# Theoretical and Practical Aspects of Distance Learning


Visegrad Fund

Cieszyn 2009

# Theoretical and Practical Aspects of Distance Learning

University of Silesia in Katowice,
Faculty of Ethnology and Sciences
of Education in Cieszyn

# Theoretical and Practical Aspects of Distance Learning

Collection of Scholarly Papers

Scientific Editor
Eugenia Smyrnova-Trybulska

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## TABLE OF CONTENTS

# INTRODUCTION

The global transformation from industrial to information society as well as social and economic changes taking place both in Poland other European countries have necessitated reforms in many areas of government responsibility. In this respect, the priorities include reforming the education system, involving the implementation of modern educational technologies and modes of tuition.

Distance learning, due to such advantages as flexibility, ease of access, modular character, quality, cost-effectiveness, state-of-the-art technology, large audiences, social balance, global reach, the new role of the teacher, positive effect on the learner, has become a leading mode of tuition and instructional technology practically at all levels of the education system.

Distance learning can cater to the needs of practically all categories of recipients and users of education services, starting from secondary school and university students wishing to continue improving their skills and acquiring more knowledge, through adult learners from all walks of life, especially teachers wishing to continue in-service training or to pursue lifelong training, and ending with the unemployed, disabled and all other people looking to improve their skills and knowledge.

Nowadays it would be hard to come across a higher education institution (faculty), school, kindergarten, vocational training institution, teacher training centre or other educational institution that does not maintain its own website. More and more educational institutions are launching distance learning systems or components thereof in response to the needs of both learners and teachers. The implementation of distance learning is being facilitated by increasing availability of information tools and means which, in turn, are being developed as a result of advances in information and communication technologies, and particularly web-based technologies. All of these developments have contributed to the emergence of multi-functional, quite reliable, user-friendly distance learning tools.

These include more advanced tools such as content learning management systems (CLMS's), including open source systems (MOODLE, Claroline, Dokeos, Atutor and other systems) supporting practically all phases of the learning process as well as content management systems CMS (e.g. Mambo, Joomla!, Nuke PHP Apache), enabling users to quickly launch vertical portals such as educational portals, featuring various services, including those with return

email links but requiring initial configuration and subsequent maintenance by an IT specialist. Solutions developed using Web 2.0 technology (Blogs, Forum, Wiki, Chat, WWW, RSS, CSS projects, open repositories of audio and video materials, etc.) are also available; they can be used by all users, including those without any special IT training. Web 2.0 is not a new worldwide web or the Internet; it is a new method for using the Internet's existing resources. Web 2.0 is the informal designation of Internet sites and services launched after 2001 which primarily rely on the content generated by users visiting the site or service. Web 2.0 was designed to facilitate interactive information sharing, to enable Internet users to use personalised web pages. Generally, websites have become more user-centred. It is hard to overestimate the importance of CLMS systems and Web 2.0. services in efforts aimed at achieving educational goals nowadays as the underlying principle of education is shifting towards personal-oriented education, focussing on the learner and on the development of the learner's mental faculties, creative abilities, personal qualities as well as the ability to think creatively and critically. The most popular and fast-developing MOODLE system, based on tenets of social constructionism and the concept of micro-worlds (enabling learners to explore course environments), implemented by Jean Piaget and Seymour Papert, has yet to realize its broad educational potential. Thanks to its open code and broad spectrum of resources offered, MOODLE can be flexibly developed, adapted and modified to meet the various needs of learners, teachers and educational institutions.

The Web 3.0. project, which is also fast-developing and promising technology, exemplifies the evolution of both the Internet and other tools and ideas towards the conversion of the present system for imparting knowledge into a broadly defined database model. The idea behind Web 3.0 is to convert web page content into a format readable by various applications (including those that are not web browsers), systems utilizing artificial intelligence, semantic solutions as well as software capable of visualizing and processing data within a three-dimensional space. Pages developed using Web 3.0 will be able to identify the user's intentions based on the data transmission context. This will enable the user to retrieve necessary data more quickly and easily and use them to effectively achieve her/his educational goals. The Internet2 project, which is expanding globally with more and more universities joining in, offers such elements and services as a global digital library, open education program database, a virtual laboratory to carry out experiments in any science field, a service to transmit 3D images to remote sites (*tele-immersion*). These services and facilities have already undergone preliminary tests and will soon be made available to the global

academic Internet community, offering new advanced educational tools and opportunities for use thereof.

The articles included in the collection of scholarly papers entitled ”*Theoretical and Practical Aspects of Distance Learning”* address various current issues relating to efforts at developing most effective ways and methods to use distance education in teaching. The authors of the papers, among whom are both beginning researchers and distinguished scholars with long experience and a rich track record of publications, discuss theoretical and practical aspects of distance learning, examples of good practice in the implementation of distance teaching at various levels of the education system, application of distance learning in teaching humanities and science and in instruction for disabled persons. The papers also cover such issues as the use of multimedia tools and applications, teacher training including the development of teacher competence in computer science and in distance learning, lifelong learning, selection of effective distance education systems, and well-run, purposeful use of Web 2.0 tools in education.

It is worth mentioning that this collection is the result of a collaborative effort by the University of Silesia (Poland), the University of Ostrava (Czech Republic) and Matej Bel University in Banská Bystrica (Slovakia), which have extensive and long-standing experience in delivering e-learning courses and are now working together on an international project, co-financed by the International Visegrad Fund, called *”E-learning – as a Road to Communicating in the Multicultural Environment”*.

We hope that the papers included in this collection will prove to be of practical use to those interested in distance learning and will answer questions that teachers, scholars, students, and educators may have while using e-learning methods and tools.

Eugenia Smyrnova-Trybulska

# I. THEORETICAL AND METHODICAL ASPECTS OF DISTANCE LEARNING

## ABOUT SOME BASIC ASPECTS OF DISTANCE LEARNING

Eugenia Smyrnova-Trybulska
University of Silesia in Katowice
Faculty of Ethnology and Sciences of Education in Cieszyn
Bielska 62, Cieszyn 43-400, Poland
esmyrnova@us.edu.pl

***Abstract**: E-learning - is one of the basic, modern forms of teaching today. In this article the following concepts are discussed and commented on: different models of distance learning, types of distance courses, structure of the distance Internet-course and other important categories, which deal with the concept of distance learning: key considerations in designing distance learning courses, guidelines for the comprehensive assessment of course distribution versions, the teacher's competences in area of distance learning, and other issues.*

***Keywords:** distance learning, models of distance learning, types of distance courses, MOODLE distance course, principles of designing distance courses, structure of distance courses, assessment criteria of distance courses, the teacher's competences in area of distance learning*

### INTRODUCTION

The global transformation from an industrial to an information society as well as social and economic changes which are taking place both in Poland other European countries have required reforms in many areas of government's responsibility. In this respect, the priorities include reforming the education system, involving the implementation of modern educational technologies and modes of tuition.

Distance education, due to such advantages as flexibility, ease of access, modular character, quality, cost-effectiveness, state-of-the-art technology, large audiences, social balance, global reach, the new role of the instructor, positive effect on the learner, has become a leading mode of tuition and instructional technology practically at all levels of the education system.

## 1. DEFINITIONS AND MODELS OF DISTANCE LEARNING

Analysing the opinions of many scholars one can draw out the conclusion that education is considerably wider and contains both the process of teaching and the basic possibilities of self-education. A teacher's activity in a distance mode stands for more and more various forms: the organization of seminars, conferences, courses, work with Ma candidates, the postgraduates, all sorts of Olympics, competitions, tournaments itd. [13].

### 1.1. Definitions of distance learning

Considering distance education one can think about the creation of the informational - educational space for teaching process in which various electronic sources of scientific materials are available (in this and first of all network): the virtual libraries, base of data, the consultative services, the electronic scientific supplies, all possible author's educational studies, the supplies of Internet, the distance courses, the forums, the controversial groups, virtual classes and so on.

In distance teaching one should underline (the dependence on the chosen model) the importance of teacher and student’s co-operation with the use of the varied shapes and contents of scientific materials, technology, supporting varied - the synchronic and asynchronic communicating modes and others. The main factors result from that, what one should consider as organizing the teaching in form of distance learning - creating the electronic courses, studying the didactic and methodical bases in distance teaching, the preparation of authors, educators, tutors, co-ordinators, administrators of teaching on distance. The form of distance teaching - is not a synonym of system of teaching, as it is often treated.

Depending on the chosen model of distance learning one can be in a continuous contact with a teacher, with other students from the virtual class, imitating all kinds of direct teaching, but with the use of specific forms, means and technology.

In conclusion, one may say that theoretical requirements, experimental implementations, the checking and serious scientific - investigative works have already been worked out.

Analysis of the scholars' investigations (M. Daugiamas, S. Juszczyk, B. Holmberg, M.J. Kubiak, E.S. Połat, P. Taylor and others) and the present investigations as well as the experience in considered area gives the basis to the statement, that the distance learning might be considered as a pedagogical technology or as a form of teaching. In [13] more precise analysis of the description of pedagogical technology of distance learning on basis of the use of the CLMS MOODLE system was introduced.

Generally, in scholars' glance, who are studying the given problem, one can say that the meaning "*the notion of education on distance"* does not possess the unambiguous interpretation and its scientific bases are insufficiently worked out. One can notice the lack of the regularity, disorder in organization and the use of distance learning system on different levels.

Simultaneously, without regard to the variety of approaches and the directions in investigation of the heart of the distance learning, many authors unite their effort to show, that the distance learning is the activity regarded as a legal *scientific – cognitive activity,* which assures the intellectual student and educator's co-operation on distance, and the students between themselves – are some kind of teaching, based on the use of present telecommunicational means and it is the most effective and adequate for the present information society. Today there are several dozens of classifications and models of teaching on distance. Some, the most widespread and often applied moels, are introduced below.

Literature presents lots of definitions and views associated with distance learning and distance education and its concepts. They are described differently in various countries due to period of time and implementation. The most popular terms are such ones as: *independent study*, *correspondence study, distributed education, distance learning, home study*, etc.

Although there is a large number of terms connected with distance education, according to M.J.Kubiak ([5], [6]) "The distance education – is the method of leading the didactic process in such conditions when teachers and learners (students) are far away from each other (in terms of time and place) and using modern and traditional means of transfer communication such as the traditional ways of telecommunication technologies, passing on: voice, video, electronic texts, etc. Implementation of the modern technology helps to establish a direct and real contact among a teacher and a pupil through audio help or video-conferences, irrespective of distance and time".

Following B. Holmberg's explanation ([2]): "The definition of distance teaching incorporates different forms and means of teaching, which do not

require an immediate teacher's supervision and a teacher's direct presence, while s/he is leading the lectures. However, this type of education is possible under the control of educational post or educational organization".

Among the best known terms associated with distance learning is the concept of the British Open University ([21], [15]). It's experience can be used in formulating other definitions to describe a wide comprehension of distance teaching such as the following:

*The non-stationary teaching (distance learning)* – is the form of open teaching, permitting the students and teachers "to meet" not only conditionally through written correspondence, telephone conversation, but also directly during the stationary courses or the summer sessions.

*Open learning* – is the definition popular in Great Britain due to CET (Council for Educational Technology) Open Learning System. This term, at the beginning, was linked with forms directed to overcome difficulty of participation in the process of teaching, and first of all for the individual independent activity;

*The home teaching (home study)* – is the term used for the description of non-stationary teaching, types of correspondence courses or the extramural education;

Currently, a personal interest in distance learning is observed in the whole world. The e-learning courses inflict ravishing as well as the unusual process of teaching, which guarantee teaching (the students) new thematic and objective knowledge plus formation of practical skills.

### 1.2. Models of distance learning

In analysing the national and foreign professional literature, a focus should be on theoretical aspects of distance teaching, qualification of models and types. Classifications includes several models of distance learning which are based on the degree of independence of teaching and participation in virtual groups (Institute for Distance Education (IDE), University of Maryland, USA in: [18]):

*Model A - virtual class.* Lessons are in synchronic mode at least once a week, the participation in them is possible from any comfortable place for students. The contact can be established among two or more places plus many transfers of messages through teleconference, audio- and video-conferences. The transfer serve as: traditional and electronic post office, fax, telephone or computer connected to the Internet supplies with assurance of online contact.

*Model B - independent teaching.* Students do not gather in a classroom, they work on their own, although they have the possibility of contact with their teachers and sometimes with different students as well. The direct transfer of data such as announcements and materials are not to be held. The contacts are both traditional and modern, connected with the Internet, the electronic post office, telephone, vocal post office, computer with the online contact.

*Model C - open teaching.* The teaching is performed in groups - on basis of the access to the printed materials, audio -, video - and multimedia materials; students meet with their teachers periodically in definite places. The data is transferred through announcements, materials are presented by tele -, audio – and video - conferences.

According to other classification based on facilities of transmission of educational information and method of contact of studying with a teacher, it is possible to select the following models of distance teaching [4]:

1. *Correspondence teaching.*

2. *Across Mass Media (radio - television).*

3. *Across Mass Media (radio - television) with interactive telephone, fax, computer and vision.*

4. *Computer - assisted teaching.*

5. *Teleconference systems.*

6. *Across computer net.*

7. *Teaching using videoconferencing systems and video phones.*

Other authors ([4], [11], [20]) select four types of distance teaching such as the following ones:

1. *Self-education* is regarded as the complete absence of contact between a student and a tutor.
2. *Asynchronous teaching.*
3. *Synchronous teaching.*
4. *Hybrid teaching* (also known as *blended learning*) – is the traditional process of teaching supported by the use of e-learning. This model is the most successful and popular, and selected by academic experts as the most effective form from the above-mentioned.

Can be numerated the different classifications and typologies of models introduced in a remote teaching [18]. The following classification of distance learning is a *form of teaching*:

- *Integration of the direct (stationary) and distance forms of teaching*
- *Network teaching:*
  - The autonomic network courses;
  - The information and education environment.
- *Network teaching and case - technologies.*
- *Distance teaching based on interactive television (Two-Way TV) or the computer video-conference.*

*Integration of the direct (stationary) and distance forms of teaching*. It is the most perspective model, for it has already accumulated its experience showing suitable for both school education (specialised courses, use of courses, the controlled form of distance teaching, for deepening knowledge, supplement the gap as well as it appears), and the high institutes. A Figure 1 shows a Model 1 (for school).It should be marked that during initiation of teaching in the older, specialized classes. Presently it was traced to four directions type in education officially termed as: humanistic, natural and mathematical science, social and economical science as technology.

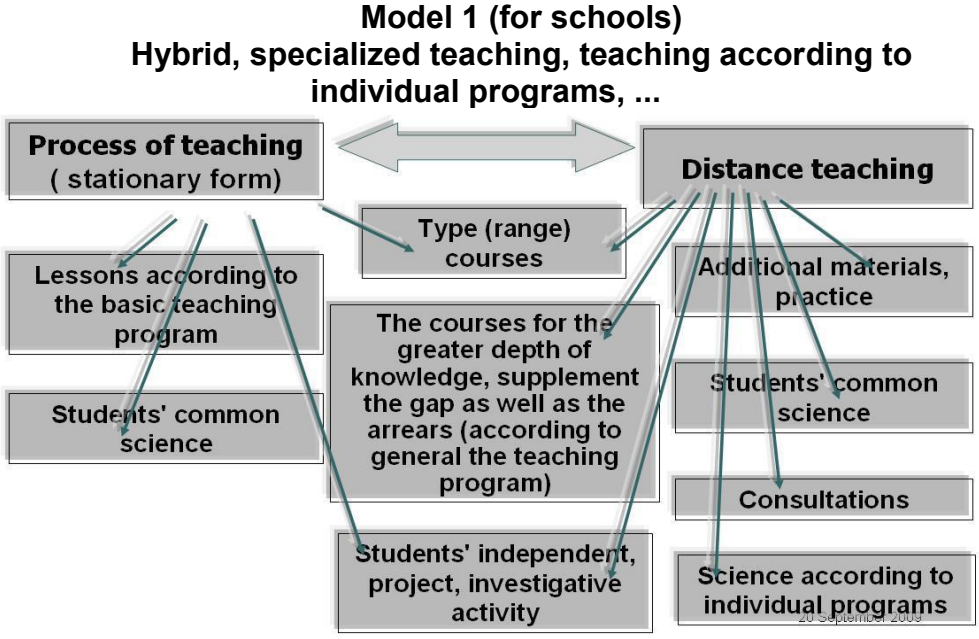


**Figure 1. Integration of the direct (stationary) and distance ([18], [13]).**

The model of integration of the stationary and distance forms of teaching (Figure 2) with more activities and more differences; applied at higher universities.

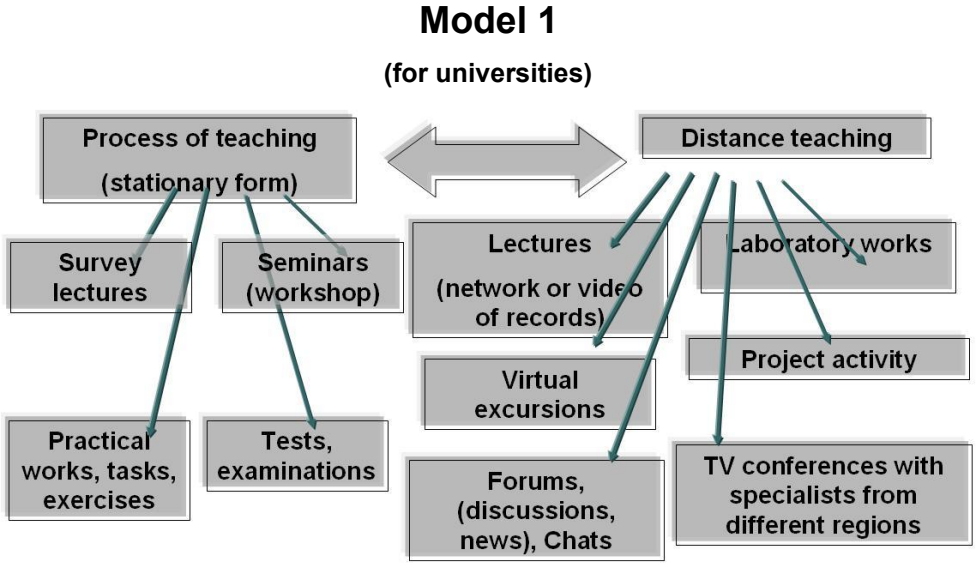


**Figure 2. The model of integration of the stationary (traditional) and distance forms of education in university ([18], [13]).**

*Network teaching.* It *can* make network education effective and apply in these cases necessarily, when the traditional forms of education are resulted with qualitative assurance of teachings complications (for children - disabled persons (invalid), for children from small distant localities and villages, and also for student and adults population (persons), improving one's level of professionalism, alter occupation etc.). In this case it creates the special, autonomic courses of teaching on distance for different objects of teaching, the chapters or the subjects of programs or the whole virtual schools of, cathedral, the universities. Autonomic courses in majorities can be designed to capture of individual objects, greater depth in data knowledge object or inversely, liquidation of hatch in knowledge. The model of network course of remote teaching was showed on Figure 3.

# Model 2

## Network course of distance learning

**For handicapped children, or children from small and remote communities, for students and adults, and anyone interested to upgrade their qualification or change their career**

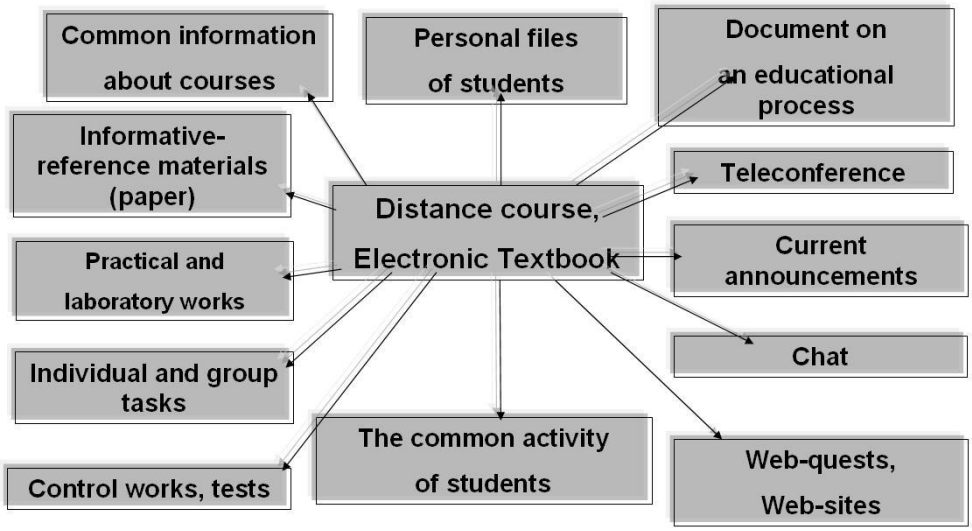


**Figure 3**. **Model 2 : Network course of distance learning ([18], [13]).**

Any course of teaching in distance – is perceived as the balanced process of teaching. The virtual school for this aid can be created well, the creation at which bets the structural of space the information and educational or environment, in which contained are all courses provided for in plan of teaching or programs of teaching, library of such courses (according to classes, according to chapters of programs etc.), the laboratory works and the practical, additional materials (the virtual libraries, excursions, dictionaries, the encyclopaedias, electronic data bases etc.). The possibility to use an existing technology also in the varied pedagogical, informational and communication technology for organization of common activity of teaching oneself in small groups of co-operation in different stages of teaching, the contacts with a lecturer, the discussion of questions in frames of teleconference, forums, organization of common projects etc. In network a model of distance learning complies with electronic network or with compact discs, the multimedia electronic textbooks or the scientific help.Another important component in any network variant of remote form of teaching is

the administrative block (registration of participants of course, monitoring their teaching, personal matters and so on.).

*Network teaching and case - technologies* (Figure 4). The *technology* is a model of network and the case of education - designed to do any differentiation in the education. Often enough there is no necessity of creating network electronic textbooks, if printed textbooks and books already existed, are being checked by the ministry of education.

Education building is effective, if it bases on already given textbooks and scientific help dealing with supplementary materials, placed in net, or deepens and widens for well that teachings material, or gives additional explanations, practice etc., for less talented pupils.It bets near the lecturers' consultations, system of testing and the control, additional practice in the laboratory and the practical, creative tasks or own projects, etc. A model of network and the case - education technology are introduced on Figure 4.

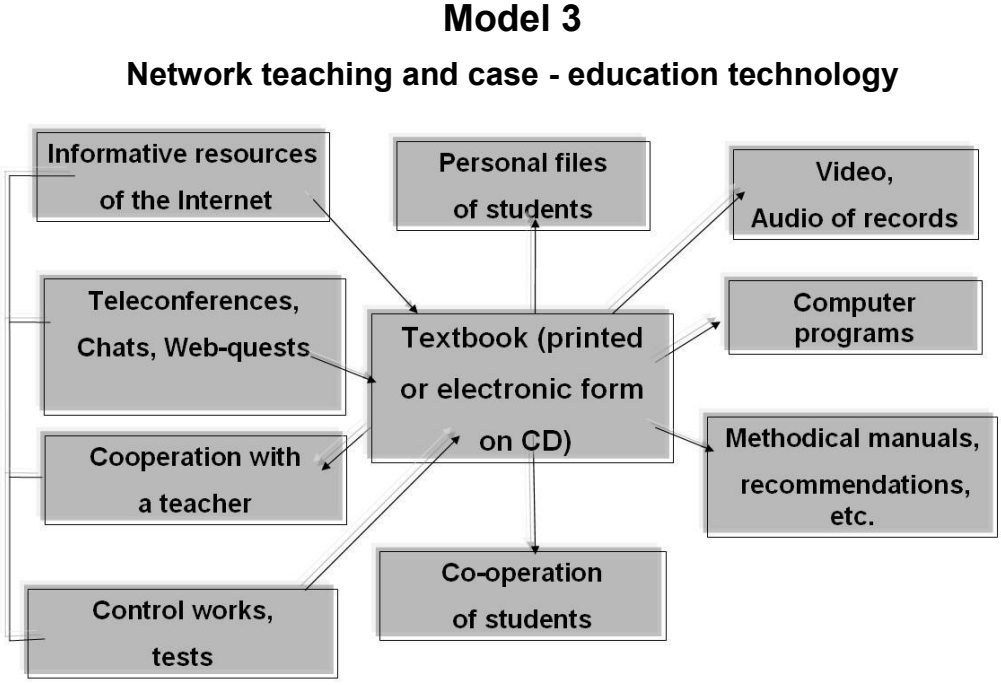


**Figure 4. Model of DL : Network teaching and case-education technologies ([18], [13]).**

*The educational television (Two-way TV).* The *educational* television is based on feed - back, learning on the use of television technologies, a model which is very expensive. This model reminds the model of distributed class, in which the broadcast of occupations is held near to help video - camera and television gear on distance. Time will show, or it will turn out more accessible - interactive television or network videoconference. The most possible steps in use and spreading on distance this model of teaching *tele-immersion* become steps realized after wider initiating technology (transfer painting 3D on distance), crossing final (last) investigation, however they are sufficiently expensive. The model of interactive television is introduced on the Figure 5.

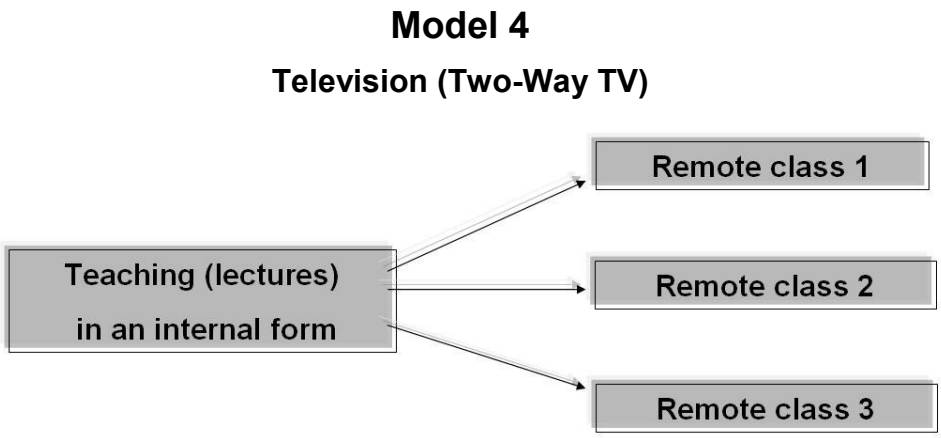


**Figure 5. Model DL : Interactive educational television (Two-Way TV)**

This model of distance teaching fully imitates the direct form. With its application the area of the classroom widens, from which the teacher and the students can have a link contact (the type of a tele-bridge). This model requires the students' presence in the use of virtual place for remote students, with whom the teacher or other students can be in any contact through a tele-bridge (as well as in the direct form) at a given time and place.

Each model introduces its own specifics and serves to solve specific didactic tasks.Every model is directed to a different user who should make his choice. It is hard to determine the priority of this or that different model. The specifics of every model are conditioned by the choice and the structure of teaching content, methods, organizational forms and the means of teaching [18].

## 2. ABOUT SOME THEORETICAL ASPECTS OF DISTANCE COURSES DEGIGN

*A distance course* is defined as a set of educational and teaching resources; and also as educational services developed to enable individual and group's learners to use online distance educational technologies. There are numbers of theoretical and practical aspects as well as issues related to teaching methodology and computer science that need to be taken into account in the design of distance learning courses. Some of them have already been discussed in numerous scholarly publications [17], [12], [10], [13], [14], [1], etc.

This chapter discusses some of the types and the principles of the design of distance courses, particularly those ones which are related to the structure of distance courses and criteria for the evaluation of e-learning courses.

### 2.1. Types of distance courses.

The *classification* based on the following criteria:

- The aims of teaching.
- The discipline, subjects, fields of science, specifics of subject.
- The level of preparation of self-teaching (the students).
- Students' age.
- Accessible technological base. [16]

### 2.2. The aims of distance teaching:

- Course completion according to the course subject in programmed teaching at higher schools.
- Professional preparation, improvement of pedagogical staff.
- Rise of qualification among the pedagogical staff according to definite specialisations
- Pupils' preparation according to individual subjects of teaching to pass examinations externs.
- Preparation of graduates of average schools to enroll in higher schools of particular profiles.
- In-depth teaching of subjects, chapters, school disciplines or extra-school courses.

- Liquidation of the gap in knowledge, the skills, habits of teachings oneself according to definite subjects of school cycle (the corrective and makeup courses).
- Base courses of school programs for self-teaching, for students unable to attend school for different reasons at a definite moment or time or at all. [18]

**2.3. The specification of a subject ( for example - foreign language )**

- Teaching pupils' basic levels of the first foreign language.
- Teaching pupils' basic levels of the second or the third foreign language.
- In-depth teaching of foreign language.
- Teaching different kinds of linguistic activity, aspects of language ( the reading on the difference levels of complexity; spoken language, pronunciation, grammar, vocabulary, phonetics etc.).
- The type teaching of foreign language (practical language, dialect, slang, language of scientific conferences, colloquial language, language of literature and so forth).
- Certain cultural aspects of foreign language (according to different categories: the country of origin, linguistic etiquette, cultural heritage, history and so on.) ([14], [18], [13]).

**2.4. Levels:**

- Basic Level (level A).
- Intermediate Level (level B) the whole course or on individual subjects, the chapters of program or the material the extra-program.
- Advanced Level (level C) also in whole course or on individual subjects, the chapters of program or the material the extra-program.
- Consultations according to different questions in these cases, if a special course is unavailable (for example: turning to informative material) [16].

**2.5. External differentiation courses:**

- Aims, tasks.
- Content of course.
- The students' preparation (the formation of the groups of co-operation).

- Number of reference marks to basic and additional informative material, also on the Internet.
- Number of multimedia objects in course.
- Level of difficulty of practical tasks and projects ([14], [18], 13]).

**2.6. Internal differentiation courses:**

1. Use of suitable pedagogical technologies.
2. Variety of didactic means:
   - Network (the Internet (websites, FTP servers))
   - Other (books, compact discs CD, DVD, encyclopaedias, textbooks, didactic materials, collection of exercises, electronic databases etc.)

**2.7. Types of courses. Classification according to course elements**

Every element fulfils in the systems one's role in course. Following the character of course this or different element can be less or more essential. Particularly can be distributed on several basic types of all Internet courses [9]:

- *Full Internet - course.*
- *Consultative course.*
- *Additional course (optional, electives).*
- *Internet course + terms.*
- *The course - the lecture (knowledge base).*

*The types of distance courses (based on the degree of independent work)*

This work proposes still one more classification [7] of remote courses in which two basic types are distinguished:

1. *Self-studying type.*
2. *Team teaching type.*

**2.8. The general structure of an Internet-based distance course.**

**I. Module: Introduction to distance learning course** :

1. *Course description:* goals, objectives, registration procedures, course structure, skills and knowledge (both in terms of IT and course subject matter), requirements of a prior to take the course and causes its completion,

information on documents, assignments required to obtain credit for the course (*text or html documents).*

*2. Reading list:* core reading, additional reading, Internet resources (a listing of recommended core and additional sources with which participants need to familiarize themselves during the course – *a text, PDF or html document*)

3. *Glossary of terms containing basic concepts and key terms related to the course topics* (types of dictionary: Encyclopaedias, ordinary Glossaries, FAQ's, etc.).

*4. Forum*, a course feature facilitating discussion on a given course (*News Forum, Discussion Forum*).

5. *Participant registration survey* designed to collect information on the profile of potential students, contains questions relating to various issues (Survey, Questionnaire).

**II. Thematic Modules N (1<N<10):**

1. *Pre-test (a diagnostic test)* (a package of quizzes (tests) designed to gauge participant knowledge of the course material).
2. *Core didactic materials* for a given course subject area (Lessons (didactic materials and self-testing quiz), Glossaries, Encyclopaedias, reference links to Internet resources, files included in folders (text files, PDF, audio files, video files, multimedia presentations, other).
3. *Package of tasks* designed to help participants assimilate material, to help the instructor check student understanding of the material, to consolidate and apply the knowledge (in a MOODLE-based course, educators can effectively utilize such features as *Assignments* (various types: Advanced uploading of files, Online text, Upload a single file, Offline activity), *Journals* (workbooks), *Workshops*, *Forum*, *AudioRecorde*r, *WIKI*, other features).
4. *Checking and testing knowledge* (1) self-testing quiz (can be incorporated into a lesson), 2) comprehension questions (progress tests), 3) Test quiz (examination test) (*Quiz, Hot Potatoes Quiz*).
5. *Creative tasks block* designed to help the student to work independently to assimilate knowledge, skills and to develop ways to solve specific problems, to complete individual projects; practical tasks (individual and group ones) (Assignments (various types: Advanced uploading of files, Online text, Upload a single file, Offline activity), *Journals*, *Workshops*, *Forums*, *AudioRecorder*, *WIKI*, etc.)

6. *Interactive communication feature*, enabling students to communicate with one another and with instructors synchronously (*Chat*, instant messaging software (*Skype, NetMeeting, Gadu-Gadu, Yahoo Messenger, ICQ*, etc.), and asynchronously (*Forum, E-mail, Internal Messaging System, etc.).*
7. *Additional reference material* for a given subject area (*Lessons*, *Glossaries*, *Encyclopaedias*, reference links to Internet resources, files stored in folders (text files, PDF, audio files, video files, multimedia presentations, other material).
8. *Checking students' knowledge* (Test quiz) *(Quiz, Hot Potatoes Quiz).*

**III. Conclusion module (Conclusion of the course):**

1. *Examination designed to test* the knowledge and skills taught during the entire course (*Quiz*).
2. *Final evaluation survey* - monitoring and analysis of student feedback on the course (*Survey, Questionnaire*).
3. *Self-reflective survey* – analysis of student feedback on distance learning - (*Survey, Questionnaire*) ([14], [8], [16], [17], [18]).

### 2.9. Assessment criteria for distance courses

In order to comprehensive evaluation of the usefulness of a distance course offered over the Internet, one needs to use a set of specific standards by which the course can be judged. The measures below are recommended to be considered when developing and evaluating distance courses ([13], [1], [16]):

1. *Course subject and structure* (Adequacy of the selection, and sufficient specification of the course subject according the objectives of the project).
2. *Course elements in the MOODLE system* (broad scope; approx. 35 modules in all, of which 18 are the key ones).
3. *Description of each course feature and resource item.*
4. *Course contents* (use of diverse teaching resources, tools, and ideas).
5. *Course format* (pleasant interface, variety, easy navigation).
6. *Multimedia and poly-sensory character* (Variety of materials and media utilized).
7. *Teaching styles and methods* (constructionist elements).

8. *Interactivity* (communication, group work and group learning, collaboration, mutual help, self-assessment and peer assessment).
9. *Compliance with the law and ethical standards* (pursuing work and learning activities in accordance with copyright laws and ethical standards.)
10. *Instructional materials for course instructors and materials for students.*

## III. THE TEACHER'S COMPETENCES IN AREA OF DISTANCE LEARNING

In relationship from active initiating *e - learning* to traditional teaching important task is exact and universal qualification of the teacher's competence of distance education. It is analysing to define national and foreign authors in area of the teacher's competence of distance education; it can formulate the following most important general teacher's competences of teaching in a wide context: author, editor of courses, teacher (tutor), administrator [13], [17]:

**1. Competences in area of pedagogy, the psychology and the new pedagogical technologies:**

- educator, methodic - be qualified, having earlier successes in education stationary he should not lose the traditional teaching contact;

- Internet adopts to conditions of use of centres the applied methodologies of stationary teaching; it - organizes and tests students in *psychology and pedagogy*;

- student's individual *psychology and pedagogy* silhouette defines and it diagnoses virtual group;

- it prevents and it solves abrasive situations;

- psychological not contradiction creates on principle small groups;

- it gives psychological support the initial stage students' education, and also friendly psychological climate support the virtual group;

- it knows the current personal orientated teaching methods: the teaching in co-operation, the method of projects, the problematic method and others;

- it applies individual, team and collective teachings forms; harmonic in well-founded links, is in work with students on distance way;

- it organizes and leads telecommunicational projects and thematic forum as well as teleconferences, stepping out in part their moderator;

- it supports and it stimulates students, informs students about knowledge and skills which should work out during teaching on course; it informs them about achievements; it helps to advise about tasks, which students did not make yet, problems, which they did not decide yet; it knows to define and to diagnose subjects and question, causing students' problems as well as it shows them the required help;

-it leads to an scientifically - investigative activity, it organizes and monitors students' scientific activity which is led in education stationary and on distance; it organizes investigative groups; it helps in a search for auxiliary materials in aim of execution of investigative works and gives the access to them;

- the effective system of control applies and tests students; definies students' activity in teaching factors on distance;

- it knows the propriety of organization of independent work students in information-educational environment - the Internet as well as the processes of assimilating near use of forms the message of distance education;

- it applies the instruments of organization of intercourse and the communication among participants of distance teaching.

**2. Competences in range of information and communication technologies and their use in teaching:**

- it knows the basic notions and nomenclatures, connected with information and communication technologies, centres and tools ICT;

- it knows architecture, recipes of principle of working and it possesses from personal computer to the practical habits of work and peripheral equipment (multimedia projector, scanner, modem, printer, microphone, digital apparatus, digital camera and soon);

- it decides about simple problems from computer equipment and software;

- it knows how to configure operating system suitably; it creates the hierarchic system of catalogues; it works with files, brochures; installs software and peripheral devices;

- it knows how to copy, to transfer and to record in system the data and on external carriers of information CD, DVD, the Flash and so further;

- it knows how to use software (minimum - the text editor MS Word, programme to creating of introduction MS PowerPoint, it also can describe different usable programmes of packet MS Office or OpenOffice, StarOffice);

- it works out in different figure the data and the corner format, it transforms and it prepares the educational materials, in this to publication in net with use of varied usable programmes (text editor, programme to creating of multimedia introductions, graphic arts editor, HTML editor);

- it knows how to measure the needs of using service programmes (programmes for converting to different formats (textual: PDF, RTF, video: AVI, MIDI, sound: WAV, MP3, graphic: TIF, JPG, and others), to use the programmes for creating of demonstrations of slides (type the slide-show, the presentation), the multimedia albums; programmes – the archivizers (WinRar, WinZip, and others), the antivirus programmes (Panda Antivirus, MKSVir, Kaspiersky Antivirus, Norton Antivirus and itd.), the drivers programmes and etc.);

- it knows how to execute analysis and the opinion of educational programme according to criteria: content - related, methodical, didactic and technical;

- it uses the different types of educational programmes: teaching, evolving games, drill - in - practice (training programmes), tests, the tool environments, programmes for creating of own environments of teaching, dictionaries, the multimedia encyclopedia, the imitation - modeling programmes etc.;

- it knows how to design and to prepare lesson (occupation) from utilization concrete educational programme;

- it knows how to use specialist programmes (for example: the packets, the mathematical environments, the programistic systems, the imitation - modeling, the musical editors, the graphic editors of arts and soon);

- it knows how to motivate and to use in didactic diagnostics the ICT on purpose and on all stages of process of teaching;

- it knows Internet, its basic principles of work as well as the software application (the minimum: browser the Internet Explorer (the Mozilla, Opera and others) as well as the programme of service of e-mail the MS the Outlook the Express);

- it prepares the author's projects of distance courses and the electronic didactic materials for students;

- a finished course –it can estimate the finished e - the learning course (the didactic materials, profile of system of distance education, uses the elements of courses, the compatibility of teaching material of this programme, also according to different criteria (the multimedia, interactive, ect.)

- it knows how to work the Internet out side, in one of words processors useful in arranging the web-sides (MS Front Page, Macromedia Dreamwear, Pajączek Light, HotDog and others) or with the help of language of programming the HTML;

- it can find on Internet materials suitable to aim of teaching, it records and it keeps on computer the data, it carries out the analysis and it chooses adequate forms of their arrangement and uses solution of educational tasks and the problems with studying intersubject projects, as well as all with competences of pupils work with supplies all the information and educational;

- it knows how the sanitary - hygienic norms of computer work;

- it can find on Internet materials suitable to aim of teaching, it records and keeps them on computer data, it carries out the analysis and it chooses adequate forms of their introduction and the use near solution of educational tasks and the problems in this near study of between subject projects, as different competences of work possesses with supplies all the information and educational;

- it knows and protects the copyrights and intellectual property;

- it knows the main currents of the development of informative technologies and communication ones;

- it knows and uses the IC in self-esteem and analysis of work's quality, his professional preparation (the electronic surveys, questionnaires, of tool of mathematical statistics and so on);

- it knows the computer centres of administration and management of educational institution.

**3. Competences in area of Internet technologies :**

- it knows the history of Internet development, the models of distance education, types of the remote courses;

- it knows the basis of the psychological and pedagogical learning on distance (the theory of constructivism, the cognitive theory, the functional

theory, etc.), the method of distance learning ( the problematic method, the method of projects, the teaching in co-operation (of cooperation) and others;

- it knows the basic types and the general principles of functioning the telecommunicational systems;

- the CLMS knows the basic systems of distance education (Content Learning Management System), commercial (the IBM Lotus Space, e - Learning and soon), and the Open Source (for example, MOODLE, Claroline, Dokeos, Atutor and others), the CMS (Content Learning Management System), (Joomla!, Mambo, Nuke PHP Apache and others);

- it knows how to conduct the comparable profile of systems and to choose the most adequate system and the model of distance education peaceably with conditions which exist in given educational post;

- it knows telecommunicational etiquette;

- it knows the categories of users of platform distance education, their roles, the functions, and tasks;

- it uses the different means of telecommunication to exchange the messages and the educational materials with other users (with students, colleagues, parents and so on) in asynchronized mode (e-mail, teleconference, forum, controversial groups, wiki, blog, WWW, service FTP etc.) and synchronized ones ( communicating in real time, for help: chat, programme-messenger - ICQ, Skype, NetMeeting, Oxygen, Yahoo! Messenger and so on);

- it has some e – navigation's habits in net;

- it works with educational supplies of net (the network bases of data, services of novelty (NewsNet), the thematic portals, WWW, etc.);

- it uses the tool programmes (for example, MSPowerPoint, Hot Potatoes, Macromedia Authorware, Matchware Mediator and others) for designing of materials for distance courses;

- it knows and can use one of systems of distance learning, on the example of MOODLE, for studying and leading the distance courses;

- it has the knowledge and the skills of the system management of distance learning;

- it works with modern hypertext and hipermedia systems;

- it searches on Internet net for the educational supplies, indispensable and the most adequate for achievement of formulated aims of learning as well as setting these ones;

- it actively uses the ICT, Internet and the remote forms of teaching for self- education, the development and the self- improvement.

So far the legal status of a tutor has not been formulated and even its charcteristic qualifications have not been worked out; there are no programmes or the methodology of preparation, any norms of learning burden ect.

## CONCLUSION

Thus, speaking about distance learning today it is possible to select ten models of the distance education and lots of types of distance courses which differ in terms of classification criteria. Certain educational establishments or a teacher can choose that model or type of course, which serves its purposes, expectations and didactic tasks.

Summing up, there are plenty of models applied in distance teaching and distance courses that can be classified on different criteria bases. For example, one can select a type of DL model, which meets their aims, expectations and didactic tasks as well as students' needs.

Unfortunately there are still problems on the way of global and intensive introduction of the distance teaching: theoretical, low, organizational, technical, methodical, in area of software, personality, social, a part which is not to end solved.

But the real will can not already change anything and the slow down progress of development of civilization, new information and communication technologies, the global net - Internet, and alongside with them new educational possibilities of the effective utilization.

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# EVALUATION OF eLEARNING COURSES

**Jana Kapounová**
Pedagogical Faculty, University of Ostrava, Czech Republic
Jana.Kapounova@osu.cz

***Abstract:*** *The development of eLearning is a rapidly expanding area of education and it has become a phenomenon in the learning and knowledge society. Many schools – from basic to universities have adopted some learning management systems and have gained much experience with this way of learning. But there are currently not reported many results of studies in the area of evaluation. There exist some results from the research evaluating the effectiveness of study by means of eLearning in comparison with classical method of study.*

*According to our understanding it is necessary to accept a system approach and attempt to evaluate eLearning study. In the paper we determine our approaches to the evaluation of eLearning.*

***Keywords:*** *eLearning, evaluation of eLearning, Kirkpatrick's model of evaluation, information and communication technology (ICT), system approach*

## INTRODUCTION

Development of eLearning products and the provision of eLearning opportunities is one of the most rapidly expanding areas of education. The growth of eLearning is accelerating by means of new technologies – the Internet, multimedia, TV, computers. Nowadays eLearning attracts attention of learners, educational institutions and official posts. But we are limited by the shortage of scientifically credible evaluation of eLearning. Is eLearning effective? In what contexts? For what groups of learners? And many other questions can be asked when we review all the works that have been done and looking for ways how to improve the quality of eLearning.

The number of courses, study materials, ways of management, experiments and finished solutions were considerable. There evolved a general

understanding that there is no a single optimum method for an effective eLearning course. The development and testing of these courses were not only at the University of Ostrava but at many high schools in the Czech Republic as well.

We gained lots of experience both positive and negative:

- how to get ready and how to work with eLearning study text;
- how to train tutors;
- how to work with students;
- how to manage study process;
- how to choose Learning Management System (LMS)

  etc.

We have not only generated many different courses for different types of study, we have tested many Learning Management Systems as well e.g. WebCT, Click 2 learn, Learning Space, eLearn, Working Place and now Moodle. We bought them, we learned how to handle them and we filled them with information. Much money, time and enthusiasm were expended and not always to use. The positive result from our efforts may be our understanding that "there is no best way".

The amount of students in eLearning courses will increase. Many of the eLearning elements we can now find not only in distance learning but in full-time traditional courses as well. The situation is favourable now, it is important not to lose a starting point and to find the way of creating effective programmes of good quality.

Our experiences with eLearning courses, programmes and students were presented and described at conferences. Some of them can be found in the conference proceedings "Information and Communication Technology in Education" (Mechlová, ed., 2000–2008).

Let us summarise changes affecting the training: From behaviourism we could follow the shift to knowledge work. In our countries the programmed instruction was very popular, lots of self-instructional materials, job aids and performance technology were realised. Some of them are described in the conference proceedings "From programmed instruction to eLearning" (Kapounová, ed., 2005). System engineering gave us the systems concepts and the systems approach with the instructional systems development (ISD) and computer systems development (Clark, 2000). We can mention the

General Systems Theory (GST) as well (Klir, 1972), we accepted the challenge of systems thinking and it stayed still with us.

There are many approaches how to evaluate training programmes (e.g. Průcha, 1996), pedagogues use them in everyday practice.

We presume that the best way of how to prepare the methodology for evaluation of eLearning should be a system approach. We review many theoretical studies and examples of good practice. For our purposes we prefer the following theoretical works:

- Kirkpatrick's Four Levels of Evaluation (Winfrey, 1999)
- A Framework for the Evaluation of eLearning (Huges, Attwell, 2002)
- System concept and system approach.

## 1. THEORETICAL BASIS

### 1.1 Kirkpatrick's Four Levels of Evaluation – reviews

Donald Kirkpartick's four-level model of evaluation can be applied to technology-based training as well as to more traditional forms of learning. In Kirkpatrick's four-level model, each successive evaluation level is built on information provided by the lower level. According to this model, evaluation should always begin with level one, and then, as time and budget allows, should move sequentially through levels two, three, and four. Information from each prior level serves as a base for the next level's evaluation.

**Level 1 Evaluation – Reactions**

Evaluation at this level measures how participants in a training program react to it. It attempts to answer questions regarding the participants' perceptions – Did they like it? Was the material relevant to their work? This type of evaluation is often called a "smilesheet". According to Kirkpatrick, every program should at least be evaluated at this level to provide for the improvement of a training program.

**Level 2 Evaluation – Learning**

Assessment at this level measures the amount of learning that has occurred due to a training program, evaluations often use tests conducted before training (pre test) and after training (post test). Methods range from formal to informal testing to team assessment and self-assessment.

**Level 3 Evaluation – Transfer**

Evaluation at this level measures the transfer that has occurred in the learners' behaviour due to the training program. Evaluating at this level attempts to answer the question – Are the newly acquired skills, knowledge, or attitude being used in the everyday environment of the learner? For many trainers this level represents the truest assessment of a program's effectiveness.

**Level 4 Evaluation – Results**

Evaluation at this level assesses training in terms of business results, measures the success of the programme in terms that managers and executives seek: increased production, improved quality, decreased costs, reduced frequency of accidents, increased sales, and even higher profits or return on investment. Return On Investment (ROI) is sometimes mentioned as a possible fifth level or can be included in original 4th level Results.

## 1.2. A Framework for the Evaluation of eLearning

J. Hughes and G. Attwell presented a new framework for the evaluation of eLearning.

They tried to arrange the number of variables, which potentially impact on the effectiveness of the programme and to decide what constitutes dependent, independent and irrelevant variables in a given situation.

Five major clusters of variables have emerged:

- individual learner variables:

  *physical characteristics, learning history, learner attitude, learner motivation, familiarity with the technology;*

- environmental variables:

  *immediate (physical) learning environment, institutional environment, subject environment;*

- contextual variables:

  *socio-economic factors, the political context, cultural background, geographic location;*

- technology variables:

  *hardware, software, connectivity, the media, mode of delivery;*

- pedagogic variables:

*level and nature of learner support systems, accessibility issues, methodologies, flexibility, learner autonomy, selection and recruitment, assessment and examination, accreditation and certification*.

Each of these can be disaggregated into more precise groups and further disaggregated until individual variables can be identified and isolated. Hughes and Attwell were seeking to build a robust classification system with clearly identified levels of aggregation, for mapping and coding existing work into the effectiveness, efficiency and economy of eLearning. Methodologies were cross-referenced against the variables being studied and major areas of omission can be identified that in turn will suggest a future research agenda.

Some of the questions that were asked:

- will the effectiveness of different eLearning pedagogies depend on particular individual learning histories?
- does the effectiveness of particular technologies depends on gender?
- are the presence (or absence) of some individual variables or clusters of variables more significant than others in determining the effectiveness of eLearning and, if so, can they be weighted in some way?
- is the profile of the learner more significant than the nature of the learning environment?
- is the effectiveness of the technological solution outweighed or enhanced by particular environmental variables?
- which is more important – getting the software right or the learner support right?
- can we use multi-variance statistical techniques (such as factor analysis) to see which variables „cluster' together and the extent to which they impact on each other?

The researchers have found this a useful framework for evaluating and researching the effectiveness of specific eLearning projects and programmes.

### 1.3. System concept and system approach

The evaluation of eLearning is similar to that of any other learning but we need to accept particular groups of attributes. We intend to accept the systems approach and we need to determine major parts of system. We were inspired by a similar approach we used in analysis of information system in education (Kapounová, 1999).

In the system purposely defined for evaluation of eLearning we have specified the following structure and we try to find their properties:

- subsystems
  - learners

    *learner motivation, age, school level (basic, high school), way of study (full-time, distance);*

  - tutors

    *teachers (according to the school level – basic school, universities), qualified tutors, professional orientation (humanities, sciences), competences to prepare and implement eLearning programmes (with certificate), tutor's communicativeness;*

  - learning contents

    *full study programme, individual course, branch of knowledge (humanities, sciences), curriculum, methodology, learning styles, testing, assessment;*

  - technology

    *hardware, software, Internet connection, accessibility, multimedia support, other technology;*

  - learning management system (LMS)

    *role of learning management, LMS with or without ICT support, type of used LMS, institutional background, accreditation, how to begin and terminate study;*

- relationships

  *between subsystems;*

- characteristics

  *experts in individual disciplines estimated typical attributes of elements, subsystems and relationships; they form the basis for system of variables which can be analysed and tested;*

- system environment with the subsystems (elements) as:
  - socio-economic characteristics

    *changes in demographic structure, learner's social status, level of education, age, gender;*

- job market

  *retrained workers requirements, increasing number of students (as well as training institution, universities), new challenges in new professions;*

- progress in new technologies

  *flexibility to accept new technologies, pressure and support (positive or negative) of computer (or other) companies;*

- policy – as governmental, educational, company, universities policy

  *kind of support – e.g. who is funding or paying for the course, public relations (PR).*

etc.

## 2. OUR EXPERIENCE

For a control model we chose study programmes and short-term courses prepared and implemented at university – it means with academic background, we do not deal with the retraining of people with basic or lower education. We identify and survey parameters that could affect effectiveness, efficiency and economy of eLearning.

We present some our findings:

*Motivation of learners* seems to be a very important factor (maybe the most important) in study programmes supported by eLearning. We must pay close attention to everything that encourages students motivation – in study text, during tutorials, in feedback,… Distance students are more motivated than full-time students. Students between 30 and 40 have strong motivation, gender doesn't matter. In particular, they appreciate that they may schedule their learning and assessment duties themselves. They admit that it takes a great deal of self-discipline.

Learners prefer eLearning *study materials* that are similar to classical textbooks; many multimedia effects distract their attention. They prefer to print study texts (or their parts), which allows them to learn in places without access to the Internet; e.g. in means of transport.

Our *teachers, tutors, authors of texts and eLearning managers* complete methodical training concerning eLearning (with the certificate). They prepare their eLearning courses more systematically, they have to propose the whole course before it starts; in classical courses some improvisation is allowed.

Which *branch of knowledge* is more suitable for eLearning? At our university we have evidently a higher number of courses in natural sciences, mathematics and information technology than in humanistic subjects, but this survey is not yet final. Our tutors use eLearning course in subjects where students train their skills, e.g. skill of painting.

Nowadays neither learners nor teachers (tutors) have any problems with *technology* (ICT) – computers with multimedia facility, the Internet connection, etc.

Our rich (and expensive) experiments with *Learning Management Systems* (LMS) point to such a system that is user-friendly for both learners and teachers, and allows communication in a native language.

Financial resources (e.g. from Ministry of Education, ESF,…) play a very important role and they enable to involve eLearning in our educational system: teachers, tutors, managers can complete courses in eLearning and distance learning, authors can write study texts, we can run pilot projects, we can improve ICT equipment, etc.

## CONCLUSION

There is no simple or easy way to evaluate eLearning courses. We have just started to find out which factors have an impact on the effectiveness of eLearning. In the next stage we will seek which system elements and characteristics are more significant and we will determine potential new ones. We intend to quantify the variables and try to use some statistical techniques to see which of them can impact other or the studied system.

Even though we are able to find what can improve our eLearning courses, it is sometimes difficult to modify them, although we know that changes are inevitable. E.g. we can be acquainted with different learning styles of our students and we understand that it is necessary to prepare different eLearning materials and management for different learners – but the solution is sometimes not within the compass of instructional courses designers.

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# GRADUAL DEVELOPMENT OF EDUCATION WITH THE USE OF THE METHODS AND TECHNIQUES OF DISTANCE LEARNING

**Halina Widła, Izabela Mrochen, Ewa Półtorak**
University of Silesia
Institute of Romance Languages and Translation Studies
halina.widla@us.edu.pl, ikabela@poczta.onet.pl, epoltorak@op.pl

***Abstract:****The article discusses the attempt made by the University of Silesia to produce didactic materials as well as enrich the process of education with the use of distance learning methods and techniques, meaning the gradual change from the traditional support of the teaching-learning process by means of technologically diversified online materials to activities on e-learning platforms. Also, it should be noted that a wide range of didactic offers are prepared not only for students, but also for others who are interested in this form of education.*

## 1. DISTANCE LEARNING AT THE UNIVERSITY OF SILESIA

Distance Learning at the University of Silesia (US) as in other academic institutions is going through a diverse range of assimilation phases of traditional teaching methods. It is worth pointing out that the attempts of e-learning have now been widely implemented for many years, i.e. from the traditional support of teaching with diversified technologically online materials to activities on e-learning platforms along with an attempt by the university to launch its own system. As a result, a new service-didactic section has been set up. Its primary objectives are entirely focused on designing unified and cohesive system supporting teaching by means of this new method at US.

Consequently, in the new Distance Learning Centre of Silesian University:

- a standard manner of designing distance education platforms with a division into separate platforms for institutes or departments was implemented,

- the same visual form of the site was designed and introduced; moreover, operating the services became unified throughout US,
- all individual e-learning services of university faculties were transferred to the new server in Sosnowiec,
- a brief description and a film presenting the most common user-problems were prepared;
- four virtual servers were prepared to deal with:
  - faculty platforms,
  - streaming (video conferences, video lectures),
  - testing platforms and training platforms,
  - UPGOW (Uniwersytet Partnerem Gospodarki Opartej na wiedzy; in English: *the University as a Partner of Economy Based on knowledge*) project platforms, which is co-financed by European Union Structural Funds,
- the system of making automatic backups (i.e. increasing backups and full backups with a certain number of other yearly, monthly, daily backups) for the portals serviced by CKO (Centrum Kształcenia na Odległość; in English: *Distance Learning Centre*) was prepared,
- Scripts allowing the automatic creation of new *Moodle* installations were produced (a fixed structure which effectively and clearly describes the place of files and folders as well as the names of data base),
- the system of CKO *(DLC)* server statistics was installed,


**Figure 1. The main website of CKO (*DLC*) US platform**

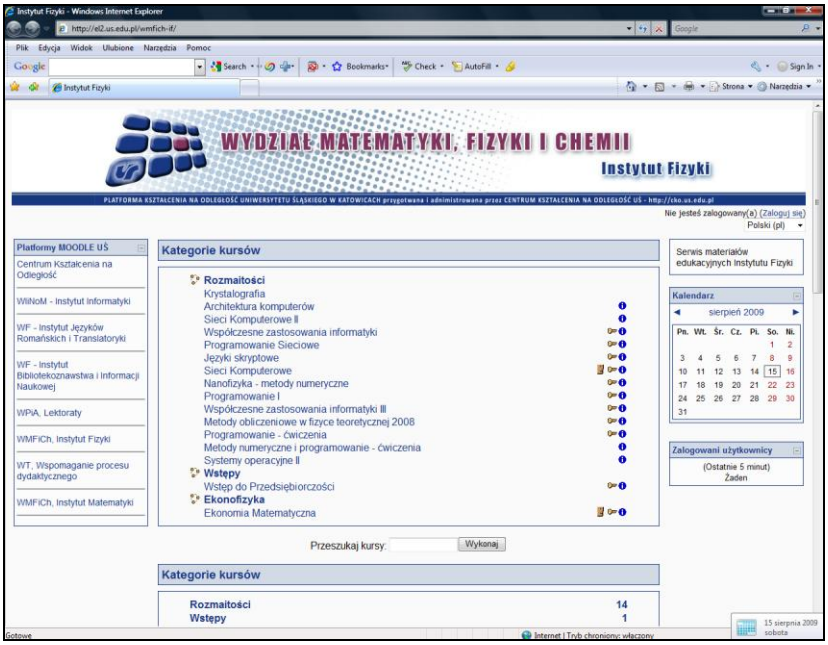


**Figure 2. The main website of the platform of the Faculty of Mathematics, Physics and Chemistry at US**

This year CKO (*DLC*) is planning to:

1. initiate a coded transmission between the users and servers (ensuring safe transmission of passwords and data),
2. launch a server used for video streaming,
3. implement global logging in e-learning sevices via the Central Logging Point connected with USOS Web system (one global name of the user and valid password to both all platforms and platform users);

Since the beginning of 2008, a great number of courses for employees of the Silesian University Faculties have been realised. It should be noted that these courses are organized in a star system, i.e. after the course the academic workers share their knowledge with their students. This system appears to be efficient since it would be impossible to train so many people at one time. What is more, the training materials such as films and *.pdf files were prepared to support the students during the training course. So far, 46 different courses for academic staff and students have been completed.

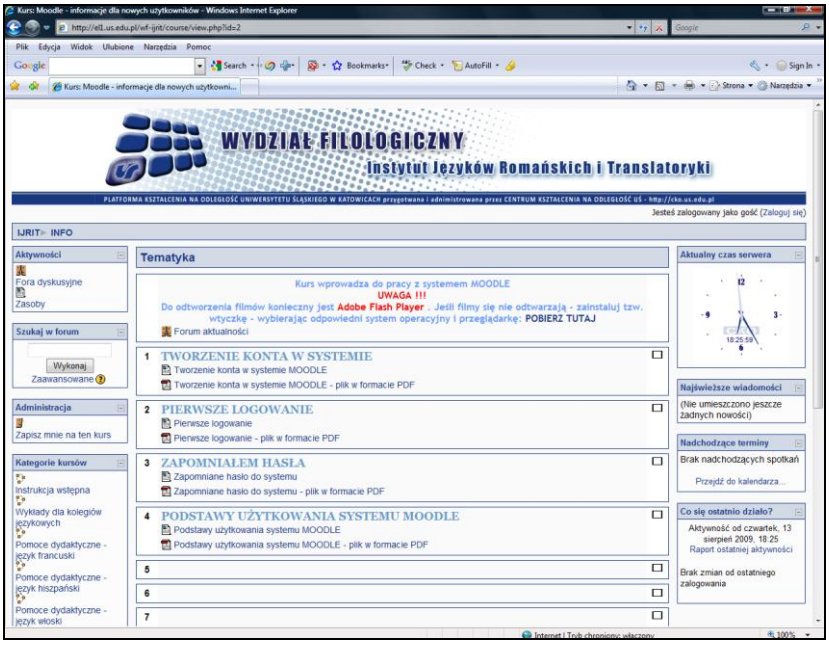


**Figure 3. The website of the Faculty of Philology with the instructions for the users of the platform**

## 2. TOPICS OF TRAINING COURSES

It is worth noticing that each faculty cooperating with CKO (*DLC*) has training materials which are produced and used in many ways. The most common of them are:

- ✓ films, multimedia presentations and testing files which help users to be well prepared before classes or to revise new information,
- ✓ a set of lectures with interactive activities as part of full courses,
- ✓ a set of exercises supporting foreign language study;

### 2.1. Materials designed within the UPGOW framework

In terms of the UPGOW project, it should be noted that training materials placed on the *Moodle* platform are good examples of their widespread use. This platform is aimed to be operated by US users. It offers a set of courses designed by experts from four university faculties (data current as of August, 2009):

**The Faculty of Biology and Environmental Protection**

Introduction to philogeography

Use of microorganisms in environmental protection

Base of GIS and satellite teledetection in research on plants

Bio-computer science in genomics of plants

**The Faculty of Geology**

Systems of geographical information (GIS) in natural science

Paleoanthropology, anthropology, paleontology, evolutionism

Truth about aerosols

Precious stones – from nature to laboratories

**The Faculty of Computer Science and Science of Materials**

Telemedicine and hospital information systems

Techniques of clinical pictures

Mobile systems

**The Faculty of Mathematics, Physics and Chemistry**

Lectures supported by Polish textbooks on inorganic chemistry, general chemistry,

coordination and metal-organic chemistry, as well as English scientific publications of many authors, e.g. the articles of academic staff of the Department of Inorganic and Coordinating Chemistry of the University of Silesia.

It is worth noting that classes in organic chemistry are carried out in the form of lectures, presentations, self-study exercises. In addition, the Microscale Laboratories are equipped with study aids providing students with information on laboratory equipment, laboratory sets and basic laboratory operations then rules and information regarding preparation requirements.

A compensatory course in chemistry, in particular provides information on 24 topics and a series of tests on 11 topics whose usefulness was assessed highly during the negotiation phase.

**Nanophysics**

Physics of condensed phase

X-ray interaction with matter

How is quantum mechanics understood? – advanced course

In addition, searching the platform gives the users a possibility to find courses at other academic institutions to satisfy all users` needs in terms of the project, for instance:

- a one hundred-hour course in e-learning servers for the Silesian University academic staff and students who want to broaden their knowledge of English prepared by the university lectures of the School of Practical Foreign Language Teaching,
- general English course – A2 ESOKJ level (20 hours)
- general English course – B1 ESOKJ level (20 hours)
- general English course – B2 ESOKJ level (20 hours)
- course: English in a student`s successful career – B1 level (20 hours)
- course: English in a student`s successful career – B2 level (20 hours)
- a ninety-hour course in the autopresentation organized by the Institute of Arts of the Faculty of Arts (the US) in Cieszyn; the purpose of this course is to develop the Silesian University academic staff and graduates` abilities to present their own achievements as well as work experience;

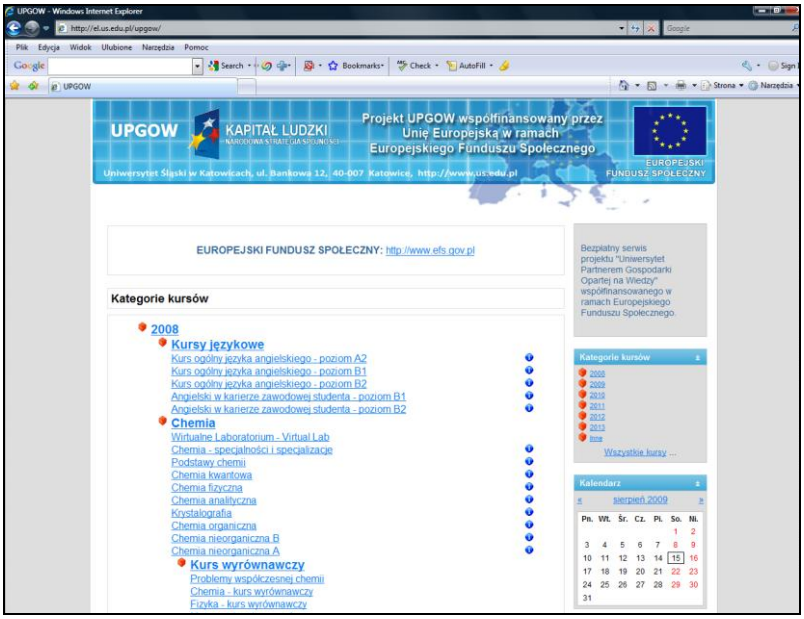


**Figure 4. The sub-site of the UPGOW project**

## 2.2. Materials prepared on the individual faculty platforms

In terms of faculty platforms, it should be noted that these support a number of lectures and classes (the Faculty of Mathematics, Physics and Chemistry, the Faculty of Philology, the Faculty of Ethnology and Eduaction), foreign language (FL) courses (e.g. FL courses for students who are going degrees at the Faculty of Law and Administration), laboratory classes (the Institute of Computer Science), or graduate seminars (Multimedia – seminars at the Institute of Romance Languages and Translation Studies).

What is more, a wide range of tasks, both individual and group projects, set up by means of different techniques: from traditional reports supported by multimedia presentations, articles, exhibitions, or performances to blogs, faculty websites or presentation of a topic in *Wiki* format – for those who are more advanced at information technology.

The main focus is on learning based on activities, co-production and sharing knowledge, but some solutions make us closer to e-learning 2.0.

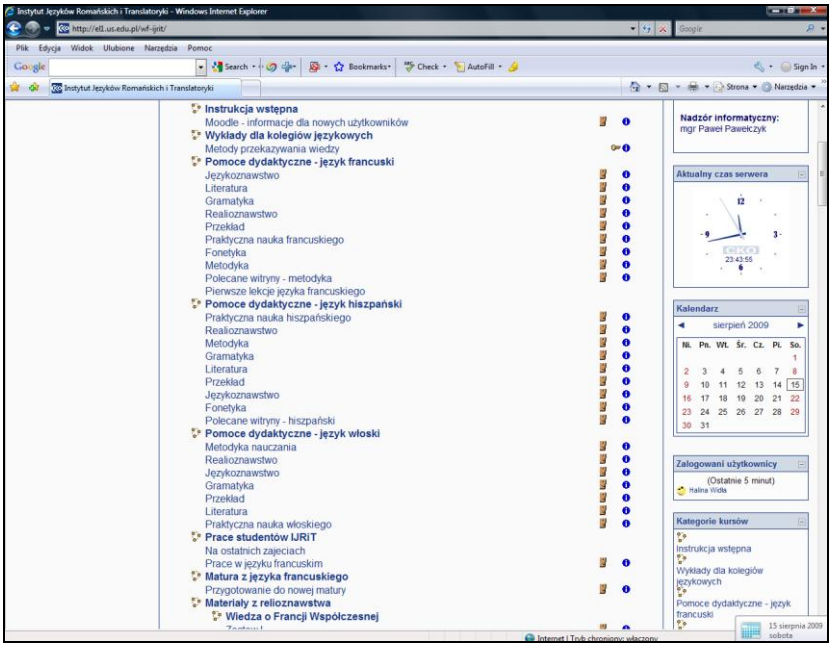


**Figure 5. An example of a list of courses which are available on the IJRiT platform**

## 3. THE OTHER FORMS OF MAKING DISTANCE TEACHING MORE POPULAR. AN EXAMPLE OF IMPLEMENTATION AT THE FACULTY OF PHILOLOGY

Courses in using new technologies in the workplace organized for the students of all majors give them a great opportunity to be familiar with the operating possibilities and acquire computer skills to use different tool programs enabling participants to store, transfer and build different materials and multimedia aids (e.g. text documents, multimedia presentations or simple websites).

Taking into account the fact that studying foreign languages is unique and the character of future workplace chosen by our students (most of them are going to be translators or foreign language teachers), the authoring systems (authoring programmes/tool systems) intended to generate various types of foreign language interactive exercises play an important role in the syllabus covering the selected classes mentioned above. Furthermore, students have the possibility to acquire the principles of programming interactive exercises which are based on simple generators used for creating one type of exercise available in one or many variations (one-task programs) as well as tools

which are more widespread, allowing users to generate several types of exercises by means of the same program (multi-task program). Considering the selection criteria of tool programs provided, on the one hand, they are chosen because of their usefulness (taking into account both a pedagogical and technical point of view), while on the other hand, their availability (these are programs are free on the Internet).

Among one-task programs, there are selected quiz generators which are under discussion. For instance:

*Question-Responses* (providing a possibility to produce language tests in a form of different types of quiz questions), *ECT* program (allowing to prepare quizzes that check a student's reading comprehension), and generators of various plays and language games, such as: *Crisscross Words* (designed for generating interactive crosswords at all levels of difficulties), *Cantare 2* (intended for doing exercises based on FL songs as well as each type of audio or audio-visual files), *Quandary* (giving the opportunity to create short or long interactive stories in which students can play different roles), *La Vouivre* (designed for organizing plays similar to 'goose game' in which a dragon is the main character), *Linnaeus* (enabling users to make exercises in which some selected elements are ordered in accordance with correct categories), and *Le Pendu* (generating exercises similar to 'hangman'). Students become familiar with the operating rules of multi-task tool program on the basis of *NetQuiz Pro* or *Quiz Faber* (enabling students to develop tests which include various interactive tasks, such as dictating, quizzes or exercises with empty gaps), and *Hot Potatoes* (giving users the opportunity to design interactive crosswords, quizzes, exercises with empty gaps, tasks in which the matching elements are linked or ordered in the correct way).

As a result, students can program their own interactive exercises which are used as output material that, in turn, may be used for designing thematic browsers and didactic websites). In the field of producing the students' own simple WWW sites, some editors (e.g. *Nvu* or *Microsoft Office Share Point Designer*) are very helpful for those who do not know any programming languages.

Then, the next important stage of distance teaching is training the students how to cope with distance learning platforms, carried out during their graduate and specializing seminars. Furthermore, students take their finals on the basis of their Master's thesis in which they depict a theoretical and practical aspect of the project that is realized during their graduate seminars. This didactic offer placed on the Institute platform helps both students and pupils in Poland.

The French Language Contest, a two-year project, is a good example of this application since it contains 20 didactic topics presented as a popular form of *Web Quests* offering extra tests and exercises enabling the participants` self-esteem. It should be added that each mission takes 20 hours of individual or group work. There are several reasons of creating a series of *Web Quests* for the future participants of the contests. First of all, theses students who take part in these contests are often extremely clever and motivated, however, they are quite alone when they come up with some interesting ideas in a typical class environment in which they have no chance to realise their ambitious goals. Fortunately, there is a chance to help this group of students by supplying them with useful clues how to study before competitions. For example, they can follow Internet sources and evaluate their current study progress. It should also be emphasized that in *Web Quests* there are individual or group projects prepared by means of different techniques and a wide range o tasks; e.g. from traditional speeches with multimedia support, articles, exhibitions, or performances, to blogs, their own websites or topics prepared in the *Wiki* format for more advanced students who are able to implement information technology.

We direct our attention to the learning process via activities, co-creating and co-sharing the knowledge as some ideas make us closer to the principles of e-learning 2.0.

Although only some tasks for the contest participants include the examples of tool and Web 2.0 technology implementation in teaching, it can be said that designing *Web Quests* in the Internet is exactly the process of implementation to teaching process for the authors who are the members of graduate seminars. In addition, *Web Quest,* in comparison to traditional methods of using the interactive study aids, does not limit anyone to assimilate the material only by carrying out the tasks only by repeating and practicing. Instead, it makes the students acquire the knowledge by doing the exercise and the traditional marking that is provided as feedback together with a percentage result, *Web Quest* offers a possibility of self-esteem on the basis of clear and detailed criteria, which makes it suitable to work in an independent and semi-independent way.

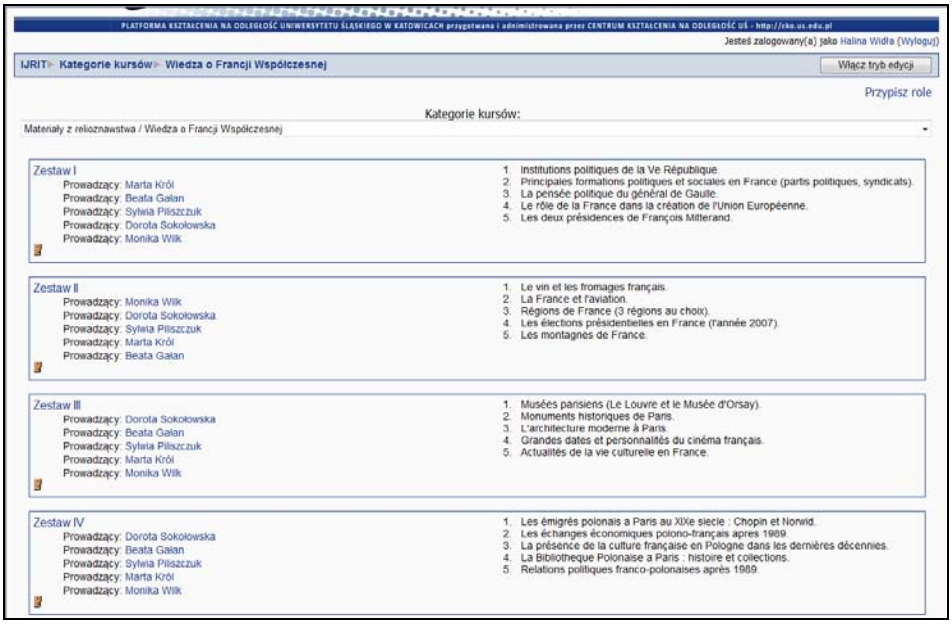


**Figure 6. The topics of 20 courses in historical accuracy science available on the IJRiT platform**

The general goal of the offered classes is not only to prepare students to the practical implementation of the selected program tools in the future workplace, but also in training students to evaluate the innovative ideas that have been put into action. To achieve the primary purposes, a set of evaluative spread-sheets (cf. Półtorak E. 2007) prepared on the basis of the established evaluative criteria of didactic resources available in literature. The proposed parameters of evaluation enable the students to evaluate the websites intended for FL studying as well as the interactive exercises selected at random. These exercises are assessed with regard to their pedagogic usefulness (e.g. the type and goal of an exercise, its potential users, a type of developed language competence, etc.) and suggested technical solutions (e.g. the type and quality of media, types of proposed interactions, etc.). Consequently, students turn their attention to quality assessment of not only ready materials but also materials and multimedia aids tailored by the students themselves.


**Figure 7. A French course prepared for dr Małgorzata Twardoń's seminar**

Taking the didactic offer into consideration, it should be noted that not only the students of our Institute use the offer but also the FL teachers. Furthermore, there are workshops for those teachers who are interested in designing language interactive exercises by themselves so as to use this type of tool programs in the FL teaching/learning process. These workshops took place in August 2009, set up by the Summer School of Language, Literature and Polish Culture, organized each year by the School of Language and Polish Culture of Silesian University in Cieszyn. The teachers who teach Polish as a FL in different institutions abroad could participate in the workshops. All in all, there were 22 people who teach Polish on different levels of advancement in schools and institutions of the Polish community abroad in Europe (e.g. teachers coming from Russia, Ukraine, Bialorus, Latvia, Estonia, Turkey, Germany, Switzerland, the Czech Republic), the USA and China, who attended the workshops.

Also, the classes focused on language development, the participants of those workshops had a possibility to attend a methodological session on *E-Learning. Polish on the Internet.* In the framework of this session were two days of lectures and seminar classes in using the tool programs in teaching/learning Polish as a FL. The training programme aimed at familiarizing the participants with:

- an offer and possibilities of practical use of tool programs intended for creating interactive language exercises during a Polish lesson,
- the rules of programming interactive exercises on the basis of operating the selected modules of the *Hot Potatoes* program,
- the rules of website design so as to do exercises in preparing simple websites by means of *Microsoft Office Share Point Designer* program;

The next workshops will be held in September in cooperation with the Centre of Teacher Training and the Foundation of Educational System Development which are intended for FL teachers from the region. Apart from the discussed subjects, there will also be a training module for those who want to deal with e-twinning, i.e. a program of joining and cooperation between twin schools in Europe via electronic media and teacher training promotion. This educational program of the European Union promotes the ways of exploiting information/communication technologies (*ICT*) in the European schools. The training will be for these teachers who are willing to be registered in the e-Twinning system – e-Twinning Groups and Learning Events.

The offered training meetings are of high interest. As a result, the participants prepare their own study aids in a different form and a set of interactive exercises at different levels of advancement. Finally, eBook is the last form of training, i.e. CD-ROM including both theory and practical exercises. What is interesting is the answer key placed on the *Moodle* platform. This key includes not only the solutions but also a wide range of explanations emerging as a useful source of knowledge and practical exercises.

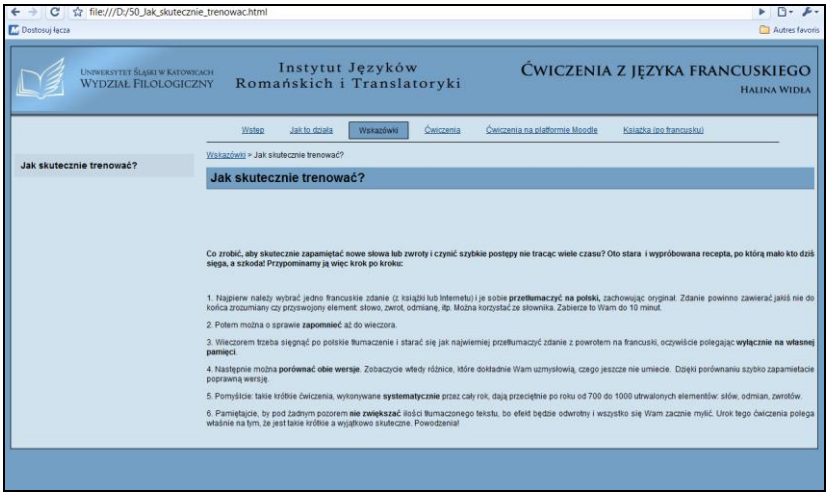


**Figure 8. An example of eBook on CD**

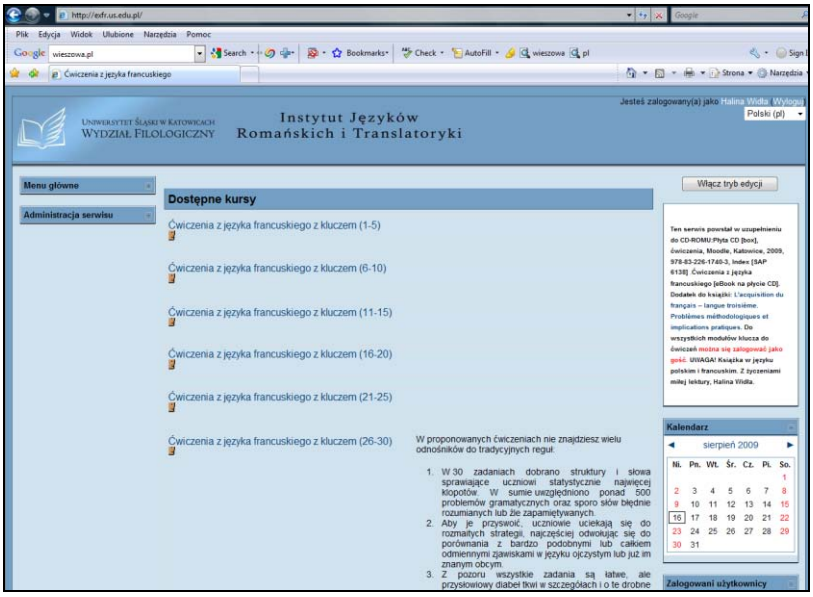


**Figure 9. Examples of the answers to the exercises on the Moodle platform**

## CONCLUSIONS

The future specialists‘ training must correspond to the needs of an emerging information society, i.e. more than 50 per cent of whom are still employed to deal with information processing (from generating, storing, processing, acquiring, transforming to implementing). Thus, the fast knowledge availability becomes the key ability in the information society.

Considering the advantages, the strong points of the discussed solutions are: rapid access to selected materials, usefulness for those who want to explore the extra material in depth, the possibility to repeat the activities as many times as required, and the opportunity to share work in groups. Whereas the weak points are: imposing the strong self-discipline, sometimes lonely stressful work, difficult motivation as well as evaluation of the results and progress in learning.

All in all, designing study aids is an element of preparing teachers and students for implementing the tools and 2.0 technology more frequently within the didactic processes, making the users familiar with tools and production of their own solutions, provides a supplement for the lack of experience in computer literacy, makes the users more sensitive to the issue

of mental powers and deprives them of having an inferiority complex about students who cope with the Internet without any problems.

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# NEW APPROACHES OF INFORMATION TECHNOLOGY APPLIED IN EDUCATION

**Kateřina Kostolányová**
Pedagogical faculty, Ostrava University
Mlýnská 5, Ostrava, Czech Republic
katerina.kostolanyova@osu.cz

***Abstract:*** *The contribution is presenting Department of Information and Communication Technologies (KIK) while showing the development of information knowledge and skills of OU students with ICT. The author would like to present the main focus of the Department and highlight methods and forms of education at KIK.*

***Key words:*** *Information technology, module study, eLearning*

## INTRODUCTION

Information technology – these two words are becoming a magic formula of modern times. Under that term we can imagine a summary of tools for communication and processing of information.

However, use of new, advanced technology also brings complications to life of certain people. Not everybody is able to adapt new technologies and new work procedures introduced by IT. It is not enough for people to get education once for all; often they must change qualification or extend their knowledge in the course of life.

In today´s information society the support of advanced education is assumed aiming at the build-up of capabilities to work with information and process them. Following graduation, students should get along with the world of information, should be able to retrieve information, critically evaluate it and actively use.

Work with information, their effective retrieving, receiving, processing or use in practical situations has s significant impact on flexible and correct decision. Hence, information competences are a basic condition of transition toward knowledge society and it is indisputable that basics of work with

information must be built as early as at the stage of school attendance and then continuously developed and complemented all life through. [1], [2].

## DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGIES

The Department was established in 2000. Yet, it had had its nucleus at Department of Technical and Work Education which was a point of concentrated didactics tools, such as overhead projectors, projectors, tape recorders, followed by several computers as a demonstration of modern technologies. At that time, computers were assigned to have a magic influence.

For education of information and communication technologies were built four computer teaching rooms of advanced outfit. At the beginning, future teachers were taught at the Department on how to use audio-visual technology and computers in their future professions and at the same time the Department was looking for its own focus. That was found in the following two areas:

- Ostrava University, where there was a free space left for the existence of the Department covering the area of educational technologies.
- Schools, where coordinators of information technologies were established.

Those two areas became the basis of the concept of the whole Department; the area of education of students and its research focus.

Within IT education, Department of Information and Communication Technologies at Ostrava Pedagogical faculty is contributing in increase of information literacy right at several levels:

A) The Department manages a group of subjects covering the induction course of Information and Computer Literacy, followed by subjects aimed at the area of multi-media and subjects focused on media literacy. Teaching of those subjects is organized by KIK for all students at Ostrava University who show their interest.

**The ambition of the course of Information and Computer Literacy (INPOG)** is to teach students the skills connected with basic work with ICT. The course makes students familiar with information systems applied at University (they get familiar on how to pre-roll to subjects of individual

semesters, how to book a term for examinations, etc.) and provide students with comparison of their computer skills.

**Subjects aimed at multimedia** make students familiar with *integration of texts, pictures, graphics, sound, animations and video for the purpose of mediating information.* Often, the possibilities of multi-media teaching and use of electronic tools are self-evident at our basic and secondary schools. Future users of multi-media tools for teaching must be taught by us not only how to assess and evaluate them, but the stated users must be also taught how simple tools could be created. The subjects aimed at the multi-media area (sound, animation, video, interactive elements, etc.) are being presented and explained to students as regards to their application in teaching with the impact placed on the aspect of didactics.

**Media education** is one of the cross-section topics of the Framework Education Program which is mandatory for basic and secondary schools. With regards to the prospect of development it is desirable to have competent and professional teachers capable of working with multimedia technology while implementing media education in their pedagogical practice. Therefore, we are trying to make the education and methodology support more intense even in that area.

Media-literate person is able to use available media for their education, personal development and satisfaction of needs at maximum. In that sense we are preparing a group of subjects organized by professionals on information sources, librarianship and media communication.

The level of the ICT competence in students joining studies at PdF OU varies a lot. In the course of their studies a dramatic improvement is experienced, yet it is impossible to be satisfied with the existing level. Unfortunately, it often happens that students actively use computer technology in the course of the whole time of their studies sporadically, and it might be the case that even not at all.

B) The Department is managing study disciplines of Information technology in education. Those are offered in the form of full time and combined studies at all three levels – i.e. bachelor, master and doctorate studies.

In fact, **Bachelor study** graduates are able to manage routinely applied computer technology tools, including basic and certain special software products. They are able to organize, manage and administer, or if needed, to share design and outfit of a school in terms of ICT and to fulfill the role of the school information system “manager”. Apart from information and communication technology knowledge, the students get specific knowledge

of pedagogics and psychology, management and marketing in the **follow-up Master studies** which will be applied by them in practice. They can become for example coordinators or managers of distance education courses, or persons responsible for education of human resources in companies. **Doctorate studies** prepare specialists with knowledge and skills in the area of design of advanced information systems, followed by theoretical bases of informatics and development of educational materials for eLearning. They are able to use modern copyright systems which also involve the extension of knowledge and skills in the area of multimedia and visual and object-orientated programming, followed by knowledge of computer theory and practice.

C) The KIK contributes to modular study being implemented at Ostrava University.

The module is a comprehensive set of subjects which are mutually connected in terms of content. The subjects are designed in such manner that following graduation, students have basic knowledge and skills in those areas which will support their position at the Labour Market. The modules will enable the students to get next competencies – knowledge and skills – exceeding the framework of the studied discipline. The successful graduates of the module will obtain the certificate which is in compliance with Act on Universities, being an official document on the graduation of the study within the long-life education. Additionally, Diploma Supplement will include information on graduation from the module.

The Department has applied with three modules for the modular study – The Preparation for ECDL Testing, The Development of Multimedia Applications and Basics of Algorithm Thinking and Programming. The modules are offered both in the combined and full time form while their studies are organized (should full time education is involved, then supported) by eLearning courses developed in LMS Moodle.

D) In the area of further education the Department is managing the course entitled **ICT Coordinator.**

The aim of studies in that course is to outfit graduates with required knowledge, organizational and managing skills, or didactics methods. Then, an ICT teacher-methodologist is able to assist methodologically their colleagues at school with ICT integration in teaching of majority of subjects, coordinate software purchase and update, and develop and implement the ICT plan of the school in accordance with the school educational program.

Moreover, the Department had its considerable share in the increase of information literacy within the **KIMKA Project (Communication, Information and Marketing Competencies of University Graduates).** The participants were involved in the subjects of communication, information and marketing. Those subjects were organized and coordinated by specialists of practical expertise. Two runs of that project were successfully completed by almost 50 graduates from various universities.

E) Last, but not least, the Department is a pioneer in a new form of education - eLearning at Pedagogical faculty of OU. The KIK is a Department organizing teaching in the combined form of study with prevailing part in LMS Moodle environment. That platform serves for the full time studies as a database of study materials and ongoing semester tasks created by students of various disciplines and focus.

The future of the Department is aimed at research focused on the establishment of the laboratory of intelligent pedagogics processes and its system integration in real teaching. We are focusing on the *eLearning issue,* which is closely connected with striving to respect learning styles of individual students, and the preparation of the tailor-made study environment. That is closely corresponding with another intent of the research - *Data Mining*, so called data mining from database deposits created during various statistic investigations (study supports, e-courses, study administration, etc.) and in the area applicable in education (e.g. analysis of audio-signals and their application in teaching). Last but not least *Petri nets* are being used for modeling of educational processes, development of study supports, theme content of subjects and teaching procedures.

The concept of research at the KIK Department is aimed at managing the contemporary world methods and tools required for education of a wide-spectrum of students. Research activities are focused on the development of methods of modeling and optimization of educational processes (methods of comparison of educational forms, controlling approaches to teaching processes), followed by simulation and animation methods (extension of simulation and animation models aimed at the pedagogical practice, use of simulations and animations to make the educational process more effective, and finally, the methodology of multimedia teaching aid development).

## CONCLUSION

Today´s society is more or less depending on information and communication technologies which we experience at each step. Currently,

those technologies are on rise and it cannot be expected that the opposite would be the case in close future. In this context, long-life learning becomes the best way how to cope with changes incurred by ICT implementation in common practice. Various EU declarations state that a precondition for successful and sensible personal and professional life of individuals is mainly the skill of "to learn how to learn" including the skill of adopting changes. Information literacy and everything connected with it thus becomes a necessary part of everyday life.

Recently we can hear a statement that knowledge is the most valuable source of economic growth and cultural prosperity. Knowledge thus becomes a drive for both personal and professional growth.

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# E-COURSE MANAGEMENT IN THE VIRTUAL INTERNATIONAL ENVIRONMENT

**Jiří Pavlíček**
freelance consultant for e-education
Štefkova 5, 700 30 Ostrava-Výškovice, Czech Republic
pcw@volny.cz

***Abstract:*** *This paper summarizes experience from European online Moodle course management. The term international environment means that the design and development of the e-course was performed by an international team of authors and e-teachers; attendants of the virtual classroom were teachers from various European countries. In the management process principles of virtual project management were used. The e-course was designed, developed, and implemented in accordance with principles of Instructional System Design discipline.*

***Keywords:*** *E-course, Instructional System Design, virtual classroom, instructional architecture, Moodle environment.*

## INTRODUCTION

E-course design and development including e-course delivery in a virtual educational environment is a quite demanding challenge from both the didactic and project points of view. An evident reason for this statement is the visibility of instruction (both teaching and learning) in the electronic educational environment. This attribute has a fundamental impact on the pre-active phase of instruction, i.e. planning and design. In our presented case some project management factors must also be added, such as an international team of e-authors and e-teachers, virtual development environment, and an international virtual classroom.

The e-course which is discussed is one of outcomes of the European project, G@ME, Gender Awareness in Media Education, [1]. The project has been solved within Socrates programme, in 2006-2009.

The e-course in question was performed on the content of Gender and ICT[1] at school, the pilot target group was formed by teachers and teacher students from several European countries.

The pilot e-course was delivered in January and February 2009, the organizational phase (enrolment, concrete Moodle introduction, familiarising with e-schoolmates) had started 2 weeks earlier. E-course evaluation and subsiding (especially some discussions) took other 4 weeks after.

24 participants from 5 countries (CZ, D, Fi, Gr, Lt) enrolled in the course, 16 others who were pre-registered did not keep the term of enrolment. 13 participants passed the course including successful task solutions and active participation in collaborative work. The rest monitored the course with rare number of visits.

The course was performed by six e-teachers and one e-tutor.

The course itself represents a transformation of the project solution into a learning unit and furthermore into a reusable learning object (RLO) in the sense of RLO's definitions as in [2] for instance. The course was developed within a 4-month period by the project team of 6 e-authors and a project manager. Every author performed a role of e-teacher in the implementation phase, the project manager added also a role of e-tutor.

Except of the issue itself the project brought interesting pieces of knowledge and experience in the field of virtual instructional design. We will attempt to generalize them into e-course design, development, and implementation (delivery) principles.

## 1. E-COURSE DESIGN AND DEVELOPMENT

The ISD (Instructional System Design) methodology was used within the e-course design and development. The project team was introduced into the framework of the methodology at first and then with its particular phases. The project WBS (Work Breakdown Structure) was specified within project phases including time milestones. The time management and adherence to it was one of the most important project processes. Most of the project activities were performed in the Moodle environment. The authors were responsible for particular learning units under the project manager supervision and feedback.

[1] ICT, Information and Communication Technology

The course concept pre-defined the course analysis as the project solution. The analysis comprised needs analysis of the research subject, educational goals identification, target group specification, framework of subject solution, course delivery platform, cost estimations, including time management and human resources planning.

In the design phase so called A-model for e-course design and development was applied. This model was introduced in [3]. The model can be ranked into the system of instructional-design models, see [4] for instance. A-model requires authors to specify prescribed didactic components. At the same time it is an adviser in the process of the e-course design. Within the A-model education dimensions {objectives, learning unit structure, learning content, assignments, evaluation, instructional architecture, instructional strategies, learning unit sequencing} are specified.

The e-course model [3] was constructed by the project virtual team and this product became the base for the course in the Moodle environment. This meant specifying and building:

- hierarchical system of learning objectives according to the revised Bloom taxonomy;
- structure of learning units derived from these objectives;
- learning content and its transformation into learning objects with a given structure;
- formative and summative evaluation;
- instructional macro-strategies upon Gagné's and Fotinas' concepts (ibid.);
- instructional strategies, in particular socratique questions and discussions to them, collaboration, and problem solving;
- instructional micro-strategies, such as presentation, discussion, WebQuest, and Wiki;
- both linear and nonlinear sequencing of learning objects and also scaffolding.

We dare to claim that applying an instructional-design model (A-model in our case) is the fundamental point for a clear and consistent e-course structure building by the virtual and even international project team.

Development patterns of external and internal learning units were created for successful dealing with the e-course. The external learning unit pattern

consists of Moodle resources and activities. The internal learning unit pattern copies the A-model structure.

The online course was delivered as a pilot one in the Moodle environment, see above. Nevertheless the authors made their effort via a reusable learning unit. Thus the outcome can be seen in the sense of the RLO, however it is bound by expert e-teachers.

The evaluation was performed in all phases of the course design and development. This kind of evaluation was used as a tool for monitoring and corrections in particular phases. For the e-course evaluation an online questionnaire was developed and the course was evaluated by participants at Kirkpatrick's first and second level.

## 2. E-COURSE MANAGEMENT

The basis for e-course management comes out from instructional-event theory, see [4]. Both directive and constructive instructional architectures were combined. E-learners were supposed to have a professional experience together with attitudes and pre-concepts to the issue, even latent only. The course offered knowledge base in facts, concepts and structures of these, procedures, and meta-cognition. After the issues initialization e-learners were asked to diagnose, analyze, think over, discuss, construct, de-construct and evaluate the relationship of gender and ICT at school. They were also asked to share their experience, attitudes, and ideas. The course offered a space for discussion. This space was monitored, controlled, and moderated by the e-teachers and e-tutor. E-learners gradually built their own collaborative learning environment in which they discussed and dealt with given and also their own problems.

The discussion teaching was used as the main instructional strategy. In [5] the major values of this method are stated (p. 102) as

- believing that individuals should participate in their own learning;
- respecting different perspectives of concepts and problems;
- promoting collaboration and a democratic process for learning;
- emphasizing questioning, critical thinking, and problem-solving skills,
- creating a community of learners;
- accepting that life experiences should be inseparable from learning.

The course evaluation confirmed the effectiveness and efficiency of discussion approach to instruction for our classroom. Our e-learners could be characterised by a high level of pedagogical knowledge and pedagogical experience.

Discussions were initialized by e-teachers, monitored by e-teachers, but first of all by e-learners. Combining individual pre-concepts to the discussed issues with knowledge gained in the course, made building a really fruitful communication space possible. Not only the virtual communication skills of e-teachers and e-tutor, but also the activity and openness of e-learners in particular helped to build virtual working community. An asynchronous learning environment then helps to reach better communication within an international classroom by giving enough time to e-learners for exploring and understanding, even if participants do not have the same language skills.

The effectiveness and efficiency of discussion teaching depends on the learning content as well. The goal of our course did not lay in mastering theories, principles, nor concepts, but in handling and developing them on the base of new knowledge, life experiences and pre-concepts. The discussion represented a tool for activating e-learners, but also a method for e-learners' activities. The discussion was performed through the discussion activity in the Moodle.

In addition to the discussion area a didactic strategy based on the Wiki technology was used.

The aim of its implementation was to build a cooperative (can be disjunctive) platform to formulate e-learners' attitudes and opinions to the learning content and even to the e-course itself. Using the Wiki technology attitudes and opinions can be articulated by an interactive way, respectively with the knowledge of those stated by others. To publish the first does not mean a disadvantage, as participants are allowed to come again and modify what they had already put down.

In this way e-learners activated their top cognitive strategies of synthesis and evaluation. This effort led to overall opinion and attitude to the learning content and also the e-course.

## CONCLUSION

Some general conclusions from the above facts can be drawn. The success of the international virtual project team work on the e-course can be attributed to:

- applying project management methods, especially the team building of responsible individuals, and time management techniques;
- using ISD methodology with a concrete e-course design model which guides authors through the design and development process;
- specifying and accepting an epistemological starting point, which leads to the choice of learning theories and consequently to certain instructional architectures;
- consistent structuring of e-course instructional components.

According to evaluation results the success of the e-course delivery by the international team of e-teachers in the international virtual classroom consists in:

- clear specification of organizational and communication rules in a community of all educational subjects within a virtual classroom;
- setting and continuous maintaining a positive atmosphere and climate within the virtual classroom;
- clearly formulated learning objectives;
- timely assessment of all e-learners' activities;
- implementing collaborative online instructional strategies based on discussions and building a common platform of attitudes and opinions to the issue and e-course.

It is necessary to mention another attribute of a successful e-course, namely the CMS Moodle as the electronic instructional environment which is user friendly for e-authors, e-teachers, and also e-learners[2].

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# E-LEARNING APPLICATION IN DISTANCE EDUCATION

**Dominik Vymětal**
University of Silesia in Opava, School of Business Administration in Karvina
Univerzitni nám. 1934/3, 733 40 Karviná, Czech Republic
Vymetal@opf.slu.cz
**Jindřich Vaněk**
University of Silesia in Opava, School of Business Administration in Karvina
Univerzitni nám. 1934/3, 733 40 Karviná, Czech Republic
Vanek@opf.slu.cz

***Abstract:*** *Education cannot be limited to short-time, often random organized educational activities. The quality is important in all types of education. In case of distance learning it is even more important as the students of distance learning are very often people who have already set up their life priorities and attitudes. This paper concentrates on types and methods of e-learning used at School of Business Administration in Karvina – a part of Silesian University in Opava. The education structure of all types of study is presented. The education scheme is built up using top down principle. The general education line is represented by a course of studies. The concrete course of studies is specified by means of a plan in which the actual subjects are ordered in time. The subjects and lessons are supported by means of distance learning tools. The paper presents various attitudes to distance learning support used at School of Business Administration. The experience shows that a centralized support department is important for e-learning success. After the concepts and operations of the CMS Moodle were mastered at the university some departments started to use it also for fulltime student support to increase the return on investment of resources invested.*

***Keywords:*** *course of study; e-learning support; CMS Moodle; subject components; communication in e-learning*

## INTRODUCTION

Education can be perceived as a process of systematic knowledge and habits acquirement by learning. It includes cognition, operational and value

perspective. While cognition part of education represents a process of knowledge learning, the operational part includes operations and skills mastering. The value perspective of education can be looked upon as appositive value orientation of an individual. In this sense the quality of education is not given by knowledge quantity but by its completeness and profoundness. This is why the education cannot be limited to short-time, often random organized activities. The quality is important in all types of education. In case of distance learning it is even more important as the students of distance learning are very often people who have already set up their life priorities and attitudes. This paper concentrates on types and methods of e-learning used at School of Business Administration (OPF hereinafter) – a part of Silesian University in Opava. Overall definitions of courses and lessons used at OPF are presented in the first part of the paper. The experiences and results of e-learning methods used are discussed in the second part. Finally, conclusions and proposals based on the experiences gained are presented.

## 1. EDUCATION SCHEME AT OPF

The basic educational unit from the academic point of view is represented by a subject. The subject is divided into lessons (lectures, seminars) and control activities (tests, examinations, student works evaluations etc.). [1]

A course of studies is an entity having special professional and educational content. Special properties of a course of studies are defined by the subject structure, form of the studies (full time classes, distance leasing, lifelong education etc.) and education level (bachelor, master, full scale university). Each course of study is characterized by its conditions and rules, time plan and conditions to be fulfilled by the student in course of the studies. This set of concepts is complemented by students and their actual courses of studies. The results of their education are measured by standard credit system.

Following course of studies types are taught at our faculty:

- bachelor level
- master level
- Ph.D. level
- lifelong education programs.

From the teaching form point of view there are following alternatives offered:

- full time studies
- distance studies
- distance studies with e-learning support.

No matter what type and form of studies is offered, the course of studies is a full self-contained education entity finished by a state examination or certificate (in case of lifelong education type of course). The general structure of a course of study is presented in Fig.1. Each course of study is formally defined by description, admission procedure, guide to study containing course rules and standards, individual subjects and termination conditions. For all types and forms there are supporting routines defined. Supporting routines contain course instructions and help procedures, communication modules which are very important for e-learning forms and glossary explaining important terms and conditions. This standard structure is very important for future standard profiling of all types of courses.

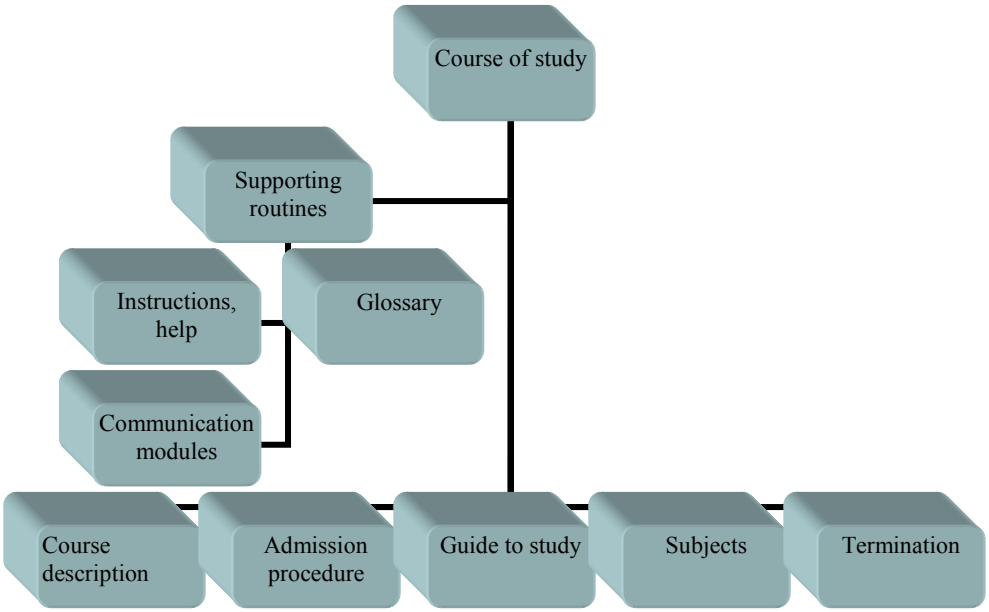


**Figure 1. Course of study outline**
**source: own**

The concrete course of studies is specified by means of a plan. A course of studies plan represents a sequence of subjects in time, the form of teaching (full time, distance) and the method of results verification. The course of studies plan forms a maximal set of both obligatory and optional subjects

offered by the school for a given major and minor specialization. The actual course and plan enrolled by an individual student represents a subset of this plan (less subjects may be enrolled due to optional subjects proposed), but from the time chart point of view, it must be looked upon as an individual subsystem.

The next level of education structure is the actual subject. In order to keep further development possibilities open for changes needed the general structure of a course is kept similar to course of study outline. Generalized subject structure is presented in Fig. 2. Important supporting routines are similar to course of study routines. The content of supporting routines is formed by individual tuition support means. In case of distance learning there are supporting tuition texts used as a base for distance teaching, while communication modules are the means of knowledge transport. At OPF the Content Management System Moodle (herein after Moodle only) is used as basic means of communication. The important properties of the subject are concentrated in the subject overview presented in a syllabus. The actual content of a subject is represented by constituent lessons.

The subject overview includes the author name(s), contents of the subjects, its aims, structure of the lessons, preliminary knowledge needed, possible author rights limitations and conditions of subject completion. By subject completion is usually meant successful examination, but, especially in case of distance learning, summary of individual work results (projects, tests, assignments etc.).

The lesson is a basic logical unit of teaching. It is our practice that the lessons are composed as independent units that can be used in other subjects. The scope of a lecture in one lesson is normally 45 to 90 minutes. In some lessons entrance or final tests are used as independent components. The components are basic units of the system. They are composed as a self-contained element with own parameters (number of starts, time plan, evaluation scheme, score values etc.). One lesson can have one to many components. The main types of components are lecture and test, but also other means like catalogues, didactical games, demonstrations and others can be also used.

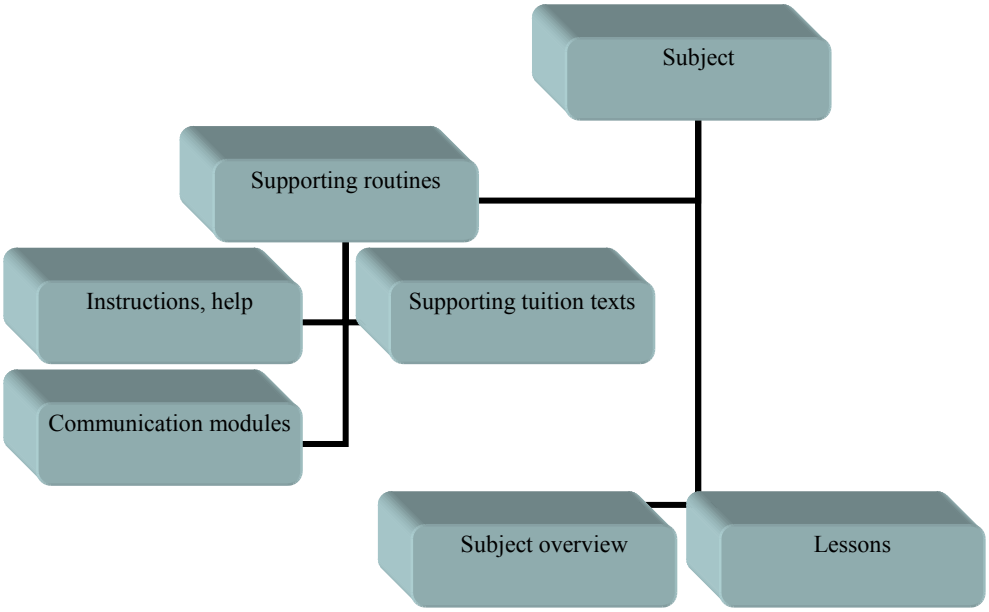


**Figure 2. Subject outline**
**source: own**

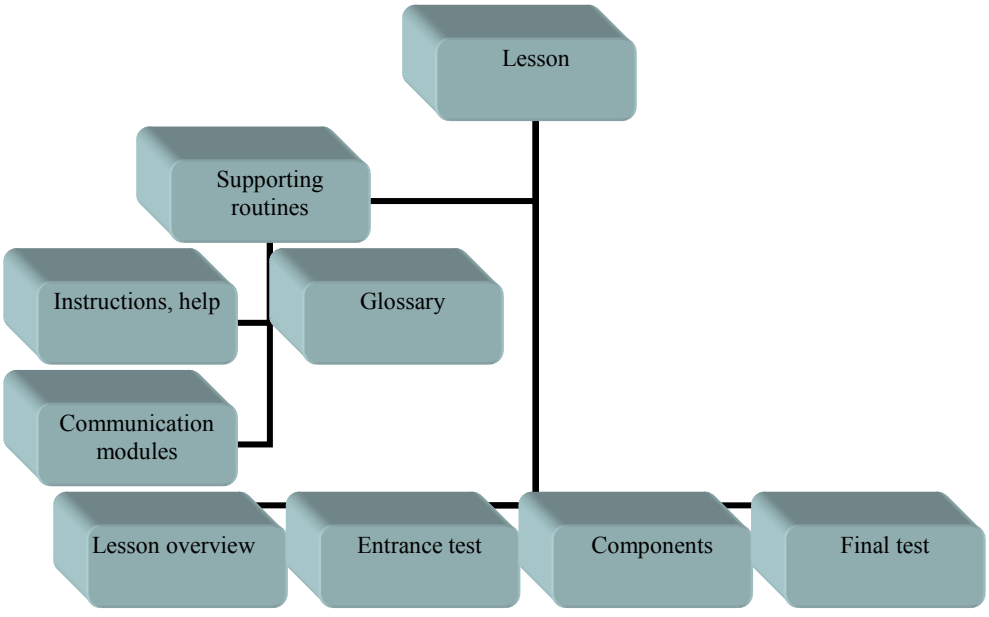


**Figure 3. Lesson outline**
**source: own**

The realization of the structure presented herein above is supported by systems used at Silesian university, namely at OPF. The basic university system supporting the formal part of the education of all types and levels is the information system STAG, supporting complete education record of students. The distance learning and some part of full time education is generally supported by Moodle.

## 2. E-LEARNING AT OPF

E-learning can be defined as a form of education using electronic media and interactive means of education support. It is a combination of teaching services and communication technologies offering the students integrated education environment accessible whenever it is needed. It is mainly used in distance learning, but as we will shortly show in this paper, it can be used as a complementary environment for full time education, too. It can be used both on line and off line.

The e-learning form of education has noticeably contributed to the studying possibilities at OPF. The number of students has increased rapidly in over the past few years.

| | **Marketing& Management** | **Economics in business and services** | **Total** | **Number of groups** |
|---|---|---|---|---|
| 1st year | 161 | 92 | 253 | 7 |
| 2nd year | 162 | 93 | 255 | 5 |
| 3rd year | 59 | 43 | 102 | 2 |
| | 382 | 228 | 610 | |

**Table 1. Number of enrolled e-learning students in the academic year 2008/2009**
**source: OPF statistics**

The numbers reached in bachelor course of studies Marketing and Management (MM) and Economics in Business and Services (EKPO) at the beginning of academic year 2008/2009 are presented in Table 1.

In order to increase the standard and quality of e-learning support a special department was established at University of Silesia in the year 2004. The

department supports the Moodle operations and helps the tutors to prepare the tuition support materials. This has had a very positive impact on the whole e-learning environment at OPF and the students' results.

The tuition support materials used to be prepared in various environments at the beginning of distance learning at OPF. The tools used were ToolBook, Instructor, Zoner Context, Adobe Captivate and others. Each of the tools had its advantages and weak points. Some problems were encountered during the export to the general communication tool – the Moodle. It was therefore decided to publish the tuition support materials in Adobe pdf format only. For animations the Adobe Captivate is still used. A typical Moodle page for an e-learning subject is presented in Fig. 4.

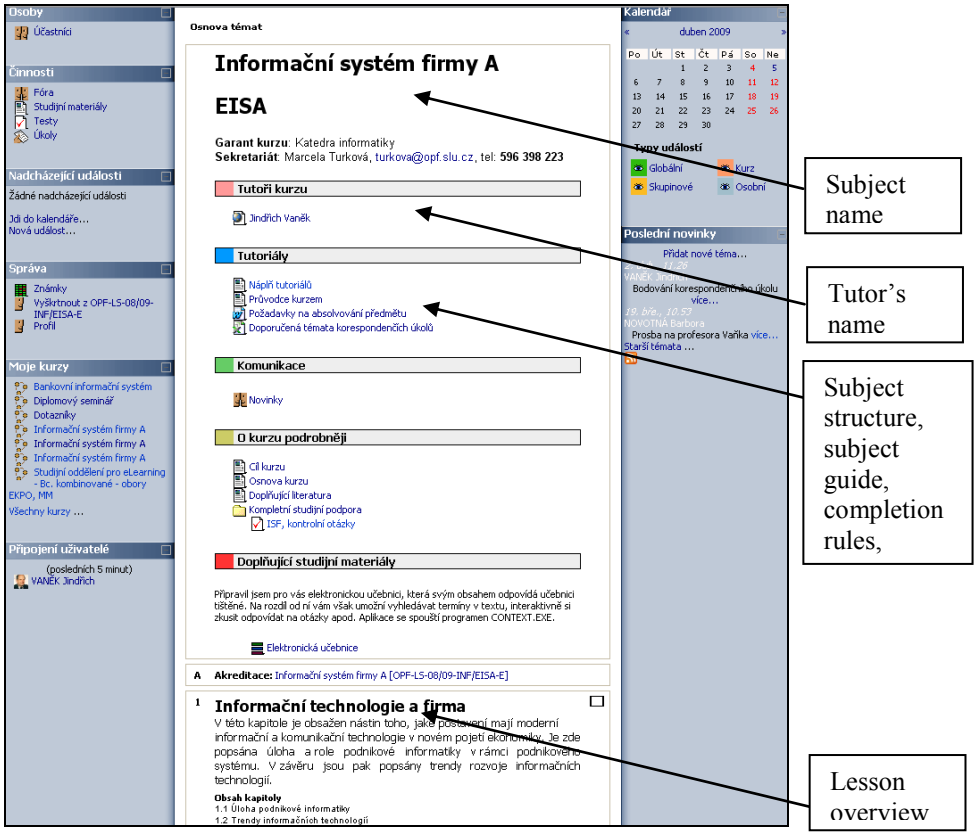


**Figure 4. Example of a typical Moodle page**
**source: e-learning.opf.slu.cz**

The Moodle environment provides the possibility to prepare tests that are generated when the test opens. A part of subject completion condition can be

remote-prepared work that can be administered by a tutor using Moodle tools.

Distance education is generally divided into three tutorials in one semester. The tutorial is only one hour long. That is why it can be devoted to subject organization and answers to questions only. Therefore the quality of tuition support and communication plays the decisive role in the e-learning. The herein above presented courses of study in distance forms are considered to be important as the distance students are already working in companies involved in frequent cross-frontier contacts with other firms operating in EU environment. [6]

## 3. FURTHER USAGE OF DISTANCE LEARNING TOOLS AT OPF

The payback period of resources invested in e-learning development and support is generally estimated to be 10 – 12 years. It is therefore reasonable to consider other methods how to increase the effectiveness of the support materials, methods and communication means of e-learning at hand. This is why the informatics department at OPF offers most of the Moodle functionalities also to fulltime education students. There are three main areas of full time education where the Moodle is used:

- Presentation of tuition support materials. For each subject a special Moodle page with a standard layout is generated. The support documents are placed in the page.
- Control and evaluation of obligatory subject assignments. Firstly the work assignment and evaluation rules are published there. The students can then upload their work into the page. The upload can be assigned to an individual tutor responsible for the students group. The tutors then evaluate the assignments. The evaluation overview and statistics for all tutors responsible for the subject is available on line all the time.
- The communication between the students and the tutors and/or among the students themselves. This kind of communication seems to be more efficient that the normal mail system.

A typical subject page for full time students of the first semester of all bachelor courses is presented in Fig.5. More than 2500 full time and distance learning students studying the general faculty-wide obligatory subject Informatics A used this page in academic years 2007/2008 and 2008/2009. This subject is generally taught by eight teachers in case of full time courses, four teachers in case of e-learning and lectured only in case of distance

learning. The page contains general description of the subject for a given form (Syllabus), tuition support materials and animations that can be used by full time and distance learning students, obligatory work assignment and link to be used for upload of the work. Each teacher has his own link for assignments to-be-uploaded. Using this page helped to master the above shown numbers of students and their work without bottlenecks. A possibility to use tuition support materials by full time students was highly appreciated and repeatedly asked for. The examples of other experiences can be found in [2], [3], [4], and [5]. The e-learning environment enables one more possibility of students' communication. It was shown in [7], that using cluster analysis of students' communication in Moodle can reveals a special type of social network. However, this topic is out of scope of this paper.

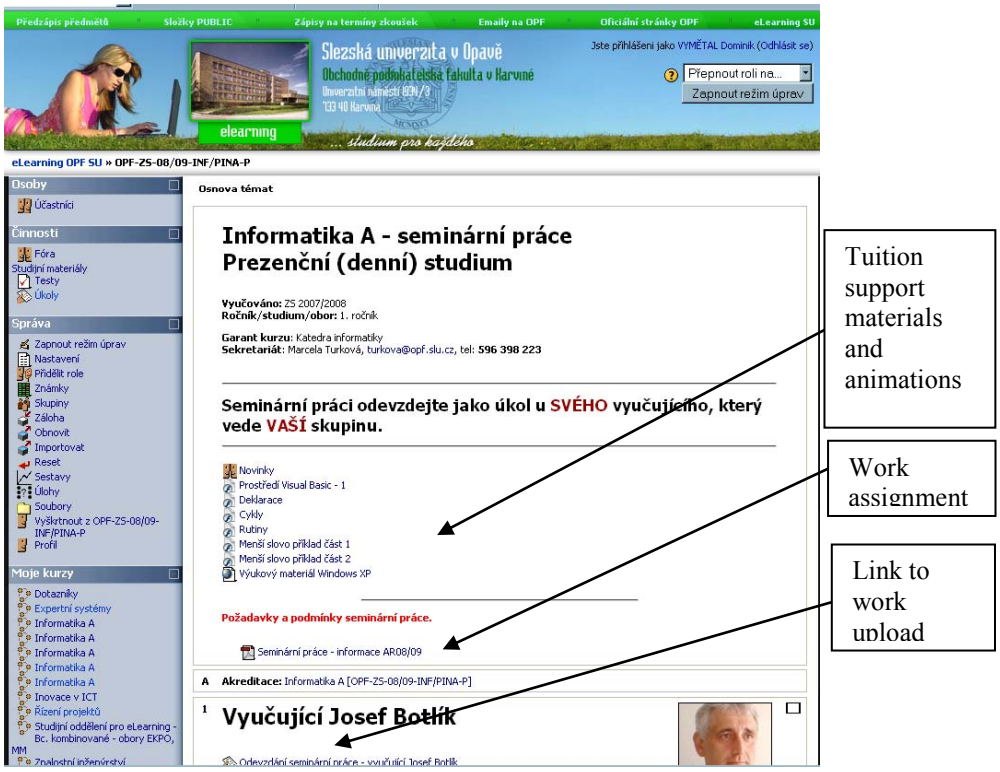


**Fig.5. Example of Moodle page used by full time students source: e-learning.opf.slu.cz**

## CONCLUSION

This paper focuses on theoretical and practical aspects of e-learning and application of technologies for distance education at OPF generally. Distance education comprises relatively complex mechanism and demands all around

and methodical approach to challenges involved. In case of Silesian university particularly at OPF an important means of support is achieved by CMS Moodle operation and a central administration body at the university level.

Moodle is preferred by distance students of all forms, especially by those studying by means of e-learning. However our practical experience shows that also full time students can benefit from tuition support material and communication means of Moodle and improve the return on investment put into the system preparation.

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# MINING KNOWLEDGE FROM EDUCATIONAL DATA

**Michal Burda, Lukáš Zoubek**
Department of Information and Communication Technologies,
Pedagogical Faculty, University of Ostrava
Českobratrská 16, 701 03 Ostrava, Czech Republic
{Michal.Burda, Lukas.Zoubek}@osu.cz

***Abstract:*** *Utilization of information and communication technologies in educational processes generates large amount of data as a side effect. Educational data may contain many interesting information and potential knowledge about students and their learning habits. However, such knowledge is hidden and their extraction is not trivial. Knowledge discovery from databases (also known as Data Mining) is a methodology for extraction of non-trivial, previously unknown, and potentially useful knowledge from data. In this paper, we discuss possibilities for applications of data mining in educational process.*

***Keywords:*** *data mining, knowledge discovery, educational data processing*

## INTRODUCTION

Utilization of information and communication technologies in educational processes generates large amount of data as a side effect. Educational data may contain many interesting information and potential knowledge about students and their learning habits. However, such knowledge is hidden and their extraction is not trivial.

Knowledge discovery from databases (also known as Data Mining) is a methodology for extraction of non-trivial, previously unknown, and potentially useful knowledge from data [4]. It is broadly used in commercial sector, science research and other domains. A characteristic feature of data mining methods is an intensive utilization of computers for difficult computations and testing of large amount of combinations.

Department of information and communication technologies (at the University of Ostrava) focuses its research activities on extracting knowledge

from educational data. In this paper, we discuss possibilities for applications of data mining in educational process.

First chapter of the paper gives short introduction to the data mining. Then, possible educational data and research activities are proposed, and some of realized researches are presented. Last chapter describes educational activities of Department of information and communication technologies (at the University of Ostrava) focused on educational data mining.

## 1. DATA MINING

Data Mining, also often referred to as Knowledge Discovery from Databases, is the process of automated extraction of patterns representing knowledge that is implicitly stored in databases, data warehouses, and other massive information repositories [4]. It is a multidisciplinary field based on database technology, artificial intelligence, statistics, information retrieval, and data visualization.

From the user's perspective, data mining solves three general types of tasks [3]:

- classification or prediction;
- description;
- searching for “nuggets”.

A brief introduction to all the three types of tasks follows below.

### 1.1 Classification or prediction

*Classification or prediction* refers to the methods for automatically answering questions about some subjects of our interest. The answers are inferred from existing data that describe *apriori* known subjects.

The questions may be simply yes/no questions such as „Is this bank customer likely to pay the loan in the future?“ or some category-assignment task such as „What type of learning method is this student likely to prefer?“. Other possible applications may be e.g. identification of troubled or excellent students or automatic prediction of some study problems.

The methods for classification or prediction need a set of data, called *training set*, with data examples about subjects from the past, for which we already know the correct answer. Such data are then processed by some *machine*

*learning* algorithm in order to obtain mathematical model capable to classify unknown or future subjects. The representatives of such methods are e.g. *neural networks, decision trees, Bayesian networks* etc.

Neural networks are mathematical models inspired by human brain. They consist of a network of heavily interconnected perceptrons that represent neurons. The whole network has several inputs and outputs, usually in the form of 0/1 (no/yes) signal. During the *training phase*, both inputs and outputs are set to correct values of sequentially all objects from the training set, and the network is forced to "learn" that facts. That steps are repeated many times until a network can answer correctly. Trained network can be then used to classify unknown objects. More on neural networks can be found e.g. in [5].

Decision trees analysis uses statistical or empirical measures to create a tree of questions with leafs representing correct classification. There exist many various methods for automatically inferring such decision trees. The advantage of these methods is relatively easy interpretation of obtained results: decision trees can be well understood by humans. For more information see e.g. [3], [4].

## 1.2 Description

The objective of *descriptive tasks* is usually to find some dominant structure or hidden relationships in data. For instance, psychologists may be wondering: „Is it possible to define some mayor factors influencing a human's intelligence?". I.e. we want to obtain some easily understandable knowledge – some rules, conditions or relationships – that would cover the whole concept and describe the phenomenon of our interest. Typical representatives of such methods are *clustering* and *principal component analysis*.

Clustering methods take a set of objects described by their attributes and search for clusters within them, i.e. for a subsets of objects with similar properties. The *similarity* of objects can be understood in many ways and the definition of objects' similarity significantly influences the results of clustering. We may e.g. cluster students by their body proportions to obtain clusters of students with slim or athletic figure. If we analyze students accordingly to their study results, we can obtain other interesting clusters (e.g. students good in languages, sciences, etc.). For more information see [3], [4].

Principal component analysis searches for *components* that best describe the variance among data. The components are defined as linear combinations of attributes. By using principal component analysis, we can observe that some attributes measure in fact a single latent attribute (principal component) that even may be directly unmeasurable.

### 1.3 Searching for "nuggets"

When *searching for "nuggets"*, one is interested in some surprising knowledge that should not necessarily cover the whole concept. For instance, one may be wondering whether we can „find a set of common attributes describing exceptionally talented students", or asking „What books are students likely to borrow together from the university library?". Such knowledge can be obtained by utilizing e.g. *the association rules analysis*.

Association rule is a rule in the form

$$A \ \& \ B \ \& \ C \Rightarrow D,$$

where A, B, C, D are some conditions. Such rule represents fact that in the analysed data, if the object satisfies all conditions A, B, C then it is very likely that it also satisfies condition D. For example, the following rule may be automatically found in data about student's habits:

alcohol_drinker=yes & smoker=yes & transport_to_school=car =>
sport_results=poor.

The association rules analysis finds automatically dozens of such rules. There exist many approaches of how to measure rule *significance,* or interest, and how to further process the mined knowledge. See [3], [4] for more information on that topic.

## 2. EDUCATIONAL DATA MINING AND RESEARCH

### 2.1 Possible educational data analyses

With the introduction of information and communication technologies into education process, large amount of various data can be recorded, stored, and in consequence analyzed. This part of the paper should serve as an overview of various sources of data and corresponding automatic applications related to general educational process.

Firstly, we can start with type of data directly related to educational process. At each level of education, testing of the students represents the most

frequent activity used to evaluate knowledge of students. Testing of students is already often performed using computer technologies. Thus, databases containing test results or students grades can be used to evaluate and/or predict successfulness of students and to categorize them into separate groups depending on various criteria.

The essential step of involving information and communication technologies into education consists of introducing some learning management system (LMS) such as Moodle into educational process. Besides presenting multimedia materials to the students, these systems allow the teachers to monitor students' activities while going through a course. Analysis of such data can be then for example used to predict students' behavior, to propose an adaptive educational system or to analyze cooperation of students in a course.

At the end, data that are not directly related to educational process can be mentioned. Into this group, various sources of data and information can be included because educational process is indirectly related to many activities of the student life. We can mention for example data coming from libraries, leisure time activities etc.

For instance, Nagata et al. [7] try to recommend automatically the books to the pupils based on the books they have read before. Barker-Plummer et al. [2] uses data mining tools to analyse results of exercises from first order logic performed by large amount of students. Agapito and Ortigosa try to detect symptoms of low performance using production rules, in [1].

## 2.2 Research realized

In this part, we would like to present some of the most recent research activities in the field of educational data mining realized at the Department of information and communication technologies. For the research purposes, two sets of educational data are available.

First set of data comes from research realized at more than 90 secondary schools in the Czech Republic. All the schools are located in Moravia-Silesian region. During the original research, about 8000 students were tested in mathematics, native language (Czech), foreign language (English or German) and general study pre-requisites [6], [8].

The secondary schools engaged in the research can be split into nine categories depending on their orientation and specialization. The categories are as follows:

- Economic (ECO),

- Grammar school - gymnasium (GRA),
- Lyceum (LYC),
- Social and health studies (SAH),
- Natural science (NAT),
- Trade and service (TAS),
- Social science (SOC),
- Technical (TEC),
- Art studies (ART).

Some of the results obtained using these data have been summarized in the article [8] presented this year at the 2nd International Conference on Educational Data Mining.

The second set of data comes from the research focused on analysis of students learning habits. During the original research, students were asked to answer questions characterizing different habits during learning. Analysis of this data set is not finished yet.

## 3. EDUCATIONAL ACTIVITIES

Department of information and communication technologies also focuses not only on adopting data mining techniques to the learning process, but also on *teaching about such techniques*. Therefore, we have prepared a balanced set of courses that introduce the students to the fascinating world of knowledge discovery and data analysis.

### 3.1 Proposed courses

The first course of the set, *Statistics - Selected Aspects,* is focused on basics and fundamental aspects of statistics. In this course, students learn basic notions and techniques of traditional statistical data analyses.

In parallel, a course focused on databases and data warehouses is available to the students: *Data Warehouses*. In that course, students obtain important pre-requisites from the domain of database technologies.

After that, a course of *Data Mining* is recommended where the students obtain knowledge about the data mining methodology as well as all the essential data mining techniques.

The set of courses is completed by a course of *Artificial Intelligence and its Applications* that is focused on solving practical tasks by using artificial intelligence and data mining techniques.

## CONCLUSION

The aim of this paper was to present an introduction to *educational data mining*, a new and fascinating area of integrating information and communication technologies into education. We have presented a brief introduction to some techniques offered by data mining and the possibilities of applying them on educational data. We have also given a short introduction to the design of the set of courses related to data mining that are taught by the Department of information and communication technologies of the University of Ostrava.

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# FORMAL DESCRIPTION OF ELECTRONIC QUESTIONS

**Miroslav Hrubý**
University of Defence
Kounicova 65, 662 10 Brno, Czech Republic,
miroslav.hruby@unob.cz

***Abstract:*** *This paper deals with the formal description of electronic questions. The term 'question object' is defined and the problem of question objects usage is discussed. The ToolBook II Instructor question objects are introduced and then three of them are used for more detailed elaboration. Practical examples are included. The teachers responsible for various subjects can be inspired for formulation of various types of electronic questions which are the most suitable for the content of their subjects.*

***Keywords:*** *e-learning, electronic question, selftest, test, ToolBook II Instructor.*

## INTRODUCTION

It's a never ending task for all the teachers to choose not only the effective teaching methods but also the proper testing methods. The great force for integrating the modern information and communication technologies (ICT) into the teaching and learning processes leads to the e-learning methods using. There are many interesting topics to discuss on this field. One of them is the electronic testing.

The Brno Military Academy (the legal predecessor of the University of Defence [5]) bought an unlimited multilicence of the authoring software 'ToolBook II Instructor v.8' from the Czech Prague firm Kontis [1] in the fall 2002. The gained experience showed that it is also a suitable software system for creating of the electronic tests. The author of this authoring system was the U.S. firm Click2Learn. In March 2004 the SumTotal [2] was formed by the merger of industry pioneers Docent and Click2learn. Nowadays ToolBook latest version is the version 9.5. Its documentation is available at [4]. The ToolBook 10 is being prepared.

Paper contains ToolBook Question objects basic description and gives basic instructions to their using. Some useful examples are included. The examples can oriented readers and give them inspiration, how Question objects could be valuable in teaching and learning processes.

## 1. THE TERM 'QUESTION OBJECT'

The term 'Question object' can be generally described by the following definition:

**Q = [id, qf, ans, sco, fdb],**

where

**id** is name of the question type prototype,

**qf** is question formulation,

**ans** are answers,

**sco** is scoring,

**fdb** are feedback conditions (feedback can be immediate and delayed).

The concrete electronic question can be created on the base of common question object prototype by setting all the necessary features. Every question object prototype can be a source for unlimited number of electronic questions of the appropriate type.

## 2. TOOLBOOK INSTRUCTOR QUESTION OBJECTS

The ToolBook II Instructor software [3] contains the special 'Question objects' for the knowledge testing. ToolBook Question objects allow the user to construct different types of questions. Question objects determine the responses that users make, calculate the score, and provide feedback. There are many types of question objects available from the 'Catalog'. It is possible to customize their appearance and behaviour or use them as they are provided and simply add a needed content.

The ToolBook II Instructor Catalog holds the question objects as follows:

- Multiple Choice,
- Definable Multiple Choice,
- True/False,

- Drop Target,
- Definable Drop Target,
- Match Item,
- Definable Match Item,
- Drag Object,
- Definable Arrange Object,
- Order Text,
- Select Text,
- Slider,
- Fill-in-the-blank.

All ToolBook system objects have properties which user can set to change the appearance and functionality of the objects. Question objects have additional settings that give the objects more functionality. These additional settings are called extended properties. Three of question objects (Multiple Choice, True/False, Drop Target) were chosen and are described as follows.

### 2.1. Multiple Choice Question Object

The Multiple Choice question object provides answer choices that allow a user to click a response. The question is presented in a field or graphic placed near the answer choices. By default, the answers are mutually exclusive, but it is possible to allow multiple correct answers by selecting Multiple Choice/Multiple Correct in the Properties dialog box.

The author can add answer elements to the question by duplicating an existing element. If he/she specifies more responses than the number of input objects, the correct responses are used, and the remaining responses needed to fill in the response objects are selected randomly from responses defined as incorrect. It is also possible to set the options Randomize answers, Multiple choice/multiple correct, Cannot change responses.

A practical example is given in section 3.1 and the anatomy of that object is showed in section 3.1.1.

### 2.2. True/False Question Object

The True/False question object provides standard true/false answer behaviour.

The practical example is given in section 3.2.

### 2.3. Drop Target Question Object

The Drop Target question object recognizes when defined objects are dropped on it. The author selects the target object from the list of named objects in the question group; then he/she selects objects that can be dropped from a list of all named objects on the page. The objects to drop can use either the default ToolBook drag-and-drop properties or can be specified as draggable, which author can set from the Draggable dialog box (from the Object Properties submenu, on the Object menu).

If an unrecognized object is dropped on the target, the Drop Target object can reject the dropped object and restore its previous position. If the object is recognized, the question can snap the dropped object to the centre of the drop target's bounds. Unexpected results can occur if the author places multiple Drop Target objects on the same page and these objects are set to certain conditions.

A practical example is given in section 3.3.

## 3. PRACTICAL EXAMPLES OF QUESTION OBJECTS USING

### 3.1 One of the Possible Multiple Choice Question Realization

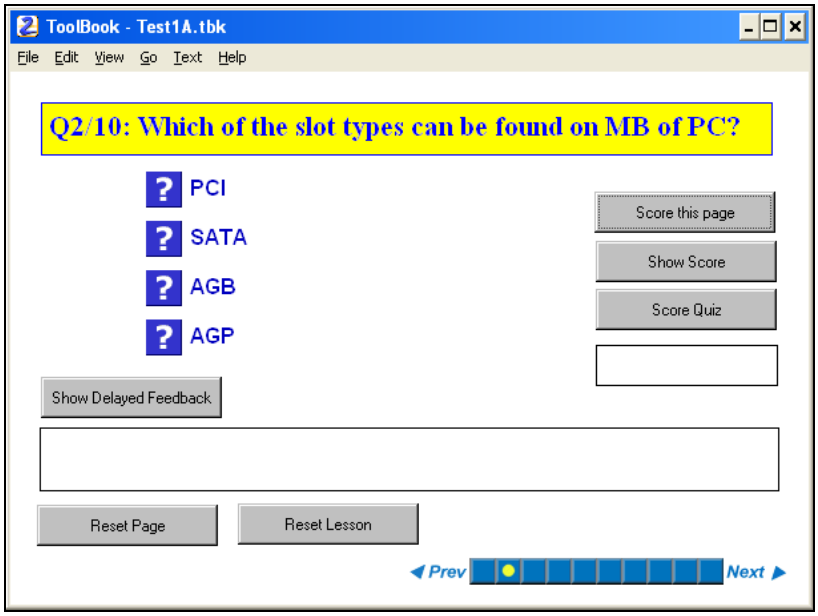


**Figure 1. The example of the Multiple Choice Question**

The multiple choice question seems to be the most useful common object for electronic testing. It is the reason why it was selected for more detailed description. It can serve for an 'anatomy description' of the question object.

### 3.1.1. Anatomy of the Multiple Choice Question and its Extended Properties Setting

After the user adds a question object to a page, he/she can specify its appearance and behaviour in the Properties for Question dialog box. This dialog box differs slightly for each type of question object. The Properties for Question dialog box consists of five Tabs as follows:

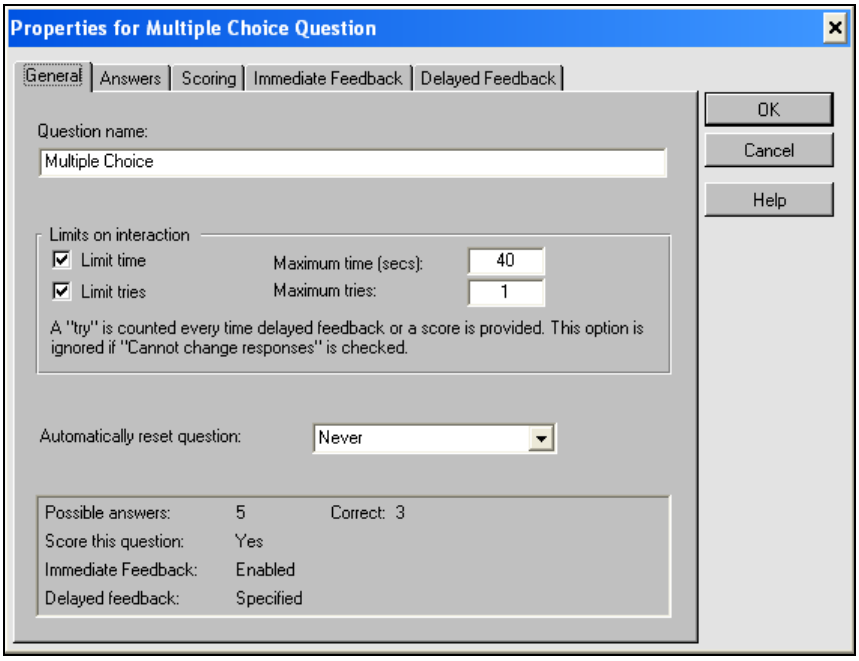


**Figure 2. The Extended Properties for Multiple Choice Question – Tab General**

The simplest scoring is a tally of the questions the student has answered correctly. For more flexibility, it is possible to assign different point values to different questions. It is also possible to assign a weight to each correct answer by specifying a correctness factor within any question object. Points can be also substracted from the student's score for incorrect answers.

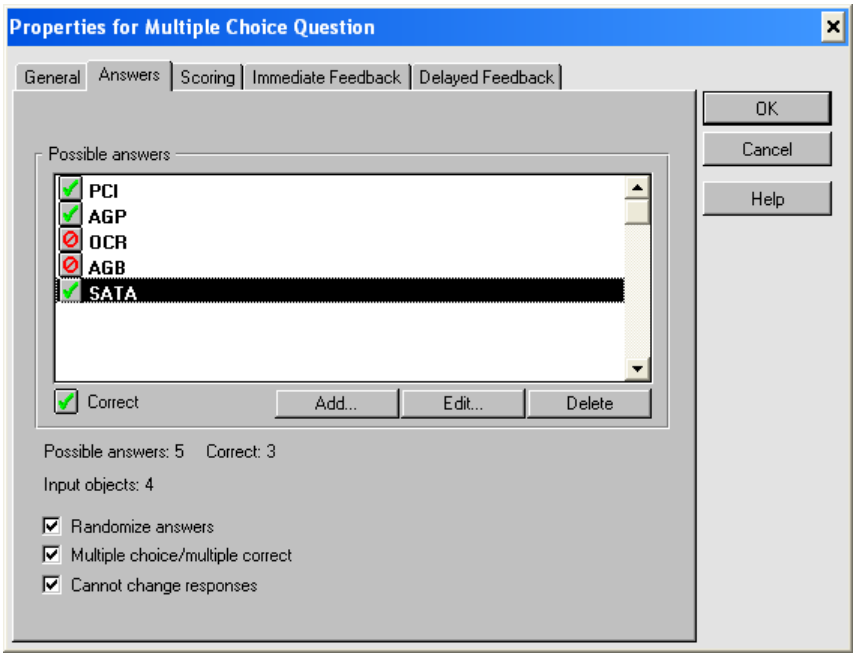


**Figure 3. The Extended Properties for Multiple Choice Question – Tab Answers**

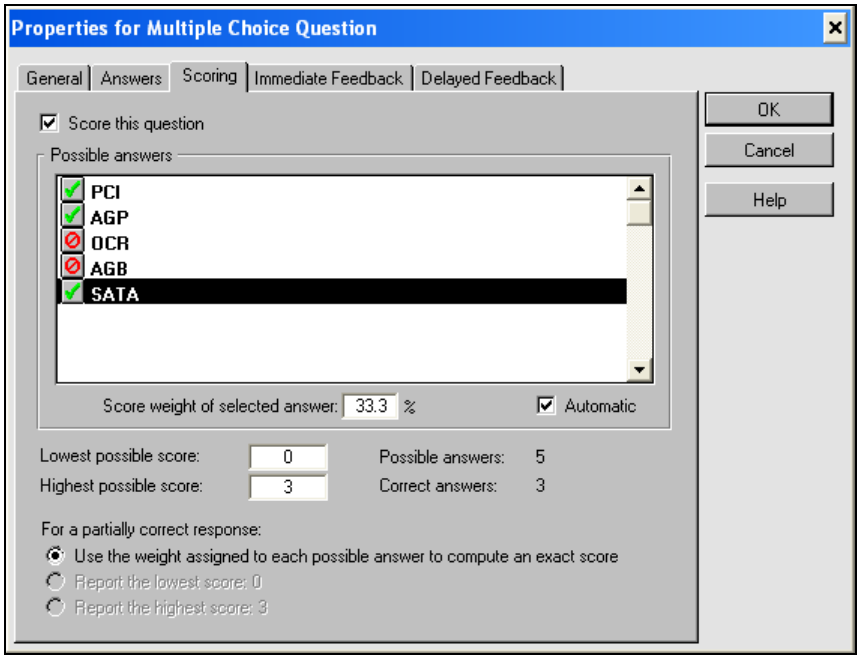


**Figure 4. The Extended Properties for Multiple Choice Question – Tab Scoring**

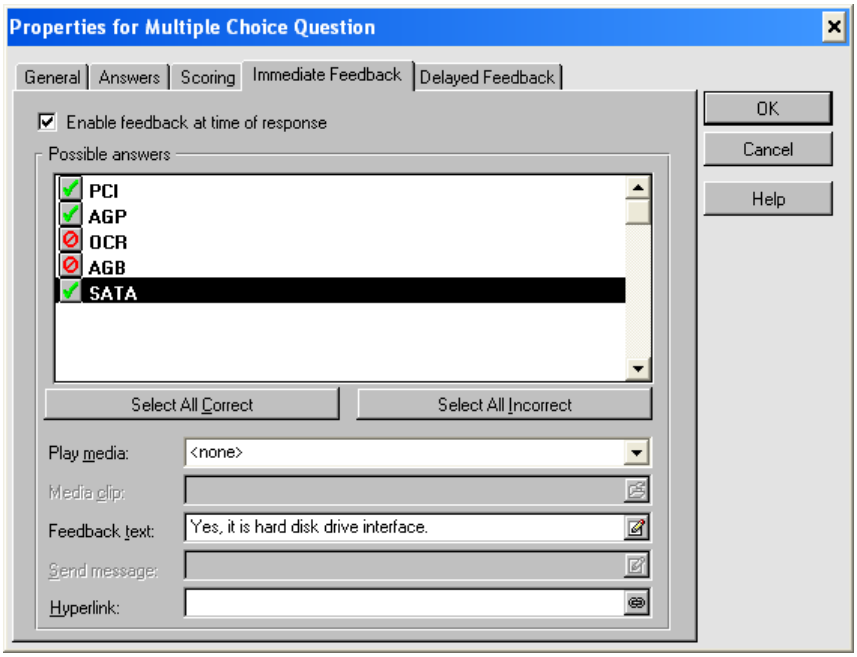


**Figure 5. The Extended Properties for Multiple Choice Question – Tab Immediate Feedback**

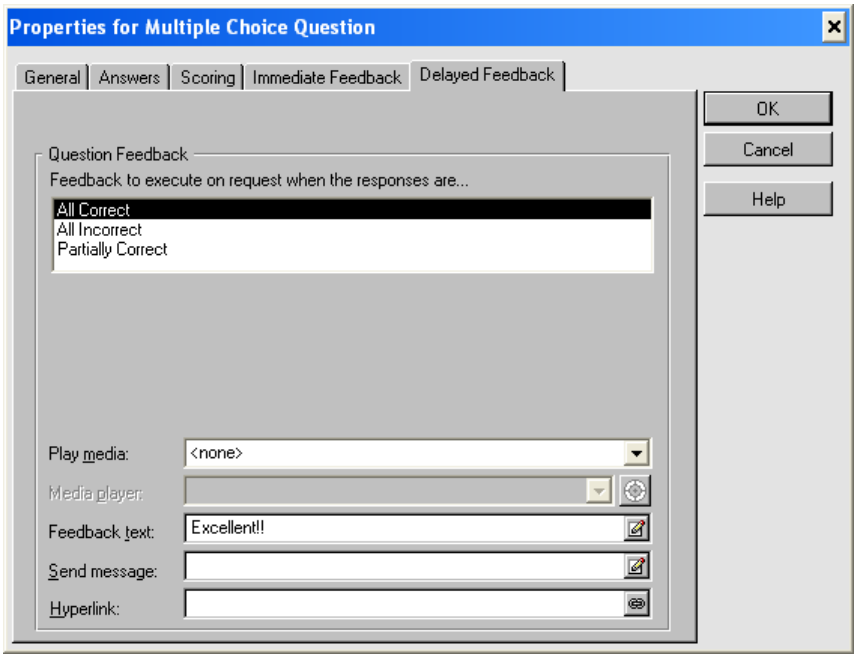


**Figure 6. The Extended Properties for Multiple Choice Question – Tab Delayed Feedback**

ToolBook Instructor provides several types of feedback that user can specify for question objects. For example, user can play a sound or media file, display text, navigate to another page, navigate to a URL (a Web address). It is possible to combine these methods and use more than one type of feedback in response to the user's choice. Feedback for a question object can be immediate or delayed. Delayed feedback is useful for providing feedback on multiple-choice/multiple-correct questions where we want a student to select several correct answers and then click a button to receive feedback on the selected set of answers.

### 3.2. One of the Possible True/False Question Realization

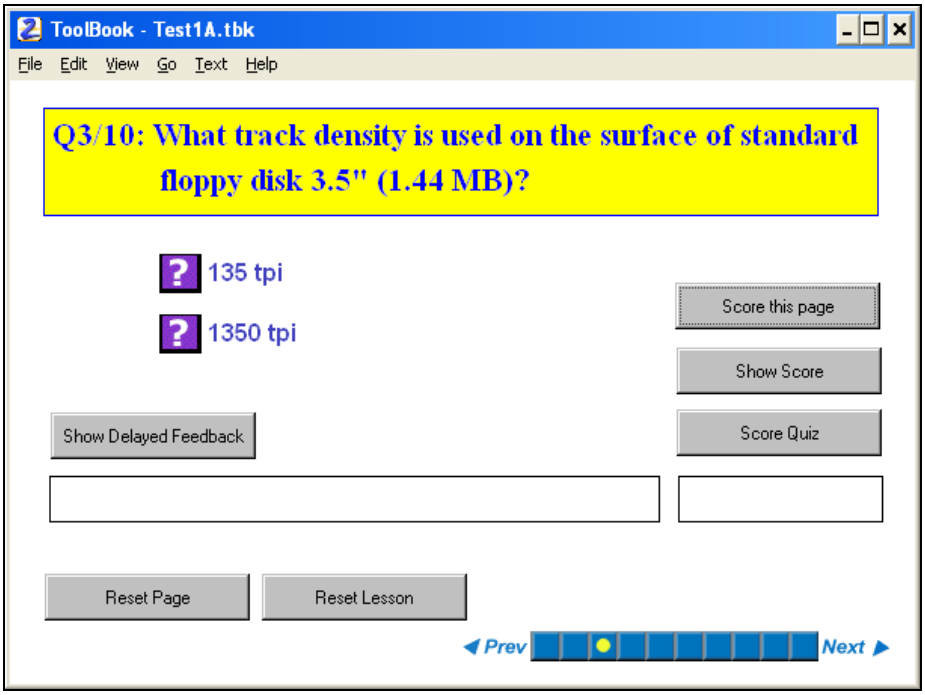


**Figure 7. The example of the True/False Question**

### 3.3. One of the Possible Drop Target Question Realization

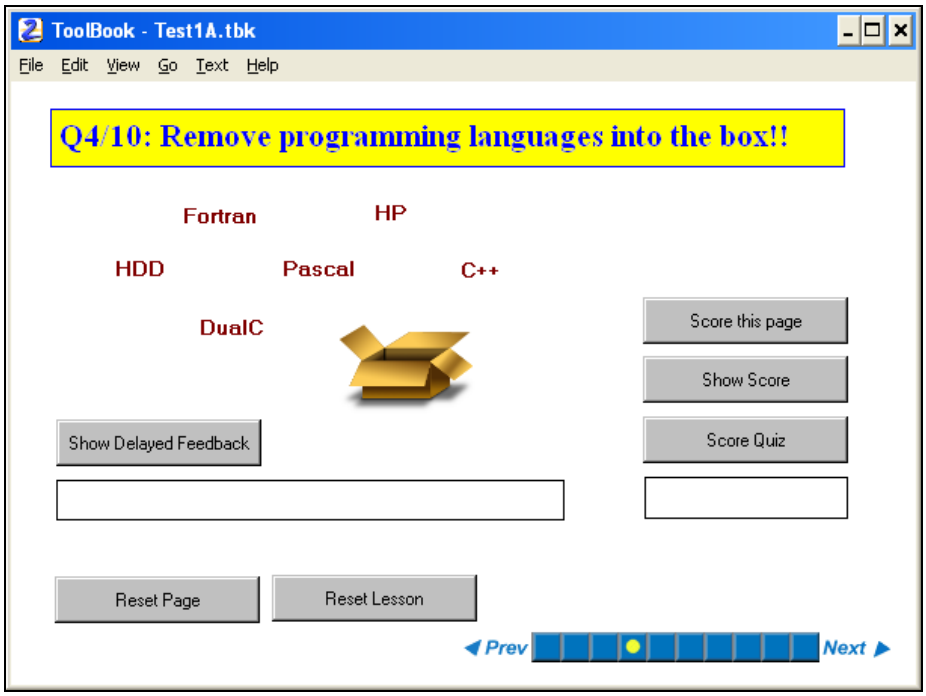


**Figure 8. The example of the Drop Target Question**

## CONCLUSION

The creation of good electronic tests is often more demanding work than the creation of good study texts. This difficult work is sometimes underestimated work. So, the topic of electronic questions as the items of electronic tests and selftests require more attention. Their contribution to the expected study results can be very significant.

The electronic tests and especially electronic selftests should be the integral part of electronic support of nowadays education. The utilization of various question objects can bring a new quality and new possibilities to the testing processes. Paper does not give the complete solution, but can inspire the potential users (academic staff teachers and co-operating students) to go this way.

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# II. PRACTICAL ASPECTS OF DISTANCE LEARNING AND SUCCESSFUL EXAMPLES OF E-LEARNING

## DISTANT LANGUAGE COURSES IN THE PROJECT ”UNIVERSITY AS A PARTNER OF THE KNOWLEDGE ECONOMY” (UPGOW)

**Eugenia Smyrnova-Trybulska**
Faculty of Ethnology and Sciences of Education, University of Silesia in Katowice
esmyrnova@us.edu.pl
**Joanna Jakubiec-Bontko, Liliana Kałafatiuk, Ryszard Kalamarz, Katarzyna Kiszka, Agata Matuga**
Study of Practical Science of Foreign Languages, University of Silesia in Katowice
jjbontko@poczta.fm, laperla@poczta.onet.pl, r_kalamarz@poczta.onet.pl, Katarzyna.kiszka@yahoo.co.uk, agatamatuga@wp.pl

***Abstract:*** *The article presents issues concerning the project ”University as a partner of the knowledge economy” (UPGOW) including, among others, goals, assumptions, constituents and lines of the project. It also includes the conception of preparing and conducting distant language courses as one of the important constituents of the project: methodology, structure, specificity of the field, competence of the tutor and the student, description of each course and conclusions.*

***Keywords****: distance language course, MOODLE, UPGOW, multimedia.*

### INTRODUCTION

The University of Silesia in Katowice as one of Poland’s biggest public higher education institutions with nearly 40 thousand students and with

highly educated teaching and research staff, following the best tradition of the ethos of European science, seeks to respond to the present requirements of the economy and determines directions of university development for 2008-2013. [8]

The priorities set out in the Human Capital Operational Programme, Action 4.1.1 *Strengthening university educational capacity* fit the guidelines of the Development Programme of the University of Silesia for 2008-2015 in the scope of education in the mathematical-natural and technical faculties, a document adopted by the University Senate. According to the priorities provided in the description of the subject matter of the competition that the University of Silesia entered submitting the project "University as a partner of the knowledge society, the prepared application focused on the development of studies in the field of mathematical-natural and technical sciences. [8]

## 1. ON THE PROJECT ”UNIVERSITY AS A PARTNER OF THE KNOWLEDGE ECONOMY” (UPGOW)

The project „UNIVERSITY AS A PARTNER OF THE KNOWLEDGE ECONOMY” (UPGOW), prepared and submitted by the University of Silesia in Katowice, won the competition announced by the European Social Fund with one of the best scores. The project actions will focus on ensuring high quality education, close relations of the university with the regional and national sectors of the economy, in particular with high tech industry. They will find expression in the establishment of new study fields, specialisations, adjustment of learning programmes to the requirements of the economy and labour market and international cooperation of academic communities. [8]

### 1.1. Goals of the UPGOW project

The general goal of the project is dissemination of education of the society at every stage of learning as well as increasing the quality of educational services and their stronger linking to the requirements of the modern economy. The actions will be taken in a peculiar environment. After the introduction of market economy, Upper Silesia, previously the most industrialized part of Poland paid the highest price. Power consuming and obsolete heavy and mining industries were liquidated. After the closedown of numerous industrial plants, the region faced high unemployment. The scientific community of the University of Silesia is very well aware of the civilization changes undergoing in Silesia and in the whole country. Trying to respond to them the university has undertaken some actions including

establishing new study fields and modifying the existing ones so that the graduates could obtain education corresponding to the needs of the labour market and the knowledge economy. [8]

The particular goals include:

- adjusting of education to the requirements of the economy and labour market;

- supporting the new and existing study fields and specialisations which are top priority to the economy playing a strategic role in the development of the country and region;

- improving the quality of educational offer;

- enhancing the attractiveness of education in the field of mathematical-natural and technical sciences and increasing the popularity of SMT fields among graduates of upper secondary schools and limiting the phenomenon of outflow of students who no longer continue their studies after first year of SMT faculties;

- strengthening practical elements of teaching and increasing employers' involvement in the implementation of learning programmes;

- deepening the cooperation with employers aiming to obtain jobs for future graduates;

- adapting the profile of teaching to the requirements of the economic development and labour market and consequently ensuring young people a stronger position in the labour market;

- strengthening educational offer by learning programmes using methods and techniques of elearning;

- improving professional qualifications by postgraduate studies and courses;

- creating greater educational possibilities for persons with disability;

- developing teaching competence of the academic staff to increase the quality of teaching and the competitiveness of educational offer of the mathematical, natural and technical fields of study at the University of Silesia.

Under the project there will be opened new specialisations important for the development of the country and region in the field of mathematical-natural and technical sciences. They include the first and second degree studies: 1) geophysics; 2) biophysics; 3) econophysics; 4) bioinformatics; 5) medical

physics; - specialisations: 1) medicinal chemistry (first and second degree studies in the field of chemistry), 2) computational chemistry (first and second degree studies in the field of chemistry); 3) data analyst (second degree studies in the field of informatics) [8]

### 1.2. Methods and techniques of e-learning in the UPGOW project

Among the key components of the project, one of the priority issues is PREPARATION OF EDUCATIONAL PROGRAMMES AND MATERIALS AND IMPLEMENTATION OF EDUCATION USING METHODS AND TECHNIQUES OF ELEARNING (Head of Activity 46 – prof. dr hab. H.Widła). This undertaking consists in preparing e-learning programmes and materials as well as their implementation in the following areas: medical imagining techniques, anatomy and physiology, introduction to medical sciences, biomaterials, engineering biomechanics, implants and artificial organs, compensatory courses in chemistry addressed to prospective first year students, compensatory courses in chemistry addressed to students, geoinformatics techniques in environmental protection, civilization threats and sustainable development of urban and industrial areas, biological invasions, basics of environmental protection, urban ecology, an elementary course in plant physiology, school mathematics competition tasks and methods of solving them, a preparatory course in mathematics for prospective students of mathematical-natural and technical faculties, auxiliary and supplementary materials for part-time students in the field of mathematics (subject to study programme), mathematical analysis, linear algebra, algebra, logic and set theory, topology, calculus of probability, differential equations, numerical methods, discrete mathematics, statistics, stochastic processes, quantum mechanics for doctoral students, history of basic ideas in physics, introduction to elementary particle physics, relativistic quantum mechanics, numerical methods in theoretical physics, physical calculations in Fortran 90, electrodynamics (course A), a specialist lecture: a standard model of elementary particles, theory of dispersions, a lecture for doctoral students: accounting methods in perturbation field theory, classical mechanics, introduction to quantum field theory [8].

## 2. DISTANT LANGUAGE COURSES AS A KEY COMPONENT OF THE UPGOW PROJECT

What is particularly important in the UPGOW project is its language component with materials for developing linguistic competence and skills (listening, reading, writing practice, study of grammar and lexis, interactive

tasks, materials for synchronous learning) in English, French, Italian; materials for life and institutions of target language countries.

During 2008-2009 the first five language courses were designed: General English Course (Level A2) by mgr L. Kałafatiuk, General English Course (Level B1) by mgr R.Kalamarz), General English Course (Level B2) by mgr A. Matuga), English in the Student's Career Course (Level B1+) by mgr J. Jakubiec-Bontko), English in the Student's Career Course (Level B2+) by mgr K.Kiszka). The language courses were prepared under the supervision of Methodological Consultant dr hab. Eugenia Smyrnova-Trybulska.

Regarding the problem of organisation of the process of foreign language teaching in the form of distance education we should consider several important factors:

1) a specific character of the organisation of a distant teaching process together with a specific character of electronic teaching means and tools and the educational technologies used;
2) a specific character of the very subject *foreign languages*;
3) preparation of teachers and teachers holding appropriate competences in the scope of e-learning;
4) preparation of learners (students) to study via the Internet.

### 2.1. Specific character of the study of *foreign languages*

According to the classification by I.J.Lerner, the study of *foreign languages* refers to a group of subjects whose key component includes methods of activity. Hence the *functional approach* in a given case and not only adjusting to modern tendencies of the development of educational process but also reflecting the specific character of the subject area. What this specific character consists in is that when we teach learners or students various types of language activity and while developing suitable habits we should ensure practice in such activity for each student in the group [7].

Besides, in the organization of the process of foreign language teaching we must focus on the learning objectives of a given educational institution and a particular stage of learning. We should also concentrate on the existing regularities (principles) of foreign language teaching developed for years as a result of quite complex research and decisions, which are based on the following:

1. When mastering any type of linguistic activity one should base on aural-motor habits, i.e. every type of linguistic activity should be based on oral practice.

2. Developing foreign language skills involves a necessity to base on the native language of the learner, which ensures conscious, and thus, more long-lasting acquisition.

3. Regardless of the selected methodology of foreign language teaching learning should be structured in such a way that a language system is developed in the learner's awareness.

The basic conceptual assumptions of the organization of the process of distant foreign language teaching can be presented in the following way.

1) What should underlie distant foreign language teaching is independent practice of each learner in the particular type of linguistic activity he studies.

2) Activity of each learner should be performed under the supervision of an experienced teacher, i.e. by interactivity. The educational process should be structured in such a way that the teacher could follow, correct, check and estimate each learner's activity. An excellent tool for the "automatisation" of such functions, for example in the Moodle system, is *Lesson,* which involves, among others, the division of material into small fragments, portions followed by a question or assignment. If the answer is correct the system "carries" the learner forward or reverses him in order to review and consolidate the material.

3) Independent activity of the learner requires effective feedback both regarding the training material – the single step internal feedback providing for the possibility of self-control, and the external feedback in the course of work in groups, by contacting the teacher.

4) The learner should have various contacts in the process of learning, apart from contacts with the tutor: with partners within the course (pairwork, teamwork, groupwork); with the server administrator, with the lecturer, with foreign partners. Also the types of the learner's individual activity should be varied: individual work, pairwork, teamwork – learning in small groups on the cooperative learning basis, cooperating with the whole course group (conferences, collective discussions) [7].

### 2.2. Information and educational technologies for distant foreign language learning

The most universal teaching structure for distant learning of a given subject, including foreign languages, which may be implemented by means of IT

tools and supporting all stages of education at the same time, is an e-learning course. A distant course – a set of scientific and methodological materials and educational services, prepared for individual and group teaching using e-learning technologies.

As far as the requirements regarding the structure of a distant course are concerned, they are thoroughly and comprehensively specified in publications ([4], [5], [6]). In short, the structure of an e-learning course can be presented in the following way as three main modules (units):

I. *Introduction to a distant course*: 1) Description of the course: 2) Literature; 3) Glossary; 4) Forum; 5) Registration questionnaire.

II. *Topical module N* (1<N<10): Pre-test (a diagnostic test); 2) Study materials on a given topic or field; 3) A set of tasks; 4) Knowledge check; 5) A set of creative tasks; 6) A set of interactive communication between the tutor and the students and the students among themselves; 7) Additional study materials on a given topic or field; 8) Knowledge check.

III. *Concluding module:* 1) Examination test (Quiz); 2) Final questionnaire (Questionnaire); 3) Reflective questionnaire (Survey).

A given course structure and all the above mentioned distant course modules can be effectively prepared in CLMS MOODLE by means of its suitable constituents: Resources, Lesson, Quiz, Hot Potatoes Quiz, Journal, Assignment, Workshop, Forum, Chat and others.

Apart from the basic part, a language course should contain a grammar reference and notes on pronunciation. By reading base texts the student can do lexical habit formation exercises. New lexis is given in phrases with relevant audio files attached. The student can not only read the phrase (using transcription) but also listen to how it is pronounced. There are texts and reading comprehension exercises for reading skill practice. There are also creative tasks designed for joint work of a small group of learners. While reading it is possible to refer to a glossary which contains explanation, translation, examples and transcription attached to a given word or phrase spotted in the text, which is especially helpful as the student gets instant explanation and the process of reading is not interrupted. Also attached to the glossary entries (words or phrases) are audio files for aural reference. [the language courses on the elearning platform: http://el.us.edu.pl/upgow]

The success and quality of distant learning largely depends on the effective organisation and methodological quality of the materials used as well as the coordination and competence of the teachers participating in this process.

If such learning is to be effective, one can mention a number of characteristics which are relevant for each type of distant courses:

- The introduction to every distant course as well as its particular units contains a detailed description of the goals of the course and particular topics, tools, methods, forms, criteria of evaluation, etc, which enable and ensure more careful and detailed designing of the learner's activity, his organisation, clear setting of tasks and learning objectives, provision of necessary educational materials as conditional on realisation of previous tasks.
- *Feedback (Interactivity)* – a key concept of distant learning educational programmes. Distant courses, especially foreign language learning courses should ensure as much interactivity as possible between the learner and the tutor, among the learners themselves, group work as the specific character of the subject involves among others being in constant touch, interactivity of the very process at every stage of learning from ignorance to knowledge.
- *Motivation* – an important element of every distant learning course. In foreign language courses it is largely achieved at an expense of the intercultural component, using possibilities of contacting native speakers, i.e. creating a natural linguistic environment. Motivation can also be achieved by preparing suitable topics with practical focus, topics that can be found useful at university, while travelling abroad, in future career etc. Such topics can arouse the learner's interest and motivate him. If the course users are first or second year students of tertiary education institutions the language courses they can be addressed to include "General English Course (Level A2, B1, B2)" and the following topics to study: "Travelling" (*On the Move*), "Student's everyday life" (*Flat Sharing*), „Modern and traditional media" (*What's On?, Well Read*), „Leisure and doing sports" (*In at a Deep End*) and others [1]. If the course is taken by students of senior years a suitable course to take is "English in the Student's Career Course (Level B1, B2)" and the following topics to study: "*Gap Year – a Good Idea?", "Getting a Job", "My Own Money", "First Job"* and others [3].
- The structure of an e-learning course should have a *modular* character so that the learner is able to become fully aware of his achievements from module to module at his own discretion or at the discretion of the tutor depending on the level of knowledge and abilities. Modules or courses of large volume significantly decrease the student's motivation to work.

- Multimedia support, which can be effected on the basis of the Internet resources and technologies, and appropriate constituents of distant courses. For example, in a Moodle e-learning course they include: Resources (audio files, videos in the form of course files or links to resources located on the Internet, on popular servers (Figure 1), multimedia presentations, etc.), Lessons with multimedia files, AudioRecorder – a course constituent for the student's recording his own audio files and sending them to the server so that the tutor can check and evaluate them, and others.

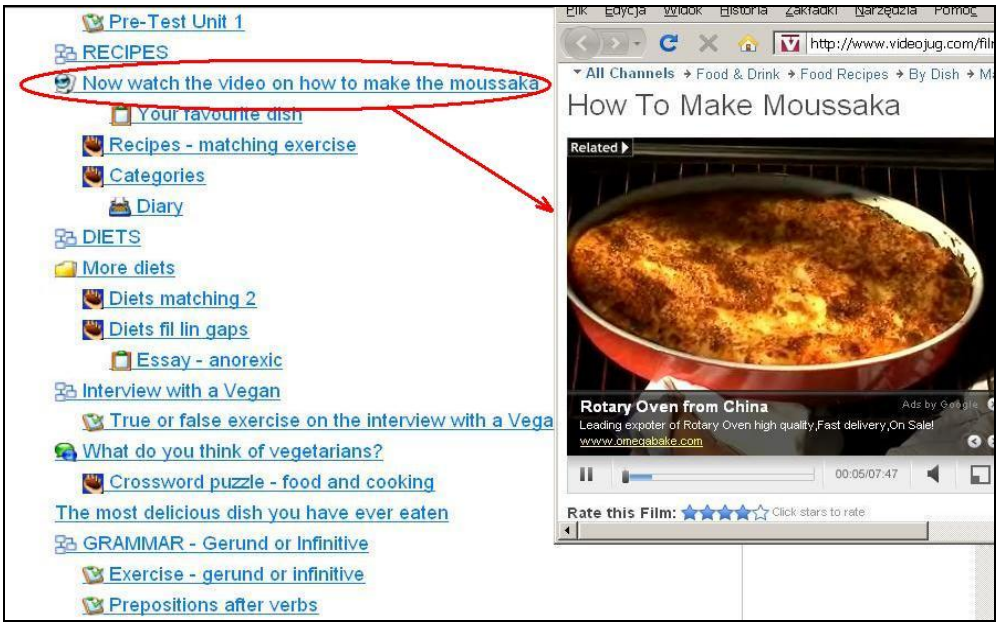



**Figure 1. Resource *Link to a website*, with a relevant video in a distant language learning course [9], [2]**

Technically the problem of distant learning can be solved now in a different way. Modern information technologies ensure practically unlimited possibilities in terms of location, storing, processing and supplying of materials and messages at any distance and of any capacity and content. Distant courses prepared in the Moodle system and made accessible on an e-learning platform can serve and perform the function of a „core" of the information and education space called the Internet or a supplement to a traditional or multimedia textbook which is used in the traditional process.

There are a great number of various types of e-learning language courses. They are described in detail in [7], [4]. Distant foreign language learning courses can practically reflect all the models of e-learning on the one hand,

while on the other hand they may have their own character specific to the subject itself, and namely a basic course in the scope of foreign language learning for learners (for the purpose of supporting remote regions, supporting pupils or students who fall behind with their study, etc); a foreign language course for everybody who wishes to study another foreign language; a course in foreign language for special purposes, for example to study professional terminology or terminology of a given study field, others.

### 2.3. The prepared distant language learning courses, their assumptions and conceptions:

#### 2.3.1. The course in general English at A2 level (by mgr L.Kałafatiuk).

The course in general English at A2 level is the Internet distant learning course developing language skills at the pre-intermediate level. The techniques of distant learning used in the course enable students to master the language at A2 level in a very interesting and innovative way. Students have the opportunity to consolidate their knowledge by using the language in numerous everyday situations provided by the course. The subject matter of the course covers common problems encountered by students in their everyday life, such as: finding accommodation, getting around in the new environment, meeting new people, organizing free time, part-time jobs, travelling, using banking services, health care, etc.

The course is addressed to teenagers, full-time students, external students, post-graduate students and academic teachers who want to learn English at A2 level or those who want to consolidate their knowledge or develop their language skills at this level. The course may be used as a very attractive supplement of the main course at which students meet their teacher face to face, or as an additional module which aims at helping weaker students reach the level of their group.

**The basic objectives of the course are as follows:**

1. Improving and consolidating practical knowledge of English.

2. Developing integrated language skills (reading comprehension, listening comprehension, speaking and writing) at A2 level.

3. Preparing students for the course at a higher level.

4. Consolidating the knowledge of English grammar and its practical application.

5. Expanding vocabulary knowledge and usage.

6. Developing practical language skills to be able to express ones opinions and needs, write letters, essays, notices, speak in public, communicate within a group, understand speakers on the radio or TV.

The participants of the course learn English grammar and vocabulary at A2 level by solving different problems and completing numerous tasks, owing to which they learn to communicate and perform different social roles. The participants can then use their knowledge of English to do the course at B1 level, which will be very useful in their future professional work.

**The structure of the course.** In order to complete the course successfully the participants have to spend at least 20 hours online and about 40 hours off-line. The course consists of the introductory part, 10 units (modules) and final part. The topics of two-hour modules are as follows:

Unit 1. Finding a place to live
Unit 2. Getting around
Unit 3. Your daily bread
Unit 4. The world of work
Unit 5. At your leisure
Unit 6. The world of fashion
Unit 7. Holiday time
Unit 8. When problems arise
Unit 9. Be careful! You might be trapped!
Unit 10. Global issues.

**The principal idea of the course is based on two parts:**

- introducing grammar and vocabulary in various ways using available methods of information technology
- practical part aiming at consolidating the knowledge and testing it.

The completion of the tests and assignments successfully is essential to move to the next stage of the course. Both parts of the course are supplemented with additional creative tasks which focus on communication and practical application of the language (projects, web quests, team work and individual tasks).

**Each unit (module) has a unified structure and consists of the following parts:**

1. Pre-test (online).

2. Basic language material (2 lessons, a glossary, links to internet sites, text files, MP3 listening material, video films etc.).

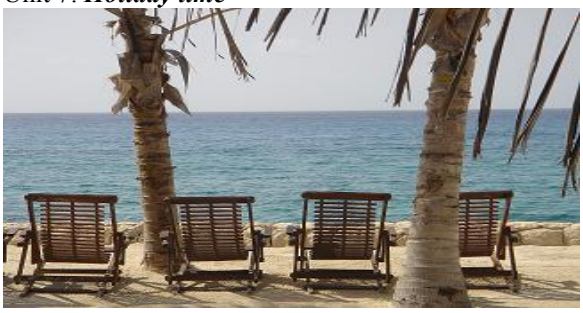
3. Assignments (essays, reports, journals, audio recorder) (off-line).

4. Tests (self-control tests, progress tests, final tests) (Quizzes, Hot Potatoes).

5. Interactive communication between the teacher and the participants and among the participants in the synchronous and asynchronous mode (Chat, Forum).

6. Additional, supplementary language material (lessons, glossaries, PDF files, ppt presentations etc.) (online).

Unit 7: ***Holiday time***



Treść:

1. Ulubione miejsca wakacyjne oraz różne formy wakacji w ofertach biur podróży.
2. Zastosowanie czasowników modalnych dla wyrażenia pewności i przypuszczenia (must, can't, may, might)
3. Wakacyjne przygody.
4. Porównanie czasów *Present Perfect* i *Past Simple*.

- Pre-Test (Quiz)
- Going places (Lesson)
  - Crossword 7 Hot Potatoes (Quiz)
  - Test yourself 7.1 (Quiz)
- What might happen (Lesson)
  - Jumbled sentence 7.1. Hot Potatoes (Quiz)
  - Jumbled sentence 7.2. Hot Potatoes (Quiz)
  - Jumbled sentence 7.3. Hot Potatoes (Quiz)
  - Jumbled sentence 7.4. Hot Potatoes (Quiz)
  - Jumbled sentence 7.5. Hot Potatoes (Quiz)
    - My weekly diary (Journal)
  - Test yourself 7.2 (Quiz)
  - Matching exercise 7 Hot Potatoes (Quiz)
- The best holiday destinations (Wiki)
- Task 7.1 My favourite holiday photo (Assignment)
- Task 7.2 My holiday adventure (Assignment)
- Holidays for students (Choice)

**Figure 2. The table of contents of one module [9]**

The most attractive elements of a distant learning course is the use of multimedia. Students can practice and develop their language skills by reading, writing, watching, listening and speaking. The course contains all those elements.

**The required competence of the course participants :**

Essential:

1. The basic knowledge of English grammar and vocabulary at A1 level.

2. Basic communication ability.

3. The knowledge of English spelling and pronunciation.

Computer literacy:

1. Word-processing skills.

2. Using electronic mail.

3. Using Internet browsers and search engines.

4. Using Acrobat Reader (Fine Reader) and Power Point.

5. Using Skype communicator to be able to take part in audio and video conferences.

6. Using Media Player and Voice Register.

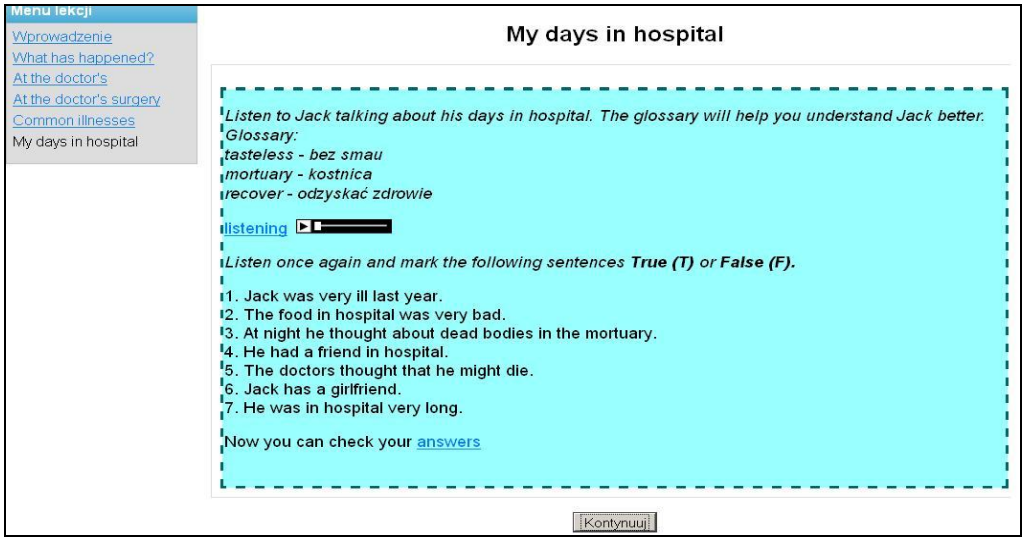



**Figure 3. The example of the listening activity [9]**

**The competence after the course completion:**

1. The participants have developed practical knowledge of English at the pre-intermediate level.

2. They are ready to do the course at a higher level (B1).

3. They have gained practical experience of using the techniques of distant learning.

4. The participants are familiar with modern forms of communication, they know how to use the Internet resources and exchange information with the other learners.

**2.3.2. General English Course (Level B1) (by mgr R.Kalamarz).**

**The General English Course Level B1** is an online course which enables the student to develop his English language skills at intermediate level (B1). The techniques of distant learning used in the course will allow the student to acquire the language material easily thanks to the lucid and interesting approach. Acquired competence can be consolidated and used in a number of practical applications within the course. The subject matter of the course centres round topics connected with the student life, deepening knowledge or understanding not only by studying and reading but also by travelling, exploring new cultures, doing sports and responding to different challenges. It also concentrates on some practical aspects of studying such as living conditions, eating, making contact and solving problems.

The course is dedicated to university students as well as students of various types of schools, courses or postgraduate programmes who wish to learn English at the target level or consolidate their command of English. It can serve as a supplement of a core English programme at B1 level (blended learning) or as its module to level off or to extend the student's competence within the core programme.

**Goals:** The General English Course Level B1 aims to upgrade and improve the learner's qualifications in the scope of his command of English, develop the integrated language skills (listening, reading, speaking and writing) at intermediate level (B1) and prepare to study English at a higher level of language learning. Its goals also include deepening knowledge of English grammatical structures and building up vocabulary as well as making the most of this knowledge by using both grammar and lexis effectively. The course also aims to develop practical skills of using English to express and exchange personal opinions, solve problems, prepare essays, letters, projects, evaluations, summaries, forum posts and to communicate within a group or team.

During the course its participants study English grammar and lexis at B1 level to use it in different ways to do a number of practical tasks and assignments which allow them to learn to communicate with other people, use English in different everyday situations and function in different social roles. Finally the student is ready to use his command of English at next stages of study and in his future job.

**Structure:** The course is designed so as to offer at least 20 hours of effective online study and further 40 hours of offline learning. It consists of an introductory part, ten basic topical modules and a final part. The basic topical modules are ten two-hour units:

Unit 1. On the move (Travelling)

Unit 2. Flat sharing (Student’s everyday life and problems)

Unit 3. In focus (Exploring the world around us)

Unit 4. Have a break (Gaining experience in a gap year)

Unit 5. Well read (Books and reading)

Unit 6. In at a deep end (Sports and challenges)

Unit 7. What’s on? (Film and entertainment)

Unit 8. The spice of life (Food and eating)

Unit 9. Making contact (Ways of making friends)

Unit 10. Food for thought (Mind matters)

As showed in Figure 4, each unit consists of two complementary and intertwined parts. The first part is made up of a presentation of grammar and lexical material in various forms using accessible online techniques (Moodle’s lessons, glossary, other teaching resources in the form of text files (doc and pdf) and ppt presentations as well as videos, audio files, links etc.). The second part aims at practising the new material, consolidating the language already studied and checking knowledge and skills in the form of online tests and quizzes (Moodle’s quizzes and Hot Potatoes Quizzes).


**Figure 4. The example of Unit2 FLAT SHARING**

To move on to another unit the student has to pass the tests and complete the assignments and other prescribed tasks and activities. Both parts are

complemented by a short online pre-test to give the student a hint of what he can learn in the unit, additional creative tasks and activities which focus on communication and a practical use of English: projects, webquests, teamwork (journal, workshop and wiki) and individual tasks (assignments), both written (letters, reports) and oral (using the AudioRecorder feature) , a set of interactive activities to practise communication between the teacher and the learners and the learners among themselves in both synchronous and asynchronous manner (chat, forum, choice, workshop and wiki).

**Requirements and final results**

To start this course knowledge of English at A2 level is required. The student should know basic English grammar and lexis and be able to follow the instructions (in English) and communicate in English at elementary level. He should have no difficulty in using the correct spelling and pronunciation at elementary level. A certain extent of independent use of dictionaries, reference books and internet resources is needed.

Technically, the student should be able to use a computer effectively enough to be able to follow course instructions smoothly, and specifically he should be able to use electronic mail, an internet browser, create and edit files, use popular software at work, for example Acrobat Reader (Fine Reader), Power Point, audio and video players and voice recorders. The ability to use the Skype program is necessary to take part in audio- and video conferences.

On completing the course the student will have a good command of English at intermediate level and will be able to start another course in English at a higher level. He will acquire practical English language skills and will gain more practice in using modern distant learning techniques. He will be open to new forms of communication, internet research and information exchange with other participants of the course.

**General characteristics**

In the General English Course Level B1 the author uses Moodle features effectively. They specifically include the following functions: forum, chat, quiz (both Moodle’s quizzes and Hot Potatoes Quizzes), lesson, wiki, glossary, choice, workshop, journal, etc.

Knowing that the Moodle lesson allows to combine instruction and assessment, the author could make use of its flexibility (it is similar to a web page), interactivity (a quiz feature), and branching capabilities. Each unit of the course contains two lessons which reflect the main topic of the unit in the teaching material (text, audio tracks, short videos, links). The material serves to expose key vocabulary and grammar and takes the form of presentations,

tables, grammar reference, hypertexted notes, links. It is supported by the interactivity of quiz questions. Hypertexted commentary is added to guide the student (Figure 5a), feedback is provided for each correct and incorrect answer and study links are included for further reading (Figure 5b) multimedia. For example, in a unit lesson audio files are used to accompany a presentation of language material, a dialogue, a single phrase, a gapped text or a checking question. It is also used to build an essential part of a listening comprehension quiz (Figure 6). Also, videos are used in a similar way.

The Moodle lesson is flexible in many ways. It can be navigated easily. The student can reach its selected parts by taking particular Study Paths. They serve as a signpost guiding the student or as a shortcut to a specific study point that the student wants to return to (Figure 7).

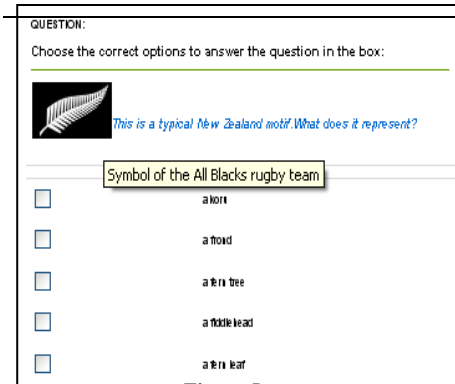



Figure 5a

Figure 5b

**Figure 5. Examples of the interactivity of the course's lessons**

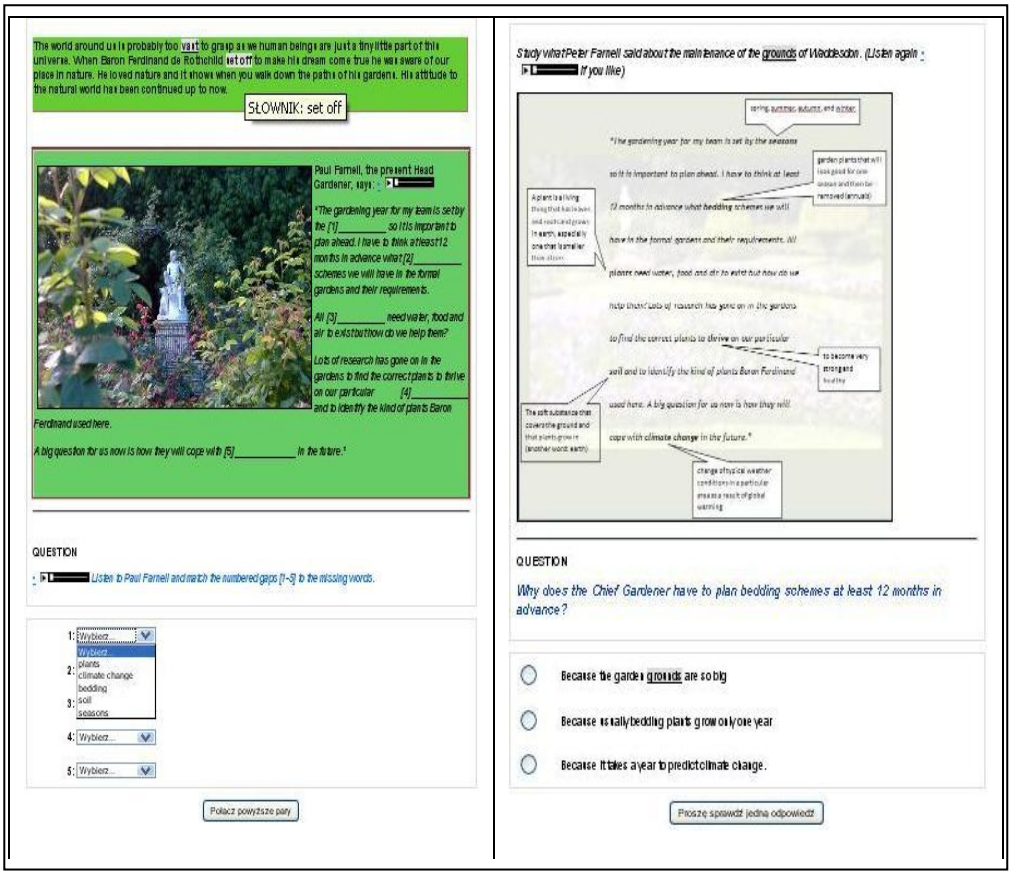



**Figure 6. The part of a listening comprehension quiz.**

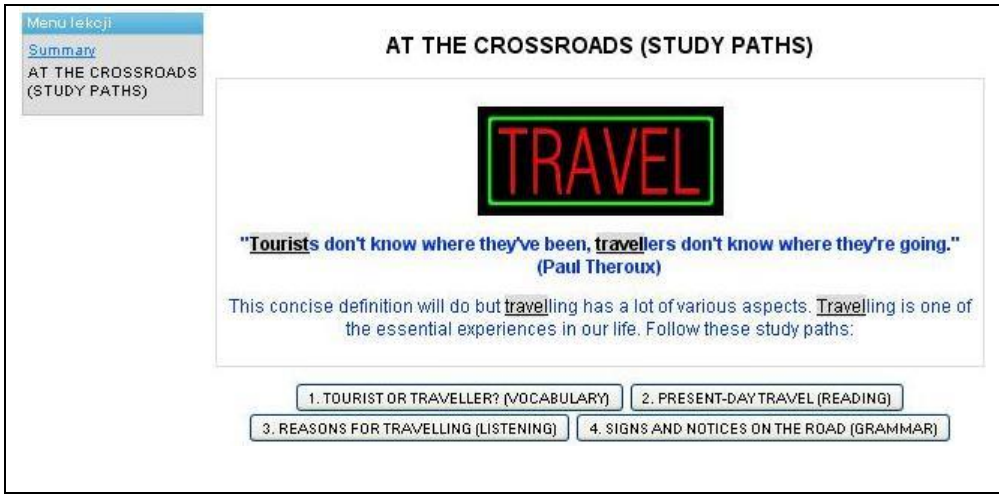



**Figure 7. Menu of the Lesson. An example of the course's flexibility**

### 2.3.3. General English Course (Level B2), by mgr Agata Matuga

General English Course (Level B2) has been designed as a multimedia supplementary course for students who have mastered English language at the intermediate level. The target group are teenagers and adults who wish to revise, practice or develop their knowledge of general English at the upper intermediate level. The course consists of 5 modules (4 hours of online studying each) and takes 20 hours. Each module is concerned with a different topic (1. food and diets, 2. body and ailments, 3. crimes and criminals, 4. sport and leisure, 5. the USA and the UK). Due to the limited number of classes covered by the course only selected grammatical issues have been presented in the course. They are: gerund or infinitive, prepositions after verbs, passive voice, the use of past tenses and reported speech.

As mentioned above the course has a modular character and the structure of each module is similar. They all start with a pre-test, which consists of 10 grammatical and lexical questions referring to the topic of the module. The purpose of the pre-test is to enable a student to check what skills and knowledge he/she already has in the field which is presented in the module. The score for the pre-test is not included in the grade which the student gets on completing the course. Each module contains one grammar and three lexical lessons. The most important elements of the course are lessons, which provide the students with multimedia study materials on a given topic. Each lesson is divided into usually three small parts (texts with photographs, video recordings, audio recordings) which end in a few comprehension questions (multiple choice, true/false, short answer, matching). Depending on whether the student answers the questions correctly he/she is either allowed to go forward to the next item or reversed to the part of the lesson which he/she did not master properly and made to do it again. The key phrases in the lessons are linked to the course glossary so that the students may check the meaning of the unknown words while reading without having to open a dictionary and being distracted. Most of the words in the glossary are first explained in English and then translated into Polish, and usually there is an example of a sentence containing the given word. The grammar lessons are also divided into smaller parts, which present grammatical problems step by step in a form of colourful charts, explanations and examples. They also contain various comprehension questions at the end.

The main lessons of each module are supplemented with extra practice interactive exercises (e.g. Hot Potatoes Quizes: multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises) connected with the material presented in the lessons. The purpose

of these exercises is to give the students an opportunity to test their knowledge and practice the words and phrases which they were supposed to learn from the lesson. There are also plenty of assignments which encourage the communication between the student and the tutor or other students (journals, essays, voting, workshops, chats, Wiki). Most of them are creative tasks and hopefully the students will find them challenging. Finally, there are links to other websites which contain more study materials (language games, videos, other texts) connected with the presented topics. The students who wish to have more practice are advised to take advantage of these resources. The time which the students are expected to spend on doing the additional tasks offline is not included in the time of the course (it is estimated to take about 40 hours in addition to the 20 hours spent online). Each module ends in a final test which contains 10-15 quiz questions of various types (multiple choice, true/false, short answer, matching). There is a time limit for each quiz and the score is important for the final grade, which the student obtains on completion of the whole course.

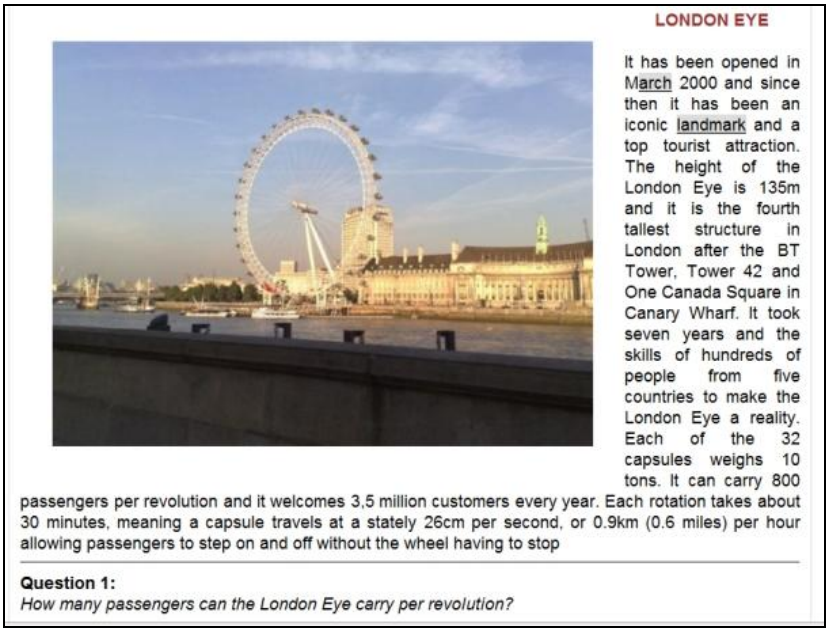



**Figure 8. Lessons Part of the distance course**

Module 5 is a little different from the previous ones. Instead of introducing a grammar problem, as it was the case in the previous modules, it deals with differences between British and American vocabulary. The charts show most commonly used British and American equivalents as well as spelling differences are discussed. The new vocabulary is introduced in the texts

containing information about historical sights worth visiting in London and around it. They provide the student with useful tourist information and some historical background.

Lesson 3 of Module 5 is concerned with Denali National Park and the highest mountain in North America – Mc Kinley. The texts are accompanied by picturesque photographs and some geographical and historical details. Thus, Module 5 has an additional function of developing the student's general knowledge about the countries where English is a native language and hopefully the contents might be useful when visiting the UK or the USA.

Undoubtedly, the advantage of the course is the fact that it may be used in different ways: by students who learn the language in a traditional way and want to supplement the handbook, by part-time or post-graduate students who cannot afford to spend much time in a classroom and prefer to be able to study at home or by those who do not have to attend English classes but wish to study at home to brush up their English. Hopefully, the use of multimedia resources makes it attractive and fun to use. However, on the other hand, the author is aware of the technical imperfections of the course, which she created herself without much professional support. Although the author is an English teacher and not an IT engineer she did her best to apply multimedia in it.

### 2.3.4. English in the Student's Career Course (B1 level) by mgr Joanna Jakubiec-Bontko.

**The description of the course :** Distance learning techniques have in view to enhance traditional language courses and to provide a student with a wide range of resources that could help them in their path to professional success.

The Student's Career Course (B1+ level) is an online course aimed at improving and developing all integrated language skills and in particular it focuses on aspects referring to a professional career of a student. The language material used in the course enables its participants to consolidate, practise and master their general English which intertwines with the specialist subject matter relating to a student's or graduate's career. The student is presented with a number of content-specific topics which include CV writing, job interviews, internships, grants, coping with stress at work, delivering speeches, as well as non-professional activities, such as travelling, looking for a flat, doing sports. The lexical material revolving around work and employment, and practical every day topics, is supported by clear explanations of grammatical points and plenty of practice.

**Target participants of the course :** The course is dedicated to college and university students being at the very start of their professional life, to students of any educational programmes who wish to deepen their knowledge and self-learners who are offered a practical approach to learning general and specialist English.

**Goals of the course :** The general objectives of the course aim to raise and develop the student's language qualifications at an intermediate level (B1+), to improve all linguistic skills (reading comprehension, listening, speaking and writing) and to upgrade and practise grammatical and lexical issues. The specific goals of the course are to encourage the student to use the language effectively in an English-speaking environment through expressing and exchanging opinions, preparing projects, assessments and summaries, communicating in a group and problem solving.

**The course structure :** The course includes 20-hour online learning and 40 hours of study offline and has a modular structure which consists of an introductory part, units covering various topics and a final part.

The basic thematic modules are structured as ten 2-hour units. Every module (unit) consists of two complementary lessons which comprise grammatical and lexical points presented by accessible online techniques in their first part, and a number of exercises to practice the new material in the other part (by means of different kinds of quizzes, Hot Potatoes quizzes, wiki, journal, assignments, letters, reports, AudioRecorder tool etc.).

Unit 1 "*Gap year - a good idea*?" and Unit 2 "*Time for travelling*" are mostly addressed to graduates who are about to get prepared for their professional life, but they seize an opportunity to travel, take a gap year and do some volunteer work.

Units 3 and 4 "*Getting a Job*" provide the learner with the most practical hints and advice concerning effective jobsearch, writing a CV and cover letter, and getting ready for a job interview.

Unit 5 "*My own money*" and Unit 6 "*Moving out of home*" are directed towards young professionals who face a necessity to manage their first own money and to find accommodation.


**Figure 9. Unit 2: TIME FOR TRAVELLING**

Unit 7 "*First job*" and Unit 8 "Job stress" give examples of a typical job contract and job description and deal with solving potential problems at first job, such as sex and disability discrimination, and present techniques of managing stress.

Unit 9 "*Presentations and conferences"* enables the student to learn about ways of giving presentations and speeches and how to manage in a professional environment at meetings and conferences.

The final module, Unit 10 "*Time to rest*", focuses on various ways of spending leisure time ranging from book reading and Internet surfing to shopping and taking up extreme sports.

A VERY BAD START

One of Murphy's laws says: If something can go wrong, it will. So, no matter how hard you try to impress your first/new boss and colleagues, some things may look different from what you have expected to see.

Listen to Mark, Helen and John telling about their first day at work which turned out to be quite unsuccessful.

MARK'S STORY

**Answer the questions:**
1. Was Mark on a business trip with his boss on the first day of his work?
2. What time did the boss want Mark to wake him up?
3. What was the reason why Mark didn't tell the truth about an alarm clock?

Click here to check your answers.

**Figure 10. Unit 8: PROBLEMS AT WORK**

**SHOPAHOLICS**


It’s hard to believe but for many young people, who have just started working and earning their own money, the best way to have a rest is doing shopping.

The film "Confessions of a Shopaholic", now on general release across the country, tells a story of a 25-year-old college graduate who gets a boring job as a financial journalist but can’t handle her own finances. Her problem is that she has a shopping addiction and she spends so much money that it puts her in extreme debts.

*Would you like to see the film trailer? Go to the following link on www.youtube.com*

**Figure 11. Unit 10: TIME TO REST. Part of the Lesson “SHOPHOLICS”**

Each unit is made up of two lessons which are a combination of teaching instructions in the scope of grammatical and lexical issues and various forms of online exercises assessing the acquired knowledge. In addition, the acquisition of language skills is facilitated by online quizzes and consolidated by offline tasks, such as oral practice (AudioRecorder), creative assignments (journals, wiki and teamwork) and interactive activities (forum, chat or choice). At different phases of the unit, the student's competences are evaluated by means of a pre-test, mid-test and final test.

The author's essential goals have been to create the course meeting the expectations of students taking up their professional career so as to upgrade their qualifications and strengthen their communicative competences. The student has been offered the up-to-date course supplementing traditional face-to-face courses. Its attractiveness and accessibility is its main asset since the participant may take advantage of diversified forms of learning, such as online and offline exercises, grammar reference, glossaries, tables and links to internet resources.

### 2.3.5. English in the Student's Career Course (Level B2+), by mgr Katarzyna Kiszka.

The B2 level course (former upper-intermediate level) is a web-based course aimed at students, who may need English for their studies, as well as graduates and young professionals, who need practical English in their career. The on-line tools and facilities used enable students and graduates to acquire and revise a lot of B2 material.

There is a wide range of topics connected with students' and graduates' life such as practical aspects of studying in English or looking for a job, making contacts and solving problems. The course supports better use English skills both receptive (reading and listening comprehension) and productive (speaking, participating in meetings, presenting, writing letters, e-mails, etc). At the same time the course revises the most practical aspects of grammar at B2 level.

**The target users:**

The course is designed for students, university courses participants, extra mural students, and academic teachers. The course may be combined with a face-to-face (F2F) classroom component or as a separate course may be used both as a training course apart from students' syllabus as well as a supportive course.

The course consists of 20 on-line hours and 40 off-line hours. There is an introductory part, 10 2-hour units and 2-hour finishing part.

The topics of units depict typical career development, from a student and a graduate looking for a job to a professional starting to think about settling down.

The first three units concentrate on the initial sages of professional life, such as: looking for a job, preparing to work in a multinational company and building up and maintaining business relations.

**Unit 1.** How to find a job of your dreams?

**Unit 2.** At work.

**Unit 3**. All work and no play makes Jack a dull boy - chill out!

They cover such areas as CV and covering letter writing and interview preparation. They practise presenting and participating in meetings.

The following two units:

**Unit 4.** Internet? - International English.

**Unit 5.** Good food ends with good talk.

Firstly, they cover areas connected with the Internet language for private and professional use, i.e. viral marketing or broadly used abbreviations and vocabulary commonly used on web-pages. Secondly, they develop the language of a professional participating in international meetings: such as food vocabulary and vocabulary of socializing (how not to make a social gaffe).

Units 6 and 7: **Unit 6.** Here and there, travel for pleasure and for profits.

**Unit 7.** School after school? Yes, school after school!

Cover areas connected with travelling and training and further studying. They prepare both a business person and a student to travel and study.

The following: **Unit 8.** Money doesn’t grow on trees, covers the area of business and capital market.

The final units: **Unit 9.** World Issues. and **Unit 10.** Settle down. You are a big boy/ girl. Start real life...GOOD LUCK! eventually reach the stage where either a student or a graduate faces world issues or professional problems. The professional may also see the need to settle down. Thus the areas

covered are: global issues, presenting arguments, giving reasons or letters to a bank as well as vocabulary connected with living in a house.

Each unit above contains various tasks connected with grammar at B2 level, such as: conditional sentences, prepositions, modals, tenses or punctuation revision, etc.

The choice of areas has been the result of the author's experience in teaching students at all levels of general English and ESP, in-company teaching of business and examining at Cambridge Exams (general and business). The linguistic needs of students and graduates and professionals are similar in many ways. The course content covers the areas where both similarities and differences were considered.

The uploaded materials provided by the author: Word documents, online quizzes, audio and video files, hyperlinks and a recorder.

As copyright regulations referring to uploading video files available on web sites are not quite clear only 2 "home-made" video files were uploaded. The audio files are the result of recording sessions with native speakers and Polish students. Another possibility is a recorder that may be customized to any course.

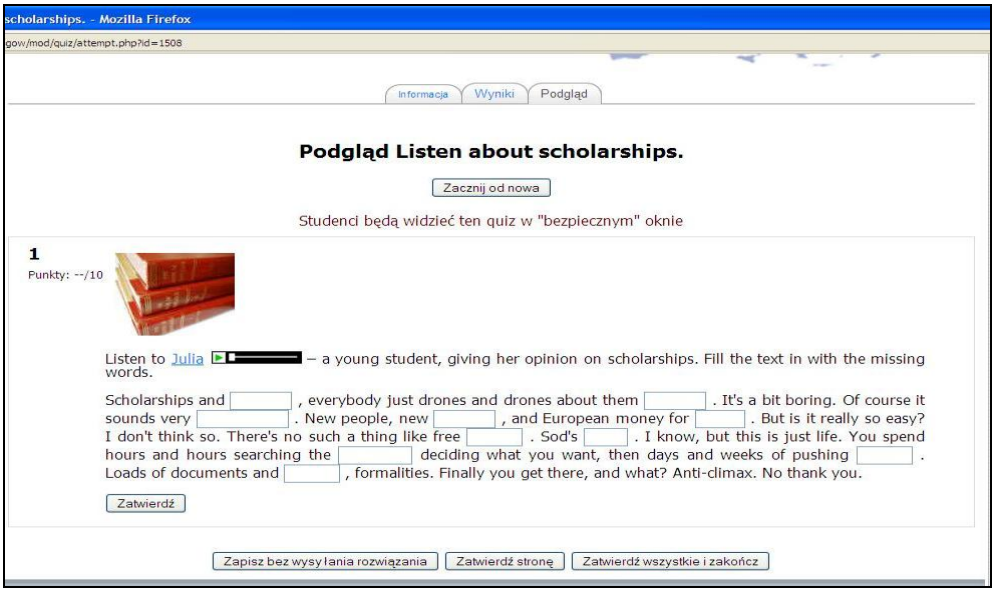



**Figure 12. Quiz "Listen about scholarships".**

### 2.3. Competences of the teacher in the scope of e-learning

Competences of a teacher as an e-learning course author and a tutor are described in detail in [4], [5]. Obviously, an online foreign language teacher should be a foreign language teacher and first of all should hold necessary qualifications in this scope. By no means should e-learning be an opportunity for the teacher to conceal his incompetences and failures in traditional teaching, but he should rather most naturally, effectively and efficiently integrate his teaching competences in both traditional and online modes and keep on upgrading and improving his abilities. The content-related, methodological, IT-related, organisational and other aspects of the development of distant teaching competences go beyond the scope of this article and are covered in other publications of the author.

## CONCLUSION

The language courses prepared under the UPGOW project ([8], [9]) have proved the correctness and effectiveness of the proposed e-learning technology applied to foreign language teaching. Definitely multimedia and distant courses cannot compete with real personal contact with a teacher provided that this contact is individual. However, as traditional classes, for example English classes, are attended by dozens of students and each student requires individual approach, the advantages of appropriately designed e-learning seem to outnumber its disadvantages and thus it becomes a modern, flexible and effective teaching technology which meets the needs of the learner, the teacher and the society.

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# ON THE THEORY, PRACTICE AND DIDACTICS OF UTILIZATION OF WEB SITES FOR EDUCATIONAL PURPOSES BY TEACHERS OF POLISH LANGUAGE

**Anna Ślósarz**
Chair for the Didactics of Literature and Polish Language,
Polish Philology Institute at Pedagogical University
Podchorążych 2/557 Street, 30-084 Cracow, Poland
aslosarz@up.krakow.pl

***Abstract***. *The utilization of personal teacher's website (web portals, blogs, discussion forums, email accounts, chat, WIKI) adapted for educational purposes*[1] *is easier for Polish philologists, than the installation and administration of courses on an educational platform, which requires higher computer skills. It is not associated with any formalities or costs, meets the pupils and students communication expectations, facilitates supplying of didactic materials, academic communication and research. Numerous teachers establish websites, connected with e-courses or career advancement, but in a situation of lack of technical support, they abandon them. So websites mirror bureaucracy of education and old-fashioned methods of work whereas useful websites are rich in didactic materials, they are interactive, regularly updated and addressed to particular students.*

***Keywords***: *personal teaching websites of the Polish language teachers, adapted for educational purposes, supplying of didactic materials, possibility of putting published didactic materials, abandoned sites.*

## INTRODUCTION. METHOD OF INVESTIGATION

E-learning is necessary for education the generation making use of the Internet since childhood. But Polish philologists, whose task is to introduce

[1]See e.g.: Wuhan Hubei *Investigation Research of Teacher's Personal Teaching Website*, China, March 2007 – March 2008; Glenn Bull, Hillary Ritt & Feng Wang *Double-Click. The 'Read-Write Web'* (blogs for classroom use), *Virginia Journal of Education*, http://www.veanea.org/vea-journal/0711/November2007-Double-Click.html; http://blogclassroom.com/; http://www.websiteclassroom.com/, retreived on the 10 September 2009.

young people into contemporary culture and communication are rarely prepared for this challenge; even technical requirements can be an obstacle. So they adapt websites, blogs, email accounts, discussion forums etc. for educational purposes. Didactic materials put online become transmissible, alterable, manifoldable, indestructible, available and seekable aids[2]. But the effectiveness of their utilization is varied, because it depends on the kind of curriculum, educational skills, the activity level of a workgroup and technical skills of both pupils and their teacher.

In order to investigate functionality of personal teacher's teaching websites owned by Polish philologists in July, August and September of 2009, the analysis concentrated on the list, available at *skocz.com* in category *Nauczyciele – strony prywatne* (*Teachers – private sites*) - 134 sites, including 13 made by teachers of the Polish language) and directors of *Wirtualna Polska*: *Materiały dla nauczycieli* (256 sites, including 14 made by teachers of the Polish language), *Strony nauczycieli* (133, including 8), *Wykładowcy* (46, incl. 2). This list was complemented with 24 other sites, especially those owned by academics.

63 websites (out of 593 taken into consideration in this study) was owned by Polish philologists: 13 belonged to lecturers (21%), 14 (22%) to teachers of senior high schools, 6 (26%) to tutors of junior high schools, 12 (19%) to teachers at primary schools, 4 (6%) to pedagogues working in various kinds of schools. Four authors were not recognized. This structure does not correspond with demographical data: in 2003/4 2.8 mln pupils attended primary schools (4th to 6th classes - about 1.4 mln), junior high schools - 1.66 mln students, senior high schools - 1.86 mln[3], whereas there were around 170 thousands of students attending humanistic courses at universities and colleges (only a part of them were Polish philology students)[4]. It means, that a statistical student of the Polish philology used websites nearly 50 times more frequently, than a primary school pupil, though the latter is more conversant with the computer.

Research of 63 sites proves that utilization of websites for educational purposes is easier, faster and more economical than offering a course on an

[2]Mariusz Kąkolewicz: *Cyfrowe środowisko wirtualnej edukacji* [on] *Fom new Teaching Techniques to virtual education.* Edited by Wacław Strykowski. Polskie Towarzystwo Technologii i Mediów Edukacyjnych, Poznań, 2006, pages 522-525.

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[4]As in: Regina Anam: *Studenci uczelni wyższych 2007/8,* „e-Gospodarka.pl", http://www.egospodarka.pl/30212,Studenci-uczelni-wyzszych-2007-2008,1,39,1.html, retrieved on the 8 September 2009 r.

educational platform (e.g. MOODLE). The creation of a blog, a discussion forum, an e-mail account or a web portal is not connected with additional formalities or costs of space on a server. It meets communication expectations of pupils and students; improves, fastens and individualizes communication, involves users and makes tutoring more attractive, thanks to "blended learning"[5].

## 1. PURPOSES OF CREATION PERSONAL TEACHER'S WEBSITES BY TEACHERS OF POLISH LANGUAGE

Didactic websites are utilized by teachers of the Polish language for four distinctive purposes: communication with students, pupils and parents, supplying of didactic materials, academic communication and research.

### 1.1. Communication with students, pupils and parents

Websites are a chance for demonstrating exemplary use of information technology for learning. The subject outline (syllabus, outline of material, teaching program, tutor expectations, recommended literature etc.) is usually published there, in spite of the fact that these are also available on official sites of a given university or school, in libraries and on the sites of publishers of recommended readings. Tutors also put there e.g. questions allowing for the evaluation of familiarity with the content of recommended readings before a colloquium[6], and after marking written work, tutors (especially academics, due to low frequency of in person meetings) publish results and comments on websites. These appear to be a convenient way of communication because the delivery of information is fast, free of interference of third parties and reliable – which is important especially at the end of an academic year in multitude of work. Part-time students, who attend lectures and tutorials every few weeks, are very interested in the results of tests due to necessity of preparation for oral examinations (in case of failing written form of examination). In practice commonly the results of colloquiums are made available together with first names and full surnames of those examined, which however ought not to happen due to privacy policy. That is why often nicknames or symbols are used to mark a given examined person; these are proposed by students on their written work – names with

[5] „Blended learning" system is based on supplementing traditional tutoring methods by materials delivered via Internet.

[6] See, e.g. http://filologiapolska.blog.onet.pl/pasek-i-wydra,2,ID298562991,DA2008-03-02,n, retrieved on the 9 August 2009.

first letters of surnames, names with added shortenings of surnames or even drawings happen to be used for identification.

I rok geografia - studia zaoczne zawodowe 3 - letnie rok akademicki 2008/2009

Wyniki kollokwium 22-02-2009

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**Figure 1. Coded Results of Colloquium**

Sites *WordPress* and *Joomla!* give possibility of accessing information after providing a password, which allows for limited access of users due to authorship rights of the owner of the site and because of privacy policy. *Google Sites*, however, limit number of users to 50; that is why confidential information may be coded as PDF and opened only after providing a password.

Results and commentaries to colloquiums are also made available to students by means of electronic mail in cases when a given group shares an email account. Such an account is utilized for internal communication within a group and is inaccessible to third parties, including teachers and tutors. In such cases tutors are only authors of the information being sent, and do not have possibility of active communication, as opposite to blogs adapted for educational purposes. They neither can be sure that information indeed was delivered, nor, in case it was delivered - check in what form (delays and distortions happen), or even if it was read, and especially accurately understood.

Personal teacher's websites are also used for an exchange of organizational information, e.g. about the way of realization authors' teaching programs[7], cancellation of a shift, tutorials or a change of room for tutorials[8].

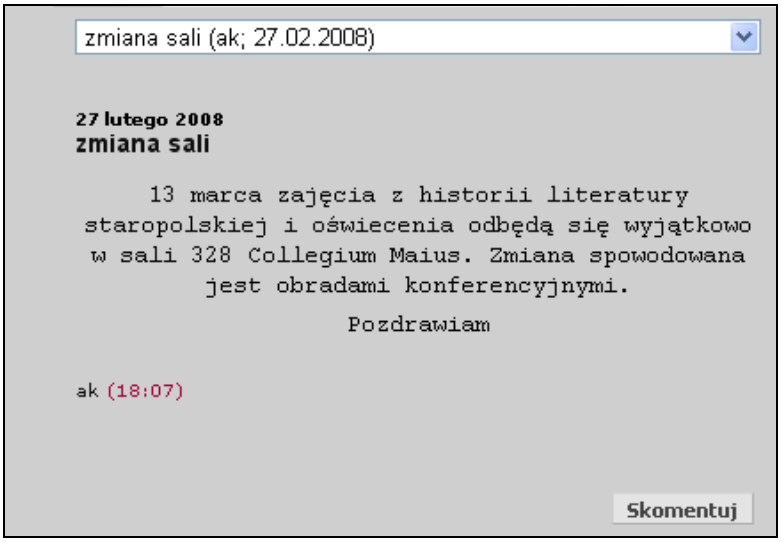


**Figure 2. Information about Change of Room, Placed on a Blog Site**

Information to a person's own website may be sent while on the journey – by the use of a mobile phone. It eliminates the necessity of a visit to the university or making a phone call to the school office, asking for putting a note on the information board, sometimes covered by other notes or lost. The work of seminar groups is being organised by the use of blogs, equally in an organizational, substantial and methodological aspect. *Google Sites* allow for sending posts, which are clustered like in a blog: according to the date of creation or correction.

### 1.2. Supplying of didactic materials

On websites one can put up multimedia presentations, printed texts, photos, links to other pages, diagrams and movies. Modern technologies allow for automatic sending of information to blogs and websites – all done at one

[7]E.g. Dr Piotr Staśkiewicz's *Strona polonisty*: http://www.polonista.strefa.pl/index.php, allowing delivery in implementation of authors' program *Przez media* (*Via Media*), retrieved on the 9 August 2009.

[8]See http://filologiapolska.blog.onet.pl/zmiana-sali,2,ID297540806,DA2008-02-27,n, where information was placed: *27 February 2008 change of room 3 March tutorials on the history of old-Polish and Enlightenment literature will exceptionally take place in room no 328 Collegium Maius. Change due to a conference session. Cheers ak (18:07).*

click only. However, the problem lies in preparation of materials in such a way that it would serve its purpose and would be suitable for publication. Didactic inventiveness of a teacher is limited by other authors' copyrights to graphics, texts, photos and movies, without addition of which, didactic materials would be of little attraction. Photos and movies, presented during classes, not in every case may be published, so free cliparts, movies and texts are still in scarcity. That causes a hurdle of publication on personal teacher's websites of electronic materials, which are used in everyday practice during tutorials and classes. However, if such materials are made available (e.g. teacher's articles, published in publications with limited access to students, examples of the competition works or examination works), they top up knowledge of pupils and students, put in order and present exemplary media opinions making it easier for students to write final examinations, undergraduate and Master theses (which are published more and more frequently with the consent of authors). A teacher at the stage of preparing materials should take into consideration the differentiation of students' needs and also their diverse capabilities of using equipment and their technical skills, and ought to be prepared technically for creation of high standard text documents, visualizations, audio and video clips, multimedia presentations. Education understood in this way means directing of students' individual activity in the net, an ability crucial in the era of Internet 2.0.

Professionally prepared didactic materials are made available also by the publishers of textbooks on their own websites – for the cost proportional to the amount of used materials and time of their use, e.g. for one semester or a year. That is made mainly for advertisement purposes, however it is also possible to use those materials in didactic practice and being inspired by them while creating own teaching aids. In above described way didactic material was made available by Piotr Marciszuk's publishing office *Stentor*[9].

[9]See. http://edukacjaonline.stentor.pl/index.php?pid=359, retrieved on the 9 August 2009.


**Figure 3. Didactic Materials of Publishing Office „Stentor"**

### 1.3. Academic communication

Internet interfaces play role of an e-portfolio of the author, e.g. Włodzimierz Bolecki's site contains curriculum vitae and a list of publications (without links however)[10]. The site of Michał Błażejewski presents his CV with links[11]. These also allow for putting up organizational information before a convention of part-time students[12] or a conference. Downloading of applications and edition standards makes it easier for delegates to send registration electronically. Also papers can be created by filling in a given form, which relieves from choosing a font, measuring spaces between lines, margins etc. and eliminates the problem of losing or mixing up hard copy pages etc. Correction of conference publications also takes place by electronic way, with the use of tools such as: comments, colour font and background, creating successive redactions and copies etc. Papers prepared electronically assist the organizers with smooth directing for printing, which allows for printing complete edition before the conference. Thanks to this, during the conference there is more time for academic discussions. Conference sites may be used for transmission of sessions via Internet television. It enables researchers, teachers, students, pupils to participate in sessions and enables communication with delegates via e-mail. Presentations

[10]See http://strony.aster.pl/bolecki/indexpl.html, retrieved at the 9 August 2009.
[11]See http://fabryka.com/mb/, retrieved at the 8 September 2009 r.
[12]See website of Renata Dźwigoł from UP Cracow: http://ultra.ap.krakow.pl/~renatad/, retrieved at the 8 September 2009 r.

in electronic form are also put (with the consent of authors) on conference sites (as a film or more and more often in form of Power Point Presentations), which is an attractive method of dissemination of the results of research, at the same time making these available for Internet search engines. Regularly organized conferences have archives of materials and presentations from previous years, thanks to which delegates may orientate themselves as to the level and topics covered during previous conferences.


**Figure 4. Site of the Conference "e-polonistyka 2"**

## 1.4. Research

Websites allow for the publication of electronic polls and questionnaires, filling in and sending of which is of less hassle as compared with the traditional way. Additionally, the electronic form is not associated with costs of printing attending or handling and delivery. Time, dedicated to sending information, is cut to minimum – a single click. In case, when the questionnaires are widely disseminated, these may be filled in by multiple respondents, which in case of the use of hard copy would be costly. In addition, questionaries prepared electronically are easily analysed by the use of computer programs, which radically shortens the time of their analysis in various aspects. Such questionnaires also make it possible to ask open

questions, which is important especially in quantitation studies or study of a case[13].

## 2. PRACTICE

In practice Polish language teachers do not own many didactic sites, in spite of the fact that they, during various courses, were prepared to create and maintain websites[14]. However, these courses occurred not sufficient due to short time (15-20 hours is not enough for learning a language, preparing materials and their publication), and there is also difficulty in acquiring any further technical help in maintaining a personal teacher's website. In consequence, the established sites are being abandoned. Such sites usually contain random information about their author, the author's family and hobby, courses their attended and, additionally, the centre, in which the courses were being delivered, becoming at the same time an unintentional advertisement[15]. It happens that on such websites there is lack of information, on what subject is taught by their author and also lack of any didactic materials[16]. Adversely, advertisements were put up because sites had been placed on commercial servers[17].

Personal teacher's websites are also created by teachers of the Polish language in connection with career advancement, namely the realisation of enterprises aiming at mastering of work expertise and improving performance of school. It includes the use and improvement of the use of computer and information technology, but also sharing the experience, conducting open teaching sessions and publishing of at least two texts. On such sites the teachers put their proposals of texts and tests, outlines of school shows, reading comprehension tests, loud reading tests, assisting materials and other documents, prepared electronically in connection with organizational and pedagogical work at school[18]. On some sites attention is drawn by dominating legal documents published elsewhere. For instance, Jarosław Kotliński, teacher of the Polish language and knowledge of the

[13]E.g. in such way was conducted research on assessment of functionality of maturity examination procedures in opinion of maturity examination undertakers, alumni and Polish philologists. Questionnaire was put in electronic version on site of Chair for the Didactics of Literature and Polish Language of Catholic University of Lublin and was available till the beginning of May 2009.
[14]E.g. Elżbieta Żuk-Suska, Andrzej Suski: *Technologie informacyjne i edukacja multimedialna w praktyce szkolnej. Materiały do modułu III,* Combidata Poland Sp. z o.o., Sopot 2005.
[15]E.g. Główny Ośrodek Edukacji Informatycznej i Zastosowań Komputerów conducted such a course in 2002.
[16]E.g. Elżbieta Kłyszewska's site http://elzbieta.klyszewska.edu.oeiizk.waw.pl/, retrieved on the 9 August 2009.
[17]E.g. L. Korta's site http://lkorta.republika.pl/, retrieved on the 9 August 2009.
[18]E.g. site *Profesorek 2003*, http://profesorek2003.republika.pl/, retrieved on the 9 August 2009.

culture in the Zespół Szkół Ogólnokształcących in Kowary[19] on his website put plans of teaching the Polish language and knowledge of culture, the Polish language matura examination standards, systems of marking in the subject, information about Olimpiada Literatury i Języka Polskiego (The Olympiad of the Polish Literature and Language) with a link to the official website of Olympiad and to four examples of competition works, three old-Polish texts, memories of watching a favourite movie and a gallery of 44 pictures (without full titles, authors or Internet addresses). Sites are not always systematically updated; it happens that they vanish after a teacher is granted promotion[20].

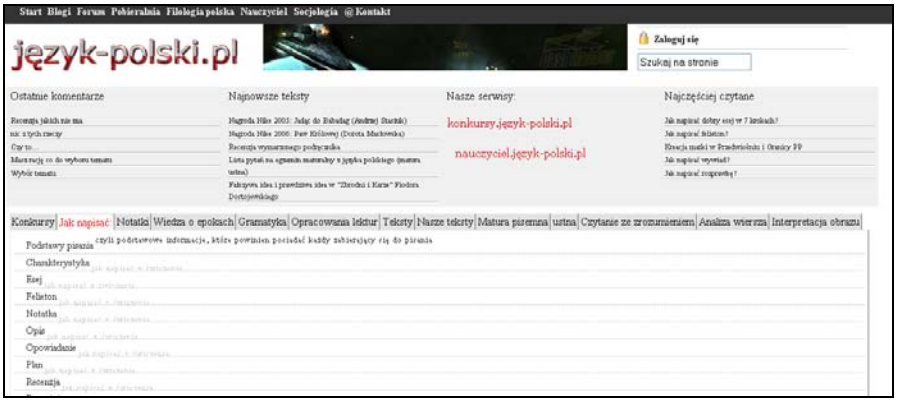


**Figure 5. Site of Tatiana and Arkadiusz Żmij Język-polski.pl**

In case of use of modern tools, such as *Joomla!,* teacher is given a possibility of putting published didactic materials (tests, pictures, programs etc.) in order, also the availability of internal links and a search engine make it easier to navigate around site resources. Users' comments and forum discussions were also accommodated on such sites. Designing and maintaining expanded sites, however, requires assistance of others[21].

19% personal teacher's websites include materials connected with career advancement, however a negative attitude of teachers towards it is striking. Such an attitude originates from the formalization of procedures and the lack

[19]See: http://www.zso-kowary.pl/jaroslaw_kotlinski/index.php?str=standarty, retrieved on the 9 August 2009.
[20]Chronicle of activities on site *Profesorek 2003* ends in 2001 that is at time of completing practice by the Polish philologist. Site of Jarosław Kotliński was last updated on the 14 May 2006.
[21]See e.g. sites of: Roman Mazurkiewicz *Staropolska on line* http://staropolska.pl; Tatiana and Arkadiusz Żmij *Język polski* http://jezyk-polski.pl/, Robert Bednarz *Serwis Humanistyczny „Hamlet"* http://hamlet.pro.e-mouse.pl, *Okiem Waldemara Krawca* http://www.eximus.14lo.lublin.pl/index1024768.html, retrieved on the 9 August 2009.

of connection between the degree of teachers' professional promotion and their work afterwards that cannot be subjected to external assessment. The serious faults of websites run by teachers of the Polish language are also: lack of the latest literature[22], old fashioned methodologies, focusing on general grammar[23], links to Internet sites such as sciagi.pl, and covering only a small fragment of program material[24]. On one site, which had been abandoned for over five years, there were no didactic materials, but humorous polls were still functioning e.g. on the level of educational system and the role of MENiS[25]. Also some advertisements that lacked closing buttons appeared and by overshadowing menu made use of the interface impossible[26].

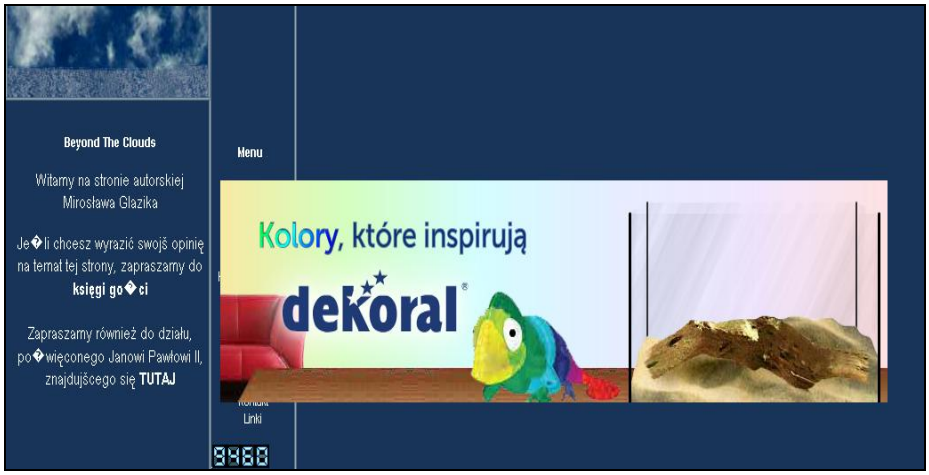


**Figure 6. Mirosław Glazik's Website – navigation overshadowed by advertisement**

## 3. DIDACTICS

During the evaluation of personal teacher's websites the following aspects were taken into consideration: the quality and amount of didactic materials (0-6p.), whether they were up-to-date (0-6 p.), communication with students (0-6 p.), the way of a tutor's self-presentation (0-6 p.). In most aspects websites of lecturers and primary school teachers had the highest score. The

[22]E.g. Czech site *Databáze k předmětu Polské reálie – inovace předmětu stávajícího studijního programu* for students of Polish language section of School of Slavistics in the Department of Philosophy at the Palacki University in Ołomuniec, sponsored by Fond Rozvoje Vysokých Škol (FRVS); it focuses on medieval literature and finishes at year 1918.
[23]E.g. site created by M. Paćko http://gojabraniewo.webpark.pl/index1.htm, retrieved on the 9 August 2009.
[24]E.g. site of J. J. Witkowski *Polonista – czas na lektury*, http://polonista.w.interia.pl/, retrieved on the 9 August 2009.
[25] See http://www.polonistka.friko.pl/index.php?a=1#215, retrieved on the 9 August 2009.
[26]E.g. http://miroslaw_glazik.republika.pl/index.html, retrieved on the 9 August 2009.

worst websites were those which neither contained the owner's name and surname nor did they have the information about potential users.

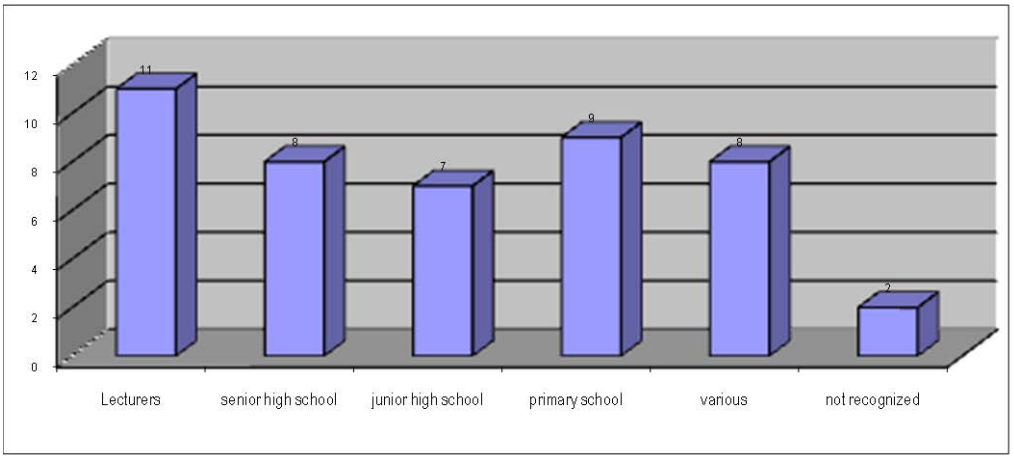


**Figure 7. Quality of websites for different types of schools**

It seems that, during courses delivered, technical and ethical problems (of copyrights) are strongly accented, with less attention is put to didactic issues, while didactic and psychologically-pedagogical aspects decide about the effects of distance learning[27]. Therefore, it is necessary to uphold students' interest systematically, motivate them to work in a skilful way. It is also essential to provide polysensoric interaction, which enhances teaching people with visual or aural memory and also kinestetics successfully. Didactic Polish language sites, however, in times of crisis of reading, are dominated by printed texts and there are only a few multimedia presentations available. There is lack of movies, graphs, schemes assisting with understanding of structure of the material taught (exception *język-polski.pl* and the Czech site *Databáze k předmětu Polské reálie – inovace předmětu stávajícího studijního programu*, containing 167 illustrations, 50 photos, 15 multimedia presentations, 17 movies).

Modern teachers, functioning in so called „informative society", change from the deliverers of information to guides and partners. They should continuously improve their skills, update qualifications and adjust work methods to the needs of students, who often dispose of technical problems more skilfully than the teacher; such a situation requires from the teacher dedicating a huge amount of time sacrificing other everyday activities.

[27] Józef Bednarek, Ewa Lubina: *Kształcenie na odległość. Podstawy dydaktyki,* Wydawnictwo Naukowe PWN S.A., Warszawa 2008, s. 31-79.

Emotional burden of this profession today is greater than it was in case of traditional teaching and requires, from Polish philologists educated with the use of traditional methods, a lot of technical skills, improving stress management strategies, deep emotional intelligence, tact, a sense of humour, dedication to work and also thoroughness and a systematic approach to documentation of work. An identification with this new self identity and at the same time understanding subjectivity of participants are also essential.

E-didactics of Polish language is associated with the necessity of proficient use of Internet tools, individualization of education, motivating participants and developing forms of control. Application of methods freeing activity in students and guiding their independent learning becomes a necessity.

## CONCLUSION

In the era of expansion of electronic media systematically updated personal teacher's websites became a modern didactic tool, enhancing effectiveness of Polish language teachers' work: these sites allow for effective usage of information, contact with the teacher and publishing the user's effects of work while teaching them how to be an active participant of modern culture. It saves time of both sides, builds interest in the subject, stimulates the process of learning and eliminates potential organizational misunderstandings. It opens new perspectives for education at all kinds of schools and at university levels.

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# ARTISTIC EDUCATION BASED ON E-LEARNING

**Remigiusz Kopoczek, Katarzyna Kroczek – Wasińska**
University of Silesia
Bielska 62, Street, 43-400 Cieszyn, Poland
remi777@gmail.com, kroczek@gmail.com

***Abstract:*** *Artistic education is directed to a small group of talented youth and is based on student - master relation. The lack of knowledge in the field of art causes that persons without basic knowledge in the field often attempt to design their own promotional materials of doubtful quality. In the article the authors present the possibility of solution of the problem in the form of a self-presentation course, aimed at persons dealing with scientific activity and based on the methods of e-learning.*

*Keywords: artistic education, e-learning, design*

## INTRODUCTION

The artistic education concerns the narrow field of human activity. It is generally directed to a small group of talented youth whose education depends mainly on master - student relation. This can be observed at academies of arts or artistic faculties at universities. Within the framework of artistic studies different majors are proposed - workshop graphics, design graphics, painting, sculpture, or broadly understood multimedia. The peculiarity of the studies, and also small number of people dealing with the matter causes that the basic knowledge in the range of plastic art is not common. Such state of thing causes that persons without basic knowledge in the range of plastic art, unfamiliar with the alphabet of values and methods accepted and used in art attempt to design their own promotional materials such as leaflets, posters, business cards or internet sites.

Such actions are frequently doomed to failure. Also commissioning the job to advertising agencies does not fully guarantee effects of sufficient artistic value. The solution of the above mentioned problems may be promotion of the plastic art by means of web based distance education, e-learning. However, does it make sense to teach art, in this case mainly design graphics, photography or multimedia by means of e-learning? There is evidence it does, and for several reasons.

The advent of computer technology introduced certain changes both in the process of designing and in the methods of teaching design. It should be emphasized that these changes concern mainly teaching process and does not release students from creative thinking. Thanks to computers technical difficulties of design has greatly diminished. There are obviously both advantages and disadvantage of this. Every user of computer can be "designer" today, if he is proficient in use of graphic design software. Moreover, availability of so called ‘ready mades’ kills creative and unconventional thinking. Therefore the role of artistic teaching is to present the basic alphabet the art, which is essential for benefiting fully from modern computer design technology.

Another reason for effectiveness of e-learning is the fact that contemporary graphic art, designing or photography is created in digital form at initial stage. The creative process has been relieved from such traditional methods of recording as use of paper. Thanks to this the work can be recorded in digital form, be algorithmically processed or recorded in countless copies. Digital recording allows for quick and easy communication between lecturer and student. It also allows to return to previous versions of the work, as all the versions are kept on record. This is essential during designing process, because lecturer can interfere in the design without destroying student's work.

The Course in self-presentation, prepared on a basis of e-learning is aimed at those who deal with scientific activity and who would like to assimilate basic knowledge related to plastic art, especially the principles of design. It was prepared as a part of a project 'University As The Partner of Economy Based On Knowledge' carried out by University of Silesia. Completion of the course enables designing of simplest objects such as: visit-cards, bills, internet banners according to established canons. The course allows to acquire knowledge how to take good pictures and the methods of retouching existing photos. In framework of the course the emphasis is put on development of skills related to design of internet sites, blogs and multimedia presentations. The skills acquired during the course can be used in promotional actions for persons or institutions, in preparation of teaching aids, in acquiring and

development of methods of distance learning and in enhancing of didactic offer. Readable and correctly executed materials guarantee professional presentation of own artistic or scientific achievements.

## 1. AUTOPRESENTATION COURSE BASED ON E-LEARNING METHOD

The course is divided in eight basic mutually supplementary modules. Every of them consist of 5 to 15 separate teaching units. The range of material is limited to indispensable minimum, permitting to get basic knowledge in the field.. The individual lessons were executed in form of video recording. Lessons were recorded as presentations with offscreen commentary or as so called screencasts, that is movies presenting work with use of computer applications. The example of application of this method were lessons concerning work with photo edition software and software for creation of internet sites. All recordings they were prepared with the support of educational software created by TechSmith company. Camtasia Studio 6.0 application turned out to be especially useful, permitting quick and trouble free preparation of individual lessons. The software allows recording of the images presented on monitor, recording lector's voice, importing additional materials in the form of audio files, video files and pictures. The Camtasia allows a very comfortable and unusually simple editing of movie clips. Additionally it features a tool for exporting finished films in popular internet formats such as Flash, mp4, and also high resolution films. Prepared materials were placed on internet platform for distance learning based on free software Moodle. Individual lesson units featured additional materials such as bibliography, photographies, graphic arts, example files, additional software, tests and exercises. The course of self-presentation consists of the following elements:

### 1. The rudiments of graphic design and composition.

The aim of the subject is to present basic knowledge in the field of graphic design. The material concerns rudiments of project creating - that is the elements designer can use: information about typefaces, colours, composition, photo materials or drawings. The basis of this knowledge is skilful decisionmaking, conscious use of artistic means as well as the technical and digital skills. The course in the rudiments of design and composition relates to such fields as logo, poster, newspaper, brochure, advertisement or internet site with regard to particularity of each of them.

**2. The rudiments of typography**

The aim of lessons in the rudiments of typography is to achieve conscious use of esthetical and functional means, which permits graphic formation of texts by means of available typographical methods. The topics assume a comprehensive approach to design. The following topics are discussed: principles of choice of paper, colour of background, colour of letter, format, distribution of text on page, selection of suitable kind of typeface, its size, selection of suitable composition. The discussed topics also include details concerning edition of the page all relations between letters, words and verses.

**3. The rudiments of computer animation and the multimedia.**

It is a block of lessons concerning the principles of creating multimedia materials for presentations and internet sites. The software used for the task is Adobe Flash. The lessons contain information allowing creation of simple animations, principles of employing movement, time, as well as additional artistic means. The acquired knowledge allows to create elements of presentation or animation with the use of simple graphic and letter forms. The scanned materials and photographies that are used in the lessons add variety to designs. This allows to create shapes even for those unskilled in drawing. The basic tools and Flash environment are discussed along with individual tasks. Successive lessons contain information related to different types of animation and symbols. The lessons discuss techniques of importing and embedding different kinds of files such as graphic art, sound and video.

**4. The rudiments of raster graphic in designing.**

The aim of the lessons is to present the rudiments of creating raster graphics for use in designing of internet applications and multimedia presentations. The basis for creation of graphic materials are video films, individual video frames, or scanned materials. The acquired knowledge will permit processing and creating of pictures with use of various tools for painting, drawing and a range of special effects. The rudiments of Photoshop will allow creating elements of 2D graphics, electronic collage and recovering damaged materials by means of retouching of pictures.

**5. The rudiments of vector graphics in design.**

The knowledge in this field concerns the basic skills related to use of vector graphics software.. The exercises in Adobe Illustrator and Corel Draw allow to familiarise with capabilities of the programs, the full set of tools enabling creation of any drawings, multipage documents, logotypes, pamphlets, posters, and also internet sites. The chief aim of the subject is to achieve

ability to use vector graphics programs as well as full utilization of previously acquired knowledge.

**6. Short course of photography and photo self-presentation**

Discussed are basic information in the field of composition, framing, technical knowledge related to photo cameras as well as lighting, depth of field, ways of utilization of daylight, artificial lighting and flash. Students focus mainly on principles of photographing man.

**7. The rudiments of work with sound - the audio processing in Audacity software**

The block of lessons relating to processing of sound aims to preparation of sound materials. Discussed are the basic physical problems of sound, ways of recording and edition of sound material, and also the principles of postproduction. All practical exercises are done with support of Audacity free application.

**8. Designing of internet sites**

The very wide issue of the principles of design and edition of internet sites was presented with use of simple and practical examples. Generally available applications and websites were used. The first part describes the principles of creating personal website basing on Google Sites. The techniques of creating website artwork and also the edition of content are presented. The following part of the course deals with the methods of creating of personal websites with more advanced Wordpress application. The installation of software, the methods of creating personal graphic motif, and also the technique of creating and the management of the content are discussed. The emphasis is put on information relating the safety of data storage.

## CONCLUSION

The course is an attempt to present the basic knowledge of plastic arts to the wide audience with use of simple and practical examples. The aim of the course is not to prepare theoretical materials but to discuss the issue in an accessible form allowing scholars and students to create more interesting presentation of their achievements. Presentation of knowledge in an aesthetical and interesting form contributes to more effective assimilation of information

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# CONDITIONS FOR E-LEARNING AT SECONDARY SCHOOLS IN THE CZECH REPUBLIC

**Erika Mechlova, Libuse Svecova, Libor Konicek, Martin Malcik**
University of Ostrava, Methodology and evaluation center, p.s.c
30. dubna 22, 701 03 Ostrava, Czech Republic
erika.mechlova @osu.cz, libuse.svecova@osu.cz, libor.konicek@osu.cz,
martin.malcik@osu.cz

**Abstract:** *Contribution describes results of research on condition for e-learning at secondary school as cancers the science teachers and pupils. Teachers filled up questionnaires on ICT for solving concrete aims of teaching/learning process*.

***Keywords:*** *ICT, science, teachers of science, questionnaire, skills in science.*

## INTRODUCTION

Conditions for e-learning were investigated at secondary schools in the Czech Republic on the sample of science teachers in the Moravian-Silesian region. Research was carried out in frame of project "Further education of science teachers". This project is focused on training science teachers from the point view the Czech curriculum reform in the field of ICT. Especially research was focused on using ICT in education of science and environmental education with connection of active method and forms of education. Project would bring improvement competences of secondary schools teachers in using ICT in science education. The multimedia digital library educational objects will be created in frame of project that will contain educational objects, like e.g. scenarios of lessons, photographs of experiments, multimedia clips, computer supported experiments, tests etc. All these multimedia objects are basic conditions for e-learning at secondary school.

Project is focused on the educational area of the Czech Curriculum „Man and Nature" which is divided into the fields of Physics, Chemistry, Biology, Geography and Geology according to Framework Education Programme (FEP) [1].

The needs of teachers were searched on the beginning of project so that training of teachers will take into account these demands. Questionnaire was relatively extensive and was composed in three parts. Data will serve as information sources for the others projects but are very interesting from the point of distance learning. These data give real conditions for distance learning of in-service science teachers.

## 1. ITEMS OF QUESTIONNAIRE

The questionnaire was constructed on new Czech curriculum – the Framework Education Programme [1]. Teachers take out affirmation at every item that was to be nearest their opinion. The questionnaire was filled up by 52 teachers of science subjects from secondary schools, 19 teachers of Physics, 13 teachers of Biology, 11 teachers of Chemistry and 9 teachers of Geography. Indicative allocation informants according to gender: 32 women and 20 men. Tables mentioned relative percent occurrence answer informants in per cent. Tabular are not mentioned number of respondents that the given to sum didn't fill up.

Questionnaire had three parts – A, B, C.

### 1.1 Didactical means in the field of IT

Part A was focused on support of key pupils' competencies by didactical means in the field of information technology.

Skills of pupils are developed in the educational area „Man and nature" in FEP [1]. These pupils' skills are as follows:

1. Education leads along pupil to formulate a natural-science problem, seeking an answer on it and to possibility to specify or correct the solution of this problem.
2. Education faces pupil to carrying out systematic and objective observations, measurements and experiments (mainly of a laboratory type) according to individual or team plans or projects.
3. Education faces pupil to towards processing and interpreting the data obtained and seeking connections between them.
4. Education faces pupil to creating a model of natural objects or processes which would make it possible to represent properly their fundamental features and principles.

5. Education faces pupil to using adequate mathematical and graphical means of representing natural-science relationships and laws.
6. Education faces pupil to making use of the means of modern technology during activities providing knowledge of natural science.
7. Education faces pupil to cooperating on plans or projects which yield knowledge of natural sciences and sharing data or hypotheses acquired during the research of natural facts with others.
8. Education faces pupil to predicting the course of the natural processes studied based on the knowledge of general natural science laws and specific conditions;
9. Education faces pupil to predicting possible impact of practical human activities on the natural environment.
10. Education faces pupil to protecting the environment, his/her health as well as the health of others;
11. Education faces pupil to employing various natural objects and processes for self-fulfilment while taking their conservation into consideration.

Teachers answered the following questions:

- Have you IT means for supporting of skills mentioned in FEP?
- Have you got experience in using of IT means for supporting of skills mentioned in FEP?
- Will you welcome the creation of IT means for supporting of skills mentioned in FEP?

Following tables include 11 skills of pupils in science (above mentioned) and teachers' answers on these questions: The term "IT means" involves in this questionnaire all these objects: static objects (pictures, schemes, and graphs), dynamic objects (videos, animations), interactive objects (flash animations, simulations), educational programmes, programs for interactive tables, computer aided experiments.

Teacher use some IT means and have some experience for support developing of pupils' skills but welcome creation IT means for support above mentioned requirement.

The results of following 10 items on skills were very similar to first one. The majority of teachers welcome creation IT means for support above mentioned pupils' skills.

**Table 1: Answers of science' teacher on pupils' skill one in FEP**

| 1. Education leads along pupil to formulate a natural-science problem, seeking an answer on it and to possibility to specify or correct the solution of this problem. | | | | |
|---|---|---|---|---|
| | I agree fully | I agree | I don't agree | I beg to differ |
| I have IT means for support above mentioned skill | 8 | 67 | 19 | 6 |
| I am experienced in using IT means for support above mentioned skill | 8 | 62 | 17 | 12 |
| I welcome the creation of IT means for support above mentioned skill | 69 | 29 | 0 | 0 |

### 1.2 Digital multimedia educational objects

Part B was focused on using of digital multimedia educational objects in education of science. Results are in table 2.

**Table 2: Using of multimedia educational objects**

| **1. Express on scale, how you use different multimedia educational objects.** | | | | | |
|---|---|---|---|---|---|
| | I shan't at the disposal capable object plus I don't want it use. | I shan't at the disposal capable object but I want it use. | I keep at one's disposal capable object but I don't want it use. | I keep at one's disposal capable object but use it sometimes. | I keep at one's disposal capable f object plus use it often. |
| Static objects | 0 | 15 | 2 | 56 | 27 |

| | | | | | |
|---|---|---|---|---|---|
| (pictures, schemes, graphs) | | | | | |
| Dynamic objects (videos, animations) | 0 | 25 | 2 | 50 | 23 |
| Interactive objects (Flash animations, simulations) | 0 | 52 | 2 | 29 | 17 |
| Scenarios of lessons, educational programmes, programs for interactive tables, computer aided experiments. | 4 | 65 | 4 | 21 | 6 |

**Table 3: Creation of multimedia educational objects**

| **2. Express on scale interest in acquaint oneself with production particular multimedia educational objects** | | | | | |
|---|---|---|---|---|---|
| | I can't design these objects and I shan't interest in theirs creation | I can't design these objects but I'm interested in theirs creation | I can design these objects but I don't create these | I can design these objects and occasionally I create these | I can design these objects and I create these often |
| Static objects (pictures, schemes, | 8 | 23 | 8 | 46 | 15 |

| | | | | | |
|---|---|---|---|---|---|
| graphs) | | | | | |
| Dynamic objects (videos, animations) | 4 | 77 | 6 | 13 | 0 |
| Interactive objects (Flash animations, simulations) | 4 | 79 | 2 | 12 | 4 |
| Scenarios of lessons, educational programmes, programs for interactive tables, computer aided experiments. | 8 | 70 | 10 | 10 | 2 |

The table two includes data that provide us with information about equipment of teachers with multimedia educational objects. It follows from the results of a questionnaire survey that at the most, teachers dispose of strategic objects, by 85 %. At the least, they have lessons scenarios, teaching programs and programs for interactive board, by 31%.

Another problem we dealt with was how frequently the teachers use these objects. Only 2 % of the questioned ones do have suitable interactive objects available (for example flash animations, simulations) but are not willing to use them; 29 % of the respondents do have suitable interactive objects available but use them only sometimes; and 17 % of the respondents do have suitable interactive objects available and use them frequently. In addition, it follows from the table that teachers most frequently use static objects (pictures, diagrams, charts), by 83 %, then dynamic objects (videos, animations), by 73 %, subsequently interactive objects (flash animations, simulations), by 46 %, and lessons scenarios, teaching programs and programs for interactive board, by 27 %.

One of the most important findings is the fact that 65 % of the respondents do not have available suitable lessons scenarios, teaching programs and programs for interactive board but they want to use them. It was surprising that 4 % of the questioned ones do not have available suitable lessons scenarios, teaching programs and programs for interactive board and **are not willing to use them**. We have to take into consideration that the respondents were those who had shown interest in the courses.

In the table three, we measured interest of the respondents in learning how to create objects. At first, the respondents were classified by whether the teachers can or cannot create suitable objects. As many as 78 % of the respondents cannot create lessons scenarios, teaching programs and programs for interactive board, as many as 83 % of the cannot create interactive objects, 81 % cannot create dynamic objects and 31 % cannot create static objects.

From the table, we can also learn that 70 % of the questioned person's cannon create lessons scenarios, teaching programs and programs for interactive boards but are interested in their creation; 79 % of the respondents cannot create interactive objects but are interested in their creation; 77 % of the teachers cannot create dynamic objects but are interested in their creation.

We further wanted to know whether a teacher who can create these objects actually creates them. The results confirmed once again that if the teacher can create these objects, he/she usually creates them himself/herself.

### 1.3. Computer aided experiments

Part C was focused on computer aided experiments. Item of questionnaire was:

1. Express on scale, if is on your school available hardware (PC and measurement system and sensors) and software for computer aided experiments.

Answers of science' teachers were: there's not disposable HW and SW - 79 % of teachers, there are only for teacher' demonstrations - 13 % of teachers, there are for pupils' frontal experiments - 2 % of teachers. The equipments for computer aided experiments are rare in the Czech schools.

2. Express on scale if do you have experience with computer aided experiments:

Answers of science' teachers were: I shan't experience - 67 %, I've got experience with demonstrations - 21 %, I've got experience with pupil's experiments - 6 %.

3. Express on scale if you want to get equipment (PC and measurement system and sensors) for computer aided experiments.

Answers of science' teachers were: I don't want - 2 %, I want get equipment only for teacher demonstrations - 15 %, I want get equipment for pupil's frontal experiments - 77 %.

4. Express on scale if you want to improve your using of computer aided experiments.

Answers of science' teachers were: I don't want - 2 %, I want improve, but only for teacher demonstrations - 10 %, I want improve in the field of pupil's frontal experiments, too - 83 %.

## CONCLUSIONS

Questionnaire was filled by 52 teachers from secondary schools from the Moravian-Silesian Region. All teachers are fully qualified in science subjects e.g. Biology, Chemistry, Geography, Physics.

The questionnaire survey addressed three areas. Part A was focused on supporting the key pupil skills by materially-didactic means from the field of information technologies. Part B was focused on digital multimedia educational objects. Part C concentrated on computer-supported experiments.

Within the educational area "Man and Nature" [1], there are 11 skills defined that are to be developed with the pupils. In part A, three questions were asked in relation to each of the skills:

- Do you have IT materials available to support the said skill?
- Do you have any experiences in use of IT materials intended to support the said skill?
- Would you welcome creation of an IT intended to support the said skill?

It follows from the part A results of the questionnaire survey that most teachers do not have available any IT materials for support of the said skills. These are specifically the following skills: skill No. 2 (71% of respondents); skill No. 4 (82% of respondents); skill No. 7 (71% of respondents); skill No. 8 (80 % of respondents); skill No. 9 (59 % of respondents); skill No.10 (57 % of respondents); skill No. 11 (73 % of respondents).

The item two intended to ascertain whether teachers have any experiences in use of IT materials for support of the specified skill. Results of the survey

show that in a large extent, teachers have no experiences in use of IT material for support of the specified skill. Only 31 % of the respondents have experiences in use of IT materials for support of the skill two. Only 21 % of the respondents have experiences in use of IT materials for support of the skill four; 46 % of the respondents with the skill six; 23 % of the respondents with the skill seven; 31 % of the respondents with the skill eight; 40 % of the respondents with the skill nine; 44 % of the respondents with the skill ten; and only 21 % of the respondents with the skill eleven. Teachers would also welcome creation of IT materials for support of all skills.

It follows from the part B questionnaire survey that teachers feel the lack of multimedia educational objects. Lessons scenarios, teaching programs and programs for interactive board are not available to 69 % of the respondents and interactive objects (flash animations, simulations) are not available to 52 % of them. In addition, it follows from the result that a large portion of the respondents can not create multimedia educational objects but is interested in their creation.

At the most, teachers can not create static objects (for example pictures, diagrams, charts) (69 % of respondents) and at the least, teachers can create interactive objects (18% of respondents).

Part C of the questionnaire survey was focused on the computer-supported experiments. In this part, we asked questions about equipment of the respondents for computer-supported experiments, teachers' experiences in computer-supported experiments, teachers' interest in getting a set (hardware and software) for computer-supported experiments and teachers' interest in further education in the area of using the computer-supported experiments.

The questionnaire survey proved very clearly that 79 % of the respondents do not have available any suitable hardware and software for computer-supported experiments. It follows from the results that 67 % of the questioned persons do not have experiences in computer-supported experiments. What we consider a positive result is the fact that 77 % of the respondents want to get a set for pupil frontal experiments. A great deal of the questioned persons is aware of the importance of pupil frontal experiments and wants to undergo further education in this area (83 %).

It follows from the questionnaire survey as a whole that more than a half of the respondents do not have available any IT materials for support of 7 out of 11 skills that are defined in the educational area “Man and Nature” [1]. In addition, teachers feel the lack of equipment for use of computer-supported experiments in lessons of natural sciences. The teachers have not equipment

for pupil's frontal experiments. Further result from questionnaire is that 93 % of teachers want to improve their skills.

Results were used in project named “Further education of Science teachers” for development of two courses for teachers: Usage multimedia educational objects in science education, Computer aided education in science. Courses were accredited in Ministry of Education. Graduation course by teachers contribute to increasing skills in science education with usage ICT. Workshops for sharing experiences will be included to program of courses. This will be big step to provide good conditions for e-learning of the science teachers.

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# THE IMPLEMENTATION OF PROFESSIONAL SUBJECTS TEACHING SUPPORTING COURSES AT THE HIGHER SCHOOL OF INFORMATION TECHNOLOGY (HSIT) IN KATOWICE.

**Jacek Grudzień**
Higher School of Information Technology
Mickiewicza 29, 40-085 Katowice, Poland
jacek_grudzien@interia.pl

***Abstract:*** *This paper presents the successful implementation of courses for the "Theoretical foundations of Computer Science" and "Software Engineering " subjects, conducted by the author at the Higher School of Information Technology in Katowice. The author discusses the process of developing courses, selecting the teaching platform as well as the result achieved.*

***Keywords:*** *e-learning, successful example*

## INTRODUCTION

Teaching classes for part-time students creates random challenges for lecturers. One such challenge is to maintain teaching standards concurrent to the level of full-time students. It is not an easy task, given the significant difference between the number of lecture hours of full-time and part-time mode of teaching. Other obstacles to overcome include: the lack of independent learning skills especially among the younger generation of students and large number of absences caused by the recklessness or professional reasons. The situation gets even worse when we look into the lack of access to the, mostly modern, literature – the university libraries are not equipped with a sufficient number of scripts and textbooks, which results in the lack of *flexibility* in the *learning* environment of part-time students .

These problems result in the standard approach of lecturers - the explanation of topics during classes and giving additional homework, which is not efficient to ensure an adequate level of knowledge. It is necessary to

introduce other methods of teaching which could meet the growing educational needs.

## 1. THE DISCERNMENT OF NEEDS

### 1.1 The needs reported by students

During the student's classes very often it appeared that more than 70% of participants are not prepared to talk over the issues presented in the lectures and discuss on the proposed solutions. Lack of preparation for the course was explained by students in three ways:

1) the lack of availability of literature recommended by the lecturer;

2) incomprehension of issue;

3) lack of detailed and complete discussion over the topic during classes.

The 1st and 2nd explanation occurred more frequently when discussing issues of "Theoretical Foundations of Computer Science" (hereinafter also referred to as FCOS), The 2nd and 3rd explanation occurred especially at the “Software Engineering” (referred as SE) laboratory classes. The problems layered from semester to semester and grew together with the arrival of the less and less prepared to the independent work students.

### 1.2 The needs identified by the lecturer

From the lecturer's point of view, the most important task is to maintain stable, high standard of both subjects teaching and preparing students to pass the final credits without any problems.

To achieve such goals, many obstacles had to be overcome. First, HSIT is a private university where the tasks of education comply with a profit attitude. Since there was no (for market reasons) opportunity to raise tuition fees, the university implemented cost-saving measures such as altering the curriculum, and reducing the number of hours spent on a particular subject. The reduction of hours generated another problem – the lack of understanding of the lectured issues by the students, especially groups containing weaker students, as they have been informing. A general lack of understanding of the subject was translated into the results of examinations, students resignations and further deterioration of the institution's financial position. A vicious circle was created in which problems with students self-learning abilities, caused by the lowering standard of teaching in secondary schools and the lack independent work skills were added to.

It was necessary to take immediate actions which could neutralize the negative results and return to the path of the actual conduct of the course. First, to provide high quality of teaching, the following lecturer's needs were identified as:

1) increasing the number of students' self-study hours;

2) preparing educational material in electronic format for students;

3) providing a communication platform to generate feedback from students;

4) introducing the automatic mechanisms controlling the work of students.

The next step was to track ways of completion the laboratory exercises and classes and to identify the final credits' positive results for both subjects. The final action was to propose a solution to the remaining problem - the implementation of the relevant e-learning courses.

## 2. THE STATE OF STUDENTS COMPETENCE BEFORE THE IMPLEMENTATION OF E-LEARNING SUPPORT

For the *Theoretical foundations of computer science* subject, which appears in the learning schedule in the first semester, the completion of the course usually occurred in the third *Colloquium* session (second make-up credit session).

This state that led to the need of preparation of large quantities of test functions, prolonging the *Semester Examination Session* and delays in the work of deanery. Taking into account the extreme cases of students who found themselves at the faculty of science by accident (avoiding military service, lack of assessment of their capabilities, etc.), the situation was absolutely unacceptable. But for the subject *Fundamentals of Software Engineering and System Design* (later renamed to *Software Engineering*) that appears in the schedule on the fourth semester, completion was usually done within the first two sessions, and only few students completed it over the third session. It looked better (because of the higher semester students have learned to work regularly and be able to adapt to the rhythm of classes), however, the completion structure was not satisfactory despite the efforts made by lecturers. It was necessary to change the whole system of teaching in order to allow students completing the course in the first examination session.

## 3. IMPLEMENTATION OF THE REMOTE LEARNING SYSTEM AND THE STUDENTS' RESPONSES

### 3.1 The first attempt - ad hoc

The search of efficient solutions began with the preparation of supplementary materials in the form of MS Word files and PowerPoint presentations. Work on the preparation of these materials lasted approximately 5 months, which helped to create the documents providing a sensible holistic coverage of the program's curriculum. All files were placed on the university website, and during the classes, the lecturer's e-mail address was given to students, for the purpose of sending queries regarding processed material, concerns, etc.

The effect of such solution for groups of first semester (at FCOS subject) was the loss of one of the excuses made by students before (lack of materials), an avalanche of e-mails at the end of the semester regarding requests for an explanation of issues covered a few months earlier, and some minor didactic effects.

Within the fourth semester groups (SE subject) almost all the previous demands of students disappeared, the only disadvantage (for the lecturer) were e-mails from various people concerning the same subject. The quality of received reports has improved, but still the time of its submission has remained constant – the end of semester.

### 3.2 The second attempt – the simplified methodology of software engineering

#### 3.2.1. Strategic Phase

It has become necessary to apply a complex solution – on the one hand, the function of the discussion forum and file server which are implementing the presentation of the teaching material, on the other hand, providing the possibility to control the students work. The aim of choosing the software was also to meet the needs of all students and a lecturer as referred to earlier. Such a task fits the e-learning platforms perfectly.

A simplified study of the purpose was carried out:

1) on the basis of the program curriculum and the needs of students and a lecturer the size of the project implementation was re-estimated,

2) the availability of resources was specified: the financial budget and staff – which caused minor difficulties, because the work was being done by the project's author over the assignment with the university,

3) a time frame for the project was set - the complete execution time of 6

months,

4) the requirements of the hardware and network parameters were specified – in this respect, the university was the source of assistance, with their WWW environment and a high-speed bandwidth.

For financial reasons the application of the commercial platform has been declined, instead the free open-source solution was introduced.

The solutions considered during the selection of the following e-learning environments: Moodle [2], Claroline [1], Dokeos [3]. LRN [4], Ilias [5], Fle3 [6] and the Manhattan Virtual Classroom [7]. For technical reasons (difficulties with an installation on servers) the Fourth (LRN) and the last platform (MVC) were immediately rejected. Dokeos, Ilias and Fle3 did not provide enough support for the Polish localization. In the final the Moodle and Claroline environments were the only considered, but the platform Claroline was chosen because of the ease of use and speed.

### 3.2.2 Implementation Phase

After the Claroline 1.6 platform was installed, the Polish language module of the platform was improved (existing translation was incomplete) and the existing documents were started being moved. The most amount of work in this phase, however, caused the preparation of new exercises, accounting, problematic and testing tasks for students, which covered all sections of the program for the both subjects. The particular attention has been paid to FOCS as, on the one hand, this subject included a comprehensive knowledge (on Bool's algebra, digital machine arithmetics, Turing machine, reverse Polish notation (RPN) and grammars), and, on the other hand, the first semester students had a lot of trouble with. The aim was clear – forcing students to work regularly throughout the semester, not only towards the end.

At this stage the mechanism of learning path with restricted access to materials from the next chapter until the student has not carried out the exercises from the current one, was put into use. Using the courses statistics (the percentage of the learning paths implementation progress) even before the classes began, the lecturer knew who should be motivated to work more solid. The savings in class time has appeared – the time previously lost on the verification and identification of the students who were prepared and these who were not. Saved time was used later on the presentations of the uncommon tasks and the practical use of knowledge. The permission for the colloquium's credit session was depended on completing path of learning .

Some students of FOCS subject tried to circumvent the system – first trying to block the operation of the platform, then solving individual tasks with

fellow students. The blockade attempts were eliminated by the administrators, and with the collective work on individual task problems, the lecturer advised maximizing the number of test questions to pass, and introducing the principle that each student works on a different task. Tasks and questions were not particularly difficult, but the large number of them enforces the individual work (there was no time to work on the colleague's tasks).

During the SE, no one tried to use the prohibited practices (or at least the lecturer was not aware of it) – everyone was creating their mini-project in consultation from time to time with colleagues or a lecturer.

Compared to the previously conducted classes, the scope has been widened with additional phases of the life cycle of the software, which previously was impossible to discuss due to the lack of time. Such an addition was very well received by students.

The discussion forums where students could submit their comments on the operation of the platform, asking their lecturer questions regarding unclear issues, exercises, etc., were provided to students on both subjects.

After launching of both forums and imposing order: reading the statuses, viewing forum topics, querying on the forum and ultimately writing e-mails, the number of e-mails sent by the SE students addressed to the lecturer drastically decreased, and the duplicate questions and requests for clarification had completely disappeared.

Based on the most common students queries the descriptions of the courses were verified and have been updated – it became clear that many of the essential information for students is randomly placed in various university files and it was difficult to find them. The accurate explanation of the procedures of completing the subjects provided by the lecturer was important to students.

In parallel with the timetable of classes the time schedule of the course was introduced, primarily to streamline the work.

Since all materials (including exercises and tasks) appeared on the path of learning, the lecturer had abolished mandatory participation in the SE classes. This met with a great feedback from the fourth semester students, especially those working as implementator specialists or technical support, who often could not consistently participate in classes due to the professional reasons (tours, delegations, or sudden events).

### 3.2.3 Maintenance Phase

The technical problems associated with platform bugs detection emerge

occasionally, and they are being removed on a regular basis. The schedule is updated and teaching materials together with the developing technologies are being modified.

## 4. ACHIEVED RESULTS

### 4.1 Calculation Methods

For purposes of the comparison, the calculations were made in the proportion of students completing the subject within the permitted time limits and the students who failed. For each method of teaching, the number of all students who made an attempt to pass was generated and divided by the total number of students in the group. The results are given in a chart.

### 4.2 Presentation of results

The structure of completion of the FOCS, and the SE subjects present Figures 1 and 2. A clear increase in the number of students passing the subject in the first attempt was noticed. In the course of the experiment, the university changed the subject completion rules – students may aim to pass the subject in the 3rd attempt only with the special permission from the rector, which slightly altered the chart picture for both subjects (marked on the chart as *After the change of mode*).

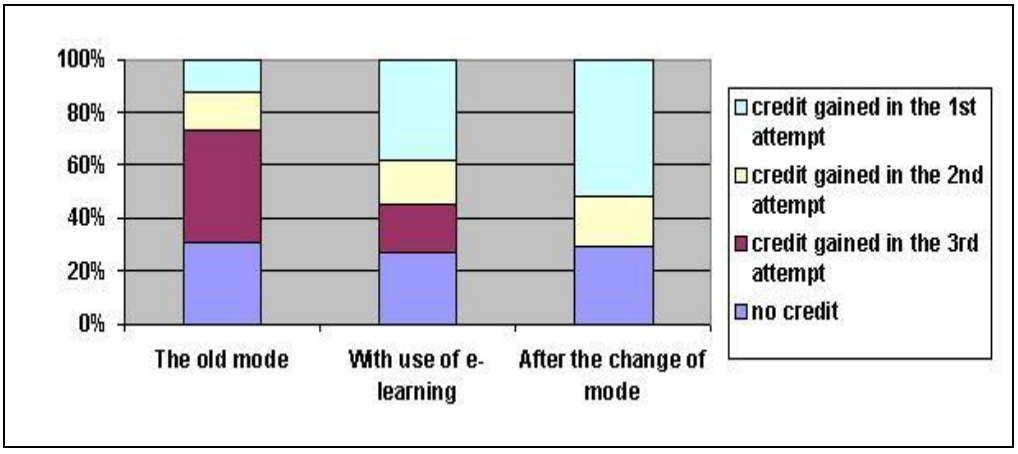


**Figure 1. Student credits of the FOCS subject conducted by the author**

For the FOCS subjects the percentage of students without a pass has not changed a lot in practice – they were the ones who signed up to study for the non-educational reasons and they had no predispositions to become software engineers. Such students usually appeared at the beginning of semester, and

later on they did not participate in the classes.

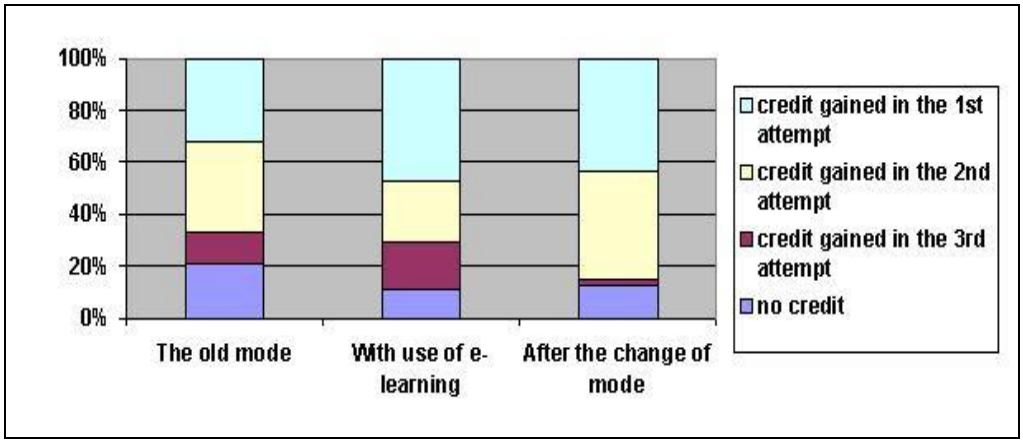


**Figure 2. Student credits of the SE subject conducted by the author**

After implementation of the platform with courses the number of students receiving a pass in the 3rd attempt has significantly decreased. There is an expectation of the further increase in the percentage of students passing at the first attempt after the motivating tools for learning emerged, but this requires further research, to draw the proper conclusions and a good selection of the resources.

The much larger number of the SE subject students entering the platform comparing with the FOSC students was recorded, and the SE students have been spending on the materials far more time. The SE students' success was the decrease of the number of students without a credit. The improvement in the completion structure was significant – more students pass the subject in the first attempt.

The improvement of the effectiveness of teaching is unforeseen – the second attempt approach is caused by the enormous work required to be done (the reports from the laboratory are very time-consuming, a large number of students are working professionals).

Unfortunately, before the introduction of complementary remote learning information about the students' examination results was not collected – who have passed, and the result, and it is a shame, because it is not possible to compare previous results with the present ones. It can only be assumed that the results have improved significantly.

## CONCLUSIONS

The implementation of distance learning in professional subjects education with a use of the platform Claroline ended with a full success. The students gained a tool through which they can learn faster and easier, without undue burden. The main benefits for students include:

1) to gain the access to all materials, exercises, tests and tasks without the need for a personal appearance in class;

2) the ability of self-exercising the issues presented during the classes;

3) to obtain better results on the completion of the course;

For the lecturer the most important benefits include:

1) introduction of the monitoring of student learning process;

2) better time use at the stationary classes;

3) the improvement and use of feedback from students in order to improve the conducted courses;

It is noteworthy that the introduction of the remote course is efficient especially for the students of the higher semesters. The students of the lower semesters (first semester in particular) require more care, if you want to achieve satisfactory results. Overall, the focus should stay on the motivation for learning factors, because most of the students have bad habits of learning or have no habits at all. Appropriately chosen motivating factors give good results with the proviso that they should be modified according to the skills of the group.

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# INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE PROCESS OF DEVELOPING MATHEMATICAL COMPETENCES AMONG HIGH SCHOOL STUDENTS

**Agnieszka Heba**
Higher School of Occupational Safety of Katowice
Bankowa 8, 40-007 Katowice, Poland
agnieszka_heba@o2.pl, aheba@wszop.edu.pl

***Abstract***: *This article discusses recommendations of European Union connected with key competences, Danish framework of mathematical competences, and overall results of PISA research in 2003 in Poland and the Czech Republic. E-learning has been defined, main results of surveys aimed at teachers and students of high schools in Silesian District have been quoted. They were connected with the knowledge of using new information and communication technologies in e-learning and education. Proposal of research shows how to use computers in the process of mathematical competences formation of high schools students in Poland. They were implemented as a part of PhD thesis being conducted at the pedagogical faculty of Ostrava University.*

***Key words:*** *key competences, mathematical competences, e-learning, information and communication technologies in education.*

## INTRODUCTION

To define the range of mathematical competences, we should think, what and whom teaching-learning process is typically connected with. According to W. Kopaliński, *"competence is features, range of powers(...); range one's knowledge, skills, responsibility(...)".*[1] But personal competence means,

[1] Kopaliński W., *Słownik wyrazów obcych i zwrotów obcojęzycznych*, Państwowe Wydawnictwo „Wiedza Powszechna", Warszawa 1967, s.201

*"owning rights, power of attorney to act, to decide, having proper qualification to judge and evaluate(...)".*[2]

At the turn of 20th and 21st century there were profound economical and social changes. They were caused by globalisation encompassing all areas of life. As a result of big scientific and technological development, we have become an information society. Students preparation for life in the world of information, the full using the benefits, coping with the challenges-these are main tasks of educational systems in many countries. The reviews of contents and teaching methods have been done and it has been concluded that proper preparation of young people should give them basic competences to create possibilities of occupation and creative involvement in social, political and cultural life. These basic competences are "key competences". They are general competences, not connected with any industry or occupation but essential in professional life.

## 1. EUROPEAN UNION KEY COMPETENCES RECOMMENDATIONS

Key competences were defined, developed and accepted in document "Recommendation of Council and Parliament of European Union 18th December 2006 – key competences issues in the process of long life learning". The document says *"Competences are defined as a mixture of knowledge, skills and attitudes appropriate to the situation. Key competences are those, which people need for personal development, social integration, activity and employment".*

*"Recommendations…"* state 8 key competences:

- native language communication;
- foreign languages communication;
- mathematical competences and basic scientific competences;
- information competences;
- learning skills;
- social and civil competences;
- activity and entrepreneurship;

[2] *Mały słownik języka polskiego*, (red). Skorupka S., Auderska H., Łempicka Z., Państwowe Wydawnictwo Naukowe, Warszawa 1969, s.291

- awareness and cultural expression.

## 2. DANISH MATHEMATICAL COMPETENCES FRAMEWORK

They were defined by Mogens Niss as the *"ability of understanding, assessing, executing and using of mathematical operations in mathematical and non mathematical context(...). There are two types of skills except knowledge connected with mathematical competences. First is ability of questioning and answering about, in terms of and using of mathematical tools. Second is based on understanding and using mathematical language and tools".*[3] He mentions 8 elements of mathematical competences:

- mathematical thinking;
- facing and solving mathematical problems;
- mathematical modelling;
- mathematical reasoning;
- mathematical being representation;
- using of mathematical symbol and formalisms;
- communication with mathematics, about mathematics and using mathematics;
- using supporting means and tools including Information Technology;

## 3. POLISH AND CZECH STUDENT IN PISA RESEARCH 2003

One of the most popular competences students research is PISA *(Programme for International Student Assessment)* conducted under the auspices of OECD. Results of PISA research allow to compare achievements of students from different countries. The aim of the programme is to research knowledge and skills of 15-year-old students. Knowledge and skills are examined in terms of:

- reading with understanding;
- mathematical thinking(mathematics);

[3] Article *"Quantitative Literacy and Mathematical Competences"* http://www.maa.org/Q1/pgs215_220.pdf. Article excerpt was translated by Maria Legutko and Stefan Turnau - website visited on 31.07.2009.

- scientific thinking(reasoning in science) .

The programme provides three year cycles of international assessment of students skills. In each cycle, the research always provides 3 spheres of competences, but various editions focus on one of them, what allows comparability of results in time. In 2003 they focused on the study of mathematics.

There were 41 countries all around the world taking part, 30 of them are OECD members. There were 276165 students taking part in the research. 260 schools and 9919 students were examined in the Czech Republic and 175 schools and 5401 students in Poland.

**Table1. Scale of mathematical achievements have been divided into six levels. This is a description typical for each level**

| Level | Skills of given level |
|---|---|
| **Level 6** | A student is able to analyse and generalize information based on self-built model research of complex problem situation. A student is able to combine various sources of information and move freely among them. A student is able to perform advanced reasoning and draw mathematical conclusions. One is able to combine reasoning with the pace of symbolic and formal operations in creative work on a new context. A student is able to make communication precisely about reasoning, justifying the action taken. |
| **Level 5** | A student is able to model the complex situations, identify constrains and clarify reservations. One is able to compare, assess and choose proper strategies to solve problems connected with model being built. A student is able to use well developed mathematical skills with the use of proper formal and symbolic representations. One is able to assess own action and communicate own interpretation and way of reasoning. |
| **Level 4** | A student is able to work effectively with given models of real situations, identifying restrictions and making the necessary assumptions. One is able to choose and integrate various sources of information, combine them with real context. One is able to use well adapted |

| | |
|---|---|
| | methods in this context. A student is able to communicate, describing own interpretations, arguments and actions. |
| **Level 3** | A student is able to execute the algorithm described also with the need of sequential decision making. One can choose and use simple problems solving strategies. A student is able to interpret and draw direct conclusions from various data sources. A student is able to present results of uncomplicated interpretations and problems. |
| **Level 2** | A student is able to interpret situation demanding only simple reasoning. One is able to obtain essential information from single source and use one form of data representation. A student is able to use a simple way of acting, draw direct conclusions and literally interpret results. |
| **Level 1** | A student is able to solve typical tasks, which is simple with direct given data. A student is able to perform routine activities following simple rules. A student performs obvious actions coming straight from the task. |
| **Under level 1** | |

***Source:*** PISA research in 2003 in Poland and Czech Republic

**Table 2. Percentage distribution of Polish and Czech students between different levels of mathematical skills**

| **Level** | **Poland** | | **Czech Republic** | |
|---|---|---|---|---|
| | **Number of students** | **Rate** | **Number of students** | **Rate** |
| **Level** 6 | 108 | 2% | 496 | 5% |
| **Level** 5 | 432 | 8% | 1289 | 13% |
| **Level** 4 | 972 | 18% | 2083 | 21% |
| **Level** 3 | 1350 | 25% | 2381 | 24% |

| | | | | |
|---|---|---|---|---|
| **Level** 2 | 1350 | 25% | 1984 | 20% |
| **Level** 1 | 810 | 15% | 1190 | 12% |
| **Under level** 1 | 379 | 7% | 496 | 5% |
| **Total** | 5401 | 100% | 9919 | 100% |

**Source:** PISA research in 2003 in Poland and Czech Republic

Analysing the results from the chart, it can be seen that better results were achieved in the Czech Republic. 1785 (18 %) students obtained results from level 5 and 6, in Poland 540 (10%) students. 379(7%) Polish students and 496(5%) Czech students obtained results under level 1 and they are not able to solve simple tasks. Chosen mathematical competences can be found in new Polish and Czech standards of matura examinations requirements.

## 4. USE OF COMPUTER IN THE PROCESS OF DEVELOPING MATHEMATICAL COMPETENCES.

The use of information technology in high schools in Poland is becoming more and more popular. Teachers see huge benefits coming from modern means supporting mathematics education. Using them during classes helps not only in developing skills but gaining more advanced information competences as well and allows better visualization of difficult mathematical and related field tasks. The research conducted by the author of the article shows that most popular computer programmes are: EduROM High School mathematics (Young Digital Poland) and Mathematics (Publisher Nowa Era)[4] or Mathcad, Cabri, Gran.[5]

According to students, the programmes:

- support teaching process;

[4] A.Heba – *„Niektóre rezultaty badań w zakresie wykorzystania edukacyjnych programów w nauczaniu matematyki w szkole ponadgimnazjalnej”* [in:] Współczesne dylematy pedagogiczne, Koło Naukowe Pedagogów Uniwersytet Śląski – Cieszyn 2009

[5] A. Heba – *Mathematical Competences Development Using e-Learning – Research Concept.* [in:] Distance Learning, Simulation And Communication, 2009, Proceedings, Brno, Czech Republic, May 6, 2009

- make learning process more attractive;
- examine level of knowledge and skills;
- develop students interests;
- make mathematics easier and better to understand;
- facilitate the conduct of refresher exercises;
- equalize educational opportunities;
- make learning more intensive during classes.

In modern society, where education plays a very important role, the possibility of quick obtaining of knowledge and skills is becoming essential. More and more important form of education have become e-learning and distance learning allowing to obtain education from prestigious universities students from most distanced parts of the world and develop traditional forms of education with new technologies, making them more effective.

According to M. J. Kubiak: *"Distance Learning is a teaching method, where teachers and students are remote from each other(sometimes far), they are not in the same place and use to provide information, except traditional ways of communication, more temporary and modern telecommunication technologies: transmitting voice, video picture, resources printed from computer. Modern technologies allow direct contact in real time between a teacher and a student with audio and teleconferences no matter, where they are".*[6]

The surveys conducted by the author shows that most students and teachers have had contact with e learning. Those surveyed claim that high schools students are still little interested in this method. Questioned about the form of education they prefer, most of them 97 (70%) students and 90 (75%) teachers accept mixed forms (traditional and with the Internet). Only 13 (10%) students took part in Information Technology e-learning courses conducted in schools by IT teachers and 18 (15%) teachers took part in Past Degree IT and English courses.

[6] Mirosław J. Kubiak: *Wirtualna edukacja*, s. 11. Warszawa 2000. Wydawnictwo "MIKOM".

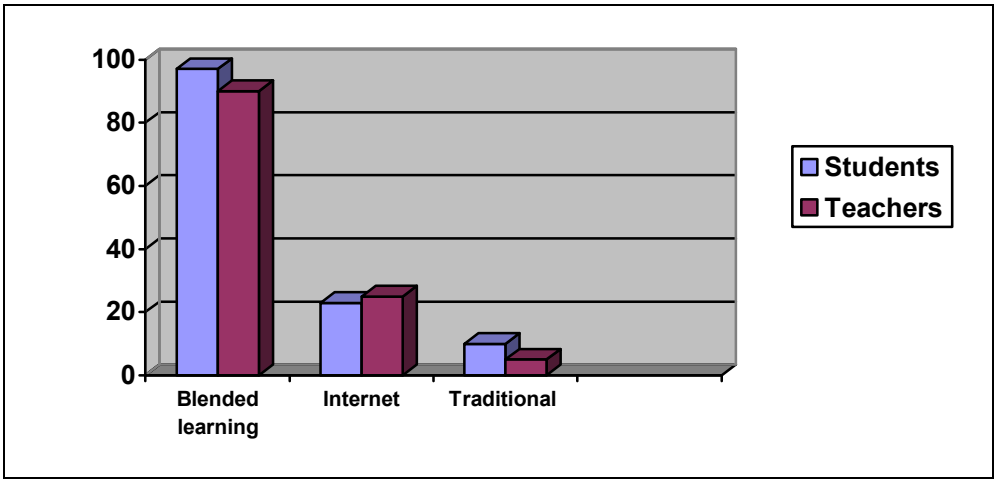


**Figure 1. Forms of education preferred by surveyed teachers and students. Source: Own research**

Schools can obtain huge benefits from e-learning, as it can support traditional education effectively. It is called *"blended learning"*, and combines traditional instruction and e-learning. This type of teaching minimizes some disadvantages of school education such as the problem with different abilities of students within the same class. According to this, teachers usually focus on the average student. Both weak students (they are not able to keep up with learning) and best ones lose out (They are bored, not taking advantage of their skills). Another problem where e-learning can be helpful is too short lessons to provide proper knowledge; it can be used to do different tasks and consolidate them. Students during classes mainly obtain information but developing skills, revision and consolidation are usually set as their homework. Disabled and sick students, who are not able to attend classes, even for a long time, are another big problem. Traditional education is not able to solve all these problems, while e-learning can be supporting in these situations.

The aim of next step of educational experiment, conducted under PhD thesis is establishing and implementing e-learning course preparing for mathematics matura exam (basic level) according to Polish standards and examining of e-learning influence with carefully selected educational programmes on mathematical competences development of high school students. The course will be placed on the web platform of University of Silesia

(http://moodle.weinoe.us.edu.pl) in Cieszyn. The course will have hierarchical modular structure and consist of a number of standard blocks.[7]

**I. Introduction to a distance learning course:** *Description of the course, Literature, Glossary, Forums, Registration survey.*

**II. Subject module:** *Pre-test (assessment test), Subject resources, Tasks block, Examining, Knowledge control, Creative tasks block, Interactive communication between teachers and students and among students, Additional resources from the subject, Knowledge control.*

**III. Summarising module:** *Final test, The last survey, Evaluation survey.*

Prepared course will be examined and assessed by experts-mathematics methodologists and distance learning professionals. After review and improving made available the experimental group students.

About 120 high school students from the Silesian district will take part in the research.

They will be divided into experimental and control groups. The experimental groups will use computer programmes in mathematics distance learning during the course. The control ones use only traditional forms without the use of computer. Then, pre-test research will be conducted (preliminary test of quality and quantity of information in the area of various mathematical competences).

After the course there will be a knowledge test. It will be dealt with in the same area of knowledge, the same issues, with the same number of questions given (can be similar to matura examination).

In the next step, the author will perform distance tasks to examine the sustainability of knowledge gained in second step. These research will be done 6 weeks after finishing research. Then, the author will analyse the students matura examinations results after agreement with students, against the background of the region and country. Finally, after choosing appropriate statistical methods, analysis of the research will be performed.

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## CONCLUSION

The article shows European Union recommendation connected with key competences, Danish mathematical competences framework, overall results of PISA research in Poland and Czech Republic in 2003. E-learning has been defined, main results of survey aimed at high school students and teachers of Silesia District have been quoted. The survey shows knowledge and use of Information and Communication technologies in e-learning and education. The research proposal connected with the process of mathematical competences of Polish students have been presented. They are implemented as PhD thesis being conducted at pedagogical faculty in Ostrava University.

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# SUPPORTING THE EDUCATION PROCESS IN SECONDARY SCHOOL BY DISTANCE LEARNING

**Wojciech Sala**
The Group of Technical - Service Secondary Schools in Trzebinia, Poland
E-mail: wsala@pro.onet.pl

***Abstract:*** *The following article describes practical aspects of supporting the education process by Internet techniques. These aspects are taken from the experience of a secondary school teacher. Currently this kind of support of the education is possible. But for the proper functioning there is a need of changes in the law and in education funding. The author describes methods of working with students - the meaning of web pages, e-mail, discussion forums, chats and compact discs. Besides, the author discusses methods of controlling students' progress. Included also are examples of supporting the education by distance learning in the school subjects related to office software, electronic workshops and computer devices. Furthermore, the article highlights the importance of exchanging experience by publishing materials and participating in symposia and conferences.*

***Keywords:*** *distance learning, Internet techniques, secondary school, exchanging experience.*

## INTRODUCTION

Supporting the education process by distance learning requires appropriate preparation, involvement, self-education of the teacher, ability to arouse students' interest and to lead them through the education process, as well as organizational, legal and economic conditions enabling to enhance education with distance learning elements.

As for the teacher's preparation, apart from intuition, which played a greater role particularly at the beginning, when distance learning issues first appeared, an important element is an exchange of experience in the professional environment, participation in workshops and conferences, and

also the creative attitude which is necessary especially while working on teaching materials.

The organization of the education system should aspire to promote the education process supported by distance learning as a more flexible and more available form of education and create the right atmosphere for exchange of experience, allowing schools supported by distance learning to help by realization the education process in a better way than the traditional one.

This article has been written by a secondary school teacher who has been using the techniques of education process supported by distance learning for many years.

## 1. ORGANISATION OF EDUCATION

The idea is to create a virtual secondary school in which most of the classes would be taught via the Internet, outside the school building. This kind of school demands deep changes in education law and also in the way education is funded. The teachers of all subjects should be prepared for working in the virtual area. It seems that it is still too early for that.

At the moment there is a possibility of creating a school supported by distance learning.

In the school supported by distance learning students spend most of the teaching time in the school building, during the traditional lessons. The rest of the teaching time is spent in the virtual area. Not all the subjects are supported by distance learning. The virtual education area is available in the computer room at school during the classes and also outside class time. The students have access to all materials prepared as a part of a given subject, also from anywhere outside the school.

For the proper functioning there is also a need for changes in education legislation and funding, but the changes might not have to be as deep as in the case of a virtual school.

The following issues should be addressed:

- The proved amount of time spent by students on learning outside the school by the network should be treated equally with the attendance in class, thereby should fulfill the school duty.

- The proved amount of teacher’s working time on the network should be treated as the conducting of classes at a traditional school.

- The teacher should receive financial bonus for courses developed in the network.

- The teacher and the student should be provided with their own computer with Internet access.

Under the current conditions, the supporting of education by distance learning is considered as a hobby, both for the teacher and for the student.

It's worth making effort aiming to create virtual units at the normal physical school, which will not only render the school more attractive, but also allow for participation of disabled persons. It will also be an important asset given the increasing competition between schools.

## 2. METHODS AND TOOLS OF WORKING WITH STUDENTS

### 2.1. WWW pages

The basic method of transmission of information is the web page, which may be opened or protected by an access code. The protection with the code provides greater convenience, because no persons from outside the class will be able to disturb the lessons. Moreover, it protects the materials prepared by the teacher. These web pages could be created e.g. on the MOODLE platform.

The teacher publishes the teaching content on the web pages. The author, in the years of 2003-2005, ran courses related to spreadsheets, databases, electronic workshops, telecommunication services on the school's MOODLE platform [3]. These courses were developed as the need arose. Currently there is a course in computer devices available, as a part of which an electronic handbook is being created [7].

Students can also create their own web pages. Among the final projects written in 1998-2000, the closest to the idea of virtual school was the project entitled "Banking law" containing elements of programmed learning in the form of web pages and a test in the form of a questionnaire. Successive drafts of the project, opinions about the drafts, marks, were sent between the teacher and the student via e-mail. The project was published on the network. Few months after the graduation the student sent a thank-you note to the teacher, saying that he was now working exactly on what he had learned during the writing of the project.

### 2.2. E-mail

The content of the teacher's correspondence to students can include teaching materials, exercises to solve, information about web pages with teaching resources. Students send back solved exercises to the teacher or they inform where they are available on the network.

The e-mail provides the possibility of individual communication with the student, pointing out mistakes.

### 2.3. Discussion forum

A discussion forum is a method of cooperation within the class. The teacher moderates the forum, provides topics, encourages students to post messages, ensures relevance to the topic. Students send answers and post their own problems. These can include information created by themselves or obtained from professional journals or found on the network.

The problem is that students are often not able to distinguish accurately what is within the scope of the activity and what is not. They also use copying without earlier selection. It can cause an appearance of information overload, and with a dozen or so people in the group the teacher has difficulty reviewing and selecting the exercises submitted. A solution would be to divide the forum in topics.

By the realization of an electronic handbook, the teacher introduced in one class of the vocational school two thematic forums. The amount of information collected was so large that the analyzing of exercises encountered quite a lot difficulties. Making use of this experience, the teacher created in another class 17 thematic forums, according to the division from the syllabus. The division of contents turned out to be favorable on account of a later analysis and creation chapters of the handbook. The division also contributed to improved discipline, because the students' duty was to answer every topic of the forum. In these two classes of the vocational school 344 posts were sent in total.

### 2.4. Chat

Synchronous contact with students at the virtual school is a very important method. It can be used in supporting the school by distance learning for exchange of correspondence between teacher and students during the lesson or for exchange of information between students. In the case of virtual school there is a need to determine the exact time when the teacher is on duty on the Internet.

### 2.5. The contemporary optical discs CD, DVD, USB flash drives

Contemporary optical discs (CD, DVD), USB flash drives, are characterized by large capacity and the low price of 1 byte. Optical recorders are readily available and easy to use. Writing USB flash drives does not require even a recorder. These features of external memories make them working tools in the school supported by distance learning.

Teaching materials developed by the teacher can be easily recorded by herself/himself. Also students will find recording their own projects on compact discs quite easy.

In this way, projects can be recorded in any format: texts, calculations, presentations, photographs, sounds, movies, etc. Thus a library of projects can be created, which can be useful for the teacher in the future.

As early as in the year 2000, a CD entitled ”Towards the virtual school” was recorded which covered the achievements of the teacher and students during the eight years of teaching work. In order to provide good communication between the files, the collection was organized in the form of the main pages (in HTML) and sub-pages of separate classes and students. It was not intended to publish the CD on the Internet. It was used many times by the teacher during lessons in the computer room. The students also asked to borrow and take it home many times.

Some of the projects made by the students were published by them on the Internet, frequently on free servers, but the fate of these pages was uncertain. Moreover, some of the students were embarrassed about being shown in public; others, even though they had computers, did not have Internet access. Using the teaching material written on compact discs complemented work done in the Internet.

## 3. METHODS OF CONTROLLING

### 3.1. Monitoring students’ activity

The teacher should keep track of students’ activity. The MOODLE platform offers a wide range of possibilities in this area. For every user it is possible to obtain information on how many times a given course was visited, for how long students accessed the selected pages, how many messages they posted, what the content of the messages was, etc.

An analysis of the activity of students during the classes supported by distance learning in the school year 2004/2005 allowed to form the following

conclusions: the interest in course grew 8 times relating the year to the first semester. Most of the students visited all the course pages, average number of days when students accessed the course was 219 [3].

### 3.2. Computer tests

Checking the gained knowledge and skills and also regularity of student work is the necessary element of the teaching process. In the physical school a great role is played by individual contact, but when classes are too large and syllabuses are overloaded, the amount of time dedicated to the individual student is little.

In the distance learning there is a need to work out the right forms of checking the students' performance. One of these forms is computer tests. They give the possibility of automatic generation of marks after finishing the test, showing the right answers, setting the time-limit on answering to the questions, determining the weight of the question, random selection of questions, etc.

The author of the article developed, and introduced into teaching process, tests in computer devices, operation systems, word processors, spreadsheets, databases, networks, programming languages. He also published multiple-choice tests in the network. In order to check user identity every student was given the personal password. The teacher assigned students the appropriate variant of the test. It was possible to attempt the test only once and after that access was blocked. The teacher was able to read the results by connecting with the web page.

The test can be also used as a help in learning.

The teacher took also an advantage of the MOODLE platform possibilities.

## 4. EXAMPLES OF SUBJECTS SUPPORTED BY DISTANCE LEARNING

### 4.1. Office software

Every lesson in office software during the school year 2003/2004 of the vocational school (40 hours a year) took place in the computer room with access to the Internet.

The students used the exercises published on the MOODLE platform during their classes at school and also outside the school. The author encouraged the students to send solved exercises by e-mail, and corresponded with them.

When teaching the course in spreadsheets, the teacher used own materials that were developed earlier; activities and exercises were extended and adjusted to the technical profile of the school. The course in spreadsheets contained 48 exercises. The course in databases contained 22 exercises.

### 4.2. Electronic workshop

During the workshop classes in electronics the students made electronic circuits (project, realization of printed circuit, assembly of components, soldering, making out the technical documentation running the unit). For the need of these lessons, material was published on the MOODLE platform called „Electronic workshop", containing the following topics: safety regulations, practical making of electronic circuits and the documentation of different electronic circuits.

Despite the fact that during the classes no access to the Internet was provided, the web pages of the course were visited by students who shared with others the printed materials. In this way the influence of the course was stronger than the number of visits showed. Also the teacher printed and shared the course materials.

### 4.3. Computer devices

Computer devices are one of the fastest developing products of technology, which is why the teaching of this subject in accordance with the current state of technology is a considerable challenge.

In order to gather current information, magazines and discussion forum on the MOODLE platform were used. One of the form of organizing the collected materials was to create chapters of the electronic handbook and publishing them also on this platform.

Three successive chapters were developed: „The processors of the future", „Hard drives", „Optical discs" and the fragments of another chapters [5].

The working on the handbook was continued in the year 2008/2009. The handbook will be supplemented by additional chapters and updated.

## 5. EXCHANGE OF EXPERIENCE

In such a new field as the application of computer science in the education process, connections with other professionals are very important, especially with the academic community - symposia, computer fair, methodological conferences, courses. Participation in the symposium „Computer in Education" organized by the Pedagogical University of Cracov, was an

opportunity to deliver reports, to join in the discussion and publish [1], [2], [3], [5].

The participation in the „e-Teacher" project, realized through the Internet allowed to familiarize with the distance learning course in practice. The partners of the project were: AGH - University of Science and Technology in Cracov, University of London, University of Tartu (Estonia) and the Trzebinia District [4].

The result of the course was familiarization with latest publications, including American ones, about distance learning. The discussion forum gave an opportunity to cooperate with teachers who participated in the course.

## CONCLUSIONS

Components of distance learning are very useful in secondary schools. Learning supported by the Internet is not an alternative to the traditional, physical school but can become an interesting complement. If adequate funds are provided, attractive teaching materials can be created, e.g. on the MOODLE platform.

The Internet makes it possible for a good school to function irrespective of where the students live. Such a school can help to eliminate the differences of social development. It's worth investing in.

The student acquires skills of searching and critical analysis of information, under the teacher's direction (digital literacy). The Internet helps to educate for freedom and for taking responsibility for what one says and does.

The wider use of these techniques, despite significant progress, is restricted by inadequate availability of computers connected to the Internet, especially during the classes in non-computer-related subjects. It's connected with the availability of funds for education.

Multimedia teaching material: presentation, web pages, tests - increases the effectiveness and attraction of lessons.

Development of teaching materials is time-consuming, especially at the beginning. Teachers who create these materials should have possibilities of extra remuneration.

The Internet is such a new technology that there is a need of building up the awareness of its significance. In order to be successful, virtual school projects need wider social support. There is a need of organizing symposia, workshops, conferences supported by local authorities.

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# III. DEVELOPMENT OF TEACHERS' COMPUTER COMPETENCIES FOR USE IN E-LEARNING

## INFORMATION LITERACY OF PEDAGOGY STUDENTS

**Ingrid Nagyová**

Ostrava University, Pedagogical faculty,

Mlýnská 5, Ostrava, Czech Republic,

ingrid.nagyova@osu.cz

***Abstract:*** *ICT integration in the educational process can make the learning process more effective. That assumes that teachers use ICT effectively not only in administration, their own studies and preparation, but in their everyday work with pupils in the classroom followed by everyday learning process. The contribution deals with the increase of ICT competences of students at Pedagogical Faculty and the level of their information literacy. It analyzes the level of teaching at the courses of Information and Computer Literacy and Educational Technology whose main focus is ICT integration in the educational process.*

**Keywords:** ICT, educational technology, information literacy, Petri nets.

### INTRODUCTION

Modern education is conditioned by maximum use of information and communication technologies (ICT); not only at the preparation and administration, but in the learning process itself. That ability which should become a basic competence of the new age modern school is called information literacy.

Information literacy involves a summary of knowledge, skills and understanding necessary for adequate, safe and productive use of ICT in the learning process and understanding both at work and everyday life [3]. Information literacy is demonstrated by abilities to use information sources and tools effectively for analysis, processing and use of information, followed by mutual communication, etc.

Information literacy does not mean a mere using of ICT, but creation of new, valuable things under their assistance [8]. From that point of view, several components of information literacy can be highlighted [4]:

- general information literacy – use of the internet for communication and retrieving information, basics of work with computer (word processor, spreadsheet, etc.);
- subject information literacy – Theory of Instruction for individual subjects, inter-subject activities, etc.;
- information literacy for pupil development – to develop their personality, creativity, responsibility, to develop abilities to think and solve problems.

The Pedagogical Faculty of the University of Ostrava (OU) is mainly aiming at the preparation of students for the job of non-teaching staff and teachers at kindergartens, basic and secondary schools. General information literacy, basics of work with computer and the capability of using the internet is acquired by students mainly in the course of their secondary education. As to university studies, the students graduate only from the comparable course of Information and Computer Literacy.

Subject matter of information literacy and the capability of preparing basic educational materials (multimedia presentations, work sheets, electronic testing, etc.) are the main content of the subject called Educational Technology. Information literacy for development of pupils is included in pedagogical and psychological disciplines attended by students within their studies.

Information and Computer Literacy and Educational Technology courses are organized by the Department of Information and Communication Technologies for all students at the Pedagogical faculty of OU. The exigence of their implementation is mainly caused by a large number of students in both courses which would be almost impossible to be implemented without ICT support. The contribution is highlighting observations and experience from teaching.

## 1. THE COURSE OF INFORMATION AND COMPUTER LITERACY

The course of Information and Computer Literacy (INPOG) has been determined for all students who begin their studies at the Pedagogical Faculty of the University of Ostrava. The course is running before the start of teaching in winter semester of a particular academic year. The purpose of that course is to compare the level of students' general information literacy. In terms of the content, the course is split into two parts:

- information literacy – students are made familiar with information systems of the school (enrolment and registration of subjects, development of time schedule, keeping of electronic index, etc.), followed by university library and university study;
- computer literacy – basics of work with computer (internet, word processor, spreadsheet, development of simple presentations), students are made familiar with university computer network, logging, e-mail, etc.

Annually, the course is attended by some 1000 students. Those students attend lectures of the Office for Studies and Centre of Information Technologies on a mandatory basis. The lectures are aimed at the OU information systems and lectures of university library. Education of computer literacy is implemented by the following combined form.

- based on their needs, the students can attend a short teaching tutorial on full time basis;
- for the sake of support of distance learning the e-learning course has been developed in the educational environment Moodle [7], followed by web learning portal [1], which is not protected by access rights thus being accessible for students already during holidays.

The output of the course is three separately processed correspondence tasks from the area of computer literacy and the final credit test.

The INPOG course is perceived positively by students and 67 % of students evaluate its contribution positively. The practical contribution of the course is mainly a greater information level of students in the area of the University Information Systems. Every year, the Office for Studies indicates a drop of queries and requests in connection with additional registration of subjects, development of time schedules, etc. Similar situation is experienced by University Library. Moreover, the level of communication of students via student e-mail boxes has increased dramatically.

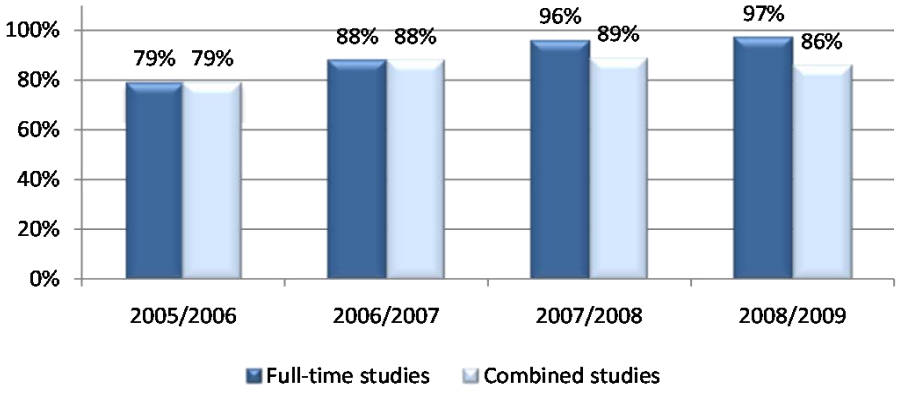


**Figure 1. The success level of the INPOG course.**

Every year, the number of successful graduates of the INPOG course is slightly increasing mostly involving younger people - fresh graduates from secondary schools. Students manage their work with operation system best (work with folders and files) and the internet (Figure 2). As to work with word processor, they experience greater problems only with set up of the language and check of grammar. However, many students work with spreadsheet for the first time. Yet, they usually manage basic work with spreadsheets quite quickly. The largest number of bad answers is finally caused by bad spelling (incorrect record of data – e.g. the number of the month is not followed by the dot).

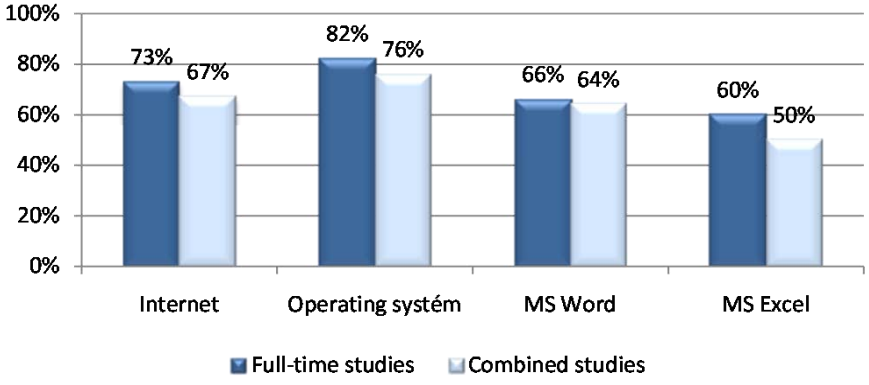


**Figure 2. Success level of students in individual parts of the INPOG course.**

## 2. THE COURSE OF EDUCATIONAL TECHNOLOGY

The course of Educational Technology is aimed at the area of ICT integration in the educational process. The purpose of the course is to extend competences of students in subject matter information literacy and specific ICT application at the preparation for teaching (the development of teaching materials), as well as in the learning process itself (methods and procedures in teaching while using ICT).

Every year, the course of Educational Technology is attended by some 400 students of both full time and combined form of the study. Within the course, the students solve cca 15 correspondence tasks organized in terms of the theme into five sections:

- routes of move – „live“ pictures, set up of their own animations in presentation;
- work sheet – draft and development of work sheet;
- sound – formats of sound files, sound recording and editing;
- multimedia presentations – the development of multimedia presentations based on the theme of a story or novel;
- web sites – the development of simple web sites, use of animated pictures and texts, hypertext links.

For the sake of education support the e-learning course has been developed in the educational environment Moodle [6]. The course is aimed at practical skills of students at work with particular educational technologies. The main emphasis of the e-learning course is placed at student motivation and forming their relation to educational technologies with the objective to initiate imagination, creativity and finding the possibilities of ICT integration in the educational process. The course covers study materials, instructions for the solution of individual correspondence tasks including certain sample solutions. The obtained theoretical knowledge can be verified by students in five tests.

Education of the course is running differently for full time students and those of the combined form:

- full time students regularly attend lessons at computer teaching rooms (2 hours per week), while solving particular tasks;
- combined form students attend one five-hour tutorial where they sort out more complicated tasks of theme units aimed at work with sound

and web site development. Remaining tasks are individually solved by them at home.

The course of Educational Technology is perceived by students as relatively demanding, both in terms of time and technology, including required knowledge and skills. Yet the majority of students are aware of a need of education in that area which is becoming an integral part of their everyday life. They value mainly a possibility to learn how to develop multimedia presentations and animations; regularly, the appropriate correspondence tasks obtain high evaluation (see figure 3).

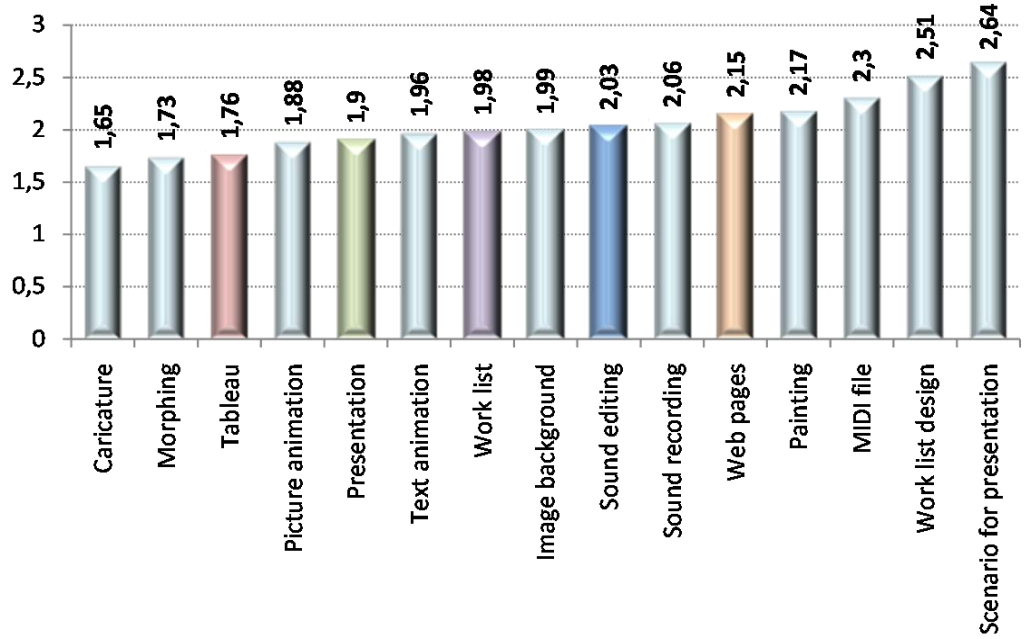


**Figure 3. Average marking of tasks involved in the course of Educational Technology.**

On the contrary, the tasks aimed at draft (script) of master piece which should be successively created are assessed by students as unnecessary or needless. The main reason is misunderstanding of the sense of preliminary consideration of the future master piece, its content and structure. Despite searching for solutions (see for example script sheets in [11]) and to strive to

increase attractiveness of the presented tasks, the opinion of students remains the same.

### 2.1 Passage of students through the course

The educational environment Moodle is recording data on individual activities of students carried out within the e-learning course (Module of Reports). Within the course of Educational Technology 195 various activities were available for students.

To be able to get a vision on methods and procedures of the study of students within the course, we are trying to analyze data recorded in Moodle environment. Methods of frequency and sequence analysis [2] can results in interaction matrices; the particular cells of the interaction matrix correspond to frequencies of $P_i$ activity occurrence following $P_j$ activity. Most frequent mutual interactions recorded in the interaction matrix can be obtained via Petri net [9] (see Figure 4 for individual correspondence tasks) [10].

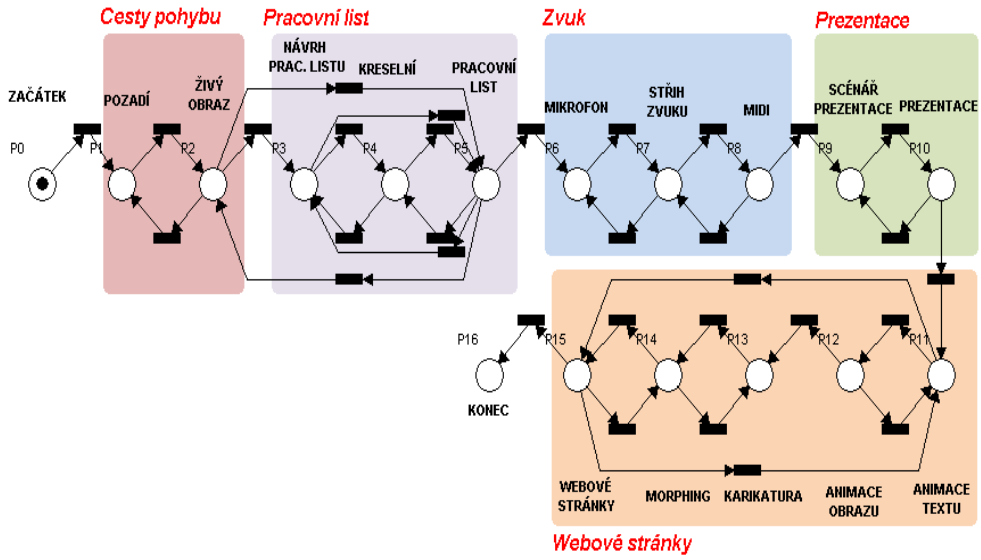


**Figure 4. Petri net showing student passage through the course of Educational Technology.**

The generated Petri net (see Figure 4) confirms finiteness and feasibility of the passage of students through the course from the start to end. Moreover, an

increased move of students within particular theme blocks (highlighted) is evident; on the contrary, passages among blocks are quite unambiguous (simple edge).

The largest number of various interactions is recorded in the theme block of the work sheet and web site development. In both cases we can trace the view of students to future, for upcoming events and tasks. If the situation mainly results from the initial interest of students in the course when it comes to the work sheet, web sites which were to be created at the end of the course were quickly developed by students at minimum quality just to get credits.

## CONCLUSION

The main specifics of Information and Computer Literacy and Educational Technology courses is their focus on practical skills at work with computer followed by the number of students who attend courses within one semester. That places increased demands mainly on the organization of courses which are significantly complemented by e-learning courses which were developed for the education support.

The contribution of e-learning courses for students is represented by availability and professional focus of study materials. And reversely, teachers have an easy access to results of work of students which can be continuously evaluated by them (point-wise and verbally). Communication with students within the course makes work of students and teachers easier and more effective.

The courses of Information and Computer Literacy and Educational Technology have been annually revised in connection with technical development but mainly with the increase of skills of students and growing possibilities of ICT integration in the educational process (e.g. implementation of interactive boards, etc.).

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# USE OF THE DISTANCE LEARNING PLATFORM OF THE FACULTY OF ETHNOLOGY AND SCIENCES OF EDUCATION IN CIESZYN (UNIVERSITY OF SILESIA) IN TEACHER TRAINING

**Eugenia Smyrnova-Trybulska**
Faculty of Ethnology and Sciences of Education in Cieszyn
University of Silesia in Katowice
Bielska 62, 43-400 Cieszyn, Poland
esmyrnova@us.edu.pl

***Abstract:*** *This article presents examples of good practice in comprehensive, systematic and effective use of the distance learning platform of The Faculty of Ethnology and Sciences of Education in Cieszyn (University of Silesia), based on CLMS MOODLE system, in order to: 1) provide pedagogical support for teaching programme courses, run in the full-time and part-time mode (hybrid learning), 2) train future teachers in distance learning – to use e-learning in own profession and to act as tutors, 3) help teaching staff as well as graduate and post-graduate students to carry out scientific research and pedagogical experiments 4) provide access to educational materials for students and other users. This article contains numerous screenshots of specimen distance courses and other resources, available on the platform.*

***Keywords****: distance learning platform, remote courses, electronic resources, teaching materials, computer competence, tutor, CLMS MOODLE.*

## INTRODUCTION

It is difficult to imagine today any contemporary university or department without a website. Moreover, it is getting more and more common for a university and individual departments to possess distance learning platforms which implement various teaching, scientific and educational aims. The distance learning platform of The Faculty of Ethnology and Sciences of Education (WEiNoE) University of Silesia, whose coordinator and administrator is the author of this article, is based on the CLMS MOODLE system and serves, among other things, to:

1) provide support for teaching programme courses, run in the full-time and part-time mode (hybrid learning),
2) prepare future teachers to take advantage of distance learning – to use e-learning in own profession and to perform the role of a tutor,
3) provide assistance with scientific research and pedagogical experiments carried out by department staff, graduate students as well as post-graduate students,
4) provide access to educational materials for students, the local community and all other people interested, also for the disabled, people with financial limitations, residents from small and remote towns and other users in order to give all citizens the equal chance to have access to the knowledge, as one of the main priority aims of the European Community.

In the year 2003, on the department's server, at first the educational portal Erudyta was launched [5], which was based on CMS Nuke PHP Apache system, whose aim was, first of all, to promote the teaching achievements of WEiNoE students, post-graduate students and the department's academic staff. On the portal one could find the papers, presentations, multimedia programmes, the gallery with photo-reviews showing many interesting teaching and scientific events (conferences, seminars, courses, lessons using multimedia and Internet etc.). But as time was passing it turned out that there are too little resources and possibilities to ensure all teaching and scientific necessities of its users.

So in the year 2004, a new idea to start the Internet service giving not only the access to educational materials, but also support all stages of education via well prepared distance courses. These expectations could be provided thanks to the platform of Content Learning Management System (CLMS), one of the most popular and quickly developing system is MOODLE .This system was chosen as a tool to the realization of becoming the defined plans of department reality and the future integration of local space into the European one, and worldwide computer-educational space. As the practice showed the system MOODLE did not fail the expectations of its users.

## 1. DISTANCE SUPPORT OF PROGRAMME SUBJECTS, PROVIDED IN A FULL-TIME AND PART-TIME MODE (HYBRID LEARNING).

### 1.1. Subject: Information Technology

Information Technology (IT) is a subject taught on study programmes as a general education subject, taking up 30 hours of teaching units of which 15

are delivered as lectures and 15 as workshops. The general aims of the course are to provide students with basic theoretical knowledge and practical skills in the use of the office package Microsoft Office 2003 (2007), or other software packages, for example OpenOffice, Works, etc. as well as individual utility programmes: word processors (Word), which are useful in office work, in the writing of any term essays, diploma or master's thesis, in the preparation of teaching and methodical materials in the future teacher's work; other software covered includes spreadsheets (Excel) to gather data, calculate all kinds of figures, to perform data analyses and to present output in graphical forms (graphs) as well as programmes preparing multimedia presentations (PowerPoint).

The general aims also include familiarization with media processing programmes: graphics processors, sound recorders, programme recording, video processing sequences, programmes-converters, etc. Among the aims is also familiarization with basic services available on the Internet and with CLMS MOODLE - the system supporting distance learning and developing distance education competences. The aim of practical classes is, first of all, to develop practical abilities of using computer equipment and to solve practical tasks with the help of utility programmes and the Internet.

The high value and relevance of the subject, and also its practical aspect, at the same time the small number of hours envisaged in the curriculum, have led to contradictions between ambitiously justified aims and objective problems with their implementation, connected first of all with the small number of hours. In such conditions, as real-life experience shows, active and systematic use of distance learning is a sufficient solution, adapted to the formulated on the subject necessities and permitting to support all stages of teaching process: familiarization with new teaching material, formulating practical abilities, recording theoretical knowledge and practical abilities, casual and final check-up of the knowledge, evaluation.

That is just the supporting system of distance learning MOODLE and a department platform http://moodle.weinoe.us.edu.pl based on it, which effectively handle performing all these tasks. In the framework of this IT subject students take part in distance courses "*MS Word and its possibilities*" ("*We are getting acquainted with the word processor Word*", "*The word processor for advanced learners", "Analysis of data in the spreadsheet MS Excel"* (fig.1), *"Arrangement of multimedia presentations in the programme MS Power Point"* ("*We are making multimedia presentation in Power Point*").

Also as an optional subject, students can take part in any computer course, for example: "*Creating web-page on Front Page Express*", "*My first front page in HTML", "Basic WebDesing" ("Internet Technologies"); "Graphic in IrfanView", "Raster Graphics in Photoshop", "Vector Technology in CorelDraw" ("Computer graphics"), "Digital photography - we are making multimedia album", "Creating animation in Macromedia Flash", "Film Development and Editing in Computer Programmes", "Sound Recording and Processing in Computer Programmes" ("Computer Science and Technology Information"),* and others.

In this context it is worth mentioning the rules of the Bologna Process, which Poland joined a few years ago. One of these rules envisages that the number of hours of instruction on tertiary education programmes will change so that more time will be devoted to self-study than to traditional face-to-face classes. When this changes materializes, it will be of crucial importance to provide means of two-way communication between the instructor and students and to ensure high teaching standards. Comprehensive and systematic implementation of distance learning methods, well-thought-out beforehand, can significantly contribute to the achievement of this goal.

E-learning courses are also actively used to support classes in various courses offered on post-graduate studies organized on WEiNoE, for example: *Oligofrenopedagogy, Educational Therapy* (Fig. 2, 3), *Education of Family Life* (Fig. 4) and others.

Taking into consideration the fact that post-graduate students mainly include active teachers, who pursue their post-graduate studies and at the same time work in their jobs and perform official duties, who have families and quite often commute to university a few dozen and even a few hundred kilometres, enabling them to take part in distance learning is a good and flexible solution, allowing them to organize their own education process and to ensure high professional and teaching standards.


**Figure 1**. **Main page of the course called "*Data analysis in MS Excel spreadsheets*" (http://moodle.weinoe.us.edu.pl)**

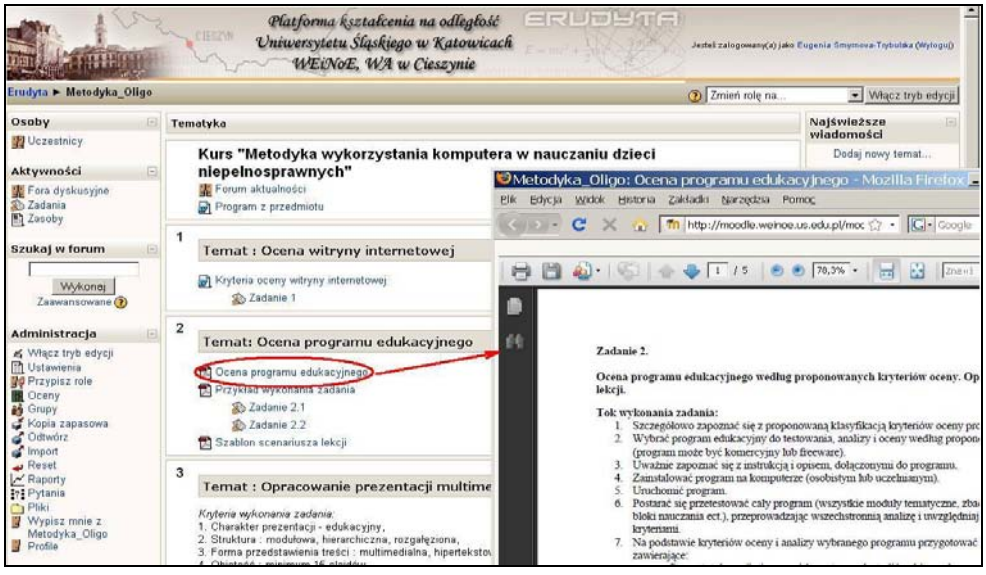


**Figure 2. Main page of the course called *"Methodology of computer use in teaching disabled children"* and resources in the form of a PDF file (http://moodle.weinoe.us.edu.pl)**

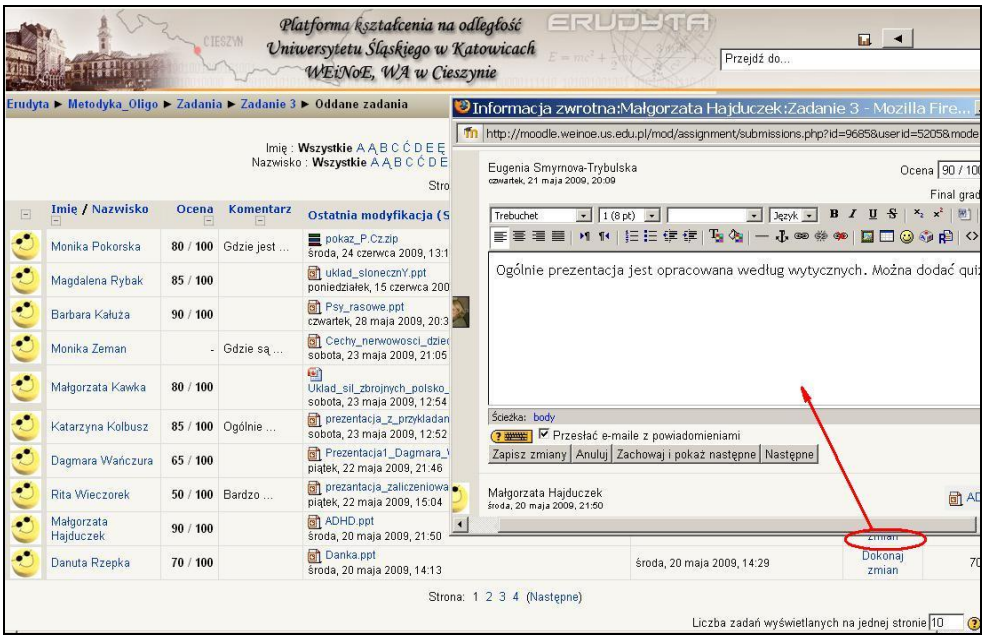


**Figure 3. Course constituent element *"Methodology of computer use in teaching disabled children"*. Task Type: *Send the file* and its evaluation. (http://moodle.weinoe.us.edu.pl)**

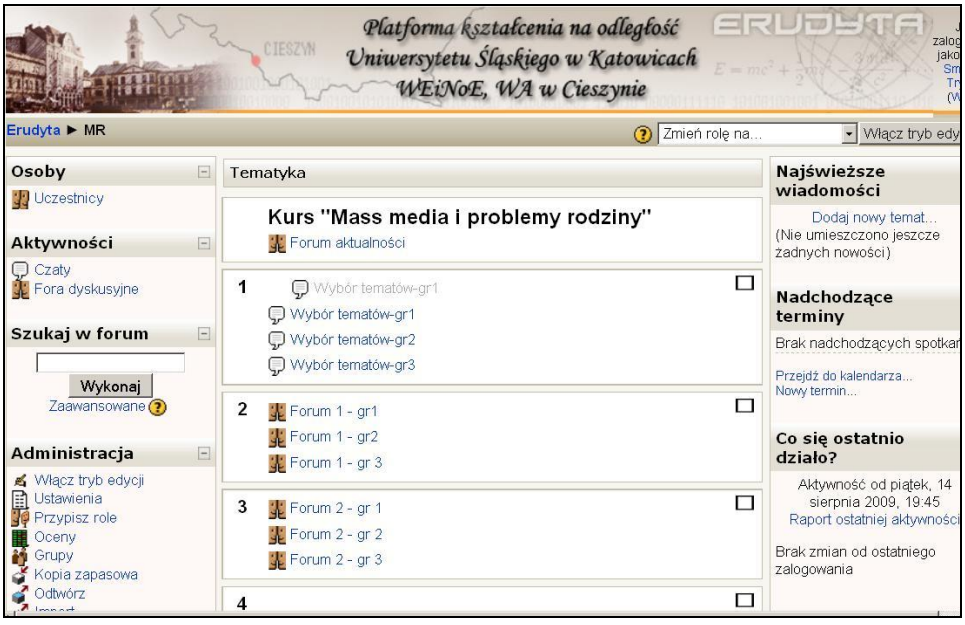


**Figure 4. The main page of distance course of *Forum* type, in the subject called *"Mass media and family's problem"*, with speaker dr J. Urban (http://moodle.weinoe.us.edu.pl)**

## 2. PLATFORM AS A MEANS AND A RESEARCH TOOL

Platform WEiNoE (FEaSE) can be and is actively used by the department's graduate and post-graduate students as well as academic staff for the purpose of scholarly research and educational experiments. Thanks to an advanced tool available in the MOODLE system - *Questionnaire* (fig.5) one can very quickly and in an easy way carry out a research survey, make it available for the respondents. After the questions are answered in the survey, the system itself very precisely and immediately processes the data in different ways, presenting them in numerical form, as percentages and in graphical form to every particular respondent, or to all respondents according to separate categories.

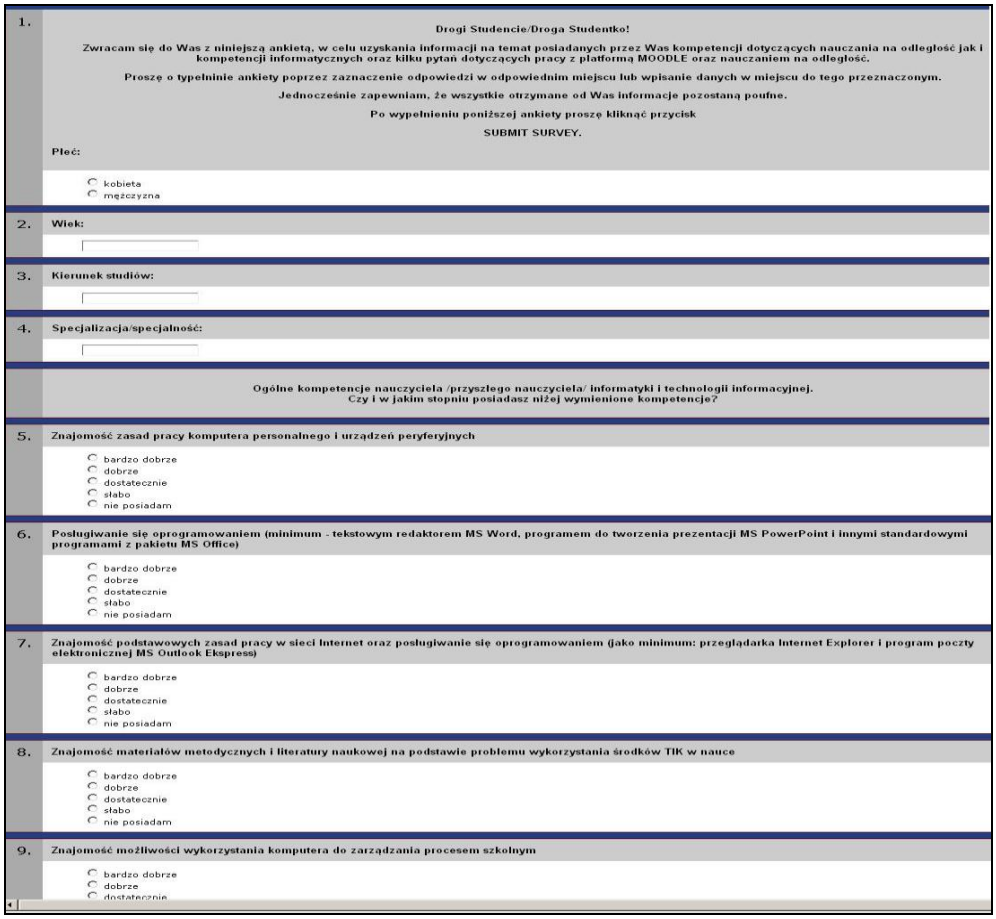


**Figure 5. Research survey designed to gauge the level of computer's competence among fifth-year pedagogy students, developed by D. Willmann as part of the M.A. thesis preparation, available on the platform (http://moodle.weinoe.us.edu.pl).**

Publishing the survey on the platform allows for carrying out research on a wide scale, without distance and time limitations, which makes research more reliable and objective, while the data processing through the MOODLE system enables scholars to save time, helps to them avoid having to carry out routine activities and ensures the accuracy of calculations.

## 3. USE OF THE PLATFORM IN THE PREPARATION OF FUTURE TEACHERS TO TAKE ADVANTAGE OF DISTANCE LEARNING – TO USE E-LEARNING IN OWN PROFESSION AND TO PERFORM THE ROLE OF A TUTOR.

### 3.1. Using the distance learning platform in teaching the course called ”Information technology in the work of a disabled person’s assistant”

In the information society, in knowledge society, there are several goals of equal importance that should be pursued. One of them is affording the opportunity to acquire knowledge to all citizens, including the disabled, persons with financial limitations, residents of small and remote towns and other users, in order to create equal chances for all citizens to have access to information resources and knowledge. These rules are the priority aims in the development of European society.

Simultaneously with the new concept of the development of educational system and standards of teachers preparation, every teacher should be a computer teacher, possessing the competence of distance learning. The implementation of these tasks should be ensured by institutions of higher education employing active and common remote controlled forms and teaching technology. The positive example in this context is the distance learning platform WEiNoE and its use in IT training for teachers while they attend the course called ”*Information Technology in the work of an assistant to a disabled person.”*

The course has been developed by the author of this article. The course workload is 30 practical hours and 60 hours of individual work. The course is deemed successfully completed if the students receives a pass for her/his coursework. The course is included in the study schedule for the second year of the pedagogical specialization called ”*Assistant of a disabled person*”.

When teaching this course, it is worth taking into consideration that first-years students attend a general education course called Information Technology, where they broaden their knowledge and improve their information competence.

**The aims of classes include**: familiarizing students with modern multimedia means and Internet technologies that can be used effectively in instruction – in educational and therapeutic classes for disabled children and for people with special needs; development of the ability to critically evaluate Internet resources and educational programmes; familiarizing with domestic and foreign experience of distance teaching of children and elderly people with special needs; development of theoretical knowledge and practical skills of preparation of multimedia, electronic teaching aids in the form of distance learning courses, intended for elderly people with special needs.

**Programme curriculum:** The role of the computer in special education, computers for special education. Classification of educational programmes, examples. Software classification for revalidation, examples:

- Classification and evaluation criteria for computer programmes; review of educational and therapeutic programmes available on the market, their analysis and evaluation; design of educational and therapeutic programmes using multimedia programmes. Analysis and testing specimen programmes according to the evaluation criteria; designing a lesson plan using one of these programmes.

- Role of computer technology and the Internet in providing access to knowledge and the integration of the disabled. The Internet - the source of educational resources. Distance learning - as a alternative for many disabled people. Distance learning-distance learning for disabled children, the implementation of different models of distance learning [1], [6]. Review of specimen Internet resources: servers, educational portals, distance learning platforms (also including http://erudyta.weinoe.us.edu.pl, http://moodle.weinoe.us.edu.pl, and others). The analysis and evaluation of Internet website on the basis of proposed evaluation criteria.

- Internet communication technology on the basis of such programmes as Microsoft Netmeeting, Skype, Gadu-Gadu, Yahoo Messenger.

- Theoretical and practical aspects of the development and utilization of distance learning courses for disabled people using the MOODLE system. Specimen courses. Using the components of distance learning: Lesson, Task, Journal, Quiz, Hot Potatoes Quiz, Forum, Chat, Survey, Questionnaire, Voting and others. Teacher's competences in the area of distance education.

**Credit requirements:**

1. Acquiring theoretical knowledge and practical skills included in the course.

2. Preparing and defending a report on the evaluation of an educational programme based on test results and analysis according to evaluation criteria.

3. Development of a lesson plan (for a lesson, therapeutic class, form tutor periods), including the use of tested programmes during the lesson.

4. Development and presentation of an evaluation report about an educational website, based on test results and analysis according to evaluation criteria.

5. Development of a distance learning course for one of topics relating to education of disabled persons

6. Successfully completing at least one distance learning course, available on the department' distance learning platform http://moodle.weinoe.us.edu.pl formulated, prepared by a fellow student and its evaluation.

The course was successfully taught in the academic year 2008-2009. All the students of this specialization effectively fulfilled the credit requirements and defended their reports, acquired indispensable competence in using computer-communication technology in their future professional careers, and developed courses which are being used by a great number of users: persons with limitations of possibilities, therapists, form tutors, educators, parents of disabled children and so on.

Thus it can be concluded that the course, developed and implemented by the author, *"Information Technology in the work of a disabled person's assistant"* is a positive example of comprehensive and effective implementation based on information technology and the Internet, designed to prepare specialists, educators of new generation, who will successfully be performing their work duties in the contemporary context of information and knowledge society, using distance learning and teaching technologies and will also continue self-learning and improving their professional skills.

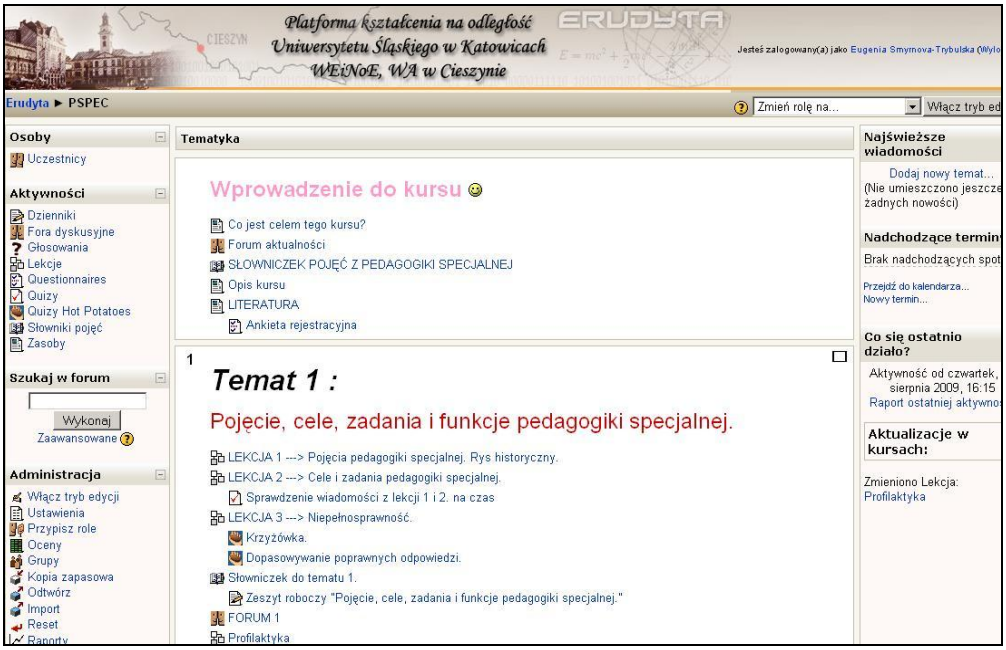


**Figure 6. Main page of the course called *"Special pedagogy"* (http://moodle.weinoe.us.edu.pl), developed as part of the course called *"Information Technology in the work of an assistant to a disabled person"***

Based on similar concepts, the author of the article also teaches such courses as "*Information technology in teaching ecology", "Information technology in teaching philosophy and social science*", which are offered in the second year of doctoral programmes for particular specializations, and comprise relevant topics and take account of the specific nature of individual fields of study.

The platform also offers such as distance courses as *"Distance learning"* and *"Developing distance courses in the MOODLE system"*, which are available free of charge to all those interested in obtaining tutor's competence: future and active teachers, post-graduate students, counsellors, teacher trainers, therapists, and others.

## 4. PLATFORM AS THE SOURCE OF EDUCATIONAL MATERIALS

As it was mentioned before, the platform also provides access to educational materials for students, teachers, post-graduate students, local residents and other people.

In the menu on the left side of the main platform page you can find available components of MOODLE system such as: *Vocabulary of useful ideas*, containing, in hypertext format, the most important passwords, ideas, and their definitions from pedagogy, psychology, computer science, media, and so on.

Resources called „*Useful publications and links*", contain a list of a few dozen of books, magazines, encyclopaedias, Internet addresses of educational portals, digital libraries, Internet magazines etc.., which can be beneficial for students, educators, as well as for all Internet users who want to learn and improve their pedagogical and information competence.

The Forum and Chat services allow users to engage in discussions, both in the synchronic and asynchronic mode, about all current topics and provide explanations for any questions that may arise. In the centre of the platform's interface there are folders with educational materials from different fields, developed formulated by academic staff. Users can access these materials without having to log on to the system and having to set up passwords. There are other resources and services which can be found after accessing the platform.

## CONCLUSION

Summing up all issues mentioned above, one should highlight the value and multipurpose character of the distance learning platform WEiNoE (FEaSE) in helping to identify right solutions for different educational, academic, social issues and so on that have proved to be difficult or impossible to solve in a conventional manner. At the same time it is worth mentioning that there is still large potential to be tapped and wide spectrum of tasks and projects which will be implemented in near or further future perspective through the active use of the platform, in particular: international project supported financially by International Visegrad Funds (IVF) "E-learning – as a road to the communication in the multicultural environment", implemented together with University of Ostrava (Czech Republic), Matej Bel University in Banska Bystrica (Slovak Republic) as well as support for all courses offered by the University of the Third Age; support for all courses run on full-time and extramural programmes; support for the disabled; organizing the competition "The best distance learning teacher (tutor) " and others.

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# EXPECTATIONS TOWARDS WEB-BASED DISTANCE EDUCATION TEACHERS

**Klaudia Błaszczyk**
Wyższa Szkoła Humanistyczna w Lesznie
Tylna 29/2, 65-413 Zielona Góra, Poland
K.Blaszczyk@wpsnz.uz.zgora.pl

***Abstract:****The article presents expectations among teachers who teach using the web-based distance education method. It explains the key issues for the topics: 'web-based distance education', teacher's competences and expectations. The following part of the article explains further requirements expected from the teacher in the field of information technology, which are the basis for on-line education. The last part of this paper addresses issues of teacher's professional competences, not directly associated with information technology, however, necessary for the effective implementation of e-learning.*

***Keywords:*** *web-based distance education method, e-learning, teacher's competences, expectations, information technology*

## INTRODUCTION

Each teacher commencing on work field of one's occupation must meet certain formal requirements in order to obtain employment in a school or other educational establishment. However, requirements such as graduation from a selected faculty, pedagogical background and completed pedagogical practice are not sufficient these days. The changes that have taken place during recent years have created new needs. One of them is the knowledge of information technology. Knowledge and skills that not so long ago were reserved only for a small group of specialists, in particular for computer science teachers, today are the requirements expected from every teacher. It is not a matter of raising the efficiency in educational methods only or making the classes more interesting by using multimedia presentations. Those expectations went even further. In the age of continuous education,

gaining the competences in the distance learning domain has become necessary for the teacher.

E-learning is gaining popularity and it is not a short-lived fad instigated by the popularity of the Internet, but a tendency which will gather pace and acquire more and more substance. It is no surprise in view of the fact that education online has numerous advantages, among which there are the following: broadly understood cost-effectiveness, concerned on the one hand with lower costs of education, and on the other hand with a growing number of students, flexibility of location and time, enhanced accessibility to didactic materials and constant benefit of updating and monitoring the achievements. On the top of all, there are also new forms of communication, which enable all-embracing contact with the teacher, both in case of synchronic and asynchronic model[1]. Naturally, there are also shortcomings that need to be reduced. However, it is clear that more and more schools and educational establishments are getting ready to accept this kind of education method. That fact confirms the growing role of e-learning.

## 1. E-LEARNING – CONFUSION IN DENOTATION OF TERMS

In the subject-matter literature there are numerous terms defining e-learning: distance education, distance teaching, tele-teaching, independent study, correspondence study, video-conferencing, distributed education, home study[2]. Most often they denote, according to J. Z. Górnikiewicz, „education executed in its prevalent part extramurally by means of various non-traditional, novel forms of organization, by the use of unconventional methods and technical solutions utilized to transfer information to remote locations'[3]. However S. Juszczyk focuses on the relationship between the teacher and the student in his analysis of e-learning processes, where e-learning is seen as a method of learning, which replaces the direct contact between the teacher and the learner with its indirect equivalent. To learn remotely is to absorb the required information without participation in formal

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[3] Szerzej:. J. Z. Górnikiewicz, Studia…, op. cit., s. 20; S. Juszczyk, Kształcenie na odległość (online), w: Encyklopedia Pedagogiczna XXI wieku Tom II, red. T. Pilch, Wydawnictwo Akademickie „Żak", Warszawa 2003, s. 874-875.

classroom instruction[4]. Each participant may tailor the curriculum of the course to his or her own needs and means, i.e. to choose the time, the location and the pace of work.

A more detailed definition is forwarded by D. Keegan, who having adopted Holmberg's and Moore's basic theoretical framework, has built on them six components of this method of learning: the separation of the teacher and the pupil; high quality work organization, especially in the planning of the course/training and the assembly of teaching materials; the use of technical media; allowing for mutual communication; allowing for the possibility of organizing seminars; participation in the most industrial forms of education[5]. To the list of mayor components B. Holmberg and M.G. Moore have added one more - the educational supervision of the organization[6].

Therefore, the distinctiveness of distance learning manifests itself in a completely different approach to the process of education, both on the part of learners and on the part of teachers. It is based on the concept of self-study and didactic supervision provided by the teacher, where the former decides to a greater extent on the course, content and pace of the educational process. It is the learner who must also display self-discipline and responsibility. Distance learning is vastly concerned with concepts of self-study, with elements of self-control, where the teacher is a mere supervisor providing elements of supervision and assessment. The contents of instruction mostly consist of text, enriched with some multimedia materials such as: illustrations, sound files, animations, video sequences, exercises, tests and internet-based assignments. Throughout the educational process the learner has access to consultations with the teacher, mostly on the forum of the course or less frequently through instant message communicators. The whole course of a particular training is handled by means of specialist software enabling the distance learning to be effective[7].

Nevertheless, the teacher who is going to teach using the web-based distance education method should first acquire the appropriate knowledge and skills, which will enable to carry out one's duty in an effective manner.

[4] J. Z. Górnikiewicz, Studia…,op. cit., s. 20.
[5] S. Juszczyk, Kształcenie…, op. cit., s. 872.
[6] J. Z. Górnikiewicz, Studia…,op. cit., s. 78.
[7] J. Kulasa, Nauczyciel, informatyk, menadżer – trzy aspekty rozwoju kompetencji w e-learningu, w: E-edukacja, red. M. Dąbrowski, M. Zając, Wydawnictwo Fundacja Promocji i Akredytacji Kierunków Ekonomicznych Warszawa 2003, s. 166.

## 2. COMPETENCE – TERMINOLOGICAL NUANCES

The most significant and simultaneously the most general expectation[8] demanded from the teacher is to be competent. What, therefore, contains this notion? It is not easy to define the term, as its meaning is somewhat ambivalent. Competence (Kompetenz in German, kompietencja in Russian) has its etymology in the Latin verb *competere* – be appropriate, compete, have a specified standing. The etymology seems to highlight the feature of the potential of a person, which measures his or her ability to undertake particular tasks[9].

The term „œompetency' or „œompetence' is frequently coupled with such terms as: skills, agility, qualifications, expertise, ability, preparedness. These are not equivalent terms, though. They merely limit the meaning of „œompetence' and relate it to a particular aspect.

In the subject literature there are numerous explanations of the term, which can be roughly divided into 3 groups of definitions[10].

The first group comprises definitions with instrumental character. They are based on such terms as: skill, agility, ability, with the annotation defining the abilities or skills as complex, enabling an individual to successfully complete particular tasks, to solve problems and overcome obstacles. Among the second group of definitions there are those which enrich the understanding of competence, seen as a disposition and whose significance cannot be limited to mere instrumental aspects, but is defined broader, together with the emotional and normative component, articulating positive and accepting attitude to a particular goal, situation or problem. In the third group there are so called complex definitions. They see competence as a complex disposition, being a conglomerate of knowledge, attitude, motivation, emotions and values. It seems, in this particular group we can find the definitions determine the most precisely teacher's competences. In that sense –competence is the ability to apply skills and knowledge to new situations in professional contexts; it also encompasses organizational and planning skills, readiness to introduce innovations, as well as ability to cope with unusual

[8] Expectation is defined as human's (social group) hope, who relied on their present objectives while counting on success. Expectation is rarely coincide with the anticipated result, since it is affected by the wishes and fears of the concerned person**.** N. Sillamy, Słownik psychologii, Wydawnictwo „Książnica", Katowice 1994.

[9] A. Męczkowska, Kompetencja. W: Encyklopedia Pedagogiczna XXI wieku Tom II, red. T. Pilch, Wydawnictwo Akademickie „Żak", Warszawa 2003, s. 693.

[10] K. Stech, Kompetencje zawodowe nauczyciela – spojrzenie na problem. W: Kompetencje nauczyciela wychowawcy, red. K. Ferenz, E. Kozioł, Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2002, s. 12 – 13.

tasks. The term also covers personality features, necessary for effective cooperation with other people[11].

Based on that short description one can infer that the term „competence' can be understood as ambiguous. There is no widely accepted definition of „competence', and its spectrum of denotation is relatively broad, as well as the broad requirements for the teachers.

Reviewing the modern typology of teacher's competency, it is possible to observe that the skills, where the web-based distance education competences are included, constitute an important issue. They can be found under several definitions, such as „computer science competence'[12], media and information science'[13] , „media and technical committees' terms[14]. E-learning is just one of many knowledge and skills areas covered with these names; however it seems that it is going to be increasingly stressed due to social needs.

## 3. TEACHER'S COMPETENCES IN THE AREA OF INFORMATION TECHNOLOGY

The basis for considering the expectations from the web-based distance education teachers is to get to know the requirements that the professional teachers should meet, in case of information technology described by „The Education Standards'. On grounds of the document, the *teacher* should obtain the general preparation in terms of information technology, as well as to be prepared for using it within acquired specialization – determined by the range of teaching methodology (course type)[15]. The educational program at the faculty of the pedagogics at the undergraduate level has recommended all together 30 hours of information technology training. The following topics as, the basics of computer science technology, text processing, spreadsheets, databases, managerial and/or pictorial representation graphics, information network services, acquisition and processing of the information should be completed

[11] C. Jeffries, R. Lewis, J. Meed , R. Merritt, Kształcenie otwarte od A do Z, Wydawnictwo Instytutu Technologii Eksploatacji, Radom, 1997.

[12] Za: D. Waloszek, Nauczyciel we współczesnej szkole – zadania, propozycje, rozwiązania, w: Pytania o edukację, red. D. Waloszek, Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2003, s. 110.

[13] K. Denek, O nowy kształt edukacji, Wydawnictwo Edukacyjne „Akapit", Toruń 1998, s. 215-217; J. Szempruch, Nauczyciel w zmieniającej się szkole. Funkcjonowanie i rozwój zawodowy, Wydawnictwo Oświatowe FOSZE, Rzeszów 2001.

[14] W. Strykowski, J. Strykowska, J. Pielachowski, Kompetencje nauczyciela szkoły współczesnej, Wydawnictwo eMPI$^2$, Poznań 2003, s. 32.

[15] Standardy kształcenia nauczycieli. Projekt z 15 lutego 2007 r.

within mentioned hours[16]. This very general overview shows the vast range of useful information related to limited number of hours during which it is supposed to be covered. When examining contents issues contained in „The Standards' from 2004 year, one can only confirm the preliminary observations[17].

Under the Information Technology subject the students should acquire the extensive competences. They stand for the base use of: terminology, equipment, software and information technology methods. They are obligated to, inter alia, learn about: the computer set construction and functioning in a way for the set of cooperating devices; get to know how to take the equipment into pieces in order to get educational experience and above all to be able to use it. It is also important to use Internet services with the educational purposes in order to collect information and communicate. You cannot miss such important issues as health and safety concerning work with the computer, especially when the present-day generation of youth is more and more afflicted with health problems associated with the sedentary way of life. In addition, the teacher is obliged to acquire the skills of fixing small hardware and software failures[18].

While gaining information technology competences, the teacher should also be able to use the software, prepare the materials and multimedia presentations, search for, collect and process information and communicate with colleagues and students. It is essential to extend and to improve the professional skills of using information technology, including web-based distance education[19]. Therefore, e-learning contains in the area of teaching skills which are not exhibited in a particular way, however, the very fact that it has been spotted in "The Standards' confirms the growing importance of this process.

Other skills that the teacher should gain while studying in the field of information technology related to the subject he or her teaches, include: the enhancement of their own skills, expanding the use of this technology, the use of common and professional software, as well as usage of information sources and databases enriched with communication process. All of this is

[16] Standardy kształcenia dla kierunku studiów: pedagogika. Studia pierwszego stopnia. Załącznik nr 78.
[17] Rozporządzenie ministra edukacji narodowej i sportu z dnia 7 września 2004r. w sprawie standardów kształcenia nauczycieli (Dz. U. z dnia 22 września 2004 r.).
[18] Ibidem.
[19] Ibidem. Por. też: W. Osmańska-Furmanek, M. Furmanek, Technologia informacyjna jako narzędzie w procesie rozwoju zawodowego nauczyciela. W: Informatyczne przygotowanie nauczycieli. Dylematy kształcenia ustawicznego, red. B. Kędzierska, J. Migdałek, Wyd. RABID, Kraków 2001.

required in order to achieve maximum benefit from the use of educational technology in the specified knowledge field. Obviously, critical evaluation information technology tools and methods are needed, as well as students' preparation for correct use of information technology, to active learning and creativity[20].

Considering the information technology issues by teaching profession and responsibilities associated, the important human, ethical, legal and social aspects cannot be ignored, as they affect the process of learning via the Internet[21]. It is obvious that the teacher is obliged to comply with the ethical standards not only at school but also in cyberspace.

Only then can one indicate the right work direction of his or her students, as well as protect them from danger, as it is well known, the Internet is not only the knowledge or entertainment source, but also is a place of a numerous risks waiting for young people. For this reason, the teacher has a moral obligation to ensure the appropriate use of this mean of communication by the students, to alert their awareness to the danger arising from unrestricted access to the Internet, to indicate the legal and ethical standards that are required to surf through the network. Finally, such important aspects as the mental and physical health of young people[22] cannot be ignored. To make the students aware of the need to care for themselves is also the teacher's responsibility.

The above-mentioned competences required from the teacher include the competences closely connected with information technology. They are extremely important and necessary in web-based distance education training, however, are not sufficient for effective education of the young generation. Each teacher who is just beginning the remote teaching process, should first obtain the knowledge, skills and experience assigned to "stationary teaching" i.e. face-to-face or traditional classroom instruction. The competences including daily school teaching are the basis for e-learning. It seems that experience gained in school reality will provide to the teacher the possibility of becoming well qualified for the web-based distance education.

[20] Rozporządzenie ministra edukacji narodowej i sportu z dnia 7 września 2004r.w sprawie standardów kształcenia nauczycieli (Dz. U. z dnia 22 września 2004 r.).
[21] Ibidem.
[22] Ibidem.

## 4. TEACHER'S PROFESSIONAL COMPETENCES NECESSARY FOR WEB-BASED DISTANCE EDUCATION

A teacher who intends to teach by the method of e-learning should acquire some experience with traditional methods first. Competence in subject-matter is indispensable for obvious reasons. He must know and understand the contents of his subject, which must be constantly broadened, deepened, updated and selected. Such preparation vastly influences the level of flexibility with which he will tackle particular areas of taught knowledge, and with which he will choose suitable teaching methods to the benefit of all parties involved in the process. Indisputably, nowadays it is of vital importance to broaden one's subject-matter, as well as supplement it and couple with other relevant areas of knowledge[23]. It is a precondition for proper understanding of the world and ongoing changes.

The competence mentioned above is closely linked with didactic competence, which is the knowledge about the rules and methods of implementation of didactic instruction and their application in real life classroom situations. Such competence guarantees effective work with students, including those learning in the distance learning mode. That is why a teacher should be first successful with traditional methods, and then, supplemented with the ins and outs of e-learning, he can undertake it with confidence[24].

Another group of competences useful for an e-learning teacher are labelled as psychological and pedagogical competence. The knowledge and skills within these 2 realms enables the teacher to solve problems efficiently and cope with difficult situations. It facilitates the process of acquainting with learners, the process of organization of educational procedures and the process of supervision of achievements. It is important that a university teacher has the ability to lead a group and solve problems within a group before he or she undertakes distance learning[25]. He must be a leader and a guide[26], as well as a friend. This will lead to better relations between all participants of the course, not only in the cyberspace, but also in the real world, where they also fall within mutual interaction.

Teacher's profession has autoeducation competence written into it, especially nowadays. As a teacher bears responsibility for the education of young

[23] W. Strykowski, J. Strykowska, J. Pielachowski, Kompetencje…, op. cit.
[24] Por. M. Zając, W. Zawisza, O potrzebie określenia kompetencji nauczycieli podejmujących kształcenie online, "e-mentor" 2006, nr 2 (14), s. 26.
[25] W. Strykowski, J. Strykowska, J. Pielachowski, Kompetencje…, op. cit.
[26] Z. Kwieciński, Tropy - ślady - próby. Studia i szkice z pedagogii pogranicza, Wydawnictwo „Edytor", Poznań-Olsztyn 2000, s. 17.

generations, it is of utmost importance for him to maintain high standards of knowledge and skills, not only within the realm of his subject, but also outside of it in neighbouring areas[27], psychological and pedagogical knowledge and obviously knowledge and skills related to e-learning. These days, only perpetual development will secure an up-to-date relationship with the surrounding world.

Communicative competence makes up another major group of competences in e-learning. It is knowledge, but also a set of skills related to communication defined as efficient reception and transmission of messages[28]. It is mainly communication between the teacher and his learners in case of a university environment, but it is also worth remembering that we communicate things not only through what we say, but also through what we do. Information in the process of communication is transmitted in the form of verbal and nonverbal messages, i.e. mimes, gestures, body movement, tone of voice, look and spatial distance. The recipient sees these signals and on the basis of his own competence, needs and emotions sends out his or her own message. But what if the sender and the recipient cannot see each other? That is when we deal with indirect communication by means of media, in this case the Internet. In such circumstances it is easy to make mistakes in communication, leading to distortions and disruptions. Therefore, it is of utmost importance to make messages clear and unambiguous and to learn to maintain a skilful dialogue pertaining to complete mutual understanding. It is advisable to paraphrase, which will confirm the understanding of the message from the sender. The process of education is an ongoing process of communication, even if it is not maintained face to face, it still calls for the teacher to possess, maintain and develop explicit skills throughout his or her professional career.

Competence in planning and designing proves to be useful in the process of online education. It is the skill of creating one's own curricula, lesson plans, achievement tests, course evaluation, adaptation of ready-made curricula to the requirements of e-learning, by means of Internet resources and electronic databases[29].

The competence of designing and assessing of curricula constitutes another important area, useful in e-learning reality. The teacher should acquire the knowledge and skills of creating his or her own e-learning courses, together

[27] Szerzej: W. Strykowski, J. Strykowska, J. Pielachowski, Kompetencje…, op. cit.
[28] Por. Z. Nęcki, Komunikacja międzyludzka, Wydawnictwo „Antykwa", Kraków 2000.
[29] M. Zając, W. Zawisza, O potrzebie określenia kompetencji…, op. cit., s. 26.

with didactic materials for their participants[30]. It is also important to possess the skill of critical analysis of one's own course. This aspect however, often proves to be difficult for the author, as he is often emotionally attached to his own material and has difficulties in distancing himself from his own ideas. Therefore, there is a need of external support to provide some unbiased, competent and critical analysis.

Controlling and assessment of students' achievements constitutes another group of competences indispensable in e-learning. Evaluation is an essential element in a well organized process of education, be it stationary or distance learning. It is therefore crucial to employ appropriate diagnostic tools, their proper implementation, interpretation of results and their further projection onto the continuity of the whole process. Evaluation „in an ideal situation leads to constant internal quality control and to its regular upgrading'[31]. We must not forget about one more key element, which is informing students about the criteria of assessment beforehand[32]. It seems that both in education online and in stationary education, it is important to control regularly and systematically, which enhances students' motivation and involvement in learning, as well as to undertake future tasks.

## CONCLUSION

The present time imposes high expectations on teachers. They are supposed to be experts in their field, educators, tutors, managers, translators, guides, advisors, coordinators, organizers and computer specialists. Some of these roles have been known to the teachers from generations and they get used to carrying out the tasks involved, however, the new challenges bring a lot of difficulties. One of those challenges is e-learning.

Even though web-based distance education has been known for many years, for some teachers it still seems to be a relatively new development. It is clear that this method used in education process is getting more and more rooted in the Polish school and with the high probability, it can be concluded that, sooner or later, most of the teachers will be confronted with it. There exists a clear need among the teachers to ‚get friendly' with information technology, which is the base for e-learning. This task is much easier for younger teachers to whom working with the computer and with the Internet it is everyday life

[30] Ibidem.
[31] I. Nowosad, Autonomia szkoły publicznej w Niemczech. Poszukiwania – konteksty – uwarunkowania, Wyd. Uniwersytetu Zielonogórskiego, Zielona Góra, s. 225.
[32] W. Strykowski, J. Strykowska, J. Pielachowski, Kompetencje…, op. cit.

routine. Studying at the university can be an additional convenience, due to the fact, that the teachers can broaden their knowledge in this field. But what about the teachers who have been raised without this particular mean of communication? It concerns those who for many years have been working as teachers without using any other teaching aids than chalk and a table. It seems that an effective way for studying this area of knowledge might be a training course, however important is the right motivation and confidence in teachers' own capabilities. Only the appropriate attitude and commitment will help to achieve the expected results. Although the completion of the course itself will not provide expected success. As in any other field, continuous improvement of acquired skills is necessary. The chance exists when the teachers using web-based distance education method will reach the satisfactory level of their work, not only for themselves but also for the students and the entire society.

The outline of competence necessary for an online teacher presented above is obviously not complete[33]. Unquestionably, every researcher examining the area would suggest other skills indispensable in the area. I trust however that the brief outline may, however modestly, constitute some assistance for those teachers who decide to face the worthy challenge of e-learning. Presented outline of the competences, which may be useful to the teacher learning oneself, how to teach others using web-based distance education method is obviously not entirely completed. Certainly, every researcher dealing with this issue would have suggested any other necessary skills concerning area of teaching abilities. Nevertheless, I hope that this brief sketch, although in the minimum way, can provide the help for teachers undertaking this important challenge.

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# IV. MULTIMEDIA AND E-LEARNING SYSTEMS IN DISTANCE LEARNING

## E-LEARNING AND ITS MULTIMEDIA AND CONTROL SUPPORT AT SCHOOL OF BUSINESS ADMINISTRATION IN KARVINÁ

**Jindřich Vaněk**
University of Silesia in Opava, School of Business Administration in Karvina, Univerzitni nám. 1934/3, 733 40 Karviná, Czech Republic
vanek@opf.slu.cz
**Petr Suchánek**
University of Silesia in Opava, School of Business Administration in Karvina, Univerzitni nám. 1934/3, 733 40 Karviná, Czech Republic
suchanek@opf.slu.cz

***Abstract:*** *E-learning has become standard and brought new possibilities to all forms of education. It is used in companies and at universities. At universities there are many successful projects to support e-learning. An example of this fact is to be found at the School of Business Administration in Karviná (OPF). E-learning is considered to be controlled education. In this respect, at universities there are many projects with the aim of the computer classrooms with a central controlled system realization. Originally, controlled education was primarily used for the support of language education. At present, controlled education is successfully used in the all subject´s education in present form such as in distance form of study. It is necessary to keep all conditions during the e-learning study materials creation. Fundamental components of e-learning study materials are multimedia. Interactive multimedia and e-learning are extremely powerful and flexible tools. Multimedia contributes to heighten the effectiveness and plasticity of e-learning electronic study materials. Standard components of e-learning study materials are video files, photos, images and sound. These elements have to be developed with the usage of powerful multimedia*

*computers and peripheral components. In this article, software for the multimedia creation used at OPF is presented and current state of e-learning support at OPF is described.*

***Keywords:*** *e-learning, multimedia, e-learning study materials, multimedia software, classrooms with the controlled education.*

## INTRODUCTION

E-learning is a convenient alternative of the classical education. It can be generally observed that it does not show such an effectiveness as the classical education but it is characteristic for a number of advantages, of which the financial takes the first place. The e-learning minimises or eliminates transport, accommodation costs and other travel expenses, as well as education rooms rent costs and lecturer's remuneration, etc. E-learning is a catch-all term that covers a wide range of instructional material that can be delivered on a CD-ROM or DVD, over a local area network (LAN), or on the Internet. It includes Computer-Based Training (CBT), Web-Based Training (WBT), Electronic Performance Support Systems (EPSS), distance or online learning and online tutorials. The major advantage to students is its easy access.

The e-learning in the Czech Republic corresponds with the development and utilisation of e-learning in the adjacent countries, Poland and Slovakia. The local development of e-learning systems commenced later than in some western countries but despite this in many cases no transfer of their experience has been observed. This in some cases has led to development of inapplicable e-learning systems. In the Czech Republic as well as in other countries e-learning is utilised in educational and company environment.

Foundation-stone of e-learning courses is multimedia. It became standard that all e-learning courses are developed as a multimedia presentation. Multimedia contributes to heighten the effectiveness and plasticity of e-learning electronic study material.

## 1 MULTIMEDIA AND E-LEARNING

Multimedia is multiple forms of media integrated together. Multimedia is often considered to be the most misused term in online learning. Multimedia refers to computer-mediated information that is presented concurrently in more than one medium. It consists of some, but not necessarily all, of the following elements [2], [3], [4]:

- text,
- still graphic images,
- motion graphics,
- animations,
- hypermedia,
- photographs,
- video and
- audio (sounds, music, and narration).

Interactive multimedia and e-learning are extremely powerful and flexible tools for the traper. Virtual classroom technology can be used to achieve blended learning where face-to-face contact is physically impossible. The interactive multimedia or e-learning elements can be used for pre-course work, refresher training, interactive visual aids to support a live course in a blended learning context.

Multimedia requires enough efficient facilities. Especially there are powerful computers with all peripheral equipments. Electronic study material for e-learning usually need system generally called digital studio. Digital studio is equipped with a broad collection of multimedia equipment that allows presenters to utilise diverse media.

## 2 E-LEARNING AT SCHOOL OF BUSINESS ADMINISTRATION IN KARVINÁ

At the School of Business Administration in Karviná (OPF) there are approximately 3300 students, of which 300 students are enrolled in the distant form of study with help of e-learning. Should we add the courses tutors, we will get to the number 300 people. At the present time these students are in three years of the bachelor study and they study "Marketing and Management“ and “Economy of Enterprise in Trade and Services”. Students are also offered the accredited majors "Finance", "Public Economy and Administration" and “European Integration”. Regarding the study organisation, all the 300 students must have an access to LMS (Learning Management System), where a problem-free operation must be ensured. At different universities in the Czech Republic the numbers of students may be considerably different.

Under the university education in the e-learning form, it may not be ignored that the electronically processed study materials can be effectively utilised also for the full-time study forms. Practically all tutors at universities are university pedagogues and the materials which they developed for e-learning

are often used in their full-time courses. In this regard, LMS faculty network, web interface, servers, computer classrooms and so on, have to be offered sufficient capacity susceptible continual system run.

## 3 SOFTWARE FOR THE CREATION OF ELECTRONIC STUDY MATERIAL USED AT OPF

E-learning study materials are very often developed with the aid of MS Word, MS PowerPoint, Adobe Acrobat and other programmes. These applications are relatively easy for the operating but they are not primarily determined and sufficient for support of knowledge presentations creation. [6] At OPF all e-learning electronic study material are created with the following software products:

1) **Toolbook Instructor** - ToolBook Instructor is a professional e-learning content authoring standard and a leading solution for producing interactive content, assessments, and software application simulations. The content is deployed as HTML for distribution on the Internet or an intranet, delivered through SumTotal Learning Management solution, or any SCORM or AICC-compliant Learning Management System (LMS). All the learning courses created can be viewed interactively on major operating systems, web browsers, mobile phones and devices. ToolBook Instructor comes as a standalone application and is bundled with a capable PowerPoint add-in. The extensible object oriented programming environment contains programming language OpenScript, action editor, script debugger (alternative of Java script writing) and object browser. ToolBook offers possibilities of exporting courses into DHTML, video and audio streaming, animations and simulations development and supports large number of standards (AVI, WAV, MIDI, MPEG, QuickTime, SMIL, MP3, RealPlayer G2, Windows Media Player, Flash Player, OLE and the like). Courses developed in ToolBook 8.1 support AICC standard, version 2004 also SCORM. [5]

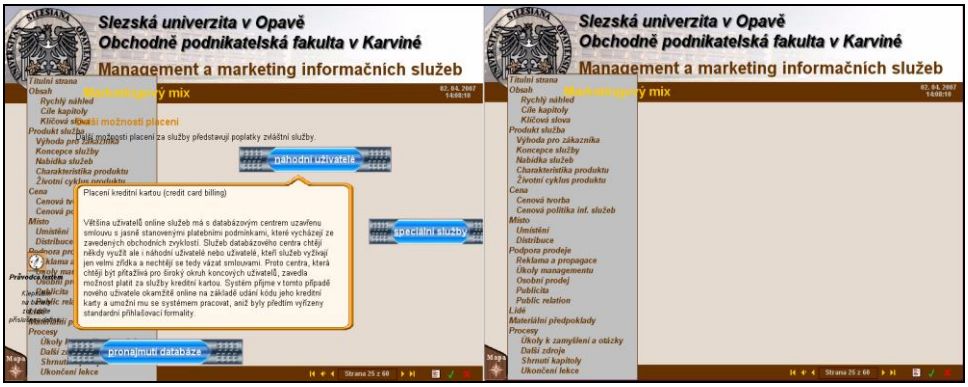
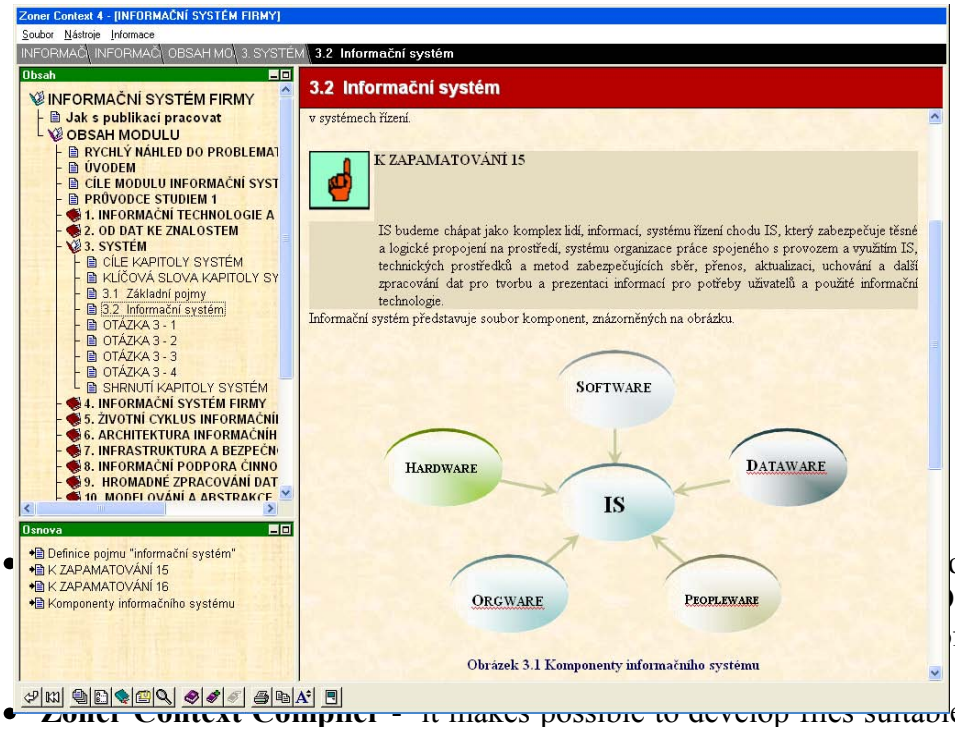



**Figure. 1. Page in edit mode and its background.**

**Source: own**

2) **Zoner Context** – is a Czech comprehensive system for development and presentation of hypertext publications. Zoner Context 4 from composition 4.0.111 supports the export of documents in XML. The structure in XML is adapted to be imported into the system of electronic education LMS eDoceo. Zoner Context is made up of three fundamental subsystems:




- **Zoner Context Compiler** - It makes possible to develop files suitable to

**Figure 2. Electronic publication in Zoner Context (One of study materials at OPF). Source: own**

- **Zoner Context Viewer** – is a browser of compiled publications. In this system, one can use searching, index lists and remarks. The system makes it possible to perform full-text searching (with language analyses).

3) **Authorware** - is a leading visual authoring tool for creating rich-media e-learning applications for delivery on corporate networks, CD/DVD, and the Web. It can be used to develop accessible applications that comply with learning management system (LMS) standards. Being both AICC- and SCORM-compliant, Authorware can be used to deliver content via any AICC or SCORM Learning Management System. Authorware can interpret both its built-in proprietary scripting language and JavaScript version 1.5.
4) **Dreamweaver** - is a web development application. Recent versions have incorporated support for web technologies such as CSS, JavaScript, and various server-side scripting languages and frameworks including ASP, ColdFusion, and PHP.
5) **Flash** - can manipulate vector and raster graphics and supports bidirectional streaming of audio and video. It contains a scripting language called ActionScript. Several software products, systems, and devices are able to create or display Flash content, including Adobe Flash Player, which is available free for most common web browsers, some mobile phones and for other electronic devices (using Flash Lite). The Adobe Flash Professional multimedia authoring program is used to create content for the Adobe Engagement Platform, such as web applications, games and movies, and content for mobile phones and other embedded devices.
6) **Captivate** - is an electronic learning tool for Microsoft Windows which can be used to author software demonstrations, software simulations, branched scenarios, and randomized quizzes in .swf format. It can also convert Adobe Captivate generated .swf to .avi which can be uploaded to video hosting websites. For software simulations, Captivate can use left mouse clicks, key presses and rollover images.

Standard components of e-learning study materials include video files, photos, images and sound. These elements have to be developed using powerful multimedia computers and peripheral components. In 2002, there was realized project intent on the realization of digital studio with support of Fund of University Development. In terms of it, digital studio at OPF was implemented. It was the first step to support of multimedia application. Digital studio was realized as system consist of two powerful computers and peripheral components such as video, video-camera, digital camera, microphone, scanner, visualizer, tablet, printer, video digital cutting card and

the like. One of computers is dedicated for the digital cutting and modeling and the second computer for rendering. Rendering is the process of generating an image from a model, by means of computer programs. The model is a description of three-dimensional objects in a strictly defined language or data structure. Two computers system makes partition of load possible and it leads to process time reduction. Since the time, digital studio was under the up-grading several times and many other studios came in to being at OPF. At present, there are available and the mostly used next software:

1) **Adobe Premiere** - is a real-time, timeline based video editing software application. It is part of the Adobe Creative Suite, a suite of graphic design, video editing, and web development applications. Premiere Pro supports high quality video editing at up to 4K x 4K resolution, at up to 32-bits per channel color, in both RGB and YUV. Audio sample-level editing, VST audio plug-in support, and 5.1 surround sound mixing are available for high audio fidelity.
2) **Pinnacle Studio** - is a non-linear video editing software application. Studio allows users to author video content, create VCD/DVDs with menus and burn them without the need for any additional software. Pinnacle Studio may be purchased separately, but is also included in bundled packages with various video capture hardware devices. These include analog and digital capture, either as PCI cards or connection via USB. In September 2007, Pinnacle released new versions of their Moviebox devices, including HDV and AVCHD support, shipped with their new Studio products.
3) **3D Studio Max** - is a modeling, animation and rendering package.
4) **Adobe Photoshop** - is a powerful graphics editing program (also known as a DPP, Desktop Publishing Program).
5) **Corel** - is a vector graphics editor.

In many cases, especially for the conversions between different file formats, freeware software can be used. At OPF we have good experiences with Gordian Knot, VirtualDub, Tmpgenc and quite a few of the other. Results from shown freeware software are not different from usually expensive commercial software.

## 4 CLASSROOMS WITH THE CONTROLLED EDUCATION AT OPF

Since 2003, there were developed multiple-use multimedia computer classrooms at OPF. At present at OPF, there are 8 multiple-use multimedia

computer classrooms with 120 students´ and 8 teacher´s computers. By the year 2009 end, number of computer classrooms will increase and 2 computer classrooms with 44 students´ and 2 teacher´s computers will come in to being. Older computers in current computer classrooms are continuously under the up-grading. For the purpose of controlled education and there were installed systems [7]:

- CSS NET,
- EBS Videodidact,
- SANAKO Study 1200,
- SANAKO Study 500.

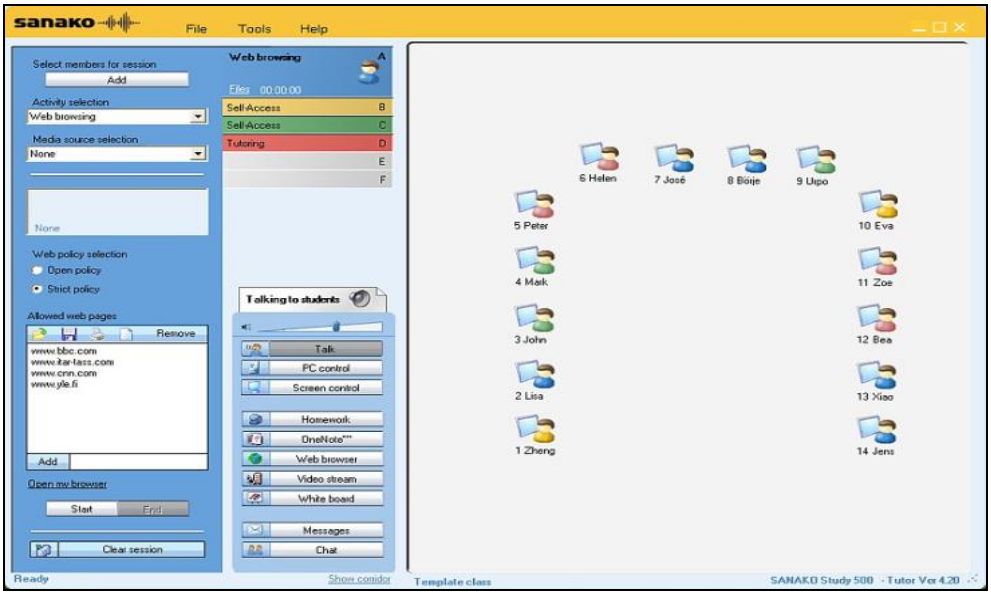



**Figure 3. SANAKO Study 500 Tutor application.**
**Source: www.sanaco.com**

EBS Videodidact is a Computer Classroom Management System (CCMS) allows the instructor to gain total control over the classroom. SANAKO Study supports teacher-led classroom interaction for the effective teaching of any subject (Fig. 3, Fig. 4). Teachers can take command of students' screens and monitor their work and easily launch and close applications for students.

Originally a controlled education was primarily used for the support of language education. At present, controlled education is successful used in the all subject´s education in present form such as in distance form of study.

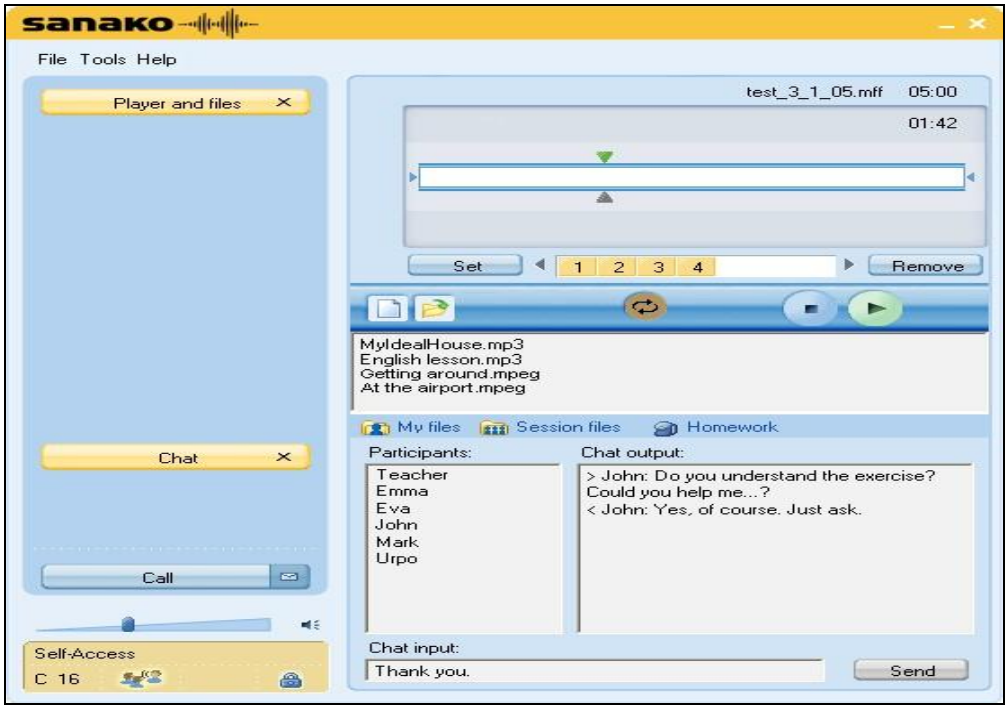



**Figure. 2. SANAKO Study 500 Student application**
**Source: www.sanaco.com**

## CONCLUSION

Modern information and communication technology (ICT) and e-learning are in current indispensable part of academic environment. Fundamental condition is development of an environment to support all activities and processes associated with e-learning electronic study material creation, its distribution and last but not least controlled education. Creation and presentation of e-learning electronic multimedia study materials demand on special software. At OPF there are many software products designed for e-learning and multimedia components creation. At OPF and we can suppose at the other universities, there is general aim to increase number of students in distance form of study. In this respect, it is necessary to insist on development of the all components used to support e-learning and ICT.

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[10] http://www.wikipedia.org

[11] http://www.school-for-champions.com/elearning/whatis.htm

[12] http://www.trainingmultimedia.co.uk/

[13] http://www.sanaco.com

# E-LEARNING AND TRAINING FOR THE SUPPORT OF COMPETITIVE ADVANTAGE IN PRACTICE

**Milena Janáková**
Silesian University in Opava, School of Business Administration in Karvina
Univerzitní nám. 1934/3, Karvina, Czech Republic
mija@opf.slu.cz

***Abstract:*** *Web-based multimedia software makes effective tools for the development of instructional materials and documents. A number of commercial and free download products such as Free Screen Recorder, AVI Screen Capture, Adobe Captivate, or Power Point are available. Students and other persons involved in education have enough space get to know the given subject regardless of place, time, and specified tutorials with teachers. These advantages are useful for learning at universities as well as in small and midsized firms and organizations in using database systems. The database systems offer levels of adaptation that support competitive advantages with flexibility, agility, scalability, and visibility.*

***Keywords:*** *education, simulation training, database systems, competitive advantage*

## INTRODUCTION

Quick development of new technologies, globalization, and internet application in information systems have influenced firm's activities, organization, and of course, education methods at universities. New technologies intervene into the lives of each of us. Students and other persons with interest about knowledge from the area of database systems have to gain access to their disposal specialized books, manuals, and web pages. The better orientation in themes offers multimedia presentations and simulations. The simulation training constitutes an effective method for resolution of the ever-repeating queries of students and users of supported and upgraded software packages. It is needed to entertain a level of support intuitive control and integration with e-learning applications for select acceptable software.

Useful aspects are virtualization and the use of dynamic elements in multimedia presentations and simulations.

The materials created in form multimedia simulations are used for visual demonstration of new products, software, or needed methods in a given interface. The selection of form multimedia simulation rests on the importance of materials and on the final group of students. Multimedia simulation helps with training in different locations, studies of various levels of students or working students, and provides answers to repeating questions. These advantages are based on visualization and on-line access to the Internet. The information is everywhere, but knowledge is difficult to get. Education and training with multimedia simulations help to gain knowledge quickly and transparently with minimum costs.

Not only students, but also entrepreneurs in small and midsize firms hesitate before using powered database systems. They are not educated. University and e-learning programs can help. A clear description of contributions is necessary to the wider use of traditional database systems in organizations with all the advantages. These advantages help to break down barriers in the area of data processing with optimal base for the use of Business Intelligence systems or integrating Customer Relationship Management.

## 1. ADAPTATION METHODS OF DATABASE SYSTEMS

It is easy to say, that a database is a collection of data. This database is created with the goal to save and get needed information. The key for resolving various problems with proceedings information is the database server. A database server is usually created for information management with a lot of data in a multiuser environment and competitive access to the same data. A good example is the Oracle database system with elastic and effective ways for information management and designed application. This option is not the final preference to ensure quality and dependability. There are numerous applications for cultivating masses of data and they do not work with classic SQL databases. These databases are ***non-relational databases*** with trend cloud computing and new web applications. [8] These tool groups do not respect the traditional, relational model and offer certain facilities for user needs.

This access effectively derives benefits from the situation that a multicultural global society needs quick and elastic solutions. Traditional methods for modeling and data processing with database systems have relatively difficult methods. These methods make implementation database systems and other

technologies harder. To these resolutions belong data normalization and distribution tables into a few parts. The benefit is a low demand for disk space. Disk space is relatively accessible in today's information society and data normalization does not bring such benefit. The situation is similar for the JOIN statement. Some non-relational databases are economical and offer base statements like insert, update, and delete. Other non-relational databases have a cluster or they are accessible as a service. These products are, for example, Amazon SimpleDB, Apache CouchDB, or Google App Engine.

The traditional database specialists have doubts whether such *implements of* these non-relational databases in areas such as banking or health care are good. These implementations need serious information management. Entrepreneurs and owners of small and midsized firms have analogous doubts when implementing database systems like Oracle. The reason is different. The doubts are evoked by the estimated demand factor for implementation and operation of database systems. A solution to these doubts is knowledge of the actual situation and (+the necessity) to have defined methods for implementation of a classic or other type**s** of database. ***Traditional Oracle database system*** uses Oracle grid architecture. The Oracle database is the first database designed for enterprise grid computing, the most flexible and cost effective way to manage information and application. [9] This architecture helps to create springy information systems. The computing groups of independent hardware and software components are connected and reintegrated on request of dynamic changes of the business sphere with grid architecture.

This architecture is applied in the Oracle Enterprise Manager interface for management database systems. Visible adaptation rests on accessing a user-friendly interface for servicing all methods with a few clicks of the mouse. The Oracle Enterprise Manager interface offers such web pages as (Database Instance Home page) with seven subpages: Home, Performance, Software and Support. For example, structured view to Server activities in the form link labels is displayed in figure 1. Conventional management methods need an SQL statement and the user must know their syntax, the given attributes, and running method. This requirement isn't needed now. For example, these web pages can easily build user-benefit interfaces for the control of existing storage objects, database configuration, or security area. In the ***Storage section*** on the ***web page Server of Database Instance Home page*** are *link labels to Tablespaces, Control Files or Datafiles*. These are one of the base link labels because every database consists of one or more tablespaces. A tablespace is a logical structure, consisting of one or more datafiles or tempfiles. [10] The traditional type of tablespace is a smallfile tablespace.

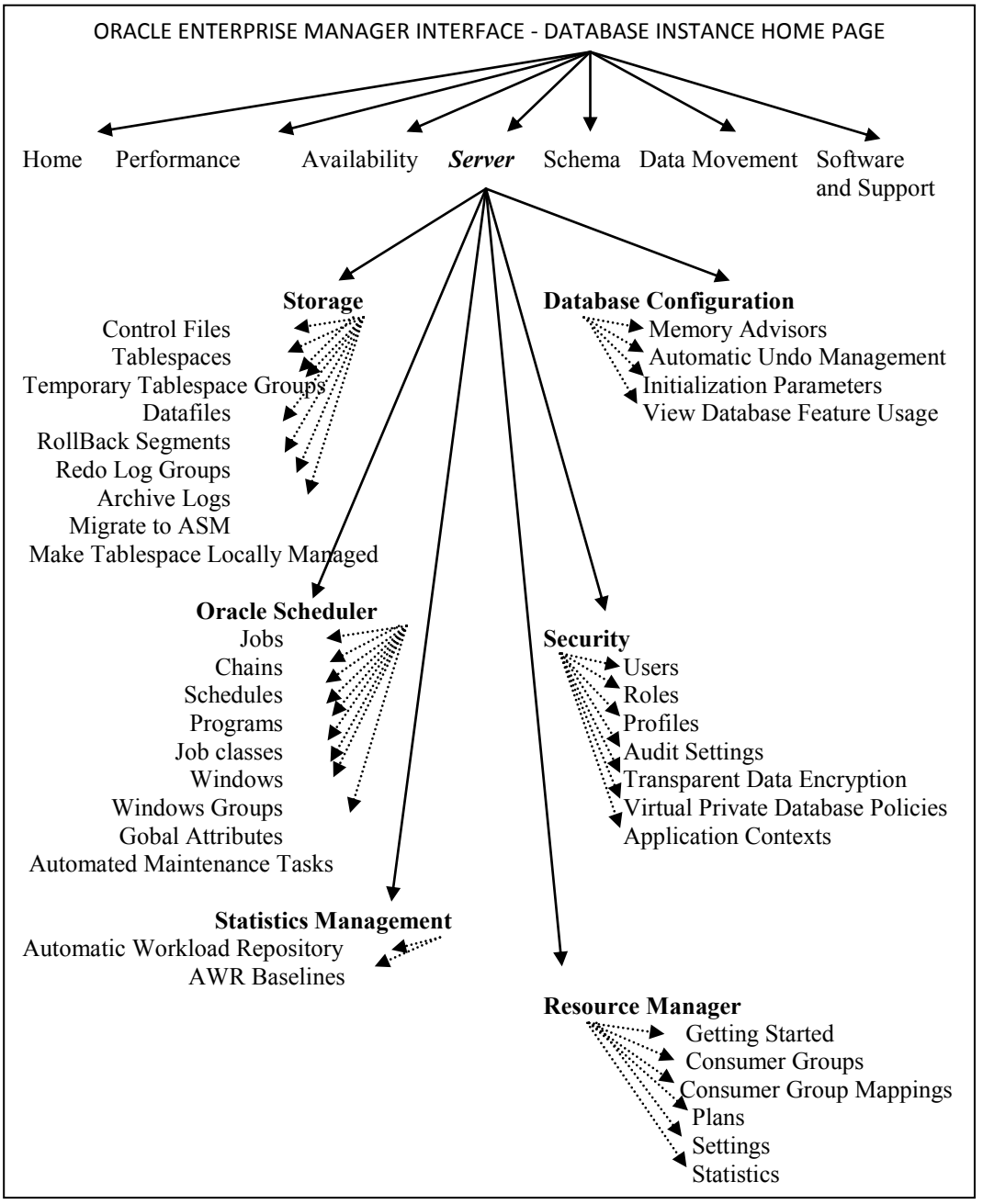


**Figure 1. A structured view of the Server offered activities**

A tablespace is generally online and its users can access information in a tablespace. The Oracle database has physical datafiles, which take in all the

database data. The fact that a datafile is associated with only one database is a characteristic of datafiles. Some characteristics of datafiles are possibly to set automatically. Every Oracle database has a control file. The control files include the database name, names and locations of datafiles, redo log files, and a time stamp of database creation. Oracle simultaneously maintains a number of identical copies of the control file to protect against the possibility of an error. The control file is used for database recovery.

The next useful link label is *Memory Advisors* in the ***Database Configuration section*** on the same page. It is helpful for work with memory – monitoring and setting. The size of the instance memory structures affects the performance of the Oracle database server and is controlled by initialization parameters. [10] Memory parameters are automatically set up within the database installation process. The Oracle database produces alerts and advisors to identify problems of memory sizing. Such information helps with determining optimal values for memory parameters. The instances and other methods of work with database systems mentioned above are effectively presented by multimedia simulation training.

## 2. SOFTWARE FOR SIMULATION TRAINING

First-rate simulation training needs corresponding software (utilities), which respect the requirements of tutors and clients (students). A number of commercial or freely accessible software for simulation training is available on the Internet or with special distribution. Adobe Captivate, AVI Screen Capture, BB FlashBack, CamStudio, Free Screen Recorder, or classic PowerPoint are the best known utilities. Free download utilities for recording are available on publicly open Web sites, as for example www.stahuj.cz. Offered utilities are dedicated to record all activities in the application window or on the computer display. They are all recorded by moving a mouse, opening windows and menus. Urgency preference is adding sound and personal comments or notes.

Offered utilities are acceptable for demonstrating given programs, building tutorials for using new products and services, and for recording a “how to use” method to solve repeating situations during application of software products. This software makes it possible to:

- Record all displays or a given window,
- Effectively work with video recordings for setting animations,
- Easily add graphic objects, text fields, annotations, darts, or stamps,

- Transform inserted objects by moving, changing orientation or size,
- Fully work with text in static or dynamic objects with using defined styles,
- Support file sound with the inclusion of control speech power,
- Delicately control individual animations,
- Work with time dimensions,
- Import record sequences with compression, cropping, scale, and color correction, and
- Support Microsoft Access Accessibility for creating simulation training for people with disabilities.

Some of the available utilities are distributed directly for use. For example, AVI Screen Capture must be downloaded and unpacked; afterward can the user (tutor) run the downloaded software. The output file is usually in various formats like Flash, AVI, WMV, sometimes PowerPoint, and of course individual running EXE files. Flash MX constitutes a standard for creating multimedia presentations and simulations for the web interface. These presentations are small, dynamic, and interactive for execution in web browsers.

## 3. BENEFITS OF E-LEARNING IN PRACTICE

Classic or modern methods with visualization support are used for information systems development. Information systems must be highly adaptable if they are to satisfy user's complex and rapidly evolving requirements. [5] Their users must know how to work with these products of information technologies. The solution is to build multimedia simulation with a given sequence of activities: record-given actions in a selected software interface, edit recording, output file generation, and running a multimedia simulation with a web browser. ***The basic benefit of multimedia simulation is the ease to gain knowledge for the application of new methods.*** It is important because users (students and owners of small and midsized firms) have ***sufficient space to think about new products and services***, ***and this brings the next essential benefit***. Correct implementation of information technologies helps with seeking new possibilities – removing market barriers, support decision with tools like Business Intelligence (BI) and Customer Relationship Management (CRM), and of course, better communication between clients and firms and organizations.

Clients and their data are the epicentre of security operations and the application of various systems. Small and midsized organizations have optimal database systems without a view on scope. *Searching for new opportunities and removing market barriers* require the analysis of free data with the goal to get an unhoped-for relationship. Modern database systems offer useful tools and interfaces for working with information and designed applications. This interface serves for effective access to database systems in organizations and in education as well. The modern and dynamic multicultural environment needs optimized database systems and the distribution information on the needs of users with links to Business Intelligence and Customer Relationship Management tools. Effective application information systems need active knowledge about available software products, given elements, and functions. Instructions are extremely important for business people from small and midsized firms. The instructions must be custom-built and they must contain a unique sequence of steps (periods) for the implementation of better quality software products. Quality software products contain the results of human knowledge. Education modernization uses selected products linked to trends of database and information systems.

Customer relationships are an important area of every firm and organization. Applications for this area are linked to *Customer Relationship Management* (CRM). Fixed clients are valued and are an important asset. These clients bring continual sales and they recommend offered products and services to new clients. Optimal relationships are solved with acceptable care about clients. This care is more than frequently sending promotional materials or offers. The key is analysing a client's experience in relation to firm. [15] The contact is mapped with special scalable and emotive metrics. Emotive metrics are important for controlling seriousness and prestige of given firms. The theme "Advocacy in the customer focused enterprise" is developed in a study by IBM and it is available on www.ibm.com. The authors of this study defined four dimensions that outline how a client feels about a firm. These dimensions are scalable power, products and services, point of contacts, and emotive power.

Information technologies offer new occasions to *simplify communication between users and clients* around the world and support developing partnerships. This situation has positive influence on the intensity of revenue from sales – it is mentioned that it intensifies on-line sales as far as 20%. [3] This limit encourages research workers from MIT to think that business people will use web pages with automatic personalization. These web pages apply new information technology for tracing the preference of users and

clients. Known preferences serve menu next pages, which are offered. For example, video or text, long or short news, displays with graphs or tables. Usually 5-10 mouse clicks are sufficient for detecting user preferences with the use of specialized software offered by MIT as open source.

Creation space for these ideas and activities needs the implementation of optimal database systems with necessary knowledge into firms and organizations; therefore, it is important to have a multidimensional view on the development of information systems and their application with preference quality and processing speed in connection with support e-learning.

## CONCLUSION

The modern information society makes and uses a large quantity of data and information. Data is clearly organized in database systems, including synchronization and upgrades, according to preferences and access rights; therefore, database systems have an important place in information distribution. Modern database systems offer levels of adaptation that support competitive advantages with flexibility, agility, scalability, and visibility.

Students and other persons with interest about knowledge from the area of database systems have specialized books, manuals and web pages to their disposal. Better orientation in themes offers multimedia presentations and simulations. There is much existing commercial or free accessible software for simulation training on the Internet or with special distribution. Known utilities are Adobe Captivate, AVI Screen Capture, Free Screen Recorder, or classic PowerPoint. Application multimedia simulation in education brings basic and essential benefits. The basics are to easily gain knowledge for the application of new methods. Users better understand new ways of adapting database systems. The essential benefit is the sufficiency of space to think about new products and services with the help of information technology.

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# MULTIMEDIA IN EDUCATION

**Aleš Oujezdský**
University of Ostrava
Českobratrská 16, 701 03 Ostrava, Czech Republic
ales.oujezdsky@osu.cz

***Abstract:*** *The primary aim of this paper is to introduce possibilities of using multimedia in education. There are use the modern technologies in a lot of courses. The subject matter of these courses is animation, video sequence, computer graphics, digital picture, sounds, web design and databases. Nowadays, anyone who creates computer educational programs should use these components. Our students create multimedia applications which are an important part of the educational process and exploit their skills, which acquired in last courses.*

***Keywords:*** *multimedia, animation, video sequence, computer graphics, sounds.*

## INTRODUCTION

In present, multimedia is a worldwide phenomenon not only in an education sphere. Modern technology unknown a few years ago allows us to employ a technique not only in a common life but also in an education process.

Hand in hand with development of modern technologies, digitalization plays an important role that allows us to develop a creativity in a wide range for the sphere of multimedia and creates better education multimedia object above all, e.g. digitalized audio recordings, digital photos, video. Using computer technology we are able to create multimedia projects, which serve as suitable tools by a presentation education activity, but also the utilization is in distance education by which a contact between student and teacher is missing.

By the multimedia project creation is necessary to take an attention not only a tout ensemble but also on a quality of an individual multimedia element. Students of Department of information and communication technologies

through their study pass a lot of subjects focused on an individual area of multimedia and also learn how to work in software concerned on sound processing, graphics, animation and video. Learning via the multimedia project, the students can utilize the ability in education process both present and distant study.

## 1. MULTIMEDIA AREAS

By the creation of a multimedia project is necessary to have spread knowledge in individual areas of multimedia products but also can create single multimedia elements. An important emphasis is in a quality of individual objects. No doubt that to basic areas/multimedia elements belong sound, graphic, video and animation (Figure 1). Despite of the creation of multimedia education projects need knowledge of variant incidental areas. It concerns pedagogic and educational knowledge of problems above all, knowledge and skills of web pages creation, programming, database knowledge, e-learning technology etc.

### 1.1 Sound

By the multimedia project creation is necessary to have knowledge of a sound field and its digitalization. Usually, sound comment is developed, comment to video shots, straight audio records eventually. A very important element for work with sound is a choice of a high-quality microphone and another sound equipment as well as software equipment for a sound modification in computer, i.e. noise-balancing, cutting shot, sound intensity etc. Also, crucial problems are in an available setting of compression of a sound record and a codec choice. Taking into account the facts, an emphasis must be placed on a sound record, i.e. good pronunciation and intonation of spoken words, senses should not be so difficult and spoken commentary should be recorded of prepared script ahead.

### 1.2 Digital photos and computer graphics

In present time, we do not work only with digital photos and their editing in a computer but we are pushed to spread the area also to computer graphics area and design. Multimedia projects include a lot of photos but also a lot of pictures and graphic objects, which need to be created and drawn. The area covers also a graphic proposal itself of the whole project and dependence on a web design strongly. Friendly graphic surrounding of an education application supports composure and sensation of subjected subject matter. A negative influence is developed using bad chosen colors. Color choice must

be in compliance with usually used standards; pallets of suitable colors and their combinations are used by the web and graphic project creation.

### 1.3 Digital video

Knowledge of digital video area is a keynote for creation of compendious/demonstrative video shots. In combination with a sound record we can create high-quality videos with a spoken sound comment. A source of the videos can be not only digital camera, but also a source of a video signal because of digitalization of the video signal also in an analog form. Nevertheless, an important factor is a resulting video quality depends not only on the video signal source but also on used compress/video codec as well as used resolution. HD (High Definition) videos often used nowadays with very high resolution is a magnificent, utilized by the multimedia project creation.

### 1.4 Animation

An integral part of the multimedia projects are animations, which can explain better some processes than a simple text or a picture. Presently, Adobe Flash is often used for creation of computer animations. It is professional software, which is not free. Even that, we are able to create a lot of simple animations in freeware software applications. A final application can be created in the form of animation picture (gif). With the area characterized by hardly described field, animations can be very good tool, e.g. an animation explained an algorithm of sorting using Quicksort method.

### 1.5 Web design and databases

Individual multimedia elements are necessary to connect with a final project. Presently, web pages are the most widely used as a final form of multimedia projects. A web page can connect all multimedia part in one aggregate. Graphics knowledge and design web can able to create friendly surrounding of web pages. A part of the multimedia education projects are tests, a possibility of communication in the form of discussion, comments etc. If we do not use one of available software LMS systems for the creation of the project, a form of the web page is a perfect. Knowledge of databases and programming in PHP area depends on a web creation/installation of web server administration. Final project is not distributed in the form of a training CD/DVD but online in Internet area is available.

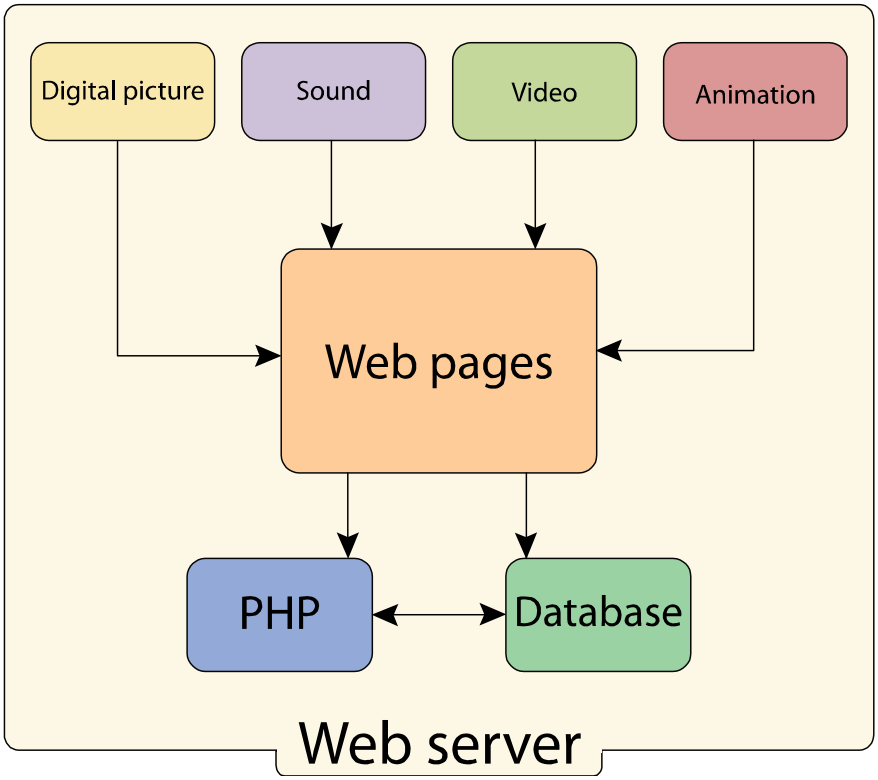


**Figure 1. A multimedia project developed in a server web**

## 2. MULTIMEDIA PROJECT DEVELOPMENT

Instead of need knowledge of creation of individual multimedia elements, self-creation of a multimedia project includes knowledge of pedagogy area and distance education. Need to take account of time consuming for a project creation. Final multimedia projects are used for education on basic and secondary schools, distance education of employees of various companies or for education web portals for general public.

### 2.1 Author's tools

Need to take account of surrounding of a created project and its final view by the multimedia project creation. We can use a lot of author's tools for a creation of the projects or also one of LMS systems exactly available for distance education. But if we create an education aid or for example a multimedia textbook usually use:

- Microsoft PowerPoint – today not so much used tool, satisfied by a lot of functions, e.g. text paste, pictures, sounds, hypertext links, keywords etc. Using the software a text creation is possible.
- Adobe Flash – modern software that help us to not only to animation creation but also as an author's tool for creation of multimedia education projects.
- Web pages – knowledge html language, programming in PHP and knowledge of databases help us to create a very strong tool for creation of multimedia projects. It is possible to use not only standard elements but also various forms of communication in Internet application as an email, chat etc.

## 2.2 ADDIE model

One of possibility how to proceed to a multimedia project is to use the ADDIE model. The model is developed by individual steps-phases that describe a cycle of project creation itself.

- Analysis Phase – the phase is characterized by an analysis of whole project; an education goal is chosen and focused to getting on it. Basic process for project creation is developed.
- Design Phase – a design phase interested in education aims similar to contest creation, exercises and planning of individual lessons. It is selected systematically and logically arranged strategy for aim project reaching.
- Development Phase – a realization phase and development of project itself. It covers a project script to testing through fine-tuning to final image. Usually, we use in the phase various authors' tools.
- Implementation Phase –the project is put on an education process. Need to say, that the phase must be checked up if the education aim is achieved.
- Evaluation Phase – an evaluation phase of the project from the point view of users. Mistakes and disadvantages are detected. Education efficiency is investigated.

The created multimedia project is innovated and optimized on the base of feedback from the side of users.

### 2.3 An example of a multimedia project

A web portal about a good lifestyle is chosen as an example of a multimedia project (Figure 2). It covers information on good nutrition, video instructions of physical exercises for various part of human body, BMI index calculation and a lot of helpful advices and instructions how to live good and vital. It is a collective project of a student team and it is located on the department server.


**Figure 2. Multimedia portal „Sportvital“**

## CONCLUSION

Taking an advantage of ICT and multimedia especially in education is an important step to an education development and does a development of modern technologies and trends. Presently, for student education multimedia tools and interactive boards as well as multimedia classrooms are applied. Usually, teaching process of students and scholars is supported by concerning and effecting on their senses for purpose to improve an education activity and to gimmick up lessons. Multimedia is very strong tools for education activities because of their flexible response on individual student needs from the point of education styles. From the point of view, using the multimedia equipment we can do so much for the individual style of learning as auditory style or visual style as well as motive style.

Students of Department of informatics and communication technologies create multimedia projects within their theses and also for education on basic and secondary school or for education employees various companies. Education process improvement concerning on the advancement and innovation of creation the projects is supported by researches on the base of multimedia tools. A main role-plays education multimedia tools by the education of scholars with special needs - handicapped scholars.

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# GRAPHICAL USER INTERFACE IN E-LEARNING SYSTEMS DEDICATED FOR SENIORS

**Łukasz Tomczyk**
University of Silesia
Bankowa 12, Street, 40-007 Katowice, Poland
tomczyk_lukasz@tlen.pl

***Abstract:*** *An important component of every e-learning course is a correctly constructed graphical user interface, constituting the pier between the remote educational system and trainee persons. In the text individual components taken into account were left responsible for correct creating of display and navigational layer of e-courses. The supplementations of the article are author's own findings taken amongst students of the III Century University in Cieszyn about the process of the remote education.*

***Keywords:*** *graphics interface user, seniors, e-learning*

## INTRODUCTION

Nowadays the information has become one of the basic economic resources, in addition to labour, land and capital. The rapid development of the organization, market globalization and technological changes led to strong demand for information. In addition, phenomena such as the dissemination of information technology, falling prices of hardware and software, and a freeware application development resulted in that, the world became a global village a long time ago.[1] The resulting transformations impinge on all areas of computerized human existence, and therefore also in the sphere of education. Currently popular trend of learning provided for life coupled with the increase in educational institutions and the permanent rise in the level of competence in the field of information technology (IT) among the public results in the introduction of new solutions in the field of education.

[1] R. Angryk, E-economy, [w:] E. Kolbusz, W. Olejniczak, Z. Szyjewski, Engineering systems in e-economy, PWE, Warsaw [ISBN 83-208-156-2], p.15.

Stabilized so far education space evolves through the implementation of the theory and practice of educational tools using Internet technologies. Currently, less surprising is that the classes under the e-learning (DL) are already in primary school, as a complement to material transmitted to a stationary, while the proportion of classes at many universities is carried out as a sterling equivalent of the classical form of education. There are, however, dilemmas associated with this process. It is important to develop properly, in terms of educational and technical accuracy, the methodology for creating online courses, as well as animate and promote these activities among groups that may directly increase their capacity to develop knowledge and interest.[2] The popularity of learning via the Internet due to the following factors listed in the following groups:

1. *Social*: increase user awareness about IT applications in different areas of life, the need for constant improvement, enlarging the number of people benefiting from TI, the implementation of the DL training projects financed from external sources (eg the European Social Fund).
2. *Economic:* to reduce training costs (rental of meeting rooms, pay enough for teachers, the implementation of platforms based on the licenses free of charge), development of professional skills prerequisites quality and quantity produced goods.
3. *Technical:* the development of infrastructure (speed, quality, accessibility or connectivity) and application (selection training platforms).
4. *Personal:* self-development, the desire to permanently enhance the potential of new technologies, gaining new training and competence.

Today, the idea of e-learning has been implemented in educational practice setting up new fields of research related to the effectiveness of that method of educational practices. In this area also includes the issue of information transmission efficiency by designing appropriately tailored graphical user interfaces (GUIs). This process is essentially a complex activity because it requires the inclusion of the individual components, which are contained in different, often independent disciplines. When creating a GUI is desirable to use achievements in areas such as theoretical and practical disciplines: design of information systems, psychology, pedagogy

[2] Ł. Tomczyk, Senior e-learning as part of the Information Society, „E-Mentor", nº 3/30, [ISSN 1731-6758], p.68.

(teaching distance education, media pedagogy, andragogy), computer graphics.

## 1. DISTRIBUTION AND SELECTION OF GRAPHICS ELEMENTS

Graphic design layout of individual items on the page (called layout) and navigation (relevant, functional planning elements for movements of the service) is one of the most important factors on which Internet users pay attention to website visitors. On the Internet it is important first impression that the person using the reference web page. It is assumed that have strategic importance of the first four clicks - if at that time you will enjoy service is considerable likelihood that inasmuch it for longer. Effect of institutions on the design and layout modification is dependent on the type of software solutions which have been applied: Page created from a template (a relatively small possibility of modifying the display structure) or solution created to measure. Therefore refined graphic layout should characterize the determinants listed below:

- lightweight applied graphics - the smaller the volume of image files that will load faster the next time the service and the server and internet connection will be less busy,
- consistency - to maintain a uniform standard in the graphic aspect of your service,
- transparency - a clear appearance of individual pages and graphics service,
- a clear and intuitive navigation throughout the site,
- visibility of the "strategic" elements. [3]

Significant role in the educational process plays an image. B. Siemieniecki notes that a rich representation of the Iconic association, reaches into the deeper structure of knowledge, polished sphere, therefore, is the effectiveness of visual memorization. Visual perception is conditional because it depends on such factors as the characteristics of the display material, the pace of presentation, type of task. Achieving the desired effect of receipt of a message requires a properly designed GUI. Colour table incorrectly can make the screen for the recipient become unreadable, and therefore

[3] B. Gregor, E-commerce marketing strategies [in:] B. Gregor, M. Stawiszyński (red.), e-Commerce, Branta, Lodz, 2002, [ISBN 83-89073-03], p.241-242.

incomprehensible. Difficult to clarify or supplement the content can become invisible or vice versa, less important information can interfere with reception of the more significant message. Therefore using the correct colour should be linked logically to the objectives of the functional on-line course so as not to cause a change in the interpretation of shown communication.[4] The following Table 1 presents the psychological impact of colour choices in the context of their use in DL processes.

**Table 1. Psychological influence of chosen colours**

| Colour | Symbolism | Compared with other colours |
|---|---|---|
| **Black** | Forms a relationship with something heavy, incalculable, dramatic, elegant, express the concentration on itself, mystery, pay attention. | It is well harmonizing with bright shades of red, blue, green. Black and grey are creating conservative climates. |
| **White** | Cleanness, hygiene, capitulation, humility | In comparison with light pastel colours it is soft, spring. Red is brightening blue and green. |
| **Grey** | Colour of the tolerance, neutral, modest colour, it is arousing the confidence, expressing the need of the balance and is symbolizing the formality. | In comparison with blue is summoning corporate, uniformed world. |
| **Red** | Colour hot, dangerous, embodies the strength, power, love, and signals the need for activity, raises the level of emotion, a sign of confidence, inner strength, and inspiration. | Compared to the green is associated with the Christmas period. Puts the colour blue. Overview of violet may cause an exaggerated impression of power. |
| **Orange** | Heat, energy, fun, joy of life, variation, colour, creative imagination and inspiration, to the eye. | Well with the blue. Red, yellow and orange to a fiery combination. Compared with green creates an exotic atmosphere. |

[4] B. Siemieniecki, Applying the information technology in the special needs education, [in:] B. Siemieniecki, Media pedagogy, Volume II, PWN, Warsaw 2008, [ISBN 978-83-01-15704-3], p.58-59.

| | | |
|---|---|---|
| **Yellow** | Colour of the sun, a symbol of envy, cowardice, cunnings. Is disorganized. Extraversion, creativity, the excess of colour can be tiring. | Perfect colour to make it appear excitement or to boost grey or blue. |
| **Green** | Freshness, calm, but also to plait, the symbol of the need of the internal balance, agreements and pliancy, is identifying also protectiveness and the nature. | In combination with blue is forming a relationship with the nature, with height. Green with yellow or white is creating „ sports" colours. |
| **Blue** | Has a soothing effect, carries joy and the peace, an impression creates cleanness and freshness; it is associated carefully, with faithfulness, arousing the confidence; powders blue with symbol of dreams, the Romanticism and the safety. | With yellow and pink is summoning the spring atmosphere. With ordinary looks smart. Well matching with green |
| **Navy blue** | It is expressing the respect, the dignity and the organization, the conservatism and the logical-ness. | In combination with metallic silver is associated with elegance. |
| **Violet** | Colour of the mysticism, of space, freedoms, for remarkable character; means the friendship and the spontaneity; he/she is removing the tiredness, he is relieving stresses and tensions. | The green creates a joyful atmosphere, with a pink creates a feminine colours. |
| **Brown** | Is associated with sadness and longing, expresses the naturalness, simplicity and reliability, and inspires confidence. | The green colour makes the earth; you can lighten it up by the yellow or orange. The purple and green make up the conservative elegance. |

**Źródło:** K. Olszówka, Kształtowanie wizerunku firmy w Internecie, [w:] C. Olszak, E. Ziemba, Strategie i modele gospodarki elektronicznej, PWN, Warszawa 2007, [ISBN978-83-01-15162-1], s.82-83. podaję za: A. Rozwadowska, Public Relations, Studio EMKA, Warszawa 2002, [83-88607-26-X]

In the presentation of images to choose and combine colours in a manner that enables the user to clear and easily receive information. The colour should serve to contrast the information from less important material. However, it should be noted that a plurality of applied colour makes it difficult to assimilate information, so that their educational value is reduced. Perceived colour depends on the colour surrounding the image, in particular, where the colour information are encoded, so the most important principle for the use of colour is their skilful selection takes into account the specific characteristics of colour and their interaction with other elements of the palette. In addition to colour an important determinant of the efficiency of teaching is the use of animation, which during the presentation should have the possibility of accelerating, slowing, stopping, and change the course of the observed phenomena and processes. Special attention during the design of the GUI deserves selection of numbers, letters and special characters, because a comment is written in many cases a necessary complement to the display of images of static and dynamic. Therefore, there is the problem of selecting the font, so that the educational content depicted in the reception was friendly, because it happens that the author of the course with a wealth of types and colours of the distorting effect of falls in the going over the top. Proper use of fonts is particularly important when the courses are dedicated to those requiring special attention such as seniors or children. To facilitate the identification marks text font should be presented booster printed or handwritten letter in particular the grammar principles. The studies show that the most legible fonts are: Arial, Arial Bold, Times New Roman Bold Italic, Symbol, and MS Sans Serif. Used the letters should be large enough so that the difficulty in reading did not obscure the content. Wherever possible and reasonable to use more optimally selected graphic elements (arrows, sliders, pictograms) than verbal information.[5]

Selection of graphic elements of the e-learning system is a folded activity alone in itself, because apart from very specification tied with combining colours, with applying the relevant font, must take features into account for the recipient. Seniors by virtue of their specific properties are standing out in the plain of the education assisted by a computer from other groups e.g. of children, young people or persons in an economically productive age, so working out the perceptual, motor, memory, intellectual, biological structure of e-routes taking changes in the sphere into account is becoming necessary.

[5] B. Siemieniecki, Applying the information technology in the special needs education, [in:] B. Siemieniecki, Media pedagogy, Volume II, PWN, Warsaw 2008, [ISBN 978-83-01-15704-3], p.59-60.

## 2. PROCESS DESIGN - THE PRACTICAL REMARKS

As pointed out by G. Billewicz if we want the end user (client learning resources) effectively use the benefits of e-learning one must have the necessary proficiency in IT and the learning environment should be characterized by friendliness. Two fundamental aspects of any computer application is the functionality (ability) to problem solving and presentation located in the service interface (windows, menus, on-line help, documentation, explanations, tips, etc.). The appearance of the GUI the user should decide the type and purpose of the use of the system. It is currently evolved into a new interdisciplinary specialization sector dealing with communication between a user and a computer system called the Human Computer Interaction (HCI).

Among the many important indications for the construction of the GUI is to correctly take into account the following recommendations:

- collecting comments from members must be present at all stages of the design and operation of the system,
- programmers responsible for project implementation should be aware that quality time not only provides a properly executed technical part of the software,
- it is necessary to fit a specific training platform for the audience,
- it is necessary to ensure that the operation "shortcuts", i.e. bypass the dialogues and communications information for advanced users,
- a system should have a simple error handling - the possibility of withdrawal or cancellation of shares,
- displays an error message should have created a careful, readable analysis of how information should be avoided,
- dialogue with the user should be simple and natural, i.e., preserving the order of the task performed,
- dialogues should be designed taking into account unusual situations,
- language appearing in the system should be similar or identical to the language which is spoken by users,
- the entire system should be characterized by cohesion, dialogue,

- to exercise restraint in graphics and colours and displays the self-help,
- inform you about the time of its tasks, and progress (e.g. by a percentage bar) prevents boredom and gives it a sense of control,
- placement confirmation is acknowledging the effects of work by the user,
- the number of objects should be <= 9, since the average user is able to work efficiently when the number of functions in no more than 9 options in the menu, so the design must take into account the nesting of functions in these tasks,
- the whole time that the system must be available to help
- aid should be transparent, i.e., the use of it can not interfere with the system,
- aid the user must be a generic (to recall, identify, indicate the performance of individual tasks) and to highlight the details of the tasks,
- due to the form of assistance should be considered in its different variants: on-line help, documentation, utility, hot line,
- must be consistent with the commonly used software (typical), excessive creativity in the area of creating applications is not desirable,
- successive versions of the system must take into account the results of observation of users, definitely the best in their natural environment. [6]

These selected instructions make clear that the process of GUI design is an issue involving the various aspects of theoretical knowledge and practical activities, creating a new interdisciplinary field. However, the realm of words and e-learning is not fixed, because in order to effectively impact teaching requires the inclusion of the complex characteristics of remote users of educational services.

## 3. SENIORS VS. E-LEARNING

[6] G. Bielewicz, User interface and development of information society, [in:] C. Olszak, Information Society, Volume I, Silesian School of Management, Katowice 2004, [ISSN 1644-8502], p.31-39.

Knowing the properties and improvement of the learning process by using information technology at a distance require an analysis of needs, opinions and suggestions of the interested parties. During the course of education in the field of new media in Cieszyn University of the Third Century research was conducted using a diagnostic survey among fifty seniors on interest under discussion form of teaching, the desired characteristics of the course should have a good, positive and negative sides and additional preferences. The results show that:

- 18 people (36 per cent.) expressed their willingness to participate in courses conducted by the Internet, while 32 respondents (64 percent) showed no interest in such form of teaching.
- None of the seniors surveyed had ever taken part in e-learning course.
- Among the features that should characterize a good course with the internet, players have exchanged the following elements: simplicity of use (one of the most frequently recurring indications), accessible terminology (one of the most frequently mentioned indications), the corresponding image, the formula step by step „possibility of presenting different versions of applications (e.g. Microsoft Office 2003, Microsoft Office 2007, Open Office). At the same time it should be stressed that 26 people (52 percent) did not respond or indicated that they knew nothing about it.
- Among the positive aspects of e-learning surveyed exchanged: to acquire knowledge without leaving the apartment (mostly emerging indication), the chance for people dependent on the acquisition of knowledge and contact with the world, the choice of time and place of learning, general accessibility, to facilitate learning, to avoid the problem associated with commuting, "rejection" of competence in the field of information technology through participation in such courses, allowing it to work after their completion. 20 people (40 percent) did not respond or said they knew nothing about it.
- The negative qualities of courses via the Internet, students' pass the Third Age: lack of direct contact with the operating activities (the most common indication), no contact with other people (social isolation), lack of a "lively exchange on issues of incomprehensible words between leading and students, lack of compelling the systematic, lack of mobilization, the possibility of mismatches to the level of difficulty of the course participants, the introduction of fees for students, a diverse public perception of the course, no immediate

relief in case of misunderstanding the issues, lack of direct cooperation in the group. 22 people (44 percent). Not reply to a question or stated that they do not know anything about it.

- The vast majority of students surveyed Third Age of 40 people (80 percent) is not willing to pay for their participation in courses conducted by the Internet, while 10 people (20 percent) would pay the fee, provided that the amount would be adjusted to the financial capacity of Polish seniors.
- Having a free choice of learning mode, players pointed out:
  - Traditional classes (group and teacher) - 44 people (88 per cent.)
  - Classes conducted only through the Internet - 2 persons (4 per cent.)
  - Mixed way (some of the material carried out through a course run by the traditional, while some classes conducted over the Internet) - 4 persons (8 percent).[7]

Conducted survey shows that the idea of learning remote to generate interest among the listeners of the University of the Third Age. Seniors see the "weak" and "strong" the e-learning, while pointing out areas that should be included in the lifetime of the development of this type of courses (an important criterion in that aspect of the current issue GUI). Most problems encountered when designing a dedicated GUI for seniors include two groups of factors:

1. Specifications: Various kinds of screen image resolution, equipment failures, slow internet connections.
2. Course: lack of proper preparation of teaching staff for proper preparation of courses for this product group, inadequate deployment of content on the site.

DL properly designed course should include typical mistakes by seniors, which include: Incorrect handling the display, menu navigation and web browser, lack of habit of verifying and monitoring whether the operation or the passage ended in a visible sign of confirmation of its accuracy, the

[7] Ł. Tomczyk, Senior e-learning as part of the Information Society, „E-Mentor", nº 3/30, [ISSN 1731-6758], p.70-71.

omission of selected significant component operations (shift the cursor, improper handling mouse). [8]

## CONCLUSION

The concept of remote education using information technology is recognized and is increasingly widely used as a basis or to supplement educational processes. That trend, despite its attractiveness resulting from the specific IT has not been implemented uniformly to all social groups. Aetiology of this condition results from many complex social circumstances, mental, economic and technical. E-learning which is currently at the stage of development and implementation requires the person responsible (methodologists, programmers, graphic designers, engaged in activities, researchers) to take the analysis in order to raise the level of effectiveness. Significant in this context is to separate components affecting the properly designed online courses, which materially include, among others: the GUI, the selection of content and methods of presenting them, so control and evaluation of progress in science.

The above considerations concerning the generation, respectively, shaped the user interface and other important elements of creating a virtual learning environment should continue to be subjected to the tests, whose results will show the main factors that condition the effective processes to acquire knowledge and skills at a distance. Among the important topics of research in that area should try to take further integration of experience teaching the theory of on-line training describing how effective the selected interface (platform) for various age groups and unions, the type of content presented, and presentation techniques. These studies must take into account the psychological, social, technical, due to the nature of selected groups of participants (seniors, the unemployed, the disabled, and people with low competence in the field of IT).

Can not help but agree with M. Grundtvig - one of the forerunners in the field of adult education, the knowledge that only functional, serving the satisfaction of human needs, cognitive and practical, and to facilitate everyday problem solving is able to raise man to ever higher levels of social and material culture. Wisely built a remote concept of adult education with

[8] B. Kaszkur-Niechwiej, Computer courses for seniors - Guide, Life Fully University, Krakow 2005, [ISBN 83-922595-0-5], p.55.

the principles of the theory is still emerging online learning offers opportunities to better prepare them for life, fulfilment of obligations and social roles, to understand reality and to keep up with social change widely understood by computer science.[9] Computerized distance education is already an important pillar of permitting the development of individuals in the information society. Therefore it is necessary to continuously develop solutions on improving the transmission of content to this type of training not only effectively generate new skills and expanded knowledge of the actors involved, but also approached IT humanization and its capabilities especially among groups involved in the phenomenon of digital exclusion.

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# V. PSYCHOLOGICAL, SOCIAL AND LEGAL ASPECTS OF DISTANCE LEARNING

## E-LEARNING AND THE FULFILMENT OF CERTAIN POSTULATES OF CONTEMPORARY PSYCHOLOGY OF TEACHING

**Maria Ledzińska**
Faculty of Psychology, University of Warsaw
Stawki Street 5/7, 00-183 Warsaw, Poland
maria.ledzinska@psych.uw.edu.pl

***Abstract.*** *Psychological studies have been conducted in Poland for more than half a century. Only the University of Warsaw has psychological studies in the frames of an autonomous faculty. Appreciating the importance of modern technologies, the University of Warsaw has incorporated modern forms, including e-learning, in the teaching process at graduate, postgraduate and doctoral level. These courses are treated as complementary in relation to traditional ones. Three types of methods have been employed: distribution of knowledge, communication and checking of knowledge.*

*The author belongs to the supporters of harnessing the Internet as a teaching aid. She refers to two large educational traditions, namely, to preparatory teaching and lifelong teaching. She recalls selected theories of contemporary psychology of teaching, drawing from the cognitive current. The author formulates the thesis that distance teaching facilitates the fulfilment of the basic postulates of contemporary psychology of teaching.*

***Key words****: e-learning in University teaching, complementary nature of distance teaching, e-learning and the fulfilment of the postulates of psychology of teaching*

## INTRODUCTION

The Faculty of Psychology at the University of Warsaw comprises the largest community of academic psychologists in Poland (Lewicka, Sosnowski, Trojan, 1998). University psychology had taken shape before the Second World War, almost synchronously in two academic centres: at the John Casimir University in Lviv (where Kazimierz Twardowski, founder of the Lviv-Warsaw school, established the psychology lab in 1901), and at the Jagiellonian University (here, Władysław Heinrich organised the psychology lab).

Several years later, psychology was also established at the University of Warsaw.

The start date is assumed to be 15 November 1915 when Edward Abramowski, graduate of the natural sciences faculties at the Jagiellonian and Geneva University, took the Chair in Psychology. The very same year, he organised a Psychology Seminar at the Faculty of Philosophy which constituted the original form of the latter Division. In 1920, within the Faculty of Philosophy, the Division of Experimental Psychology was established, headed by Władysław Witwicki. The second Division functioning next to Experimental Psychology, namely the Division of educational Psychology directed by Professor Stefan Baley, physician, pedagogue and psychologist, opened in the 1927/1928 academic year.

After the end of the Second World War, the University was reactivated, including both Divisions of Psychology. The year 1950 was a groundbreaking year for the development of the discipline as the first independent studies in Psychology was opened. The following turning point in the history of Warsaw psychology was the 1953/1954 academic year. This was when, *inter alia*, the Faculty of Pedagogy was established, within which psychology was placed. Warsaw's academic psychologists achieved full administrative independence in the year 1979; this is the date when the Institute of Psychology was founded, which functioned on the rights of a Faculty. We became an autonomous Faculty in 1981.

## 1. STUDY ORGANISATION AT THE FACULTY OF PSYCHOLOGY

In the organisational structure of the Faculty, there are currently twelve Chairs, including: the Chair of Psychopathology and Psychotherapy, the Chair of Learning and Memory, the Chair of Rehabilitation Psychology, the Chair of Personality Psychology, the Chair of Clinical Child and Family Psychology, the Chair of Health Psychology, the Chair of Neuropsychology,

the Chair of Cognitive Psychology, the Chair of Social Psychology, the Chair of Individual Differences Psychology, the Chair of Biological Psychology, the Chair of Educational and Developmental Psychology. Education at the Faculty of Psychology of the University of Warsaw is conducted as uniform Master's studies performed on a full and part time basis.

The five-year system of teaching has a basic cycle (first two years) and an advanced cycle (year 3 to 5 of studies). During the last two years of studies, the students prepare a Master's thesis and acquire knowledge and skills within specialist courses. Students can continue their education as participants of Doctoral Study courses or post-graduate courses. In the 2008/2009 academic year, the Faculty offered the following post-graduate courses: Cognitive Skills Trainer, Human Resources Management, Transportation Psychology, Psychology of Media Communications, School Careers Advisor (co-funded by the European Union), Rehabilitation Psychology, Psychology of Advertising. Psychological studies have for many years been very popular and the most talented, specially selected candidates undertake the studies. The post-graduate and doctoral studies are also very popular – the latter gathering at present over 90 persons.

## 2. DIDACTIC STATUS

The authorities of the University of Warsaw accentuate the specificity of a higher education institution which is expressed, *inter alia*, in combining scientific activities with didactic work. They also do their utmost to foster the highest level of both forms of activity, which is expressed in manifold ways.

**1.** Candidates want to work at the educational institution are accepted on a competition basis, selecting the best candidates. Analogous principles of recruitment are held for doctoral studies. The competition scheme for scientific posts open on a national level are announced by the Dean of the Faculty, and the assessment criteria primarily concern the achievements to date (publications, conference appearances, participation in scientific programmes) as well as didactic predispositions.

**2**. The work of all the academic tutors (including professors) is subject to assessment. Periodic evaluation of professional achievements encompasses the whole of their activity: scientific research, didactics, organisational involvement, popularisation of knowledge, etc. This assessment is made collegially by a special commission of the Faculty Council. This body analyses the documentation submitted by the employee (standard forms) supplemented by the opinions of their supervisors. A positive mark is

awarded only if positive marks have been received throughout all forms of work.

**3.** Each faculty has an independent team responsible for matters concerning the quality of teaching, the work of which is regulated by a special Regulation of the Vice-Chancellor. One of the existing Regulations stipulates that the didactic activity of all the academic tutors is subject to monitoring and appraisal. Those new to didactic work (e.g. doctoral students) are encompassed with special care. Students also participate in the didactic appraisal process by filling in special questionnaires at the end of each semester via the internet. The feedback received from the students reaches the employees conducting given courses as well as their superiors.

**4.** The employees of the University of Warsaw understand the significance of the newest technologies, not only in the institutional teaching process but in a broader field, namely, in the development of individuals and societies. On 1 February 2008, the founding assembly of the Polish Economic Chamber of Advanced Technologies (PECAT) took place, which affiliates over a hundred institutions. Among the members were ten higher education institutions, including the University of Warsaw. The mission of PECAT is to support entrepreneurship based on knowledge and the development of advanced technologies. One of the most important tasks remains the eradication of barriers hampering the development of a knowledge-based economy, *id est* legal, financial and environmental limitations. This is the first Polish economic chamber affiliating scientific institutions, industrial companies, banks and funds specialising in financing increased risk enterprises.

**5.** The employees of the University of Warsaw perceive the specificity and plethora of educational challenges of the period at the turn of the century. One of them remains the information revolution inclining to creating such an educational system that would encompass not only the transmission of information but also stimulate to transformation of information into knowledge. In the existing situation, knowledge itself comes to the rescue; its growth carries with it the simultaneous development of technology, the products of which become objects of everyday use. Academic tutors are fully aware that the use of information technology as an educational tool may constitute the answer to many problems of contemporary education. A perfect example of the educational solutions of our time is e-learning. This is commonly understood as assemblages of educational effects, comprising their own structure, based on such techniques of information and knowledge distribution that harness mediated communication via the internet (Winnicki, 2006).

## 3. E-LEARNING IN PRACTICE

E-learning is gaining in popularity at the University of Warsaw. Distance learning constitutes a significant complement to traditional education accomplished through the face to face method. The reason for its rising popularity remains without doubt the possibility of using modern technology, which are available thanks to the proliferation of the internet. We are mentioning those that are used by persons conducting classes at the University of Warsaw. Fundamentally, they are divided into knowledge distribution methods, ways of communicating, and techniques of exacting knowledge. The first include text files available online, multimedia presentations, audio-video files, links to materials available on the internet, specialist access programmes on the web. Distance learning uses the facilities enabling dialogue between participants of the course and in the tutor-participant arrangement (Wieczorkowska, 2004). The biggest problem of mediated learning is the methods of assessing the progress made in learning. The traditional form still dominates and falls short of the premises of e-learning. Among the mediated forms of verifying knowledge is, however, on-line tests (single or multiple choice answers), fill in the blank tests, individual tasks, open questions, etc.

The complementary nature of distance learning education emphasised earlier will most probably remain the dominant feature of teaching at the Faculty of Psychology, University of Warsaw. Psychology studies are connected not only with intellectual formation but also with shaping many other skills and abilities. It is difficult to imagine how they could be formed without the direct tutor/trainer-student contact. Thus, wherever concrete skills are required, there is a special need for teaching referred to as traditional teaching, *id est*, requiring direct contact.

Distance learning at the University of Warsaw is well coordinated and assumes two main organisational forms.

A. The popularisation of science (fields, disciplines, research currents, theoretical concepts, applications) is also done through regular broadcasts on Campus radio (97.1 FM). The station began its broadcasting activity on 1 June 2005 and the owner of the license is the University of Warsaw. The format includes, among others, original programmes by renowned scientists, news services, student news, music programmes, etc. Several dozen members of staff of the Faculty of Psychology representing almost all Chairs, presented their interests and research projects during this academic year.

B. Formal education on an academic level is coordinated by the Centre of Open and Multimedia Education: COME, acting from the year 2000. The number of participants of the courses in the first year of operations amounted to 37. By June 2004, approximately two and a half thousand people were educated thereby. At present, during one semester there are several thousand students participating in courses on a distance learning basis. From 2002, COME also offers post-graduate studies conducted entirely via the internet.

The didactic offer performed via the e-learning method encompasses two types of classes: general university classes and "local", *id est*, intended for students and doctoral students of concrete educational units (faculties, divisions, institutes). Below are sample courses offered during the summer semester of 2008/2009 to the so-called broad recipient:

- Language courses
- The anatomy of propaganda – an introduction to manipulating public opinion
- The civilisation and culture of Spain
- Didactics of higher education
- Experimenting with economy
- Ethics of the public sphere
- Excel in financial and statistical applications
- Mathematics for students of arts and humanities
- Methodology of social studies – basic level
- Studies on globalisation
- Introduction to macroeconomy
- Introduction to Psychology
- Introduction to intercultural psychology
- Educational aspects of contemporary art

This brief list – serving as an example – reveals the specificity of the courses: generally formulated topics, broad approach and introductory nature. This manner of profiling enables students from different levels of education and with diverse interests to participate in the courses.

The offer directed at students of the Faculty of Psychology is equally interesting and abundant. (General 22 courses). The class topics remain, for

obvious reasons, narrower and more specialised. Below are some topics to illustrate this:

- Leadership
- Control-helplessness
- The psychology of a woman
- Practical statistics using SPSS
- Conscious and unconscious games in close relationships
- Mechanisms of psychopathology
- Practical ethics
- Psychology of slimming

Registration on all courses takes place at the Faculty of Psychology, University of Warsaw, through the internet. Students have informed us on numerous occasions that the enrolment for the distance learning courses is finalised very quickly. Sometimes the list of participants is filled up within minutes of launching the enrolment process. This is best proof of popularity of this form of learning, which is attractive for logistic as well as psychological reasons. The historical outline of the University of Warsaw as well as the Faculty of Psychology presented at the beginning reveals the intensive development of my educational institution. The modest beginnings and the great dynamics of changes are of great significance for both individual and social development. There is a well known saying in Poland that "there can be no school without pupils, but the school is based on teachers". It should be added that it is based on tutors that utilise the methods of teaching offered by contemporary technology.

## 4. THE STIMULATING ROLE OF E-LEARNING

When writing about selected problems in distance teaching, fundamental issues cannot but be mentioned. The theory and practice of modern teaching concentrates around two traditions, which are most generally referred to as the concept of preparatory teaching and the idea of lifelong education, which has taken shape in the field of psychology in the form of cognitive positions (approaches) (Przetacznik-Gierowska, Włodarski, 1998; Ledzińska & Czerniawska, in print). The former, referred to as the traditional approach, is no longer current but is well established historically (generationally) and functions in the minds of many in the form of the so-called educational myth,

namely, false knowledge (Ledzińska, 2008, 2009). Thus, in the traditional perspective, the dominating understanding of the essence of learning and teaching consists in the passing on of knowledge, the acquisition of knowledge by pupils, as well as the transfer of knowledge from textbooks and the minds of teachers to the memory of pupils. The traditional approach to teaching emphasises the transmission of ready-made knowledge. This task is fulfilled by a carefully selecting content, dividing complex content into smaller units, formulating concrete learning goals and establishing an order for their fulfilment and, particularly importantly, by specifying the methods of verification of whether the set goals have been achieved by the learners. It is the teacher that plays the leading role in learning, specifying what, how and when is to be the subject of learning. They are not very interested in the type of mental activity that their pupils undertake and what should be done to instil in them the desired methods of action.

In the meantime, in the light of cognitive approaches, learning and teaching are referred to as processes: learning is the process of actively constructing knowledge in an individual's mind (Czerniawska & Ledzińska, 2007). Dialogue-based teaching of others consists, largely, on creating the conditions for independent learning. It is indeed impossible to transfer knowledge and skills directly to a person's mind. Learning is the result of the personal activity of the learners (Iran-Nejad, McKeachie & Berliner, 1990). The results achieved by them depend above all on the type of mental tasks carried out by them alone. Therefore, in teaching stemming from the cognitive current it is not the teacher that plays the leading role but the learner along with his/her cognitive activity (Bednar, Cunningham, Duffy & Perry, 1991).

In the reported approach, learning is understood as leading towards the development of the ability to think and act in the direction of becoming an expert, a master in a given topic. An expert has knowledge and skills in a certain field at their disposal, which can effectively be put to use by them. They also possess the adequate mental models and concepts that capture their given field. Learning that takes this very objective or situational context into consideration, approached not as abstract "exercising" the mind but as cognition that has been incorporated into a concrete activity, is referred to by psychologists as *situated learning*. The endeavour to shape the ability of localized thinking, namely, set in a concrete field, the development of mental models of the studied area and their connection with the abilities to think that are characteristic for the given field of studies are the tasks and challenges of contemporary education (Brown, Collins & Duguid, 1989).

This kind of teaching, as was already mentioned, is sometimes referred to as process oriented because it makes the processes used by the learners its main point of interest. It also heads towards a cohesive teaching of the strategy of thinking and objective knowledge, promoting localized learning. In this approach, the significant tasks of a teacher still include initiating, supporting and influencing the thinking processes of the learners (Glaser, 1991). The above statements directly result from the cognitive concept, which informs that one cannot and should not learn "in place" of the learners or perform an incessantly strong control over their actions in the scope of learning.

Upon returning to the main phenomenon of distance learning, it is evident that scientific literature on e-learning is more abundant and becoming richer. The earlier polarisation of research positions (adherents versus adversaries) seems to be withdrawing and making place for substantive discussions directed at revealing a whole array of possible applications, removing obstacles accompanying its implementation, and the like. The voices of psychologists are becoming more audible in the discussions taking place. There are more theoretical elaborations and empirical analyses on learning and teaching in the internet environment. The official organ of the European Association for Research on Learning and Instruction (EARL), the Learning and Instruction journal, includes articles on different aspects of e-learning almost in every issue. Many detailed issues are presented therein, concerning, for instance, the technical aspects of instruction.

The reported results reveal the need for a more general reflection and for the conduct of empirical studies inspired by such a reflection. A significant field of analysis seems to be above all the possibility of harnessing internet education in fulfilling the postulates of cognitive-oriented education psychologists. Even a superficial analysis of university courses reveals their great thematic diversity. We are sometimes ready to formulate judgements like "what narrow topics", or "how restricting theses courses are." However, such fears are insubstantial. In university level education – at least in the case of the home Faculty – e-learning supplements the courses that are run in a traditional way. Its advantage remains not only the attractiveness connected with crossing the boundaries of all too familiar convention or overcoming the barriers of time and space. A psychologist also notices other merits, including the possibility of stimulating, intensifying and individualising cognitive activity; the key is the number, the level of difficulty, the originality of the tasks, as well as the specificity of the demands that are set to the course participants. In light of the earlier mentioned characteristics, the extensive offer of courses constitutes above all an opportunity to actualise the postulates of *situated learning*. The internet environment facilitates the

selection of concrete study areas, issues and problems that a student would like to fathom and develop "here and now", *id est* to reflect upon personally, connect with the knowledge acquired earlier, relate to everyday life situations. E-learning does not replace traditional teaching but supplements and enriches it, thus facilitating the fulfilment of certain indications of contemporary psychology.

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# ÜBER DIE NOTWENDIGKEIT VON SOZIALPHASEN BEIM (E-)LEARNING – NEUROBIOLOGISCH UND THEOLOGISCH BEGRÜNDET

# ON THE NECESSITY OF SOCIAL PHASES IN (E-) LEARNING - NEUROBIOLOGICAL REASONS

**Franz Feiner**
Kirchliche Pädagogische Hochschule Graz
Lange Gasse 2, A-8010 Graz, Austria
franz.feiner@kphgraz.at

***Abstract**: Learning is basically a dialogical process. - Socrates knew that and evoked in his concept of „Maieutik" the „thinking of a dialogue partner". That learning is a dialogical process is shown from early childhood on: In the first few weeks the first mirror neurons of the baby are activated by the relationship to its mother.*

*Recent neurobiological research shows the dangers of refused communication: Refused communication activates pain centres as with „physical pain". The topic „social learning and learning empathy" becomes increasingly important in school, since students often have enormous social deficits, and therefore prone to autistic behaviour and violence. What do these findings for learning in school mean? Emotional Intelligence (Goleman) can only be learned in communication - certain kinds of intelligence can't be learned on the PC.*

***Keywords**: neurobiological research, dialogical process, mirror neurons, Emotional Intelligence, computer games, social learning*

## EINLEITUNG: WIE GESCHIEHT LERNEN?

Vor kurzem stellte ich einer Gruppe Studierender die Impulsfrage: Wann habe ich am meisten *gelernt* in meinem Leben? Einige Antworten: „Vor der Matura"; „für die Ausbildung zur Kindergartenpädagogin" …; die meisten verstanden „lernen" als „büffeln" und „strebern", also sich Wissen, d.h. Kognitives aneignen. Im Laufe des Gesprächs ging uns auf, dass Menschen

von frühester Kindheit an am meisten lernen: Fähigkeiten und Fertigkeiten in der Bewegung, den aufrechten Gang, Verstehen von Sprache und Sprechen … In allem geht es um Anstöße, Motivation (= Beweggründe im wahrsten Sinne des Wortes), innere Antriebe über Freude, Erfolge, Ausdauer …

Selbstverständlich ist zwischen dem computergestützten Lernen / e-learning bei SchülerInnen und bei StudentInnen an einer Fernuniversität, zu differenzieren. Ich werde zunächst beides in einem verstehen, um generell die Notwendigkeit sozialen Lernens zu begründen.

## 1. LERNEN IST GRUNDSÄTZLICH EIN DIALOGISCHER VORGANG

Dass Lernen dialogisch ist, war für Sokrates einsichtig, als er eine Gesprächskunst entwickelte, die als Hebammenkunst bezeichnet wird. Sokrates versuchte nicht andere Menschen von seinen Einstellungen zu überzeugen, sondern er sah sich selbst als einer, der ihnen half, ihr Wissen auf die Welt zu bringen, also ihnen geistige Geburtshilfe leistete. Er wollte bei denen, die mit ihm sprachen, das Bedürfnis erwecken, selbst nach der Wahrheit zu suchen. Lernen geschah im Dialog mit den Lernenden.

Gewiss: Auch beim sog. objektivierten Lernen (mittels PC) ereignet sich Dialog; aber es ist ein Dialog mit Dingen und sachlichen Inhalten. Es stellt sich die Frage: Woher kommt der Anstoß, die Motivation (= der Beweg-Grund) zum Lernen?

Ich stelle die These auf: Die meisten Anstöße zum Lernen kommen nicht von einem Objekt, sondern von einem Subjekt / einer Person.

Martin Buber bringt die Erzählung einer chassidischen Legende, die vom Lernen handelt, und zwar von einem Buben, der keine Ausdauer beim Lernen hat:

Rabbi Aaron kam einst in die Stadt, in der der kleine Mordechai, der nachmalige Rabbi von Lechowitz, aufwuchs. Dessen Vater brachte ihm den Knaben und klagte, dass der im Lernen keine Ausdauer habe. "Lasst ihn mir eine Weile hier", sagte Rabbi Aaron. Als er mit dem kleinen Mordechai allein war, legte er sich hin und bettete das Kind an sein Herz. Schweigend hielt er es am Herzen, bis der Vater kam. "Ich habe ihm ins Gewissen geredet", sagte er, "hinfort wird es ihm an Ausdauer nicht fehlen" (Buber 1949, 327).

Wie bedeutsam personale Beziehung, Zuneigung, Liebe … sind, soll an Hand der neuesten neurobiologischen Forschungen aufgezeigt werden.

## 2. DER „DIALOGISCHE LERNPROZESS“ – NEUESTE ERKENNTNISSE DER GEHIRNFORSCHUNG

Der Prozess des Lernens ist ein sehr differenzierter; neurobiologische Erkenntnisse helfen, den Prozess zu deuten. Entscheidend dafür ist die Erkenntnis über die Fähigkeit, einen anderen intuitiv zu verstehen und sich in einen anderen einzufühlen:

### 2.1 Spiegelneuronen befähigen zur Empathie

Warum können wir uns intuitiv verstehen, spontan fühlen, was andere fühlen, uns sozial und solidarisch verhalten? Die Erklärung dieser Phänomene liegt in den Spiegelneuronen, die erst 1996 zufällig entdeckt worden sind. Sie ermöglichen uns emotionale Resonanz mit anderen Menschen, versorgen uns mit intuitivem Wissen über die Absichten von Personen in unserer Nähe und lassen uns deren Freude oder Schmerz mitempfinden. Sie sind die Basis von Empathie, »Bauchgefühl« und der Fähigkeit zu lieben.

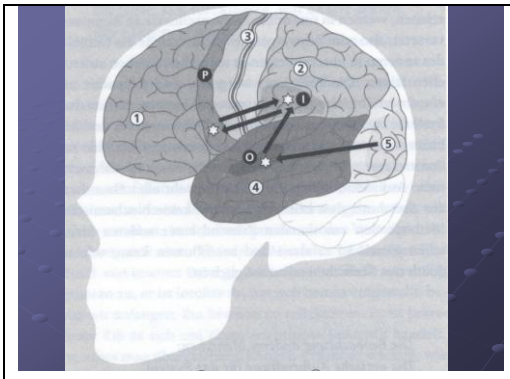


**Abb. 1: Bauer [9]2006, 52**

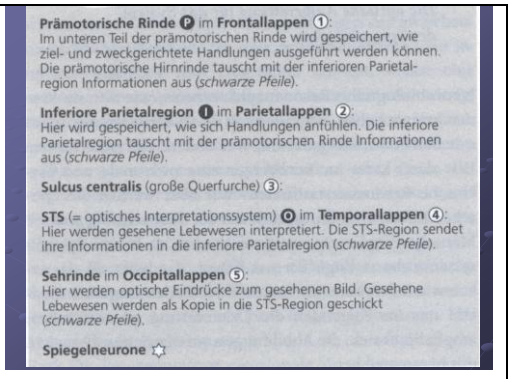


**Abb. 2: Bauer [9]2006, 52**

Bereits ein kurzer Eindruck von einer Person reicht aus, um eine „intuitive Ahnung zu erzeugen, wie die körperlichen Empfindungen der beobachteten Person im kurzfristigen weiteren Verlauf aussehen werden“ (Bauer [9]2006, 44f.).

Um die Gefühle eines anderen Menschen mitzuerleben, „werden in uns selbst Nervenzellnetze in Resonanz versetzt, also zum Schwingen gebracht, welche die Gefühle des anderen in unserem eigenen seelischen Erleben auftauchen lassen“ (Bauer [9]2006, 51). Aus den Augenbewegungen anderer lassen sich „weit reichende Schlüsse ziehen. Dies gilt nicht nur für die Einschätzung der jeweiligen aktuellen Situation, sondern auch und vor allem im Hin*blick*(!) auf

die Gedanken, Intuitionen und Handlungsabsichten der uns umgebenden Person“ (Bauer [9]2006, 55).

Wann beginnt sich diese Fähigkeit zu entwickeln? “Mit seiner erstaunlichen Fähigkeit zur Imitation hat der Säugling bereits von den ersten Lebenstagen an die Möglichkeit, sich auf ein wechselseitiges Spiel einzulassen, welches dazu führt, dass sich erste zwischenmenschliche Bindungen entwickeln können“ (Bauer [9]2006, 58).

Wie sehr der Dialog nötig ist, um diese Fähigkeiten zur Entfaltung zu bringen, zeigt uns ein nicht unproblematisches Experiment, das sog. „Still face procedure“:

„Die Bezugsperson bringt ihr Gesicht in den richtigen Abstand zum Gesicht des Kindes. Wenn der Erwachsene … seine Miene absichtlich völlig regungslos beibehält, dann wendet sich das Kind impulsiv ab. Wird die Prozedur mehrere Male wiederholt, hat dies einen emotionalen Rückzug zur Folge: Die Bereitschaft des Säuglings nimmt ab, nach weiteren Möglichkeiten für mimischen Signalaustausch zu suchen“ (Bauer [9]2006, 62).

Schon ein mit Kind zwei Monaten sucht Übereinstimmung, und es entwickelt sich bei ihm das Grundgefühl, in einer intuitiven Verbindung mit anderen gleichartigen Wesen zu stehen, mit ihnen in einer gemeinsamen emotionalen Welt zu leben. Im dritten Lebensmonat entwickelt es „ein Gefühl dafür, dass es mit eigenen Lebensäußerungen bei seinen Bezugspersonen Verhaltensänderungen auslösen kann“ (Bauer [9]2006, 63).

Wenn hingegen emotionale Resonanz nicht möglich ist, kann Autismus entstehen: "Die Defizite von Kindern und Erwachsenen, die an Autismus leiden, zeigen sich exakt im Bereich jener Fähigkeiten, die auf der Funktion der Spiegelneurone basieren.“ (Bauer [9]2006, 73).

### 2.2 Schläge und Worte können gleichermaßen verletzen - Im Gehirn macht die Ursache keinen Unterschied

Does the experience of pain associated with social exclusion engage the same brain structures (the anterior cingulate cortex) that mediate the affective responses to physical pain? Eisenberger *et al*. tested the hypothesis by telling subjects that they would play a computer game with other individuals. They were then either passively excluded from the game while they watched (due to alleged technical problems), or were actively excluded from play after participating. Comparison of activity in the active exclusion versus inclusion conditions revealed greater activity in the anterior cingulate cortex, which correlated with subsequent self-reporting of distress during exclusion.

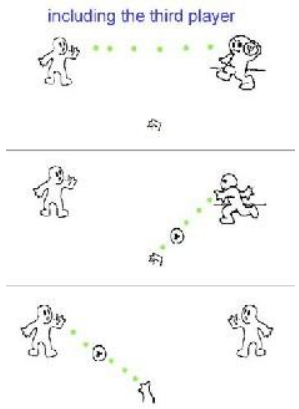


**Abb. 3: Bild: Science**

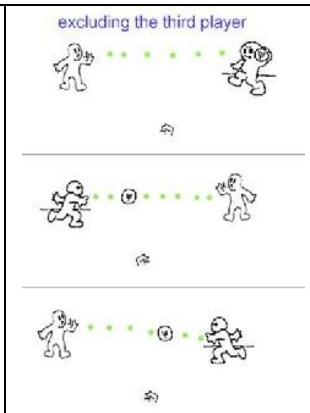


**Abb. 4: Bild: Science**

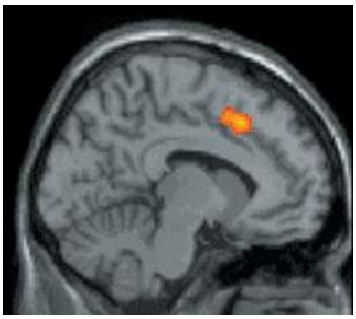

**Abb. 5: Aktivierte Schmerzzentren**

Es wurde also beim sozialen Ausschluss ein Schmerzzentrum im Gehirn aktiviert, die normalerweise nur bei realem körperlichem Schmerz aktiviert sind.

Dass Beziehungen nicht misslingen, sondern glücken, ist nicht nur eine zentrale menschliche Sehnsucht, sondern ist auch theologisch eine entscheidende Dimension.

## 3. EIN GOTT DER BEZIEHUNG - THEOLOGISCHE BEGRÜNDUNGEN FÜR SOZIALES LERNEN

Aus biblischer Anthropologie, dem jüdisch-christlichen Menschenbild lässt sich die Relevanz sozialen Lernens begründen: Gott ist ein Gott, der in sich Beziehung ist, und der Beziehung unter den Menschen will – dies ist der Glaube an den dreifaltigen Gott.

Der Priester und Dichter Kurt Marti drückt dies lyrisch aus:

Am Anfang also: Beziehung.
Am Anfang: Rhythmus.
Am Anfang: Geselligkeit.
Und weil Geselligkeit: Wort.
Und im Werk, das sie schuf,

suchte die gesellige Gottheit sich
neue Geselligkeiten.
Weder Berührungsängste
noch hierarchische Attitüden.
Eine Gottheit, die vibriert
vor Lust, vor Leben.
Die überspringen will
auf alles,
auf alle.
(Marti $^{2}$1993, 8f.)

Schon im ersten Buch der Bibel ist davon die Rede, dass Gott nicht will, dass der Mensch allein sei, und er gesellt Adam eine Gefährtin bei (vgl. Gen 1,26f.).

Jesu Handeln ist stets Gemeinschaft fördernd, Gemeinschaft stiftend. Wenn er Aussätzige, d.h. von der Gemeinschaft Ausgestoßene heilt, dann will er damit v.a. ihre Gemeinschaftsfähigkeit bewirken.

Seine Stiftung des Letzten Abendmahls aus der Pascha-Erfahrung heraus will Gemeinschaft stiften, Communio wirken. Kommunion ist der Auftrag an uns, Gemeinschaft zu ermöglichen, Kommunikation (communio facere) im Alltag zu üben.

Verstehen wir den Auftrag zur Communio (Gemeinschaft) als pädagogischen Auftrag, will Gott nicht nur in der Liturgie zu Communio führen, sondern in jeder Art von pädagogischer Arbeit.

Welche Konsequenzen haben die neurobiologischen Erkenntnisse und theologischen Aspekte im Hinblick auf (e-)learning?

## 4. KONSEQUENZ(EN) FÜR DAS (E-)LEARNING BZW. WARUM SOZIALPHASEN NOTWENDIG SIND

Die entscheidende Frage im Hinblick auf unser Thema scheint uns zu sein: Wie können wir unser Einfühlungsvermögen, die Fähigkeit zur Empathie bewahren und immer wieder schulen? Denn wie bei allen gewonnenen / erlernten Fähigkeiten (Synapsenbildung) gilt die Devise: „use it or you loose it“. Beziehungsweise: Wo gefährden wir leichtfertig (durch übermäßigen PC-Gebrauch) unsere sozialen Fähigkeiten, sodass wir sie verlieren / verlernen?

### 4.1 Der Computersucht entgegenwirken - Selbstwert stärken

„’Im Internet bin ich wer’, schreibt ein Betroffener im Internetforum www.onlinesucht.de. ‚In dem Spiel gab es gewisse Stufen, die man erreichen

konnte. Je höher die Stufe, desto höher das Ansehen. Innerhalb von acht Monaten hatte ich die höchste Stufe erreicht. Ich wurde geachtet, ich wurde gemocht. Genau das, was ich immer wollte. Im Real haben mich meistens alle gehänselt, ich war ein Niemand. Aber im Spiel war ich ein JEMAND.'" (Bauer 2007, 23).

Viele Kinder sitzen Tag und Nacht vor ihrem PC, übermüdet, unternährt, vergessen die Freunde, die Schule und sogar sich selbst: computersüchtige Kinder. Wer ist besonders gefährdet, und wann beginnt die Sucht? Was sind die Ursachen dieser Zeitkrankheit Computersucht, ihre Folgen für Psyche und Hirnentwicklung? – Wer verhindern will, dass Kinder und Jugendliche Computersucht entwickeln, muss verstehen, was sie so sehr fasziniert und was in ihrer Seele und ihrem Gehirn beim Computerspielen passiert.

Erziehungswissenschafter Wolfgang Bergmann und Gehirnforscher Gerald Hüther stellen in ihrem 2006 erschienen Buch „Computersüchtig - Kinder im Sog der modernen Medien" klar: »Kein Kind kommt mit einer Anlage zur Computersucht auf die Welt." Dieses bis zur Abhängigkeit im Gehirn gebahnte Verhalten entsteht wie alle anderen suchtartigen und zwanghaft ausgeführten Verhaltensweisen zumeist erst während der späteren Kindheit oder der Pubertät. Es ist also ein erworbenes, d. h. erlerntes Verhalten. Mit Hilfe bildgebender Verfahren wurde festgestellt: Im Gehirn der betreffenden Kinder und Jugendlichen werden alle im Zusammenhang mit diesem Verhalten aktivierten neuronalen Verschaltungsmuster und synaptischen Verbindungen so stark gebahnt (‚Autobahnen') und gefestigt, dass das betreffende Verhalten zunächst immer leichter und schließlich fast automatisch ausgelöst wird, wenn sich dazu Gelegenheit bietet.

Die entscheidende Frage ist „nicht, *ob* computersüchtige Kinder und Jugendliche ein verändertes Gehirn besitzen. Daran gibt es keinen Zweifel." – Aber: Wem hilft dieses Wissen weiter? Entscheidend sind die Ursachen: Wie und weshalb sind sie hineingeraten? Was bringt ein Kind oder einen Jugendlichen dazu, sich tagtäglich mehrere Stunden vor einen Computer zu setzen und sein Gehirn in erster Linie nur noch für die Beschäftigung mit Computerspielen zu benutzen – und alle anderen Möglichkeiten außer acht zu lassen?

„Die Ursache dafür, dass Kinder und Jugendliche computersüchtig werden, sind nicht ihre Computer oder Computerspiele, auch nicht ihre ungünstigen genetischen Veranlagungen oder gar ihre falsch verdrahteten Gehirne, sondern *die gestörten Beziehungen der Menschen*, unter deren Einfluss sie auf- und in deren Gemeinschaft sie hineinwachsen". Computersüchtig werden nie die starken, kompetenten und beziehungsfähigen, die offenen,

neugierigen und gestaltungsfreudigen oder die lebenslustigen Kinder und Jugendlichen, sondern „diejenigen, die über alle diese stark machenden Ressourcen nicht oder in nur unzureichender Weise verfügen“. Gemeinsam ist allen Computersüchtigen, was ihnen fehlt. Sie versuchen nun mit diesem Defizit zurechtzukommen, sich irgendwie in der Welt zurechtzufinden.

Nicht eine Behandlung des Symptoms, des Störungsbildes ‚Computersucht’ hilft, sondern es ist Hilfe und Unterstützung bei der Überwindung genau derjenigen Defizite nötig, die sie dazu gebracht haben, nach dieser 'Krücke' zu greifen und von ihr abhängig zu werden: Es gilt, ihnen zu helfen, wiederzufinden, was sie verloren haben, nämlich das Vertrauen in sich selbst und meist auch in die Menschen um sie herum.

Manchen ist es das Kunststück gelungen, aus dieser Krisenzeit der Selbstfindung irgendwie von allein wieder zu ihrem wahren Selbst zurückzufinden. Selten war es eine therapeutische Intervention. Die meisten sagen: „Irgendwann ist etwas passiert, irgendwie haben sie eine neue Erfahrung gemacht, die genau das in ihnen gestärkt hat, was sie schon fast verloren hatten: ihr Selbstwertgefühl, ihr Vertrauen, ihren Mut, ihre Lust am Leben, am Entdecken und Gestalten. Manchmal waren das neue Begegnungen mit anderen Menschen, manchmal neue Herausforderungen, manchmal war es aber auch nur eine anerkennende und wertschätzende Bemerkung durch einen Lehrer oder einen neuen Freund, vielleicht auch nur eine gelungene, selbstständig erbrachte Leistung. Von außen betrachtet, war es meist nichts Besonderes, sondern eher etwas, das sich im normalen Leben immer wieder ereignet (oder ereignen sollte)“ (Bergmann - Hüther 2006, 139ff).

### 4.2 Bewegungsmangel, Computerspiele und Schulleistung

Wir benötigen Bewegung für Sprache und damit für Weltdeutung. Ist hingegen die Bewegung eingeschränkt, zeigt sich – trotz hoher kognitiver Information am PC – ein Mangel an Sprachkompetenz und damit an Weltdeutung.

Während bis Mitte der 1990-er Jahre männliche Jugendliche „häufiger Abitur gemacht, weniger häufig die Schule abgebrochen haben und im Durchschnitt die besseren Noten als Mädchen hatten, hat sich dieser Trend mit Beginn des neuen Jahrtausends umgekehrt …“ Es wird vermutet, „dass Computerspiele … den dramatischen Notenabfall der Jungen erklären könnten. So fällt der Abwärtstrend der Schulleistungen von Jungen in der Tat mit dem flächendeckenden Aufkommen von Computerspielen und Spielkonsolen zusammen. Insbesondere sogenannte Ballerspiele werden vor allem von

Jungen gespielt (zu über 80 Prozent), und dies bereits von 12 bis13–Jährigen mehrere Stunden am Tag … Da sie sich weniger bewegen, wird ihre haptische Geschicklichkeit nicht trainiert, und auch die Konzentrationsfähigkeit wird außerhalb der virtuellen Bildschirmwelten kaum gesteigert“ (Korte, 2009, 196f.).

In den 1950er Jahren wurde von KIPHARD ‚psychomotorische Übungsbehandlung’ geprägt und entwickelt mit dem Ziel, das Medium Bewegung in die Therapie von bewegungsbeeinträchtigten und hirngeschädigten Kindern einzubeziehen. Heute haben sich die Begriffe Mototherapie und Motopädagogik durchgesetzt. Diese suchen therapeutisch und pädagogisch Defizite in der Bewegungsfähigkeit aufzuarbeiten.

Die Bewegungsbeeinträchtigung zeigt sich heute bei einer großen Zahl an Kindern und Jugendlichen. ‚Zu viel Zeit vor dem PC und zu wenig Sport’ ist die einfache, aber bedenkenswerte Formel.

Kiphard sieht das Bewegungshandeln als Verwirklichungsmöglichkeit der menschlichen Persönlichkeit. Zentrale Kategorie des psychomotorischen Konzeptes ist das Handeln, in dem sich die kindliche Bewegungs- und Wahrnehmungstätigkeit untrennbar vereint. Dies wird über die Bereiche Körpererfahrung, materiale Erfahrung und Sozialerfahrung ermöglicht. Kiphard sieht die Bewegung in sehr vielfältigen Funktionen und entwickelte neun Übungsgruppen: Fortbewegungstraining, Handgeschicklichkeitstraining, Sprechbewegungstraining, Augenfunktionstraining, Optisches Wahrnehmungstraining, Taktiles Wahrnehmungstraining, Akustisches Wahrnehmungstraining, olfaktorische und gustatorische Wahrnehmungen und kinästhetische Stimulierung.

“Wir müssen die Kinder lehren und durch Einsicht dazu bringen, auch auf ihre körperliche Gesundheit zu achten und durch vernünftige Ernährungsgewohnheiten, ein vernünftiges Maß an körperlicher Bewegung und bewusstes anatomisch-funktionelles Bewegen im täglichen Leben die Körperfunktionen zu erhalten und zu schonen“ (Logar 2006, 82). Es gilt, einladende und fördernde Bewegungsräume zu schaffen, “um die positiven Aspekte der körperlichen, sportlichen Bewegung für die menschliche Entwicklung, die Gesundheit und die Sozialisation“ (ebd. 82) zu erhalten.

### 4.3 iBrain – Veränderungen im Gehirn durch häufigen PC-Gebrauch

Die High-Tech-Revolution hat nicht nur unseren Alltag grundlegend verändert, sie verändert auch unser Gehirn, so die provokante These von

Gary Small, Professor für Neurowissenschaften an der Universität Los Angeles.[1]

Seine neuesten wissenschaftlichen Befunde belegen: Der stundenlange Gebrauch der digitalen Medien stimuliert die Hirnaktivität, löst biochemische Prozesse aus, welche Veränderungen im Gehirn bewirken - und zwar nachhaltig. Während sich neue Fähigkeiten verstärkt entwickeln (Effizienzgewinne bei der Verarbeitung großer Informationsmengen oder schnellere Reaktion auf visuelle Stimuli), schwinden andere, z. B. soziale Fähigkeiten radikal, z.B.: Zuhören können, Körpersprache wahrnehmen, sich auf eine Sache konzentrieren.

Aus diesem Befund begründet sich die u.a. die dringliche Notwendigkeit sozialen Lernens.

### 4.4 **Spiegelsysteme und die Entwicklung emotionaler Intelligenz**

Da LehrerInnen nie ausschließlich als Stoffvermittler agieren können, sondern immer als ganze Person in Erscheinung treten, wird klar, dass effizientes Lehren und Lernen in der Schule nur im Rahmen einer gelungenen Gestaltung der Beziehung zwischen LehrerInnen und SchülerInnen möglich ist. SchülerInnen wollen als Individuen gesehen werden. Entscheidend ist, dass der / die LehrerIn insbesondere den Beginn der Unterrichtsstunde mit einem deutlichen Signal der Beziehungsaufnahme markiert. Der motivationssteigernde Effekt des Gesehen-Werdens potenziert sich, wenn der / die SchülerIn spürt, dass die Lehrkraft eine Vorstellung davon hat, wie und wohin er / sie sich entwickeln könnte.

### 4.5 Sinn-Findung durch Empathie und Solidarität

In zunehmendem Maße sieht sich die Schule mit Kindern konfrontiert, bei denen eine schwere Beeinträchtigung im Bereich des Mitfühlens und der Empathie vorliegt, meist kombiniert mit einer starken Tendenz, Gewalt gegen andere einzusetzen. Ihr Vermögen, die Gefühle von Mitmenschen zu erkennen und zu berücksichtigen, ist stark beeinträchtigt. Kindern, die selbst nur wenig Einfühlung, Rücksicht und Zärtlichkeit erlebt haben, stehen wegen fehlender Spiegelungserfahrungen keine eigenen neurobiologischen

[1] Scientific American bezeichnete ihn als einen der weltweit wichtigsten Vordenker im Bereich Wissenschaft und Technologie. Sein Buch über iBrain hat er mit der Wissenschaftsjournalistin Gigi Vorgan verfasst. Es ist nun 2009 auf Deutsch erschienen: „iBrain. Wie die neue Medienwelt Gehirn und Seele unserer Kinder verändert“. Der amerikanische Titel lautet provokanter: “Wie man die technologiebedingten Veränderungen im Gehirn überlebt“. – „Surviving the Technological Alteration of the Modern Mind”.

Programme zur Verfügung, die es ihnen ermöglichen würden, Mitgefühl zu empfinden und zu zeigen.

Immer mehr Schulen suchen diesem Problem gegenzusteuern, indem sie Aktionen und Praktika einbauen, bei denen sich SchülerInnen sozial engagieren können, z.B. Begegnung mit Alten, Kranken, Menschen mit Behinderung, Obdachlose. Besonders beachtenswert ist das Projekt „Compassion“ (vgl. Kuld – Gönnheimer 2000). Hier wird Wirklichkeit, dass ich über eine Aufgabe, die ich übernehme, Sinn erfahre; denn: „Nur in dem Maße, in dem wir uns preisgegeben an die Welt und an die Aufgaben und Forderungen … erfüllen und verwirklichen wir uns selbst“ (Frankl 1972, 75)

2003 wurde in Österreich von allen christlichen Kirchen gemeinsam ein viel beachtetes „Sozialwort“ herausgegeben. Dieses betrachtet viele Themen des Zusammenlebens in den Orten Familie, Arbeit, Wirtschaft, auf dem Land, in der Stadt, und thematisiert das Leben in der globalen Welt mit dem Blickpunkt Friede, Gerechtigkeit und Verantwortung in der Schöpfung. Das Sozialwort beleuchtet Defizite in der Gesellschaft und beschreibt Notwendigkeiten; es stellt auch dar, was Christen Positives leisten, damit das Zusammenleben besser gelingt.

Das erste Kapitel dieses Sozialwortes ist dem Thema Bildung gewidmet. Hier wird betont, dass Bildung Bindung schafft: „Bildung kann Menschen mit unterschiedlichen Hintergründen zusammenführen, durch gemeinsames Lernen den Horizont eines jeden und einer jeden Einzelnen weiten und helfen, Brücken zu bauen zwischen Generationen und zwischen den Geschlechtern, zwischen Kulturen und Religionen“. Als Aufgabe des Bildungswesens wird gesehen, „mitmenschliche Sensibilität und Dialogfähigkeit zu fördern“ (Sozialwort 2003, 21 und 25).

## 5. CONCLUSION: DIGITALE UND SOZIALE KOMPETENZ GEMEINSAM FÖRDERN

Computernutzung und Technisierung haben unsere tägliche Umgebung verändert; sie verändern uns als Menschen und die Gesellschaft als ganze. Wir haben ein geändertes Verhältnis zu Zeit und Raum und zu uns selbst: Früher war die Arbeitszeit auf acht Stunden am Tag festgelegt, heute können wir am PC ohne Zeitbegrenzung arbeiten, einkaufen, kommunizieren. Am Wochenende / Sonntag gleichermaßen wie werktags. Welche Auswirkungen hat dies auf uns Menschen? Welche Kultur einer Strukturierung des Alltags ist nötig, damit wir unser Menschsein nicht gefährden? Wie können wir darauf als Einzelne/r bzw. als Gesellschaft angemessen reagieren?

Soziale Kompetenzen wie guter Umgang mit eigenen Werten, Wünschen und Grenzen, Konfliktfähigkeit, aber auch Gemeinschaftsdenken und Teamgeist, sind gefragter denn je. Ein Institut in Deutschland, das Institut für Digitale und Soziale Kompetenz (DISK) (http://forschung.wi.uni-passau.de/agip/) hat sich zum Ziel gesetzt, auf diese Herausforderungen zu reagieren, d.h. die Vermittlung von notwendigen Kompetenzen und Wissen anzubieten und in Forschung und Lehre tätig zu sein.

Was ist heute notwendig?

° Empirische Erforschung des Einflusses von Computer- und Mediennutzung auf gesellschaftliche Entwicklungen und auf die Persönlichkeitsentwicklung.

° Förderung und Unterstützung eines bewussten Umgangs mit Computer und Medien.

° Stärkung sozialer Kompetenzen: Persönlichkeitsbildung, Konflikt- und Teamfähigkeit ...

° Die Verbindung zwischen Computer- und Medienkompetenz (Fachwissen, aktueller Stand der Forschung, juridischer Hintergrund ...) und soziales, persönlichkeitsbildendes Lernen.

° Ausschließlich computerorientiertes Lernen sowohl in der Pflichtschule als auch der Universität ist ein fragwürdiges Lernen. Im blended learning sind Konzepte zu entwickeln, die Sozialphasen einschließen; Konzepte, die ein sinnvolles Einander-Ergänzen der beiden Lernformen (pc-orientiert und face-to-face) planen und verwirklichen helfen; Konzepte, die eine hohe Wertigkeit auf Rückmeldung und personaler Begegnung gut gewichten, sodass fachliches und persönlichkeitsbildendes Lernen Hand in Hand gehen.

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# BIOCOMPUTER SUPPORT IN EDUCATION AND MEDICINE

**Adam Adamski**
University of Silesia in Katowice
Faculty of Ethnology and Sciences of Education in Cieszyn
Bielska 62, Cieszyn 43-400, Poland
a_adamski@go2.pl

***Abstract:*** *Internet is becoming a very useful tool, helpful in doing homework and solving school tasks. It is also a marvelous way of making friends with people from around the world and of other cultures. It is the cheapest ticket to travel around the world. However, one should remember that it carries numerous hazards in the cultural, moral, and social and especially health system. The electromagnetic field emitted by the screen blocks the synthesis of melatonin, what causes the perceptive disorder, hyperactivity connected with the shortage of concentration and decreases relaxation level. The modern model of education should prepare possible computer users to use it effectively as a tool which helps them to pull themselves together in a quickly changing reality. The popularization of Information Technology exerts a great influence on schools and the educational process proceeding in them. The basic problem is to integrate with computer as a tool and method in educational contents skillfully, which a student should master in a new educational model.*

## 1. COMPUTER BIOTECHNOLOGY WITH THE USE OF HOMO ELECTRONICUS

Contemporary information and communication technologies have been changing the surrounding world at breakneck speed. The changes involve all spheres of our life: work, science, social relation-ships, and especially education. Living on the threshold of the informative society we constantly face an overload of information, which should be filtered and search for the most valuable information. It happens so that the knowledge of the 21st century is „the strategic wealth', and the skills decide about gaining a

competitive advantage over the competitors on the job market.[1] It is a great challenge for the 21st century's education to educate a man of high social competence, able to search for and transform information, solve the life problems and deal with the modern technologies. To fulfill this task appropriately the highly qualified it is a great challenge for the 21st century's education to educate a man of high social competence, able to search for and transform information, solve the life problems and deal with the modern technologies. To fulfill this task appropriately the highly qualified teaching staff is required, who efficiently will use the modern teaching resources.[2] It is not sufficient to equip a teacher with knowledge and skills of using the computer programs at school. The more essential thing is to teach them to use the computer in the educational process in a creative way. The use of the right educational programs makes the perfect conditions for children to develop creative thinking and influences their personalities positively[3].

The biotechnology development progresses towards constructing a computer on organic biostructures such as DNA and enzymes. The experiments showed that a human body is equipped with appropriate electronical material, which might be used in the biocomputer production. These are the human actions, however there is also a biocomputer produced by the nature in the evolutionary process throughout the billion of years. It is called electronicus, as apart from biochemical and molecular properties, an electronic base of semiconductor's nature of its organic compounds is taken into considerations, mainly protein and nuclein acids. In the electronic model of a man, the biological system consists of piezoelectric elements, piroelectric and protein semiconductors, nucleic acids and melanin. A central brain system exists in some the integrated system, which may control a whole system and coordinate it as well. Steering is performed by the net of electrons, photons and phonon's information channels[4].

Life is light, so it is a kind of energy and a wave. Life as a wave is indestructible, until it is absorbed into another system. Human consciousness has got a similar electromagnetic nature as life; it is understood as an answer

[1] R. O. Pachociński Oświata XXI wieku. Kierunki przeobrażeń Warszawa 1999.
[2] E. Smyrnowa- Trybulska, D. Willmann.Teoretyczne i praktyczne aspekty przygotowania nauczycieli do nauczania na odległość. Praca zbiorowa pod. Red. A. Mitasa (w:) Informatyka w Edukacji i Kulturze. Wyd. Uniwersytet Śląski w Katowicach, Cieszyn 2005, s.193-204.
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[4] W. Sedlak . Homo electronicus. Wyd. Ekomed. Opole 1994: s. 53.
[5] W. Sedlak Wpływ świadomości na somę człowieka w bioelektronicznym kontekście. Wychowanie Fizyczne i Sport 1973. t.2 s. 69-77.

of bioelectronic system for some external and internal information.[5] Quantum consciousness is neither the consciousness provided by sensual receptors nor the consciousness understood in psychology's category as a reflection in the cognitive process. Thus it does not appear in the middle of evolution, it exists right from the beginning of life. During the evolution it was connected with the brain and its coordinative function.

With the reception of such a piece of information is to be connected the reflective consciousness, while the quantum consciousness receives any instability of environmental parameters: mechanical, magnetic, thermal, gravitational, chemical, acoustic and also mass of piezoelectric semiconductors[6]. Biological system contains electronic material – protein, nuclei acids (DNA, RNA), melanin. Electronic features that were not taken into account from the biochemical paradigmatic point of view:

a) semiconducting amino acids, proteins, biological membrane[7], melanin[8]

b) piezoelectricity and piroelectricity of acids[9], proteins[10], bones[11], muscles, tendons, blood vessels[12], plant tissues, cellulose, DNA[13].

One can pay attention to the whole number of phenomena, such as photo conducting of some of biochemical, stimulating part of coherent light:

- slight electromagnetic radiation in optic range accompanied by life processes and working nerves and muscles;
- electronic aroused states, intermolecular electron transfer;
- emission of electromagnetic wave in under red scale through alive organisms;

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[6] W. Sedlak Biofizyczne podstawy świadomości. Roczniki Filozoficzne KUL.1969. t.17.z.3. (Filo.Przyrody), s.125-155.

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[11] E. Fukada. Piezoelectric effect in muscle. Japanese. Journal of Applied. Physics 1970.9, s. 844-849.

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[13] E. Fukada, I. Ando. Piezoelectricity in oriented DNA films. "Journal of Polymer Science". Part A: Polymer Chemistry, 1972, 210, s.565- 567.

- ultraviolet emission in mitosis's period, emission of phonons in organic piezoelectric;
- forming the donors-accepted complexes and emission of phonons on joints p.n.

On the sub molecular level, a piece of information carries completely different meaning than the theory of information does. The change of energetic balance includes some information for biological system and psychological process.[14].

## 2. BIOCOMPUTER ON THE DNA BASE AND ENZYME REACTIONS

Leonard Adleman led the way to the programming computer based on DNA. Three years after the presentation of a biocomputer, called Maya-I, it was time to present its follower, so called a biocomputer Maya –II. Similar to its predecessor, it was constructed by a group of scientists from New Mexico University. Biocomputers on the base of DNA, unlike the classical computers, are in some sense matrices with many rows of glass test tubes, in which the DNA chains replace the silicon's chips[15]. According to the scientists, the new technology can be successfully used in the future in many different diagnostic methods. They estimate that in the next 5-10 years, appropriate tools to use the biocomputers will develop similar to Maya –II, which might be used in education, in medicine for example in diagnostic and killing cancer cells. These computers based on the DNA technology, can be used in such solutions as blood sample, or in the body. A man, with the help of this computer, will be able to make up his mind on the single "cell" level, claims Joanne Mac Donald [16].

For some years the scientists have been working on three new technologies which are to replace computers based on silicon: quantum, optic, and DNA one. In a quantum computer, the information bits are included in the electron spin. In an optic computer the flow of electrons making binary signals were replaced by photons. The laser ray which can move with the light velocity is resistant to any disturbances and the transmission can be followed simultaneously on different length waves. However, computers where

[14] W. Sedlak Bioelektronika 1967-1977. Wyd. IW PAX Warszawa: 1979, s. 172.
[15] L.M. Adleman, Science, 266, 1021. 1994.
[16] Eurekalert!, Biokomputer.republika.pl,

elementary particles of deoxyribonucleic acids are used may become a real revolution[17].

In DNA computers instead of zero and one sequences four nucleotides sequences are transformed, which consist of DNA: adenines (A), cytosines (C), quinines (G) and thymines (T). DNA computers outdo the former solutions both in the density of packed information, the speed of activity as well as the slender use of energy. It is enough to say that requires recording on above trillion CD-ROMs, would take about 1 $cm^3$, equivalent of 1gram of DNA. Molecular computers secure the exceptionally big level of parallel transformation. In one drop of water solution – this is an environment where DNA computer works in – there may be above trillion molecular nanoprocesors, doing billion operations in a second[18].

Bimolecular computer are highly energy saving: 1 J (Joule) is enough to perform about 2 x $10^{19}$ operations in connection of elementary particles DNA. Nowadays, super computers with the use of energy 1 J perform only $10^{9}$ operations. These are not the only capabilities of this computer. Because the entrance, exit, and multimedia software of such nano processors consist of elementary particles of DNA, the part of overtakes appearing in the nature enzymes[19]. Even today it is expected that around the year 2050 the first molecular doctors will develop – inserted into human body and appropriately prepared molecules which will be able to heal people on the cellular level. Such intelligent molecules could react to biochemical changes in organism and in an emergency case create appropriate medication on the spot and administer it[20].

The basic structure of DNA computer is the particles of deoxyribonucleic acid. DNA consists of two chains of particles of nucleic acids made of nucleotons. Both nucleotons chains are connected with each other, hydrogen ties between complementary pairs of nucleotons. A is connected with T, and G is connected with C. In a computer based on molecular particles, the restrictive enzymes fulfill the main role. These proteins recognize described a double thread DNA sequence precisely and cut the particles in the range of the sequence. Cutting the DNA double thread can occur (depending on the used restrictasa) either in the same spot on each thread ("on the same height") or both threads are cut in two different places, forming so called *sticky ends.*

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[17] John McMurry. Chemia organiczna. PWN, Warszawa 2000.
[18] http://pryzmat.pwr.wroc.pl/Pryzmat_170/170dna.html
[19] R.J. Lipton : DNA solution of hard computational problems." Science", 1995. Vol. 268, s.542- 545.
[20] O. Unold, M. Troć : Biomolekularne modele obliczeniowe. W: Inżynieria komputerowa. Praca zbiorowa pod red. Wojciecha Zamojskiego. Warszawa: WKŁ 2005 s. 73-85,

**Figure1**. **Double helisa DNA**.

**Figure2**. **Calculating DNA is constant intertwinding and unwinding thread of DNA.**

Molecular computer, which uses enzymes reactions to do any logical calculations, was presented by a group of Israeli scientists from the Hebrew University of Jerusalem. The research team led by Itamara Willnera built a computer using GDH enzymes (glutamate dehydrogenizes) and HPR (horseradish peroxides), which activate two tied chemical reactions. In turn two chemical compounds hydrogen glucose molecule were used to represent the exit value (A and B). The presences of any of these compounds, which are recognized with a camera, correspond with the value 1 in a binary code, while the absence analogically represents the value zero. Enzymes computer was used to deal with the two basic logical operations defined as AND and OR [21].

Willner claims that his enzyme computer will find the use e.g. in biosensors monitoring the reaction of the patient's organism on the specific dose of medication medicine. In this way the enzyme machine could serve to the precise calculation administer in the medicine directly to the internal organs. Willner adds, that an implant enzyme computer can also be used to comprehensive estimation of the men's metabolic path[22] of the bimolecular

[21] http://www.newscientisttech.com/article/dn8767.html.
[22] http://www.in4.pl/archiwum.htm?okres=5&od_kiedy=2006-02-24

computer studying do not need sophisticated and expensive technology, the idea is more valuable than money. It gives a chance to widely spread scientific development[23].

## CONCLUSION

There is a new era of biological computers waiting for the man, an era of computers which do not need digital transformation, which are held in silicon integrated circuit. Electronic computer record the information in a memory as a sequence 0 and 1, and transform these data by means of defined program. However, there are biocomputers, in which calculations are made by particles coming into different reactions, just like in a case of DNA. Molecular computers have many more attractive features than any technical computers. They work on the bases of rule sequence in DNA, what allow them to pack the information extremely densely. Molecular computers secure an extremely big degree of parallel transformations, which are very energetically economical. At 1 J activity it is able to perform 2 x $10^{19}$ operations of connecting DNA particles. Nowadays technically supercomputers are much slower, while 1 J allows to operate on at least $10^{9}$ operations[24].

Compared to a computer, which is an example of technical creation, the brain does not require external software as it owns software built into the cells. Biological computer works on algorithms, the role of programmer is overtaken by the consciousness, which is programmed in heuristic way. And due to appropriate confirmative changes enzymes may function as molecular switches [25].

In a short period of time we will have to come to terms with a new reality. We will be obliged to adopt to biological computers and many electronic devices, known as register readers storing the information in the brain. The educational process will be carried out in a new way of learning, where the dominant part will be given to supporting devices which help to memorize material, and the information recorded in brain, (as a biological piezoelectric semiconductor) will be running not only through senses, but also with the help of technical devices. In a new system of learning the amount of

[23] http://pryzmat.pwr.wroc.pl/Pryzmat_170/170dna.html

[24] L. Adleman. Molecular computation of solutions to combinatorial problems. Science 1994.266, s.1021-1024.

[25] M. Wnuk Enzymy jako nanoprocesory – perspektywa bioelektroniczna. „Roczniki Filozoficzne" 1`995.43.(z.3. Filozofia Przyrody i Ochrony Środowiska) s.127- 154.

computer information will enhance the power of X, the psychical development will accept a new dimension of reality, although not everyone will find it easy to adopt to this style of learning, what will lead to pathological states in personality repeatedly.

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[21] http://pryzmat.pwr.wroc.pl/Pryzmat_170/170dna.html

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[23] http://www.in4.pl/archiwum.htm?okres=5&od_kiedy=2006-02-24

[24] http://pryzmat.pwr.wroc.pl/Pryzmat_170/170dna.html

# THE PLAGIARISM PREVENTION AND REVELATION IN DISTANCE EDUCATION

**Ján Skalka, Martin Drlík**
Constantine the Philosopher University in Nitra
Tr. A. Hlinku 1, 949 74 Nitra, Slovakia
jskalka@ukf.sk, mdrlik@ukf.sk

***Abstract:*** *The online knowledge testing and evaluation pose one of the main parts in the area of distance education. Their greatest problem is plagiarism. The authors deal with the term definition of the plagiarism and go into some important facets of the plagiarism prevention and revelation in details. They analyze actual state of the fight against plagiarism in Slovakia and in other countries. They try to classify the kinds of online testing and evaluation activities that are supported in contemporary LMSs in the second part of the paper. They describe their own experience in plagiarism reducing in computer science e-learning courses. Finally, the authors stress out the important role of plagiarism prevention and bring several methods that could reduce the risk of plagiarism in e-learning.*

***Keywords:*** *plagiarism, programming, e-learning*

## INTRODUCTION

The electronic education (e-learning) and LMSs markedly contribute to the fulfilment of the dreams of many pedagogues, cyberneticists and theorists ((Pressey, Skinner, Crowder, Pask and many others) at the beginning of the third millennium. They were introducing their models in the early 20th century, but they had not sufficient tools to their effective implementation at that time.

E-learning has brought many other automated components to the programmed learning besides the opportunities to study self-paced and to use adaptive components (monitoring of the educational process, assessments, automated tests corrections). The Internet has markedly simplified study materials distribution and has improved communication between student and

teacher. The electronic study materials make possible quicker and simpler actualization and multimedia integration.

The distance and blended learning in the narrow conjunction with e-learning represent modern area of the contemporary education. Many pedagogues and "pseudo pedagogues" have built their reputation on it. There were a lot of financial and human resources to the e-learning implementation at the universities invested, but the result of this effort was often very insignificant. The main reason is the finding that e-learning is only other approach to knowledge presentation and it is not a cure for the absence or topicality of the learning content.

When we consider the results of the analysis of the Gartner Group from the university management's point of view, we can see the position of the e-learning has changed during the last few years. E-learning has undergone from its state of overestimation to the state of an important but not dominant part of the classical university educational portfolio [1].

The employment of the LMS has demonstrably improved the motivation and exposition phase of educational process. The distance education potential is often unused in the phase of the fixation and diagnostics at the university level of the education. The usage of repeating, testing and assessing features of the LMS are the main problems that delay effective and complex exploitation of e-learning in the distance education. The efficiency of these features embodies in the sufficient amount of the various (randomly generated) tasks and assignments. Accordingly, the efficiency encounters the problem of human factor and the particularity of the subject. They both require modification, in the limiting case extension of the existing LMS solution. These problems are solvable now and contemporary LMSs are prepared to nowadays situation [2] and offer tools for user's modification.

The complex achievement is more exacting. If we concentrate on the university education, we recognize each consecutive testing, final and second exam require a physical presence of the student in the time and place. But it is in the steep conflict with the basic paradigm of the distance education.

The proctor centres provide other worldwide alternative. Their main advantage is being closer to the student, but they increase the study costs at the same time. The greatest problem braking the online testing and student assessment and evaluation is plagiarism – incomprehensible in modern world, but very prevalent and ubiquitous at the universities in the Central Europe. Some solutions [3] could bring certain revival, but they do not represent world-wide acceptable solution.

## 1. PLAGIARISM

There is a great deal of the term definition of plagiarism in the scholar literature. Many universities have their own definitions of this term in their academic orders and academic ethics memorandums. These definitions are often very similar and vary only in some details.

We introduce the following definition of the plagiarism for the purpose of this paper. The plagiarism is an illegal imitation or transfer of artistic or scientific work without information about its original work or author [4], [5]:

- turning in someone else's work as your own,
- copying words or ideas from someone else without giving credit,
- failing to put a quotation in quotation marks,
- giving incorrect information about the source of a quotation,
- changing words but copying the sentence structure of a source without giving credit,
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not (see our section on „fair use“ rules).

### 1.1. The Plagiarism in the World

Although the problem of imitation, cheating and plagiarism in general is as old as the mankind, the disclosure of the plagiarism at academic sphere has been sporadic and quietly accepting state in the previous last decades. We know today that the plagiarism is a serious problem. The combat against the plagiarism requires the further education from the beginning.

Teachers in a lot of countries have recognized that the restriction of the plagiarism requires primarily the cultural education from its first potential opportunity. The first step should be the “agreement” between the educational institution and a student. The agreement sets the limits for the plagiarism’s definition and the approval in the case of its provability.

Signing the agreement each student agrees with the outcome and penalties in the case of breaking it. The first information about plagiarism has come to the student’s mind at the secondary school so that offers to build up correct awareness and later to reduce plagiarism in his/her study and career.

The automated plagiarism detection is realized with the support of the relatively small group of the anti-plagiarism systems. They work on the principles of the text comparison between the examined document and the large database of electronic documents and available web pages. The best known universal anti-plagiarism systems are *iThenticate*, *CopyCatch*, *Urkund*

a *Ephorus* a *SafeAssign*. They are able to be integrated into well-known LMSs. The *Plagiarism-detector* offers a very interesting solution. It uses Google database, cuts the examined document to the chunks and than compares them against the database.

There has been developed a specialised system at the Masaryk University in the Czech Republic based on the combination of the National register of the bachelor and master thesis and anti-plagiarism system.

### 1.2. The Plagiarism in the Slovak Republic

The combat against plagiarism is only at the beginning in Slovakia. There were several accusations of plagiarism in the press within last three years, but they were nearly always suppressed. We can indicate in our experience and our knowledge of the well-known order of the plagiarism supporting web sites [6] that these cases are only the top of all.

The plagiarism of the final and qualification thesis is the most protrusive and painful problem in Slovakia nowadays. The vindication of these theses is the necessary condition for successful finishing university study. The problem rises when the student obtains the higher qualification and then pecuniary benefits against this background.

The universities solve legal facets of the authorship of the final theses separately. For example, the students at the VŠM/City University of Seattle in Bratislava are preannounced about the fact that their documents, projects and theses will be checked with the anti-plagiarism system, namely with the system TurnitIn [7].

The Economic University in Bratislava is the next university that presents the combat against plagiarism [8]. The management of the university is planning the control of the bachelor and master theses in the academic year 2009/2010. They would like to upload to the system seminar works later.

The national project intended to collection and originality evaluation of the theses is starting at this time. The researchers believe this project improves the quality and assures the originality of the theses, because it would be illusion to assume that plagiarism does not exist in Slovakia, as states in [9].

### 1.3. Plagiarism in the University Computer Science Courses

If we mention the statistics of the revealed cases of the plagiarism at the Department of Informatics UKF in Nitra in more details, we can encounter an interesting paradox – the more exacting requirements of the subject, test or assignment are, the more rare similar solutions exist. We can generalize this

fact with impunity, because the following reasons are common for all areas of the students' activity:

- Difficult assignments usually require understanding the fundamental nature of the problem by the student and its formalisation through the use of the appropriate tools. This is not usually possible without prior student's knowledge and skills. If the student has not the elementary knowledge how to solve the assignment, he does not try to solve it in a general way regardless of its mandatory or optional character.
- Non-trivial solution cheating – difficult assignment is lengthy to mechanical transcription and student is not able to correct mistakes that he has made during this process.

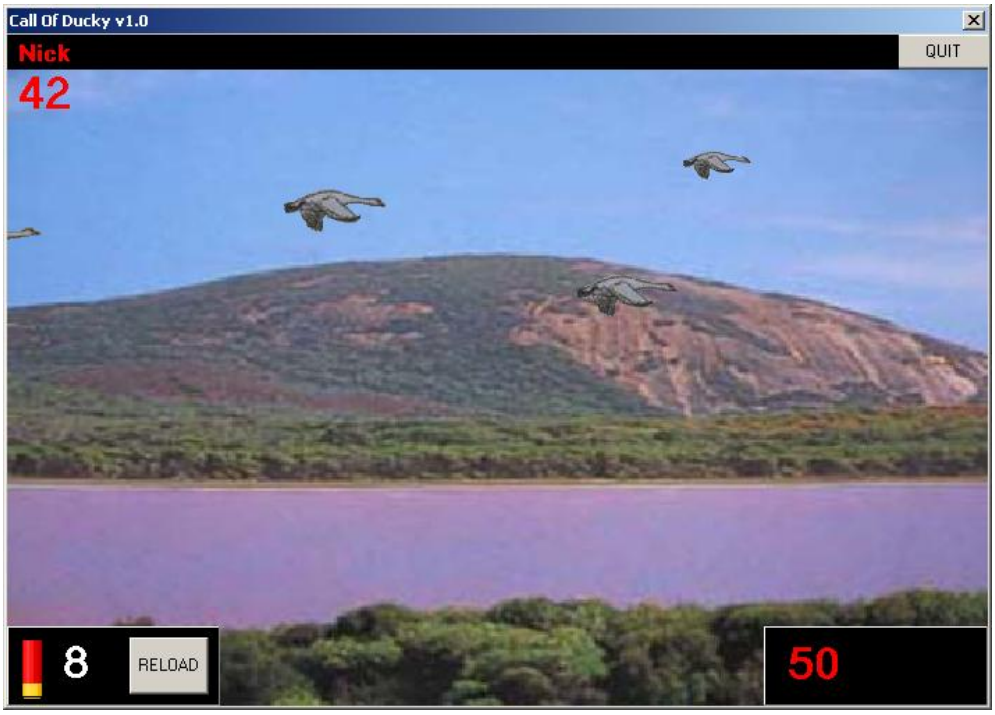


**Figure 1. Moorhuhn – the programming assignment that supports student's creativity: there were used student's own images, sounds, navigation and effects**

Some students try to replace missing skills and knowledge with the generality of phrases and chunks of program code. They often try to hand in other assignment as they have assigned. We recommend ignoring these partial "pseudo" solutions and predefining criteria for entire right solution. The

works necessitating creative thinking, expression of opinion, information resources analyse are the analogy of the difficult assignments in other subjects.

The final, qualification and seminar theses represent other specific category. But, we can not understand these theses as a direct part of the distance education. Additionally, mentioned problem is out of the scope of this paper.

We can come to the conclusion in the consideration above mentioned text and our own experience that plagiarism is less the problem of the specialized and vocational education than the university education. The vocational education is characterized by solving the non-trivial assignments, often time consuming and easily verifiable in work. Additionally, enough experienced and skilled people take this education or training more often as an inexperienced one and such people do not need special individual help.

The plagiarism, cheating and imitation during the test phase is a routine situation at the everyday education at our schools and universities. It is bewildering because this part of the education disposes the potential to apply the complex model of distance learning and so to achieve high spatial and technical saving and effective utilisation of the manpower.

## 2. THE PLAGIARISM ELIMINATION IN THE DISTANCE EDUCATION

As we can see from the aforementioned text, a friction area between student and teacher comes into existence in the diagnostics phase of the learning. The fruitfulness of any kind of the education realization (and mainly in distance education) depends on the elimination of the plagiarism. If we take into account that plagiarism detection and its penalisation is only the consequence of the underestimated role of prevention, we can point out that it is necessary to make provision for heterogeneity and personalization of the learning content and tools for students' evaluation already in the process of e-learning course creation.

### 2.1. The Kinds of the Knowledge Testing and Evaluation in E-learning

If we concentrate on the opportunities that LMSs offer for distance and blended learning, we find out that we have numerous activities and modules that improve learning, but do not solve the problem of plagiarism themselves. The application of individual tools, activities and methods in a particular LMS in terms of the combat against plagiarism is on the shoulders of the course creator or teacher.

The classical testing belongs to the essential part of the diagnostic phase of learning. The online equivalent of the testing procedure of contemporary LMSs belongs to the most sophisticated parts of such a system. It represents probably the most widely used and the quickest way to test students without prejudice. We should think over the automated support of the test control since the beginning of the e-learning course creation due to the expected time-consuming nature of the control process. For example, the LMS Moodle disposes several variable options for defining the test questions. The details can be found in [10], we summarize them in brief:

- The question type with one or more correct answers – we recommend to use more than one correct answer and penalties for wrong answers.
- The direct or calculated question type – the student answers to this question in a single word or phrase or in single number.
- The questions with the nested answers – this question type is similar to the direct type of question, but the filling of the correct answer is executed directly in the text of the question.
- The matching question type – student must bind correct pairs of questions and answers.
- The error correction is an infrequent question type, because it can end in misunderstanding the basic relations and connections. This question type has irreplaceable place in the area of the programming languages teaching.

Of course, there are some more specific and more interesting kinds of knowledge evaluation that bring more profit for a teacher at the same time. We describe only these that are suitable for distance learning and have been supported in the contemporary LMSs:

- Team work – it can be organised in the arbitrary form and activity rate:
    - Hierarchical organisation – students are divided into groups with the team leader. It is a time-consuming form of team work and therefore we recommend using it only once or twice in an academic term. If some team-member does not want to collaborate, we recommend students to exclude him. Consequently, the excluded students create another team. The weakness of this approach consists in the insufficient encompassment of the learning content substance due to the averaged knowledge of the team members.
    - Role assignment. The tutor of the course assigns the role to the students. Each student gets the assignment that regards the student's prior knowledge and skills. This approach lays stress on

the individual student's knowledge improvement. This approach has also some shortcomings. It taxes the teacher heavily to prepare assignments with variable difficulty and their adjusting to each student.

  - Information gathering about the students from miscellaneous collaborative activities. We assume that students have equal conditions and assumptions to solve assignments in the sufficiently general in scope, examples include dictionary writing or wikis.

- Online discussions (forums) create a separate and content-rich category. They allow the exchange of students' opinions and their evaluation regardless of the subject area. The main advantages of the online discussions are sophisticated management and history archiving.
- Peer-to-peer critical and objective evaluation. It may be in relation to online discussions or can stand for the separate category of the online activities. The students learn from others and find their own limitations.
- The role acting is a very interesting and alternative tool for creating specific groups of students and simulating the real situations, for example customer – supplier, student – teacher, manager – employer, and sympathizer – opponent.
- Problem solving from the students' environment gives students the immediate feedback continually and motivates them to successfully finish the assignment.

## 2.2. The Risk of the Distance Online Testing and Evaluation

The indisputable risk of any form of knowledge evaluation, especially in distance learning, is plagiarism. We can meet the plagiarism in miscellaneous forms. We try to organize the students' sins to the following categories:

- The utilisation of the disallowed study materials – students are trying to use drawing card or find solutions on the websites. We are witnesses of the situation when the student tries to hand the work of other student unknown to him/her.
- Cheating is the most frequent form of plagiarism. It sometimes takes place with or without the author's agreement.
- The utilization of the advisors or substituent is very serious and unacceptable form of plagiarism. The substituent may be the direct participant of the testing in face-to-face or distance learning and teacher may not know him/her.

### 2.3. The Decrease of Risk of the Plagiarism

We can see the problem of the plagiarism during testing phase from the two perspectives. From the side of plagiarism prevention:

- Assignment personalisation – each student obtains an original assignment. The assignments must roughly have the same difficulty and they should be controllable and evaluated automatically by the reason of expected more students [11].
- The restricted access to other application on the testing computer. Less skilled users do not negotiate such a barrier and so they must rely on their own experience. But this solution is relatively easily breakable in the distance education with the parallel usage of another computer.
- Task formulation in such a way that they are not solvable by the mechanical using of existing sources or solved tasks and they require their own creative thinking.
- Permission of the arbitrary access to the known sources can reduce the stress during testing. Its combination with time restriction gives rise to the restriction of the number of available resources. Students need to read through the available resources before test, because they will not have enough time to do this during the test in the future.
- Biometric sensors represent the future of the on-line plagiarism detection. The user will be uniquely determined within the all testing period.

From the side of plagiarism revelation:

- Recording the testing procedure with camera. This procedure guarantees its own accord some level of the barrier. We can say in our experience that we have made decreasing attempts at fraud when we have monitored the testing procedure. On the other hand, if students get accustomed to the monitoring and their attempts go unnoticed; this activity is not worth having.
- Specialized editors that have limited ability to copy or paste text. They are able to uncover the differences between the student's style throughout the term and at the time of the final exam.
- Reveals the resemblance between referred students' solutions by tutor or by automata. The automata analyses the textual or visual content. Some opportunities have been sketched in [11], the extent of this problem exceeds the scope of this paper. It is possible to use web browsers or anti-plagiarism system in the case of long documents.

### 2.4 Organisation Background

The distance education and especially knowledge assessment must be supported by the legislative level of the educational institution. Academic order and disciplinary order are basic documents in this area in the case of Slovak universities. It is necessary to qualify the definition of the term of plagiarism and academic ethics in the academic order. It is necessary to define strictly disciplinary actions and penalties in the disciplinary order in the same way.

On the other hand, it is crucial to prepare teachers in compliance with the abovementioned documents. They should not create a ground for further proliferation of the plagiarism as we can see in our days. We flatter to claim the experience of the private Slovak universities [7] that have reduced the plagiarism among students in a couple of exemplary sentences.

## CONCLUSION

The experience in reducing in plagiarism in many countries witnesses that this fight is a very time consuming process. Therefore, the teachers endeavour to do prevention by sufficient students' awareness, calling the attention and taking about sanctions in advance already at the secondary schools. In the present, when computers and the Internet provide myriad tools supporting and simplifying plagiarism, tolerance of plagiarism at the beginning of the study leads to the complete acceptance at the next levels of education (bachelor, master and doctoral theses, scientific and artistic works).

It is necessary to give rise students to correct citing from under secondary school level. Students should always refer to the original resource of idea or inspiration. This is a primary but a simple step.

If we fail to prevent plagiarism, but we can reveal it, we must predefine the penalties and sanctions. Each charged person must have the right to attorney and additionally we must distinguish between wilful or isolated (sloppy citing, unlisted bibliographic resource) plagiarism. And the one opened question is what we will do, if we uncover the plagiarism as late as the academic title will be granted.

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