

# APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN PREPARATION OF FUTURE SPECIALISTS OF AUTOMOBILE AND ROAD INDUSTRY

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## *Abstract*

The authors of the article consider the information and communication technologies, justifying their use in the educational process of technical universities.

The author proves that these technologies contribute formation of the students experience to practical application of knowledge to solve complex problems.

Thus, modern information tools require a confident teacher tenure new teaching method, especially the method of computer lecture presentations, practical laboratory simulation, computer game, testing and more. The use of electronic textbooks and manuals, training CDs and educational web sites helps to provide students full information under study to present it in a visual form, helps accumulate the necessary educational materials in their personal library. Consider distance education, which is entirely based on the use of information and communication technologies. The feature of distance learning is: distance from a student to a teacher, self-mastering the information and perform the necessary tasks, active use in learning information tools and resources. The most promising is now network technologies based on the use of the Internet to consult students and transfer teaching materials. This is due to the prevalence of the Internet population, the relative simplicity and mobility of this type of communication and information.

Common forms of learning in synchronous mode are chat sessions, videoconference, teleconference. Chat sessions can be conducted as a "round table", "brainstorming" role-playing or business games, competition of creative works, chat, presentation, brainstorm problems. Education in the synchronous mode is organized in different ways, "teacher - student" (individual counselling), "teacher - a group" (group counselling, workshops, "Flying Control"), "student - student", "student - a group", "group - group" (communicative teaching methods).

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The introduction of information and communication technology changes the traditional position and role of a teacher in the educational process of the university, and models its interaction with the students. It is increasingly becoming an organizer and adviser than a "repeater" of educational information. The students, especially enrolled in distance mode are active and full participants in educational activities. This updates the competence of teachers of technical disciplines.

*Keywords:*

information and communication technology  
 distance education  
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*Schlüsselwörter:*

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Nowadays educational technologies aiming at building the students' competences, actual control means and educational process evaluation, are being widely implemented.

Professional targeting at the teaching and learning process in the high school is demanded for the integrated general cultural and professional competence build in the course development.

It should be meant that the local higher education system is being reformed under difficult social and economic circumstances. Higher technical school becomes more economic-targeted and competitive. State focuses on the education, science and production. Educational boom also results in the increased responsibility and new tasks emerge.

Educational process is improved both intensively (leverage of internal resources) and extensively (attraction of external funding, logistics improvement, use of e-learning tools).

The use of technology in education is one of the main IT development directions implying the new e-communication and software means development and implementation. The latter are targeted at psychological and pedagogical objectives and higher school students' upbringing (A. Andronchik, A. Asherov, A. Banjiminov, A. Belyayev, A. Bershadskiy, L. Bilousova, V. Bepalko, I. Bulakh, L. Gorbatyuk, V. Guzeyev, M. Zhaldak, T. Kaushan, I. Kostikova, A. Kupriyanov, G. Loiik, V. Marusyn, N. Morze, L. Morska, N. Oliynyk, Ye. Polat, S. Rakov, I. Synelnyk, Ye. Skibitskiy, A. Sokolov, A. Sludnov, P. Stefanenko, L. Kholina, V. Khomenko, S. Yaremchuk, N. Yatsynina, etc.). E-learning methodological aspects are investigated by scientists (V. Bykov, I. Bogdanov, A. Verlan, R. Gorbatyuk, M. Zhaldak, N. Morze, V. Osadchiy, Yu. Ramskiy, V. Khomenko etc.).

The objective of the article is the review of e-learning means in the technical higher school.

Nowadays the special attention is paid to the Introduction of information technology in education. The review of the activities in the technical higher school institutions revealed: currently technical higher education facilities are equipped with the e-learning workstation lecture halls. Teacher and student workstations are connected to the local auditorium and corporate network. During the presentation the teacher demonstrates educational materials on the multimedia information widescreen. At the same time the students look at the screen and work with the detailed e-compendium. Due to the use of the e-lecture presentation the teacher is able to show any complex patterns expressed by the mathematical formulas, production process and engineer device models. The timeline for new material presentation decreases, and the learning material amount

increases along with the degree of assimilation, proving, that the visual demonstration speaks louder than the narrative techniques.

Michael G. Moore (Director of ACSDE/ founder, editor-in-chief and publisher of AJDE / e-learning expert) provides the clearest description of the so called 'american model' (an e-learning approach): 'The most popular idea is that the e-learning advantages may be attained with the minimum change of the means of educational organizing. From this standpoint, effective teaching and learning can be sufficiently received through the consolidation of teachers and students via media. All we need therefore is to buy the new communication equipment for schools, school units and universities. Then, school teachers, high school professors, along with educators and trainers working for the companies may become remote teachers. They just should be moved from their classrooms to studios. As an option, their classrooms and auditoriums may be equipped with cameras and speakers. A lesson or a lecture may be translated from their lecture hall to pupils or students sitting in the other classrooms.'

With this educational pattern students perform on their own at the same level as with the conventional form of education in the classroom. Teaching materials developed for the 'american model' of e-learning are basically the same as the aids made for the full-time education. In the addition, a remote student gets just a kit of lecture records. As opposed to the 'british model', there are no tutors in the 'american model'. Group sessions conducted in the remote auditorium are managed by the instructors busy mainly with logistics, not teaching issues. The 'american model' is generally targeted at college and high school students studying in the evening and during weekends (so called 'part-time students'). Furthermore, it is widely used in the corporate skills development systems (in particular, used by armed forces). The quality of the remote education is basically provided by the guaranteed quality of the interactive communication between the parent unit (more accurate to say, the studio or specially engineered auditorium with the lecturer inside) and remote units (auditoriums), and by the duly presented logistics supported by the proper technical arrangement.

Information and communication technologies are effective when conducting practice sessions and lab works. For example, when doing simulation labs dedicated to the development of devices or certain technologies (1), students have the possibility to examine physical, chemical, technological and other processes thoroughly, get essential knowledge and experience with the use of computer models. Educational e-tests are increasingly used to check current and final learning outcomes. Such computer programs are integrated in the e-textbooks.

Thus, significant opportunities provided by the modern media require certain skills. A teacher is expected to use new teaching methods. First and foremost, he/ she should be able to make e-presentation, conduct simulation labs, manage computer games and tests, etc. The educator should also keep in mind the own teaching goals. One more issue is the danger of mind 'computerization' observed between the students of technical higher schools. Scientists strongly believe that device limits instigate user limits and incite technocratic thinking. Negative impact of the widely distributed e-learning may occur late, but the teacher should be aware thereof. The students should be actively engaged in intellectual exercise and discussions. The own moral assessment and choice is an essential step, along with the ability to provide facts and emotions.

The global practice proves that the remote education expands both in the education and business support sector. Private educational systems are designed by General Motors, I. C. Penney, Ford, Walmart and Federal Express. In the overwhelming majority these systems are much more complicated and numerous than the ones developed in the high education institutions.

In recent years, electronic study guides and training manuals have been actively developed in the technical higher schools. Thus, students are able to absorb and consolidate new information. Such items provide the possibility to ensure follow-up and self-assessment. Multimedia capacities are particularly valuable for studying technical subjects. One can deal with complicated device and equipment layouts. Any technical teacher pretending to use electronic educational means should be duly qualified (IT, some additional psychological and pedagogical background). There are some specific psychological and comprehension demands voiced for electronic information development. It should be properly arranged and structured. The teacher should use the certain amount of information, adapt the style and choose the proper language suitable for teaching 'computer-based subjects'. The appropriate text is precise, intelligible and spectacular. To tackle this challenge one must have knowledge of cognitive psychology (first and foremost, be expert on patterns of e-data perception) and engineering human psychology studying the interaction between humans and machines.

These requirements must be especially followed during the process of e-learning totally based on information and communication technologies. The peculiarity of remote education is the geographical distance between the teacher and students. Furthermore, the student studies data and completes all the tasks required independently. Various information means and media are actively used in the educational process.

The difference between the traditional system of face-to-face teaching and e-learning lies in the impressive level of interactivity achieved by the wide use of information and communication technologies. All the participants of the educational process (teachers and students) are continuously engaged with each other during the entire period of education. The process of education is constantly monitored. Electronic textbooks based on Wide Web technology, online browsers and other network information means are equally interactive.

Network technologies call for implementation of online (synchronous) education process. There are two basic ways to arrange the process of e-learning. The synchronous approach provides for study in real time. An asynchronous option assumes that the teacher and student do not interact simultaneously. Other forms of e-learning are also used. Students acquire video records of lectures with specified educational problems. Distant lab works are conducted together with research job, web conferences, and remote Olympics. They widely use electronic textbooks, workbooks, compilations of homework texts, educational tests, and e-newspapers with comments and remarks [2].

Common online education forms include chat classes, video conferences, and video links. Chat class may be conducted in the form of 'panel discussion', 'brainstorm', role or business game, creative competition, chat presentation, collective problem discussion. Synchronous mode is organized in the following forms: 'teacher - student' (personal sessions), 'teacher - group of students' (group sessions, workshops, 'casual inspections'), 'student - student', 'student - group of students', 'group of students - group of students' (communication

methods of education). The teacher encourages the activity of students, asks leading questions, leads discussions, summarizes statements and takes stock.

To effectively manage online communication with students the teacher must have certain communication skills. In particular, one must be clear and provide explicit instructions, manage dialogues. During the online class the teacher does not observe the students' response and is hardly able to make proper adjustments considering their feedback. Thus, the educator is expected to envisage lots of issues in advance.

The importance of the additional use of the mobile applications is to be highlighted. One of the clear examples is 'Duolingo' designed for interactive English learning.

Use of mobile applications provides for the new educational means and methods integration. The students are free to study subjects outside the classrooms and choose suitable time and place for perception, reconsideration and learning of information.

Today's experts must keep up to date. Information reality that captured modern youngsters requires using some new approaches. Students are hardly interested in the process of studying subjects. Nevertheless, the animated tasks and video lectures with visual aids come to the assistance and give everyone a chance to fulfil himself. Traditional education approach must be replaced. The students are changed. So the teachers must also change themselves. To sum it all up, modern education is impossible without the use of information, telecommunication and IT media. These means provide for the effective conditions and ensure advanced training. Such an arrangement of educational process complies with the realm of the post-industrial society.

Accordingly, the wide use of the information and communication technologies in the educational process poses new challenges to the technical high school teachers. They develop new educational means and implement modern learning methods. Some of the pedagogical functions may be transferred to the artificial intellect (for example, monitoring of learning achievement and assessment of knowledge). Such a solution reduces routine and increases creative component of the educational process. Traditional roles and interaction models are changed with the introduction of new information and communication technologies. In the conventional sense, the teacher is no longer a teacher. Nowadays he becomes more a moderator and consultant, than an information 'transmitter'. Remote students become full and active participants of the educational activity. Accordingly, a teacher of technical disciplines becomes more competent.

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