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Use of Information Technologies in Upper Secondary Education – Practical Inspirations from Karol Miarka Upper Secondary School Complex No. 2 in Pszczyna

Abstract

In the foreseeable future multimedia will not replace natural teaching tools. However, there are a number of didactic situations where the use of indirect forms of reality description is advisable or even necessary.

The article aims to present elementary pedagogical practice in the field of contemporary educational technologies and to show the creative quest and reflexive enrichment of the pedagogical style of teaching, in which particular skills are used. The presented problems contribute to future research into the analysis of teachers' skills development in terms of the use of computer programmes in school management.

What presents a challenge to the Digital School is education in cyberspace, e-learning, new technologies and solutions, accompanied by simultaneous prevention of media-related risks. Schools need to keep abreast of the rapidly changing reality – only in this way can they produce beneficial educational results for society in the 21st century.

K e y w o r d s: Internet, multimedia, computerisation, digital school

Preliminary Reflections – Information Technology

Information education is education preparing for life in information society. Today's students are tomorrow's teachers – they will be teaching other people. Educators and psychologists say that what causes various qualities to develop in children and youth is the influence that mass-media have on their audiences. The term "influence" can be taken to mean a direct response to a stimulus or a long process that manifests itself in various changes, often hardly perceptible, occurring in different periods of one's mental life, in development of norms, and in the ability to make moral and aesthetic judgments. Hilda Himmelveit has identified three types of influence that media have on children and youth. These include direct, cumulative, and subconscious influence (Himmelweit et al., 1958, p. 79, quoted in: Koblewska, 1980, pp. 89–90).

That is why it is necessary to introduce media education courses; young people should be taught how to develop their faculty of will, how to develop emotions, and how to mould proper attitudes which are the most important result of the educational process. Media education means shaping proper attitudes towards the mass-media. "Attitude" as such means an individual's relatively permanent stance (negative or positive) towards a specific object (Karkowska, 2007, pp. 167–179).

A classification of new media has been proposed, with the first two items being particularly relevant to work at school:

1) teaching and learning,
2) educational help,
3) obtaining professional qualifications, and
4) distance learning tool (Gajda, 2004, pp. 33–37).

IT will allow the student to acquire extensive knowledge and skills to use computers running various operating systems, to instal, configure, and use various types of software, as well as to independently develop software applications. The student will become familiar with the structure, principles of operation, and use of digital components and systems, microprocessor systems, as well as multimedia devices. He or she will also be responsible for the creation, configuration, and administration of computer networks. The student will be able to apply the knowledge acquired to the development of web applications, which today are inherent components of every website, and to create both static graphics and animations as website elements (Batorski, 2006, pp. 131–133).

The practical aspect should be emphasised in the whole teaching cycle. Learners should recognise both the tremendous benefits of the widespread use of IT tools and the risks that come with their ever-increasing use.

School and Media – A Practical Application

Media are standard teaching tools in many educational institutions, and outside schools they serve as communication tools, overcoming the barriers of distance and isolation, making it possible for many different people to study at many different places at the same time. Media education provides teachers with more freedom to choose how they teach a particular lesson. At present much emphasis is laid on modern teaching methods, based on the use of technical means as well as various multimedia programmes (Hatalska, 2002, pp. 47–48).

The use of multimedia presentations in the teaching and learning process involves presentations taking over some of the teacher's roles. Richard I. Arends defines them as interaction functions, and reviews them according to the mode of operation of a particular educational establishment (Arends, 2000, p. 264). Drawing on the works of cognitive psychologists, and Ellen Gagné in particular, Arends identifies three types of knowledge: declarative, procedural, and contextual one. Declarative knowledge is a systematised collection of information about the reality. Procedural knowledge is a set of skills and information about the ways in which particular activities are carried out. Contextual knowledge allows for the effective use of declarative and procedural knowledge; contextual knowledge also includes attitudes that are characterised by determination to use the information and skills acquired. These definitions are consistent with a psychological concept of representation systems which lays emphasis on teaching that supports students' active thinking and information processing.

Schools take steps aimed at making the student a creative individual, capable of obtaining necessary knowledge and skills independently. Schools work to ensure high academic standards, to prepare students for further education, and to provide conditions for each student's comprehensive development, as well as high quality of instruction and education.

Nowadays it is difficult to imagine school education without modern technologies. IT is an area that evolves rapidly. In order to keep up to date with IT, it is necessary to continuously update one's knowledge and skills. That is why it is so important for schools to have highly qualified teachers who are open to new ideas and further improvement of their skills, and head teachers who have a vision for their schools and are open to innovations, competent, and straightforward. What is also useful are specialised computer programmes for individual subjects, particularly in vocational schools.

In Upper Secondary School Complex No. 2 in Pszczyna, instead of interrelated loosely connected lessons, many subjects are combined into projects spread over several units. They are implemented by a group of students. These projects have the task of mobilising students to work independently, and during them materials

prepared by the teacher and the textbook are only indicative of the achievement of learning objectives using computer technology.

In the school chronicle there is a motto that indicates the aims of education in this institution, the development of the student, but it also related to the media: "Help others develop and make it the greatest joy of your life" (A. L. McGinnis). We are ready to share our knowledge, skills, and long-standing experience, in order to prepare our students for life as successful citizens in a changing world.

During lessons teachers use interactive whiteboards, interactive software for particular course-books, DVDs, and films; they prepare banks of additional exercises and resources for use in case the lesson objectives are completed earlier than expected.

Thanks to the use of technology at school, teachers can ask willing students, giving sufficient advance notice, to prepare (individually or in groups) media presentations on a specific subject; the students are required to search for information independently in a variety of sources of knowledge, to select the material gathered, and to present the results of their work in front of the class audience while the fellow students are asked to evaluate the presentation after it is given.

One of the school's strategic goals, as stated in its mission statement, is to increase the use of information technology in the didactic process. The school's overriding objective is to increase students' motivation to learn by making the educational process more attractive. Efforts are being made to improve the availability of information technology to students and teachers (computers, multimedia equipment, interactive whiteboards etc.) so that they could perform tasks related to various spheres of life.

The Pszczyna school has two computer laboratories, and in the library there is a multimedia centre. The school's ample educational facilities ensure young people's comprehensive physical and intellectual development as well as the opportunity to acquire qualifications or learn a trade.

All of the lab classrooms are equipped with study aids and modern audio-visual equipment. Of the lab classrooms especially worth mentioning, there are computer laboratories which are equipped with modern computer equipment and software allowing students –following both the IT technician curriculum and other study paths – to properly learn how to operate and use computers.

Preparing students for a career as an IT technician often involves the use of materials found on the Internet, in online directories, software and hardware manufacturers' websites, user forums, etc. As far as computer hardware is concerned, the materials used are always newest and up-to-date (e.g. latest equipment specifications), which is their advantage over textbooks about hardware which at the moment of printing are already outdated due to rapid development of technology.

Below, benefits of attending the classes for the student are presented. He or she:

- is capable of purposeful computer use in information society;
- is familiar with potential risks associated with computer use and uses computers in accordance with ergonomic standards and occupational hygiene guidelines;
- can practically and effectively use selected software – also available in computer networks – to obtain and process information (e.g. can prepare documents using word processors, can use spreadsheets to make calculations and graphics to present numerical data, can prepare effective multimedia presentations, and can process images, text, and sounds);
- can use a computer to design, plan, and independently execute projects;
- uses computers to study and at work;
- is familiar with ethical principles applicable to media use and can observe them in conscious, critical reception and creation of media messages;
- is familiar with methodology relating to teaching with latest information technologies;
- can use IT in the didactic process to develop class scenarios and educational materials, and to carry out other cultural and community-related activities;
- can search for and verify content on the Internet (that is, knows strategies for searching for information);
- can develop their own content using Web 2.0 tools (Internet 2.0);
- is familiar with e-learning fundamentals; and
- can deliver an educational project using IT (e.g. WebQuest).

The student can also obtain the latest software versions that are compatible with his or her hardware platform from the Internet. Before classes and lessons, it is necessary to set up and check hardware and software intended for use during the lesson. Sometimes it is necessary to solve technical issues. When preparing their workstations, students have to resolve certain technical issues unassisted. In such cases they go online, e.g. to download hardware drivers, instruction manuals, or software compatible with the hardware used, to find advice on Internet forums.

When preparing to take their examinations, students use online practice tests, e.g. www.egzamin-informatyk.pl, www.kwalifikacjewzawodzie.pl, www.technikinformatyk.pl, www.testy.egzaminzawodowy.info/technik-informatyk. These websites allow students to verify their theoretical knowledge and have instant access to test results.

Specimen practical assignments are obtained from the Internet; students complete them and subsequently discuss and evaluate them as a group. Students send in their homework and other assignments to a dedicated email address. The electronic register makes teachers' and tutors' work easier and more efficient by automatically generating statistical data and reports on the basis of current data. This, in turn, facilitates school management.

During lessons and integrated education classes, computer hardware and software is used to independently prepare teaching materials; multimedia projectors are used to present materials prepared, students give presentations of their

assignments and watch instructional movies. The students learn to use presentation software (Prezi) to create presentations and hold debates on topics of human relationship with media in the following aspects: social aspect – the functioning of an individual in a virtual world, Internet communities, digital course-books in education, computer games potential, media ecology, risks associated with medial culture, e-learning in education.

Within the e-learning framework, a Cisco instructor runs a School Cisco Academy and teaches the following courses: IT Essentials (hardware and software basics), CCNA (computer network basics), and Linux. The Cisco Academy provides access to the www.netacad.com international multimedia e-learning platform, where course participants have their individual accounts. Those attending courses follow their course curricula online, perform tasks and exercises, and take partial examinations, final examinations, and a practical examination in the instructor's presence.

Programming tools, such as HTML editors and office suites, allow the user to create interactive multimedia presentations that take into account the audience's cognitive abilities and preferences, and determine the audience's level of knowledge and competence.

Most of the programmes used to create educational media (Microsoft PowerPoint, Microsoft FrontPage, Macromedia Dreamweaver, free programs: Open Office, NVU, the Moodle educational platform) have extensive help systems, are available in Polish versions, and come with creators and presentation templates. What merits special mention is WebSite X5 – a creator that allows users to create a website step-by-step using ready-made templates. It is a comprehensive solution as it does not require any other programmes to work with, e.g. applications for exporting files to a WWW server. After watching a short instructional video on the Manufacturer's website, each user can create his or her own website very quickly. Unfortunately, no Polish version is available; still, the number of features that the user needs to master is very low. Thanks to extensive literature and easy availability of the software, each interested individual can quickly learn the basics of multimedia presentation creation.

Video projectors allow viewers to watch films and presentations on large screens. Applications that transfer images from a teacher's computer screen to his or her students' computers are available. NetOp School is a very good example of such an application. By interacting with the applications being presented by the teacher, the students co-create the presentation. The teacher can preview all the students' screens, remotely disable or shut down the computers, send out or download files, and record the students' activity (Jędryczkowski, 2008, pp. 59–83).

Students are involved in the IT-School project (https://it-szkola.edu.pl). They attend online lectures in selected subjects. The lectures are supplemented with quizzes, presentations, and tests. What is included in the lectures is also content related to teaching materials development methods as well as errors,

faults, and advantages of multimedia software. The lectures also address media use in education (also based on empirical experience), human communication with the computer, communication models, creative aspects and risks associated with manipulation. The school's website is maintained on Google Sites, where authorised users have access to materials for lessons and other resources.

Students need to be reminded that the Internet not only is meant for providing entertainment, but also is a tool for work-related purposes. Students should be taught how to use the Internet to solve technical issues, where to find reliable information, how to interpret and implement solutions obtained. Work should be consistently continued to develop a reliable professional attitude in students and to imbue them with a sense of responsibility for their work.

Here are some examples of the achievements of the Digital School in Pszczyna:

- Secondary technical school students pursuing extended curricula for IT technicians and mechatronic technicians, as well as systems and renewable energy curricula regularly visit the Silesian University of Technology in Gliwice for academic purposes. They enhance their knowledge on, for example, artificial neural networks.
- As part of the Unibot Silesian Science Festival [Śląski Festiwal Nauki Katowice Unibot] and University Scientific Society – Silesian College of the University of Silesia in Katowice [Uniwersyteckie Towarzystwo Naukowe – Wszechnica Śląska Uniwersytetu Śląskiego w Katowicach], every year a tournament/race is held for primary school pupils as well as middle and secondary school students, called "Eco-Race." As part of the university initiative (Unibot), construction and programming classes are held for children, youth, and teachers. "Eco-Race" is designed to encourage students to think creatively and to learn in interesting and unconventional ways. The idea behind the competition is to build an eco-racing vehicle that is made from 100% recycled materials. After such vehicles are constructed, they race over a distance of 4 metres (without electric power).
- Every year the school holds a competition as part of the "Euroelektra" Electrical and Electronic Knowledge Contest organised by the Association of Polish Electrical Engineers upon the request of the Ministry of National Education. Students from the Pszczyna school always score high in the Silesian Province ranking.
- Around November, the Grand IT Test competition is held. Contest participants take knowledge tests in various IT areas which are made available on the IT Szkoła website and on the Facebook profile (selected tests) over the period from November to May.
- The students' track record of success includes coming in third in the M@tando nationwide mathematics and IT contest. Waiting for the results to be announced, the students attended the "Timeline and Virtual Reality" workshop,

organised by RCS2/Apple. The prize award ceremony was graced by the Minister of National Education.

- Every year, the Pszczyna school students come in top positions in the MIKROPROFESOR Rev. Prof. Józef Tischner Nationwide IT Competition. It is a multidisciplinary competition, with one of its aims being to promote the use of IT in various spheres of life; the competition, however, concerns more than merely completing tasks related to particular IT areas.

These are but a few examples of how education supported by media and new technologies produces tangible instructional results and supports young people's interests and hobbies.

The students' greatest success to date is their internship stay in Portugal, where they learned the ropes, secret IT tips, and new technologies.

Figure 1. IT students with the school head teacher, Piotr Cygan (first on the right), in Portugal. Photo by Natalia Ruman.

Conclusion

According to European Commission forecasts, over the next few years in member states there will be a significant increase in demand for IT specialists. The most probable scenario envisages that by 2020 the number of IT specialists employed will increase by a total of approximately half a million. Demand for IT

specialists is increasing faster than their employment. It is important that learning outcomes be properly selected based on the curriculum. Labour market analysts point out that IT specialists most commonly use the following programming languages: SQL, HTML, CSS, and PHP. MSSQL, Oracle, and MySQL are the most popular database tools. According to statistics on IT specialists' competencies, most of them administer LAN networks (31%), and a slightly lower number deal with broadly understood http server service provision (30%). On the other hand, information from job offers provides a clear picture of employers' requirements. 41% of job offers target programmers (mostly web application programmers), 20% – network administrators, and 16% – computer system installation and servicing technicians (source: http://pzs2pszczyna.pl/index.php/kierunki-ksztalcenia/technik-informatyk, "Internet zagrożeniem?…").

Students are provided with solid theoretical knowledge of unchanging and always relevant computer science fundamentals, both theoretical and technical ones. Students will be able to apply for the following positions:

- IT system analyst,
- application designer and programmer,
- web application designer,
- computer game programmer (an engineering course),
- data analyst (an engineering course),
- software integration specialist,
- information management specialist (e.g. in healthcare establishments), and
- information security specialist.

Contemporary computer use in schools not only poses classic challenges before students but also requires them to demonstrate computer science creativity, i.e. to possess the ability to solve non-routine problems that call for artificial intelligence methods and techniques. It can be said that both in Poland and other countries there is a real need for "digital schools."

The use of technology in school today cannot be limited to computer use, web development, or learning programming. The widespread use of IT tools and the ongoing use of the Internet in other areas of social life has led to a growing educational dimension in the implementation of the computer science curriculum. Teachers primarily commit themselves to: educating students about cybercrime problems and about respecting the effects of other people's work (including the protection of copyright), developing skills in the computerised world, and making the students aware of the benefits and risks of technological progress.

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Natalia Maria Ruman

Wykorzystanie technologii informacyjnych w szkole średniej Praktyczne inspiracje pochodzące z Powiatowego Zespołu Szkół nr 2 im. Karola Miarki w Pszczynie

Streszczenie

W przewidywalnej przyszłości multimedia nie zastąpią tradycyjnych narzędzi wykorzystywanych do kształcenia. Jednakże w licznych sytuacjach dydaktycznych wskazane jest użycie niebezpośrednich sposobów przedstawienia rzeczywistości.

Celem niniejszego artykułu jest omówienie podstawowych praktyk pedagogicznych z zakresu wykorzystywania współczesnych technologii w edukacji oraz ukazanie kreatywnych poszukiwań i pełnego refleksji ulepszonego nauczania wykorzystującego potrzebne do tego umiejętności. Zaprezentowane problemy posłużą do przeprowadzenia przyszłych badań nad rozwojem umiejętności nauczyciela z zakresu wykorzystania programów komputerowych do zarządzania szkołą.

Wyzwanie dla cyfrowej szkoły stanowią edukacja w cyberprzestrzeni, e-learning, nowe technologie i nowe rozwiązania oraz zapobieganie towarzyszącemu im ryzyku. Szkoły powinny dotrzymywać kroku zmieniającej się rzeczywistości, bowiem tylko w ten sposób efektem ich pracy będą korzyści edukacyjne na miarę społeczeństwa XXI wieku.

S ł o w a k l u c z o w e: Internet, multimedia, komputeryzacja, cyfrowa szkoła

Natalia Maria Ruman

Использование информационных технологий на заключительных этапах среднего образования Практический опыт Комплекса средней школы К. Миарка № 2 в г. Пщине

А н н о т а ц и я

В обозримом будущем мультимедиа не заменит инструменты естественного обучения. Однако существует ряд дидактических ситуаций, когда использование косвенных форм описания реальности является целесообразным или даже необходимым.

Целью статьи является представить элементарную педагогическую практику в области современных технологий обучения и показать творческий квест и рефлексивное обогащение педагогического стиля обучения, в котором используются навыки. Представленные проблемы способствуют будущим исследованиям в области анализа развития навыков преподавателей с использованием компьютерных программ в управлении школами в их профессиональной деятельности.

Вызов для Цифровой школы представляют - образование в киберпространстве, электронное обучение, новые технологии и решения, сопровождаемые одновременной профилактикой рисков, связанных со средствами информации. Школы должны быть в курсе быстро меняющейся реальности - только таким образом они могут получить полезные образовательные результаты для общества в XXI веке.

К л ю ч е в ы е с л о в а: Интернет, мультимедиа, компьютеризация, цифровая школа

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Uso de Tecnologías de la Información en Educación Secundaria Superior. Inspiraciones prácticas de K. Miarka Complejo de escuela secundaria superior n. ° 2 en Pszczyna

R e s u m e n

En un futuro previsible, el multimedia no reemplazará las herramientas de enseñanza tradicionales. Sin embargo, hay una serie de situaciones didácticas donde es aconsejable o necesario el uso de formas indirectas de descripción de la realidad.

El artículo tiene como objetivo presentar la práctica pedagógica elemental en el campo de las tecnologías de aprendizaje contemporáneo y mostrar la búsqueda creativa y el enriquecimiento

reflexivo del estilo pedagógico de la enseñanza, en el que se utilizan las habilidades. Los problemas presentados contribuyen a futuras investigaciones sobre el análisis del desarrollo de habilidades docentes utilizando programas informáticos en la gestión escolar en su trabajo profesional.

Lo que presenta un desafío para la Escuela Digital es la educación en el ciberespacio, el aprendizaje electrónico, las nuevas tecnologías y soluciones, acompañado de la prevención simultánea de los riesgos relacionados con los medios. Las escuelas deben mantenerse al tanto de la realidad cambiante, solo de esta manera pueden producir resultados educativos beneficiosos para la sociedad en el siglo XXI

P a l a b r a s c l a v e: Internet, multimedia, informatización, escuela digital