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Information Technology in Contemporary Education – Individuals' Researches

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Abstract The development of computer technology is reflected in, among other things, the development of modern didactics. Current pedagogy and media education, as a fast developing discipline of general pedagogy, is a topic of a number of studies. Applying the modern multimedia aids at various stages and in various types of education is considered as an indispensable element of modern didactics, due to new opportunities the modern media offer. An interactive whiteboard is an example of such a modern teaching aid applied at present in education.

Keywords: *media education, didactics, multimedia, information society, ICT*

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1. IT in Education

Media education is a concept connected with the spread of information technology in didactics. It has been subject of numerous dissertations in Poland and abroad. According to a definition, media education is: „developing the skill of conscious, critical and selective use of social communication media, including the education to become a mass media audience" [4]. In practice, media education can be also understood as an interdisciplinary subject whose aim is to familiarize the receiver with the applications of information technology in broadly conceived education. Within the next few years both the methods of teaching this subject and its content are going to change on the basis of a new curriculum, which has yet to be developed. Controversies appear even at the level of the definition and naming the subject, alternatively referred to as education by the media, media in education or education for the media. I do not intend to discuss the terminological problems in this paper, since what matters most is the familiarity with the subject content and its implementation. Analyzing the possible interpretations of the different names, on the other hand, does not seem to lead to any fruitful conclusions. The most interesting aspect of developing a curriculum for media education is the function and aim of the subject, as well as methods of teaching and it is on those issues that I expect feedback from the reader of the present paper. Media education should be carried out not only by schools, but also by other social institutions, such as the family, the state, the church or other organizations. As evident, the problem is very broad, so it is necessary to concentrate on its selected aspects in the present paper.

2. Assessment of the Media Education Practice against the Schooling Reform of Polish Education

The main assumptions concerning the practical application of media education in school curricula were formulated in 1998, that is at the time when the school reform introduced in 1999 was being prepared. The justification of the necessity of introducing media education at university level was included in the documents of the Bologna Process (1999), and later in the Prague Communiqué (2001) and the Berlin Communiqué (2003). The countries which signed these declarations adopted a common framework of cooperation and mutual exchange of experience. Common aims were also adopted, as well as a number of specific solutions, including the organization and scope of lifelong learning. Media education is therefore a practical approach to the education of the youth, developed on the grounds of media pedagogy [9]. On the basis of the previously mentioned definition, it can be stated that information obtained via the electronic path can be useful for a young person in his/her didactic activities. A young person should be able to face a new role and challenges of living in an information society, the role based on the recent developments in electronics and information technology. Education is this area has to be a multi-stage process starting as early as possible and offering a chance of learning how to use modern technology in the process of education and later in work. For the young generation to develop the skill, they are to be regularly and permanently exposed to the latest achievements in technology. That is why it is vital to popularize the idea of information

technology in the school in various forms and at various levels of education, from kindergarten to university.

It has to be noted that education programmes and curricula, although developed by outstanding specialists, may become outdated before they actually reach the classroom. The publishing of textbooks may take even years, so that teachers are often rightly concerned about the validity and currency of the textbook content. Sometimes, in the pursuit of their individual interests, students get updated about the latest scientific and technological findings by surfing the Internet. On the one hand, it is a positive phenomenon, on the other hand, it makes educators think how to keep teaching curricula updated. This, in turn, implies further questions: how to pass on the knowledge by means of modern and more attractive teaching aids? In the light of the financial situation of the school system in Poland, it is not easy to find an answer to either of the questions. Fortunately, due to the unbelievable pace of the IT development, what is currently the most modern and expensive will soon become cheaper and more available when new solutions appear. The dynamic character of the changes provides an opportunity for schools, most of which are equipped with IT labs, multimedia software and access to the Internet. It has to be kept in mind that some five or ten years ago the situation was different and few schools could pride themselves on having a modern IT lab.

As the time passes, the requirements that educational services have to meet evolve. Social changes following the economic ones created the demand for up-to-date educated staff. Finding such employees may be a real challenge for an employer. Owing to that, it is essential to offer education in the fields in which specialists are sought. Besides, in the long-term perspective, it turns out that the skills acquired at school are insufficient and education must therefore be continued in the form of lifelong learning. Both state and private educational institutions respond to this need, offering many courses financed by resources coming from EU projects. The development of lifelong learning provides a unique opportunity to enhance or to change qualifications.

Media education is oriented mostly towards young people. The teacher, who also participates in the didactic process, should naturally have enough knowledge on media education to arouse interest on the part of the young learner. An interesting classification of teacher – student roles is presented by Marek Prensky, an author of numerous publications in the field, a renowned writer and expert on education and learning. He puts forward his ideas in his books and web site [14], where he names the young generation, born after 1983, for whom the digital world and the media are a natural environment, digital natives. The older generation, including teachers, is the generation of digital immigrants, because they come from the world of traditional analogue media and have to learn to live in the new reality of digital media [8]. Thus, a paradox can often be observed in the field of media education, involving a teacher-student role reversal, since students can outperform teachers in their ability to use media for educational purposes. This phenomenon is referred to as ‘pedagogical inversion’: it is the teacher who learns and the learner who teaches [15].

Taking into consideration the fact that young people acquire IT knowledge on their own, the question can be asked about the usefulness of media education. To answer this question it appears necessary to analyse the social and psychological aspect of education by the media. On the basis of the existing publications the following conclusions can be drawn:

- The knowledge of IT is indispensable for a citizen; a person unfamiliar with the computer has practically no chance for educational or professional success;
- Information is nowadays perceived as a product of economy and source of income for society. The position of technologically advanced countries is crucially based on the external market, highly qualified personnel and availability of the Internet technological infrastructure;
- As far as the positive contribution of IT to the social and economic development is unquestionable, there is also a negative side to it, such as common access to unreliable sources of information or even to pathological or criminal sites;
- The development of IT leads to revolutionary changes in the education process, quite soon the traditional school will be gradually losing its position as distance learning will be gaining momentum.

I have described this problem in detail from the didactic viewpoint in my previous publications. The founding of virtual schools will be definitely prompted by the high cost of maintaining traditional schools. The prospective savings can be seen at every level of school operation in Poland. On the one hand, it is known that approaching each learner on an individual basis promotes creativity and on the other hand, the number of pupils in the class is constantly increasing. Teachers are naturally opposed to this trend, which is understandable from the perspective of didactic effectiveness.

3. Individual Research on Using IT in Education

I conducted the research from 2009 to 2012 in the Institute of Technological and Safety Education, Jan Długosz Academy in Częstochowa, Poland. It took place in the laboratory, the classes concerned computer studies and electro – electronic classes. The research conducted in that field is essential because it is important to educate future teachers who can share their knowledge with future generations. Teachers’ future work will be based on the cooperation with children and young people at different age, which means that their knowledge need to be delivered in compliance with the foundations of the didactic instructions. There exists a large correlation between the content of teaching subjects and the ability to share it. It is essential to teach students the methods of instruction and the manner to share the content, which requires not only theoretical knowledge, but also practical knowledge in taking actions, developing skills in choosing the work methods, communication with students, and skills in establishing the cooperation.

3.1. The First Stage Of Research

I conducted the first stage of my research work in the academic year 2009/2010. I gathered 68 students that studied in their first, second and third year at the Academy.

During this stage, I subjected students to leaning research on the poll and the questionnaire of the interview. Questions in the survey were in a form of closed-ended questions, whereas in the interview, students answered the questions, being often proposals for changes in the further stage of the research. The purpose of research was to obtain information from the students about the validity of current knowledge and about the view on the current teaching methods used at the University and also in the secondary school.

3.2. The Second Stage

I conducted the second stage in the academic year 2010/2011 and 2011/2012, with 280 students participating in the survey. In order to conduct the research, I separated from the existing laboratory groups – the experimental groups, from both computer and electro – electronic classes. In those groups I held classes personally, which made it possible to introduce innovation into the course of classes and a thorough evaluation of the learning progress.

During this stage of research, I introduced to the experimental group new didactic solutions, which were based on new didactic measures with the use of multimedia techniques. I chose the particular media due to their usefulness and expectations of listeners expressed in the first stage of the research. In order to compare the results obtained, the research was based on the same poll and the questionnaire of the interview similar to the first stage. The control group also participated in the research, without having any innovations introduced. The division of students into the control and experimental group differed as far as the initial level of students' knowledge and their average marks of analyzed subjects were concerned. Due to the fact that marks from particular subjects could have been subjective, I created the test concerning the basics of computer science and electrotechnology in order to check their knowledge. The analysis of the results - made in a correct manner showed the actual level of students' knowledge. Groups with a lower average marks were assigned to the experimental groups and students with higher average marks to the control group. Due to the fact that the average marks did not significantly differ from each other, it was possible to state that students represented a similar state of knowledge.

3.3. The Differences in The Maintenance of Training in The Experimental and Control Groups

In the experimental groups, interactive software was used in the didactic process. The software corresponded with the subject matter and content taught. In the control groups, the didactic aids included video tutorials, mostly made in the traditional form, and panels. The students were also requested to learn from the literature. As far as the didactic methods are concerned, classes in the experimental group were taught in IT laboratories and modern classes equipped in electronic devices and IT devices. Much emphasis was put on the individual character of each student's work. Classes in the control group were conducted in lecture rooms or traditional laboratories, without any IT equipment or access to the Internet. The didactic process in the experimental groups was also boosted by using the Moodle platform based on the academic server, providing access to downloadable materials. Additionally, the project method WebQuest was applied. During the whole study, the students' activity was controlled by means of statistical tools on the Moodle platform. Besides, it is worth noting that the students could communicate directly with the instructor during duty hours. The achievement test in experimental groups was carried out online, with questions selected for each student on a random basis and with limited time for answering them.

Classes in the experimental group and in the control group were modefied not only with respect to the organisation but also with respect to the diversity of didactic means. The main assumption underlying the study was that the didactic means should meet two important conditions: they should correspond very closely to the aim of teaching and they should be based on a license, such as Freeware, Adare, Affero GPL, GNU, Shareware. From the first condition it follows that software significantly exceeding the range of topics included in the subjects should is of limited usefulness. One of the conclusions obtained in the study was that software and other didactic aids intended for broader topics that those included in the class curriculum hinder rather than help the didactic process, by introducing too much information, or information which is irrelevant for a current purpose and distracting the student. As for the software being based on one of the above-mentioned licenses, all users can avail themselves of it, at the same time showing respect for the creator's copyright.

3.4. The Examples of The Use of Information Technology in Training of Experimental Groups

The IT classes were conducted with the use of a modern stand, representing a computer model with all its component parts, describing also its technical parameters. The model was intended to show to students how the computer CPU is constructed and how it collaborates with external information storage media. The model is not based on a computer application but it is not the point in this case, because its role is to simulate and illustrate the operating principle of the computer, which it does in a highly appealing way. In the task description, there was an instruction to assemble a required computer configuration on the basis of the prescribed operating parameters. This is an example of a problem method, and to solve the problem it was necessary to get acquainted with the literature and the characteristics of subsystems being parts of the model. The task appears to be highly useful, since in the future work as an IT teacher or Design and Technology teacher, students will be able to rely on experience and skills acquired by performing the task. Another interesting proposal is based on the packet called "IT Lab" produced by Elbox. The packet consists of an interface with measuring sensors and actuators, a programme for developing an algorithm and didactic materials such as ready-made lesson plans and instructions of use. The ready-made function blocks were used by students to assemble individually designed models and then to simulate their use by means of a computer application.

Other computer applications used include Multitester 2.0PL by Elsoft (multiple choice tests in IT), a number of PowerPoint and Adobe Flash slide shows, Prezi, interactive courses of using Microsoft Office, the Internet, CorelDRAW, SISDraw, SolidWorks, and others.

Since not every technical university has an electronic laboratory with modern equipment, the students of electronics from the experimental group worked on adopting the computer with a basic configuration to be used for measuring quantities and representing the results of measurements visually. A device utilised to this end was a popular sound card, which can normally read sound signals, but when slightly modified, it can also be used to obtain a device working similarly to a digital oscilloscope. The computer itself makes it possible to record signals and to observe them on the screen. Even though this device cannot replace a regular oscilloscope, it offers an interesting way of using an ordinary computer, without the need to purchase any additional extended cards. The only condition that has to be met for a computer to be used as an oscilloscope is that it has a sound card compatible with the SoundBlaster mode and the software Oscillogram for SoundBlaster v1.10, available in the Internet. Being universal as it is, the computer can also be used as a device for creating connections between virtual electronic elements and simulating the operation of electronic systems by means of the software Electronics Workbench and Multisim. All too often, we think of laboratory classes as of tedious work, involving connecting various systems and measuring devices by means of cables. Such tasks are also useful from the didactic viewpoint, by providing students with direct familiarity with devices and enabling them to learn how to use them in practice. In fact, however, preparing a laboratory stand for class activities can also be time and effort consuming for the class instructor, who may face certain technical obstacles. Besides, the influence of external factors may render the task assessment difficult, or also time consuming. It was observed that the classes with virtual electronic equipment were met with great interest on the part of students, whose involvement grew significantly. In the experimental group for teaching electronics, other virtual simulators were also used, such as Digital Circuits v.2.0, Multisim (educational version), Electronics Workbench v.5.0, Eagle – v.4.03, multimedia presentations, LabVIEW v.4.0/5.0 pl, Calcul de Resistance v.1.1, Oscillogram for SoundBlaster v.1.10, Crocodile Clips v.2.0, DasyLab, and others. In all experimental groups, the theoretical classes were conducted with the use of a interactive multimedia board coupled with a projector and individual tablets. The interactive board is a renowned device, combining the functions of a display screen, carbonless board, and computer.

3.5. Methods, Techniques and Tools of Measurement

In my research I applied the following techniques:
- questionnaire of the poll,
- interview,
- observation.

The questionnaire of the poll and the final tests that checked the knowledge from a given subject were regarded as the bases for a verification of accepted hypotheses. I ranked the formulated questions according to the problems which were realized during the didactic classes from a given subject. Fourteen questions concerned the opinion of the applied didactic measures regarding their usefulness and functionality during the laboratory classes.

3.6. Findings

In order to evaluate whether the effect of teaching in the control group and in the experimental group was comparable or differed in the two groups, I conducted the final test. The results obtained gave me the possibility to compare the marks in two groups. I used the method of the statistical analysis – using a non-parametric test for independence chi-square distribution, for the purpose of a closer analysis of the data and the indications whether the didactic aids used in the experimental group had an essential influence on the level of students' knowledge.

$$x^2 = \sum_{i=1}^{n} \left(\frac{O_i - E_i}{\sigma_i} \right)^2 \quad (1)$$

where:

O_i - the measured value,

E_i - the corresponding theoretical value (expected), resulting from the hypothesis

σ_i – the standard deviation,

n - the number of measurement.

The analysis of the collected data consists in an attempt to verify the hypothesis that two qualitative features in the population are independent. Thanks to this method one can make sure, whether data contracted in the many-divided board delivers a sufficient proof for the relation between the two variables. The test $\chi 2$ consists in a comparison of frequencies observed with the frequencies expected, at the assumption of the zero- hypothesis about the lack of relation among these two variables. I compared the calculated values χ^2 with critical values for accepted degrees of freedom and the level d=0,05. I also calculated the C-Pearson's coefficients (the coefficient of Pearson's linear correlation determines the level of linear dependence between random variables),

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \overline{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \overline{y})^2}}; \quad (2)$$

$$r_{xy} = \in [-1,1] \quad (3)$$

where: x and y are continuous random variables,

x_i, y_i represents random trial values of these variables ($i = 1,2,...,n$); whereas, $\overline{x}, \overline{y}$ are expected values from these attempts, i.e.

$$\overline{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \; \overline{y} = \frac{1}{n}\sum_{i=1}^{n} y_i \quad (4)$$

which statistically confirmed the essential relation between the received marks in the control and experimental group. The analysis of the results confirmed the hypothesis of the research and induced me to formulate the present conclusions.

A number of conducted researches has proved that the use of new didactic measures undoubtedly has a positive

impact on the didactic process. Of course, it is difficult to mention only the positive values of the given didactic aid, because there are some of the measures which have a negative influence, although they should support this process. It is necessary to carefully evaluate their usefulness, because often the novelty of a given aid does not guarantee its usefulness. The introduction of didactic aids during classes should be based on special evaluation by the person who conducts classes. In many cases, the introduction of new aids, will not only make the didactic process less attractive, but also will not arise the interest of students. The most frequent reasons concerning this kind of situation is an extensive material of the didactic programme, a detailed presented theme, and an inappropriate level of an adequate vocabulary according to the age and education of a participant.

Poland has a grading scale: 5-highest, 4, 3, 2-lowest.

Table 1. Test χ2 – Computer science

test value χ2	degrees of freedom	C- Pearson
58,61	df=2	0,48

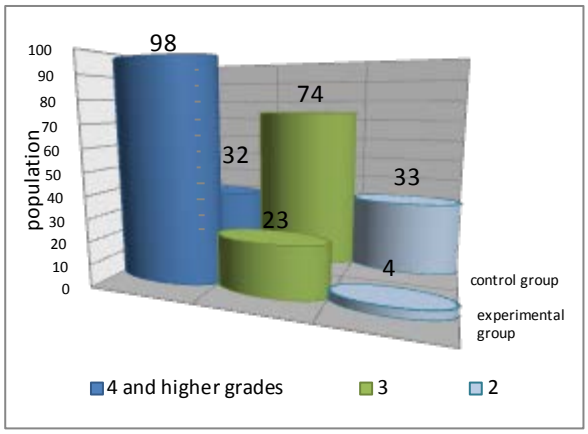

Figure 1. Scheme two-dimensional: ESTIMATION – GROUPS (computer science groups)

Table 2. Test χ2 – Electrotechnology

test value χ2	degrees of freedom	C- Pearson
8,049	df=2	0,34

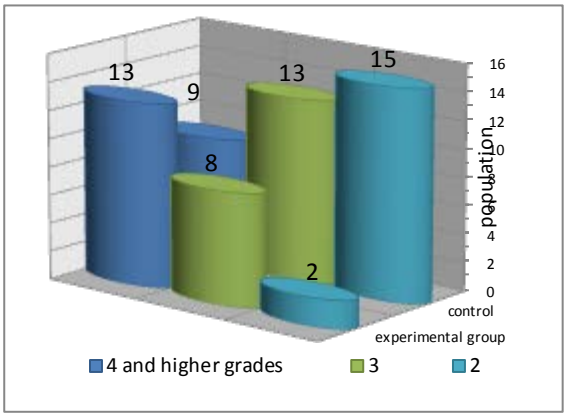

Figure 2. Scheme two-dimensional: ESTIMATION – GROUPS (electrotechnology groups)

4. ICT in Education

ICTs are potentially powerful tools for extending educational opportunities, both formal and non-formal, to previously underserved populations inhabiting rural areas, groups traditionally excluded from education due to cultural or social reasons such, as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus [10].

There are thirteen reasons to use educational technology in lessons:

- where information and communications technology (ICT) is taught well, it has been shown to enhance pupils' levels of understanding and attainment in other subjects. That's because "real" ICT is more about thinking skills than about mastering particular software applications;
- ICT can provide both the resources and the pedagogical framework for enabling pupils to become effective independent learners. For example, computer programs are available that adjust themselves to the pupils' level and then set appropriate tasks and give feedback on performance. Used wisely, these can help pupils to move on;
- ICT places all learners on an equal footing. Given the right hardware, software and curriculum activities, even severely physically disadvantaged pupils can achieve the same degree of success as anyone else;
- ICT has been shown to have benefits in terms of motivating pupils. That comes about partly through factors like being able to produce nice-looking work with no teacher's red marks all over it, and partly because the computer is seen as being impartial and non-judgemental in its feedback to the pupil;
- ICT enables pupils to gather data that would otherwise be difficult or even impossible to obtain. For example, data from inaccessible places (e.g. outer space), inaccessible times (e.g. overnight), from both overseas and nationally on demand (without having to physically go anywhere) or data at very precise time intervals;
- ICT enables pupils to gather data that would otherwise be time-consuming or costly, or both. For example, pupils can use the internet to get up-to-the-minute information on prices. They can use a DVD or the internet to watch movies of old dictators speaking, or the moon landings, or to listen to a piece of music by Mozart;
- ICT enables pupils to experiment with changing aspects of a model, which may be difficult or even impossible for them to do otherwise. For example, pupils of Business Studies and Economics can see what might happen to the economy if interest rates were raised or lowered. Pupils can use webcams to capture the development of an egg or a plant;
- ICT enables pupils to draft or redraft their work until they are satisfied with it;
- Another reason to use ICT in lessons is because it can help to implement personalised learning;
- Pupils usually enjoy using computers and other types of technology, so lessons which make use of it start off with an advantage (which is all too often squandered);
- Educational technology puts the pupil in control (if it is well-designed), enabling her to personalise the

interface, select and create resources, and even choose what to learn;
- Just about every aspect of modern life involves educational technology; therefore, to not make use of it in the curriculum is anachronistic;
- Because educational technology pervades all aspects of modern society, schools have a duty to ensure that pupils understand issues such as keeping safe online, protecting their identity, recognising good and misleading information sources on the Internet, the effects of educational technology on communications and the economy, to name but a few issues [6].

5. PAN European Survey on ICT Use at School

A study commissioned by DG Information Society and Media reports that while 2/3 of EU schools benefit from broadband access to the Internet –giving them access to higher quality content – there are still important discrepancies between member states. 'Benchmarking Access and Use of ICT in European Schools 2006' presents the results of two surveys carried out in spring 2006: a head teacher survey of more than 10,000 school heads with a focus on information about the schools and a survey of more than 20,000 teachers focusing on their use of ICT. The survey was conducted in 25 Member States as well as Iceland and Norway. The survey showed that 96% of EU schools have internet access today, also more and more school are moving to broadband connection with an EU average of broadband access at 67%. Broadband is more widely used in Nordic countries, the Netherlands, Estonia and Malta. Greece (15%), Poland (28%) and Cyprus (31%) have the lowest broadband access rate. On average in the EU, the ratio computer/pupil is 1/9 or, in other words, 100 pupils share 11.3 computers. Since the earliest measurements performed in 2001, there has been a steady increase in the computer/pupil ratio since measurements of the earlier study made in 2001. The study also looks at how and to what extend schools use the infrastructure in teaching and learning. The answer to the question whether "computers and the internet are integrated into the teaching of most subjects" shows that countries such as the UK, Sweden, Finland, the Netherlands, Denmark reach high figures, while other countries where ICT is still taught as a separate subject achieve lower results. Finally, another key area of work focuses on teacher's motivation to use ICT, in Germany (10.5%), Latvia (8.6%), France (7.5%), Belgium (5.8%) and the Czech Republic (5.5%), more than 5% of all teachers are not using computers because they say they see "no or unclear benefits" [7]

6. Concluding Remarks

To conclude, I would like to express an opinion on the future and significance of media education in the times of educational challenges. The question is what media education can offer to the future generations of learners appearing at schools every year. The answer is rather pessimistic, since it seems that the offer of educational institutions may be insufficient with respect to the expectations and demands. At present, the young generation is one step ahead of the Polish school but it would not be surprising to find out that the problem is more widespread.

References

[1] Barski, T, *Technologia kształcenia nauczycieli techniki*, Śląskie Przedsiębiorstwo „OPCJA-IPO" Publisher, Uniwersytet Opolski, 1998.

[2] Conclusions of the Presidency of Lisbon European Council of 23 and 24 March 2000, Council Document 100/1/00, European Commision, Brussels 2000.

[3] *Edukacja medialna wyzwaniem XXI wieku*, social networking service, http://www.edukacjamedialna.pl/news.php.

[4] Encyklopedia elektroniczna – Wikipedia, http://pl.wikipedia.org, 2011.

[5] European Commission Information Society and Media Directorate –General, http://ec.europa.eu, 2011.

[6] Freedman T., *The educational technology site*, http://www.ictineducation.org, 2011.

[7] Gerhard P., *Insight observatory for new technologies and education*, http://www.xplora.org, 2011.

[8] Morbitzer J., In: Prensky M., *Cyfrowi tubylcy i imigranci*. http: //www. edunews. pl (access 26.06.2009)

[9] Morbitzer J., *O potrzebie edukacji medialnej*, http://www.wychowawca.pl, 2011.

[10] Tinio V.L., *ICT in Education*, http://www.saigontre.com/FDFiles/ICT_in_Education.PDF, pp.6, 2011, bused by The Asia-Pacific Development Information Programme (APDIP) 2007, http://www.apdip.net, 2011.

[11] Prensky Marc home page, http://www.marcprensky.com, 2011.

[12] The Global Information Technology Report 2008-2009, World Economic Forum, Geneva, 2009.

[13] Twining,P. & Footring, S. The Schome Park Programme – exploring educational alternatives. In Peachey et al (Eds) *Researching Learning in Virtual Worlds*, pp.53-74, London: Springer & The Open University, 2010.

[14] Twining, P. When Educational Worlds Collide. In Sheehy, K; Ferguson, R. & Clough, G. (Eds) (2010) *Virtual Worlds: Controversies at the Frontier of Education*. pp. 125-142. New York: Nova Science Publishing, 2010.

[15] Walsham, G. & Sahay, S. *Research on information systems in developing countries: Current landscape and future prospects.* In: Information Technology for Development, pp. 7-24, www.tandfonline.com, 2010.