

# EXPERIMENTING WITH SUPPORT OF MOBILE TOUCH DEVICES FOR PUPILS WITH SPECIAL EDUCATIONAL NEEDS

Mgr. Vojtěch Gybas, Doc. Ing. Kateřina Kostolányová, Ph.D. and Mgr. Libor Klubal  
University of Ostrava, Pedagogical Faculty, Department of Information and Communication Technologies  
Fráni Šrámka 3, Ostrava, Mariánské Hory, 70900, Czech Republic

## ABSTRACT

The aim of this paper is to describe one of the learning option for pupils with special educational needs with the support of ICT in the educational area Man and Nature, „a basic knowledge of chemistry.“ Form of experimental teaching is not commonly used in elementary school special education. With the support of ICT, specifically the iPad, we can try a simple experiment as a demonstration of unusual subject matter: the solubility of the substances, the density of matter, detailed structure of the fabric surface. Perception of microscopic object details is very difficult and sometimes impossible for pupils with special educational needs. Working with a microscope is very difficult because of various pupils affection, such as fine motor skills disorder, visual disturbances and so on. But if we use an iPad and an appropriate application, we can do experiments very effectively also in a special elementary school. iPad, in connection with Magniscope appropriate tool, is a great tool to capture any detail that a student with moderate mental disorder cannot notice Pupils can „experiment“ on their own, they can create screens. These screens can be used in the creation of interactive books in Book Creator - add their descriptions, reviews and previews.

## KEYWORDS

Pupils with special educational needs, ICT, iPad, experiment, Magniscope, Book Creator.

## 1. INTRODUCTION

ICT has been a part of education for many years - a computer, interactive whiteboard, laptop. However, cell touch technology - tablets are increasingly involved in students' education. Tablet allows greater flexibility to pupils with special educational needs, „it requires less burden on graphomotorics control and facilitates visual and sensory Learning.“ (Flewitt, Kučírková, Messer, 2014), while „it significantly increasing attention at work.“ (Epps, online, 2016) . Fine motor skills difficulty is usually the most frequent manifestation of pupil's moderate mental disability. Therefore, the tablets can be a very effective tool in teaching. In such a situation the teacher is able to work in a completely different way. New way. He can create experiments with students, he can use a different form of writing notes of relevant phenomena in the form of video recording, photography, writing on the virtual keyboard. This would be impossible by using a computer and a standard keyboard and using conventional paper materials would be unrealistic from the learner's point of view. „With its variety of input and output methods, the tablet provides easy access to a variety of users. For students with motor skills impairments, the touch screen is easier to use because they do not need to control their finger as precisely as with keyboards or other writing utensils. Tablets are also used to contribute to the development of these skills“ (Johnson, 2013, online). While other technology solutions exist, none is as easy to use as a tablet.“

## 2. FORMS OF TEACHING

According to Muller, Valenta (2013), the most often forms of pupil's work in special elementary school are characterized into four groups. These forms of work are complemented by our own knowledge from

experience: **frontal work** - in a special elementary school it is highly recommended to use it with other forms of teaching. Frontal form is suitable in familiarizing students with the desktop application. We want to introduce one content to all pupils at the same time. **Group work** – all students work together on one output, each student meets one part that he can handle, the output is common. **Individual work** - this is the main approach to pupils in special elementary schools. The teacher works with each student individually, during certain time unit, with a predetermined aim. **Individualized work** – „since it is very demanding for a pupil’s inner motivation, leisure skills and self-control ability, it is used sporadically in special elementary schools.” (Müller, Valenta, 2013, p. 388). „Technology allows teachers to devote to all pupils at the same time, and concurrently plan lessons for individual students with diverse educational needs. Pupils can work individually on pre-prepared materials, or directly in an electronic environment, if a school allows that.” (Adamus, 2015, p. 9). In their own pace, there is a predetermined learning aim for the moment.

### 3. MOBILE TOUCH TECHNOLOGIES

Many researchers suggest that especially tablets are very useful. Eg. in the partial research Gybas, Kostolányová (2016) in Mobile touch screen devices as compensation for the teaching materials at a special primary school: special education teachers in the Czech Republic use tablets and applications as one of the most common forms of compensation for missing teaching materials, most often in the educational area Man and Nature.

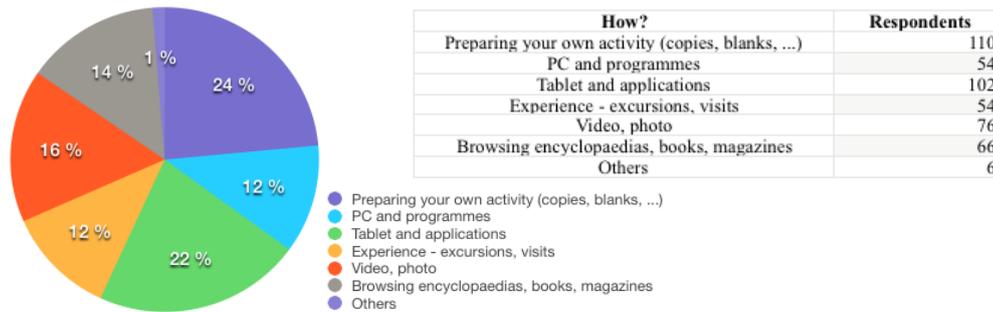


Figure 1. Compensation of learning material - the most often used form?

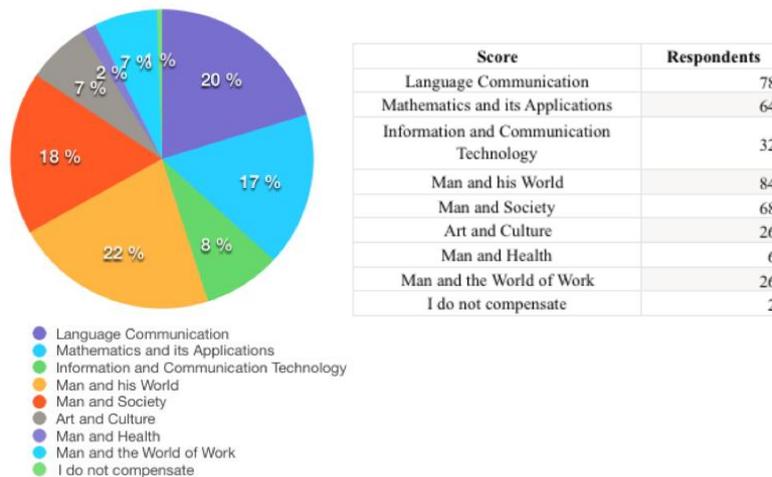


Figure 2. Compensation of learning material - what kind of educational field the most often?

The principle of the criteria above is confirmed by words of teachers from the state of Virginia, USA, where in 2010 there was the first pilot project with the introduction of the iPad into teaching in primary schools. As reported in Digital Directions (online, 2016): English teacher Erin Upton tries to personalize

reading assignments based on proficiency, and uses a feature of the iPad to help highlight key vocabulary words for students. Math teacher Amreen Alvi has found some apps to help students understand Fractions and decimals, and Also has the students off the open worksheets Blackboard Inc. classroom-management site and complete them with a stylus pen During a classroom exercise. Remember that *„learning process is successful when you involve all the senses in the learning process, as far as possible, especially when we are active ourselves.“* (Pipeková, Vítkov, 2001, p. 25). Holler (1996) states that a learning brain retains 10% of what we read; 20% of what we hear; 30% of what we see; 50% of what we hear and see; 70% of what we say, and 90% of what we do. iPads can support the claim. It's very important in special elementary schools. Allen (2016) states in his study that, digital technology affords a unique advantage and opportunity for customization that traditional paper material cannot provide. Apps can either be “closed” or „open“: both are interactive, but only the latter allows the user to change or modify content. Flewitt et al. states, however, one of the key features of the tablets on which apps are used is their touch-screen; thus, touch, gesture, and pointing can be supported by the use of tablet hardware (Flewitt et al., 2014) and the apps used to support learning could be designed to enhance this type of sensory interaction to a greater extent than possible with traditional print medium embedded. MacDonald, Hill (2014) state that in particular, these devices can be categorised based on their primary use as augmentative and alternative communication (AAC), access equipment, environmental control units (ECU), assistive listening devices (ALD), visual aids and mobility and positioning technologies (eg, wheelchairs) and thus further determined as low-tech or high- tech gadgets according to the degree of electronic and computer components incorporated within the device.

#### **4. EXPERIMENT IN A SPECIAL ELEMENTARY SCHOOL EDUCATION**

Experiment, as a method of natural science research, may be highly beneficial in a special elementary school, but only if the teacher keeps certain rules. As it is indicated by Malčik, Mechlová (2014), the principle, for teaching the science subjects in general, is experimentation, which is based on effects research and patterns detection or verification of what students already know from the theory. Unfortunately, the intellectual capacity of pupils in special elementary school does not allow to base on a pupil's theoretical knowledge. Yet we can use experiment as a method of science research teaching, but we must adapt the process to the pupils. According to the Framework educational program for the field of education, in special elementary schools (hereinafter FEP ZSS), the basic knowledge of chemistry is learning content as well as. Bilek, Tobiřiková (2010) report that digital technology has become an organic part of teaching chemistry as one of the natural sciences and enables discovery of new knowledge and principles. The experiment, in simpler form, can be an excellent tool to teach the curriculum, to introduce the phenomena to students, within their intellectual abilities. For pupils in special elementary schools, it is very important to re-fix the curriculum and try to keep memories. Redman, Jakab, Carlin (2014) concluded, that iPad use can redefine learning spaces and Contribute to the creation of innovative pedagogies, as teachers RESPOND to the iPads versatility and mobility features. The potential, and limitations, of Digital Technologies to Contribute to students' learning Opportunities Explored have been here, through analysis of the perceptions, stories and actions of teachers, students and parents. Thanks to the iPad and selected applications we can keep the experiment for future use: the form of photos, videos, interactive books.

##### **4.1 Application Magniscope**

Due to the intellectual abilities and individual differences of students in special elementary schools, it is possible to include working with the iPad as a "computer aided teaching of science. "into teaching process. In practice, we mean adoption and approach of substances features - solubility, density, surface detail. This allows students to work with the iPad and applications Magniscope. Applications Magniscope - it is an easy used application "magnifying glass for everyone." Holding iPad of about 10 centimetres above the paper. We can see *„small letters printed sentences through the lens of the camera on the iPad.“* (App Store, online, 2016).



1. area of shot subject
2. object detail - microscope function
3. button "Information"

Figure 3. Magniscope applications operating environment.

Students are able to work independently with the iPad and applications Magniscope. They enclose the iPad in front of the object of their interest, they wait for the focus of the object. Once it is focused, they „freeze“ the object by touching the screen. This will keep a preview of the inspected object. Students can independently create screen display by double touching (pressing a Power button and home Button - simultaneously). This created screen is saved to the iPad in the Photos app. Pupils already know where exactly find the resulting images.

## 4.2 Experiment process

In the first part of the lesson, we talked about living and nonliving nature. I explained the importance of non-living components for living nature. In the next part of the lesson, pupils were given several different subjects and they were supposed to assess them in terms of state - solid, liquid and gas. Together we have gathered the main common characteristics of these three types of state. To be able to see details of surveyed objects, we used the iPad app Magniscope. Pupils were able to see the structure of sugar, salt, a carpet, a stone, a paper tissue, oil in water, ice. At the end of our experiments we demonstrated, that some substances can be found in all three states. The proof was water, which we brought to boil, and we saw it going up in the form of gas, which is steam. We let freeze part of the water in the freezer, so that at the end of the lesson it was in the form of solid - ice. Thanks to the fact that we introduce most of the demonstrative aids continuously to our observations, we were able to keep their attention on the maximum level. Bílek, Tobiříková (2010) states, that the real experiment should not disappear from the school practice, but also, we cannot avoid vicarious observing and working with models. It is necessary to search for an appropriate combination of both approaches applications. For pupils with special educational needs, the experiment is working with Magniscope application and observation of details.

## 4.3 Findings record

To record the findings of knowledge in a special elementary school, feedback is very important. Based on meta-analysis of series of studies, Hattie and Timperleyová (2007) indicate, that various types of feedback can be variously effective. Primarily, feedback focused on the process fosters deeper understanding. On the contrary, they oppose to feedback, focused on the personality, which has no direct connection with actual pupils' performances. Applications Book Creator can be used in any field, regardless of age, from the age of 4 and up. "Using Book Creator we can create our own learning resources, or work on their own materials with pupils:

- interactive stories,
- digital documents,
- journals,
- poetry books,

- science write-up,
- instructions for use." (Redjumper, online, 2016).

Thanks to the book created with book Creator , the educator gets interactive material to which he can return at any time and can easily update it, edit, share. For the pupil, the feeling of a well done job naturally increases, reinforces key skills for learning, skills for problem solving and social personnel and especially communicative competence. If the student has an interactive book content created by himself, he recalls information more easily. „*All educational content must face the formation and development of key competencies , methods and forms of education and activities taking place at school. By respecting the specific needs of students with moderate intellectual disability, the focus is on key communication skills, social and personal work.*“ (RVP ZSS, 2008, p. 13).

## 5. BENEFITS OF WORKING WITH IPAD

For children lacking motor skills, touch screens are more intuitive devices. **Fine motor skill** - experiment in teaching, using the tablet, has clearly demonstrated a reduction in claims on fine motor skills. Students are unable to work with ordinary keyboard due to these difficulties. Typing on the virtual keyboard of the tablet is very fast interactions: eye - hand. A pupil sees immediately what he writes. For students, who have not embraced writing letters, using common writing instruments -a pencil, a pen, tablets are a new mean of working, which he couldn't do before. **Working with the media** - pupils work with the tablet, using the camera application. They can create photographs, video recordings together with the teacher. With those they work in Book Creator and create interactive books. That lesson is still "alive". It means that students can always come back to their interactive books in their tablets. They can look at the photos, videos. If the teacher only created a "passive" book that would be printed, photos would reduce the effect of re-call of the phenomenon. **New possibilities** - using ICT, in the form of a tablet, in the classroom, offered a completely new form of work and a completely new tools for working. Working with classic microscope is impossible in elementary school. Working with Magniscope, which simulates a microscope, was very helpful and efficient. Students were given the opportunity to examine the details of substances and objects. **Motivation and imagination** - working with the tablet is still a very strong motivator. Pupils enjoy working with tablets. Tablet can increase their attention at work. Pupils are focused, concentrated, are keen to explore and research. This phenomenon is very valuable. We could see their interest in object details. We can reinforce imagination very effectively, which is characterized by "narrow-mindedness, fragmented and unclear connections, which can be seen in stereotypical and content-poor activities of the play, which persists even in compulsory schooling.“ (Zezulková, Kaleja, 2013,p. 25).

## 6. CONCLUSION

Methods of work, forms of education and access to pupils with special educational needs are very specific. Limited to some extent. From both sides - students - intellectual ability and personal oddities, and from the teaching materials - they are very outdated, inadequate. Nevertheless, using innovative features and approaches, usually encountered in elementary schools of an ordinary type, we can try even in special elementary schools to maximize the development of students. When working with an iPad we can use several forms of teaching. Frontally - illustration of Magniscope applications; individually - helping pupils with the creation of the Screen, Screen inserting and the creation of interactive books; We can individualize the teaching process - capable students perform their tasks independently with their own pace. They reach the goal = creating an interactive book. We should not forget one thing. Using mobile touch technologies, which tablets represent, bring new possibilities for pupils. We naturally raise their motivation, enthusiasm, new possibilities of gaining knowledge. Pupils in special elementary schools can work as ordinary pupils. They use the same options, only in a limited extent.

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