Application of Electronics in the Formative Educational Process

A great attention is paid to the modernization of the materially technical basis at all types and levels of schools. The topicality of these issues results from the continual development of the existing science disciplines (that already regularly co-operate with the pedagogy) but also from the development of branches newly emerging or newly cooperating with the pedagogical branches (for example cybernetics, ergonomics, cybernetic pedagogy, information theory, etc.). To prepare all the pupils and students for the wide-ranging use of electronics and computer technology, both in the future professional and personal life, belongs to basic goals of the contemporary school.

The application of electronics in the formative educational process comprises three basic spheres:

- **teaching that concerns electronics** as a branch of study and science in separate subjects or as a part of other subjects,

- **teaching that concerns computers** and their application as a branch of study and science in separate subjects or as a part of other subjects (it concerns primarily the algorithm development and programming).

- **application of computers and electronics** (video technology) in the formative educational process for support and management of the teaching and learning.

Computers and video technology in this third sphere can be perceived as an important didactic technology that together with other electronic devices function in teaching as important tools for intensification of knowledge in various school subjects or studying branches.
These devices can be used both for direct teaching and individual learning, testing and evaluation but also for self-control. It is possible to state that acquiring of modern information and communication technologies will be assigned as a tantamount part to such basic cultural technologies as are reading, writing and computing. These technologies will become a part of the general and professional education. Its alternative forms will also be used in the distance education that is currently topical in the sphere of pedagogical theory and school praxis also in our country. Distance education is basically a certain type of extra-mural studies that is intermediated by media – broadcasting, television, telephone, computer etc. – and that is above all based on structured programmes and on the so-called individual learning. One of the forms of the distance education is the so-called correspondence college namely at the university study level. The recent expansion of computers and Internet has contributed to the growth of the so-called e-learning that from a certain aspect can be considered as a computer form of correspondence college. The methodology of e-learning courses preparation often draws from the knowledge of the preceding methodology of the distance education and correspondence college. The advantage of e-learning consists in the possibility of using multimedia and interactivity provided by the contemporary computer technology. These media are for example suitable for preparation of various simulators and interactive training that beside the distance education can also be used as a suitable supplement for the classical form of teaching (combination of classical forms of teaching with the use of e-learning media is sometimes called blended learning).

The e-learning course can be regarded as a basic entity in the e-learning education. The course typically contains the matter discussed in a concrete teaching hour or as a concrete theme. E-learning courses visually most often suggest an electronic book with a content used for navigation and the screen enables to display a concrete page of the course. The pages usually contain an explanatory part, a test at the end of the chapter or a summary test at the end of the course. The text of the explanatory part is usually similarly structured as the texts of the correspondence college, supplemented by multimedia elements. The multimedia elements used for documentation and interpretation of a concrete matter are efficient and represent a strong point of these e-
learning courses. The used decorative graphics is a bit controversial, as it is necessary to consider its purpose and the final bearing on attention of the course attendants. E-learning courses are most often implemented as Internet applications (programmes) that are run in the Internet browser.

E-learning courses are often saved in the so-called LMS system (an abbreviation of the term Learning Management System). This system enables browsing of courses, files of pupils or students, saving of test results of individual students, and checking through the intermediary of statistics and other administrative functions. The system also defines various roles for teachers who assign courses to concrete students. A part of the LMS system forms a tool for creation of e-learning courses. The functioning of these tools is based on a similar principle as the same of the text editors in which the pages of the course are created and put together in a concrete order.

To avoid the dependence of the created courses only on the LMS system of a given producer and enable to view them also in other LMS systems, it is appropriate to create the courses according to a technical standard. Two standard formats that are most often used for this purpose are AICC and SCORM as they are supported both by the majority of LMS systems and also by the tools for creation of courses (it is recommended not to be satisfied with the affirmation of the producer and testify whether the courses really function without any problems).

For a systematic support and creation of e-learning courses can also be used the so-called LCMS systems (abbreviation of the term Learning Content Management System), that usually enable to compose courses from the previously created reusable objects, create versions of these courses, publish on the Internet a list of available courses including its annotations and the like. The LMS and LCMS systems are usually implemented as Internet applications similarly as e-learning courses.

The relative attractiveness and manifold functions of both types of systems can lead to a frequent mistake in introducing of e-learning represented by an idea that the most important part of implementation of the e-learning is the installation of LMS or LCMS system. Without a parallel development of a concrete methodology adapted to the local conditions of the school, without a motivation of the teach-
ers to support the development and use of e-learning and above all without concentration on creation of good quality courses (that are not only copies of the course textbooks supplemented by occasional graphics) the installation of the LMS system will finally remain with a questionable result. Briefly saying, the introduction of e-learning process only starts with installation of a LMS system.

The process of electronics application is nowadays primarily connected with computer technique problems as of the sphere comprising the development, production and use of the computer systems. The application of electronics enables the growing use of information the bearer of which are computer media. This aspect is connected with the question concerning the skill to communicate with the computer. Information saved in an electronic form both in a concrete computer and on Internet will be unavailable for someone without the ability to communicate with the computer equally as information saved in the books for an illiterate individual.

The pupils should acquire at the schools the respective information and practice for working with the computer technique and use of Internet for retrieval of information. This will become a good basis not only for rational acquiring of information from the computer media but also for the use of computers in professional and private life. The following part of the text will deal with the importance of computers in teaching.

Actual application of electronics in the educational system requires implementation of some basic elements:

- provision of reliable computer technique, video-technology and electronic visual aids;
- incorporation of questions concerning electronics, computer technique and informative communication technology into the real teaching, not only into the teaching plans and syllabuses of the individual subjects;
- optimal training of school teachers;
- solution of problems concerning the creation of a software for teaching and use of personal computers in individual subjects;
- use of computers for school administration and outside the school activities.
**Possibilities of using computers at schools**

Our attention will now be paid directly to the problems concerning the use of computers in teaching. Acquiring of the computer literacy (that can be understood as a part of the information literacy) and intermediation of this goal through the process of teaching belongs to the basic goals at the contemporary school. Computers should fulfil its basic mission at the school – to help the teacher manage the learning activities of pupils, help the pupils in their advancement and the school director in administration and management of the school.

The efficiency of using computers in the process of teaching is not possible to assess one-sidedly and separately. The success of using computers depends, beside other things, also on the didactic skill of the teacher, on his previous successful work with a whole complex of teaching means, on his complex attitude as to the use of computers in teaching. The experiences show that a direct computer operation by pupils themselves is much more efficient and more attractive than using the computer in the process of teaching only by the teacher himself. This approach is also meaningful for the development of the computer literacy as such.

The use of a computer can be primarily determined on the basis of the function criteria: using computers in the formative educational work (both by the teacher and the pupils) and using computers in school management as of the whole educational system.

**Possibilities of using computers in the formative educational work** can for example comprise:

- processing of written and oral exam results;
- selection of testing questions, composition of benchmark tests;
- databanks of some subjects that enable to create gradually the rules for classification (personalities, data, spheres, themes etc.);
- creation and printing of textbooks;
- retrieval and work with information on the Internet;
- multimedia teaching aids, simulators and e-learning courses.

**Computers in school management** can be for example used for:

- databank of the pupil and student files;
- saving and printing of a timetables, lectures, seminars, eventually also its partial creation;
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- transfer of the complete records of the class teacher to a computer method of recording and processing with the aim of time saving as against the classical method.

In consideration of the problems connected with the introduction of computers into the schools it is especially important to take into account the methodology of the programme creation, the possibilities of using the programmes in individual subject teaching, the possibilities of programme implementation in the framework of the complex methods of teaching and also school modernization.

Many sociological and psychological research studies have confirmed that children and young people will live in an ever more tell-all world. Computers, video, television and Internet nowadays become to a considerable extent common realities of their living environment. There is no doubt about the fact that using information technologies will markedly influence the teaching environment of the school and the pedagogical process itself in the new millennium. A complete series of new didactic and pedagogical problems will consequently arise including the training of future teachers.

The role of computers in teaching should not be generally overemphasized. The computer from the point of view both of pedagogues and IT experts should be perceived as a tool, that can find a suitable fulfilment in some spheres of teaching and on the contrary in others it could be less efficient than classical methods and sometimes it could be even counter-productive. In spite of the fact that technologies, used in the society have generally a great influence on the way of communication and the social interactions are metaphorically reflected in the philosophy of the period, the technology itself does not improve or make more efficient the process of teaching from the principle of the point. The chance to do it has only the respective methodology that uses the technology as its means. This commentary does not in any way cast doubt upon the steadily growing importance of computers and the necessity of computer literacy development, it only strives, based on experiences, to adjust a realistic and productive approach to the use of this technology in the process of teaching.

Let us briefly to determine the advantages of using computers at the school and its possible reserves.

Among the advantages can be included:
- computer enables to respect the individual learning activity tempo of pupils;
- enables to present different demanding programmes (diversely difficult tasks and exercises) to pupils;
- realizes the displaying possibilities, enables to programme the successiveness and motion;
- fairly evaluates and thus properly motivates pupils as to their respective activity;
- enables to the teachers and pupils to issue their own texts (including the possibility of a fast and cheap publication on the Internet);
- enables to the teachers individual selection of the supplement schoolwork (multimedia encyclopaedia, resources on Internet etc.);
- motivates the pupils to work with information and communication technique;

Among problems connected with the use of computers in the process of teaching are most often mentioned:
- insufficient emotional education;
- reduction of written and spoken language;
- restriction of the divergent thinking (excessive adaptation to certain rules and models, favouring of operation with clear conditions, postulates offering only one right conclusion);
- absence of direct observation (new information technique submits the findings indirectly, the direct observation of the life, recognizing people, nature, things and ideas is missing);
- lowers the socialisation of a human being, the stay and contact with people and visit of cultural institutions;
- problems with the development of creativity and thinking evaluation etc.

Pupils from our schools are acquainted with the modern technology already at home and many of them also with computers. The children at home prefer playing computer games more often than make use of the education programmes. The world experiences a huge development, production and sale of computer games. If the child sits excessively at the monitor, especially playing computer games, it results in the lack of exercise, restriction of creativity and mental and psychical
disturbance. The school should have many other means enabling to balance and overcome with unquestionable positives the potential undesirable consequences of some computer games.

The humanization tendencies in teaching are nowadays gaining strength in spite of the fact that modern technical means are significantly pervading into the process of teaching. The **humanising influence of the school and education does not get along without interpersonal communication**, without a direct contact between the teacher and pupils. No technology can replace the interpersonal relations created in the process of teaching between the individual participants of the pedagogical interaction.

As for the educational function of the communication technology, it also changes the social task of the book that cannot be replaced in any case. The role of the reference encyclopaedia or aids for the regular knowledgableness of a human being can gradually assume the services based on the video-technology. Nevertheless, the immediate reading of classical books, whether it concerns the belles-lettres or scientific literature, represents a non-replaceable asset. It requires an active engagement of psychical energy and imagination. Read text offers a deeper and many-sided understanding than following a spoken language or an image displayed from a technical device.

Beside the work with computers in the role of an information resource at the school, it is also necessary to develop the education focused on the work with books and other text aids and to develop a whole complex of skills for the work with information and information resources.

**Bibliography:**


