 2011a).

The traditional connection interactive "board - projector - computer" is still accompanied by other features, such as voting machine through which we can very quickly and precisely find out the rate of gained knowledge and consequently involve students in the tuition.

Based on a series of direct tuition observations where the interactive board has been used (Klement et al., 2011b) the following advantages of interactive boards usage can be deduced (j. Dostál, in Klement et al., 2011a).:

- Students can be motivated more effectively using the interactive board appropriately;
- the study material can be visualised, it is possible to use animations, move objects, the principle of objectivity is applied;
- enables to keep the longer attention of students;
- earlier created materials can be re-used or easily corrected;
- students can get actively involved in the tuition more easily;
- the text written in the actual tuition can be easily saved and shared with other students through the internet;
- students develop their information and computer literacy, that is crucial nowadays, while working with the board.

It proves that the trend in equipping schools with interactive boards can lead in the fact that using interactive boards will be essential for teachers. Until now we have been able to come across isolated attempts which mainly deal only with partial integration issues within particular segments of learning material. Some of the so far realised researches (Klement et al., 2011b) clearly show high students' and pupils' interest in tuition supported by interactive boards and multimedia presentations. Tuition oriented in this way is considered by some authors to be *a new complex method* that should offer students funnier and less routine form of tuition and learning (compare Manâk, 1997; Betcher, Lee 2009, Klement et al., 2011a). It should involve students in cooperative class formation, which will lead in students' motivation to study.

Although there is a generally declared need for incorporating new media (i.e. multimedia) and new educational technologies (i.e. interactive board and its accessories) and promote new educational approaches and methods derived from them, the question is whether schools are ready for that at all. Since the authors of the presented study are not aware of an overall analysis dealing with this issue, we have decided, based on carrying out a research, to identify the interest and preparedness of schools and teachers in implementation of modern didactic tools and digital technologies in primary education. The progress, process and results of this analysis are presented in the following study.

3 The starting points for the research execution

Based on frequent impulses from primary schools dealing with primary education, that closely cooperate with Faculty of Education at Palacky University in Olomouc, we have begun to deal with the possibility of research execution which would monitor the interest in new

technologies and educational methods of these schools. On the basis of these starting points, we have decided to carry out a thorough analysis of the needs for the execution of education supported by modern didactic tools and digital technologies in two fields:

- the interest of the primary schools headmasters dealing with primary education in the issue of interactive boards and multimedia presentations incorporation into educational process,
- the interest of teachers from these schools in tuition focused on interactive board usage and necessary multimedia presentations forming.

A form of questionnaire has been chosen as the basis of data collection that would enable to gather reliable and valid results (Foddy, 1994). This questionnaire has been formed for either part separately. The questionnaire was anonymous, which ensured the maximal real value. These questionnaires were distributed among particular target groups and after handing in continuously evaluated. All in all, more than 100 questionnaires were distributed, which ensures high real value of the following results.

- **Used methodology description**

Two types of questionnaires have been used for every target group of the analysis separately. The research respondents could answer the specific presented questions only in a dichotomic way - YES/NO (Horák, Chráska, 1983). We assume that this method is sufficient for this case and provides an adequate overview of primary education teachers' and headmasters' interest in a particular type of activities that could enhance the education quality. The validity of that is supported by the fact that for the statistic results evaluation an analysis of particular answers frequency and percentage representation in form of graphs and charts has been used.

From the above mentioned reasons the standard research hypotheses were not formed, however, we defined specific closed questions with a dichotomic answer that was marked by the respondents in the questionnaire. Based on these facts in the next parts of the analysis we will consider the conclusive outcome the value when 60 and more per cent of the relevant research sample answered the asked question YES or NO. In that case the question was evaluated in two ways - the target group either is or is not interested in the particular field and the further concern is or is not useful.

5. The research execution and results with a group of headmasters dealing with primary education

In this area of the analysis, the collection of necessary data was started with the questionnaires distribution in regular meetings of faculty school headmasters, on the occasion of the beginning of academic term 2010/2011. Faculty school headmasters and headmistresses dealing with primary education had the opportunity to fill in a questionnaire with these questions:

○ Does your school have modern didactic tools (interactive board, the voting machine, etc.)?

○ Are your teachers able to use these methods properly?

○ Are your teachers able to create the needed educational material (multimedia presentations) for the needs of tuition execution supported by an interactive board?

○ Are you interested in graduates of Faculty of Education of PU that can not only use the modern didactic tools but also prepare the needed educational material?

All in all, 15 faculty headmasters and headmistresses dealing with primary education have answered these questions with the return of all 100,0% in this research sample. To make the research complete, other 12 primary schools dealing with primary education and cooperating with the faculty through pedagogical practice have been addressed which meant there had already been existing and applicable contacts. As a result, 12 headmasters and headmistresses from these schools have been addressed and they have been given the questionnaire mentioned above. Again, we can claim that the return of questionnaires reached 100,0%. The composition of the respondents sample in this area of analysis is shown in the chart below:

	Filled in questionnaires in total	Schools in total	From that Faculty schools	From that "common schools"
The number	27	27	15	12
in %	100,0	100,0	55,6	44,4

Chart 1 - The composition of research sample of headmasters and headmistresses dealing with primary education

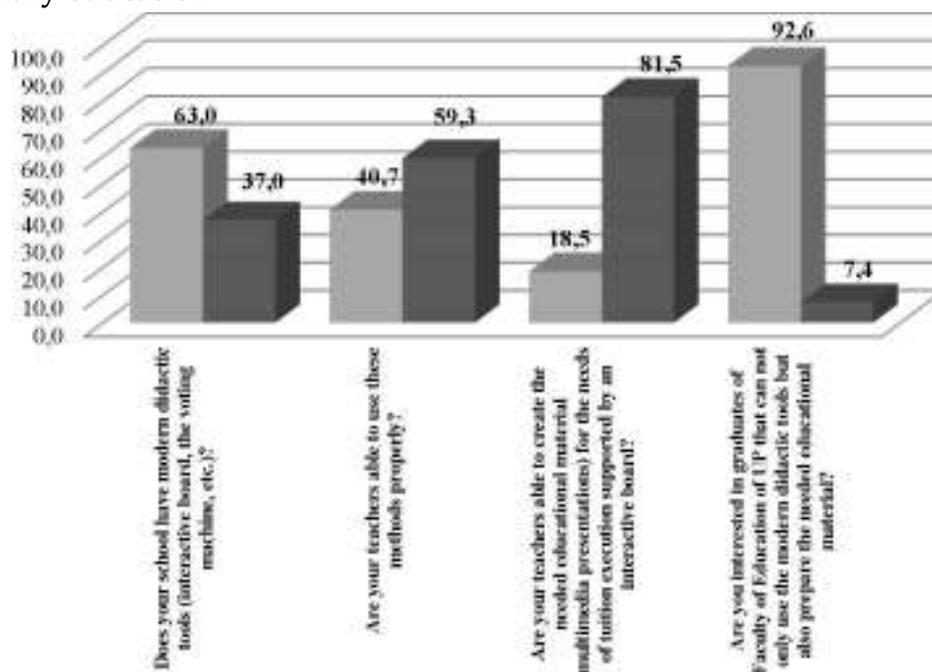
According to the above mentioned rules we have evaluated total 4 questions for cooperating schools headmasters or headmistresses dealing with primary education. The research results in this field of interest in interactive boards and multimedia presentations and related activities are shown in the chart 2 and graph 1 below.

	Question 1)	Question 2)	Question 3)	Question 4)
YES	17	11	5	25
NO	10	16	22	2
YES in %	63,0	40,7	18,5	92,6
NO in %	37,0	59,3	81,5	7,4
In total	27	27	27	27
In total in %	100,0	100,0	100,0	100,0

Chart 2 - The research results with a group of headmasters and headmistresses dealing with primary education

The carried out analysis clearly shows the interest of headmistresses or headmasters from schools dealing with primary education in modern didactic tools and technologies, since 63,0% from them stated that they do have modern technology but only 40,7% from their teachers are able to work with this technology. Furthermore, only 18,5% of the schools have teachers that are able to create adequate educational material for the tuition organised in this way. In addition, 92,6% of headmistresses or headmasters stated that they are definitely keen on pedagogical faculty graduates who would be able to use didactic tools and digital technologies, which means to operate interactive boards and create such multimedia presentations. The whole situation is even more obvious in this graph 1.

The research results with the group of headmasters dealing with primary education



YES in% NO in%

Graph 1 - The research results with the group of headmistress and headmasters from schools dealing with primary education

According to the obtained results, shown in the previous text, there is an obvious interest of school institutions dealing with primary education in teachers who are able to use modern didactic tools and digital technologies in tuition, which means to operate interactive boards and create multimedia presentations for them.

6 The execution and results of the research with the group of teachers from schools dealing with primary education

In this field of research, the collection of the needed data was started by a questionnaires distribution in 27 school institutions dealing with primary education, their headmistresses or headmasters got involved in the first phase of the research. Even though this measure significantly narrowed the space for obtaining research data, it provided us with the possibility to compare the opinions of the headmasters and teachers working there. The questionnaire was aimed at the teachers of 1st - 4th grade at primary schools, in particular, in two regions of the Czech Republic with these questions: