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THE ROLE OF E - LEARNING SYSTEMS IN MEDICAL EDUCATION

One of the factors, which determine the effectiveness of e-learning and distance education, is the possibility of adjusting the education process into individual mental factors, cognitive preferences and educational needs of learners. [1]. The development principles of educational multimedia packages are still a challenge to authors of educational environments requiring a deep analysis of not only the load of the application and its structure but also the specific rules of distance distribution of applications. They also have to be related to contemporary pedagogical theories and social needs and expectations. Distance learning methodologies will play nowadays a great role in various subjects of training. One of the most spectacular fields of teaching seems to be a medicine. Big number of textual and graphical evidences has to be delivered the user in accordance to his current needs. Description of various diseases, surgery operations, rehabilitation processes control and analysis and many other data files have to be given in very specific way. Unfortunately these training methods are yet not gaining in popularity within medical circles.

1. INTRODUCTION

Thanks to widespread civilisation transformations, we can easily notice that modern technologies are being introduced into all domains of human activities and they exert greater and greater influence on the existence of a contemporary man and change his way of functioning in society. It is an undisputed fact that the common usage of a computer science is a main characteristic feature of new society, called the information society [2] or the Global Information Society that is arising nowadays. This phenomenon was first noticed in the 60s. In 1963 a Japanese journalist, Tadao Umesa, used a new notion – "information society" – for the first time and accordingly, a new idea, which was generated in Japan and which defined a new identity of that country, was adopted all over the world.

Many definitions of this notion can be found in literature. One of them defines information society as " a configuration of social relations based on information economy". [22] Another definition says that information society denotes the society which "possesses highly developed means of communication and data processing". [23] Information technology includes not only commonly used computers with software but it also refers to new production technologies, technologies of creating and transferring information, management systems, educational systems and many others. The most basic models of functioning of social and economic institutions are being considerably changed. [3]

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Such a dynamic development of civilisation gives rise to new tasks the educational system is faced with. The changes, which are being observed, are of principal type and they consist in transforming methods and organizational forms of education in connection with the common usage of information technology. Hitherto used educational models are being slowly restructured just to prepare learners to cope with problematic and unpredictable situations which require creativity and activity. [4] This, in turn, makes it necessary to abandon "teaching subjects in favour of teaching (creating) skills to acquire knowledge". [5]

2. COMPETENCIES OF CITIZENS IN INFORMATION SOCIETY

Civilisation transformations, which are easily noticed nowadays, make us search for answers to the following questions:

- What features should a member of information society possess?
- What knowledge and abilities should citizens is provided with to function best in new society?
- How to teach most effectively?
- In what direction should contemporary education go?

It is an extremely difficult task which requires considering many complex conditions in which information society is to function; this task is also extremely important because of the need to determine new directions of development and changes in the contemporary educational system. The characteristics of new society members in the face of the development of modern technologies and the role they play in the humanistic development of a man is the main determinant in educational transformations.

Information society happens to be defined as the society of knowledge because its development requires citizens to constantly supplement their education. Hence, very intensive development in the whole lifetime of a man connected with rapid increase in the accumulation of knowledge in all spheres of life and the fact that it gets out of date very quickly is one of the main characteristic features of information society. Thus, educational system is faced nowadays with an important task to provide society with the rudiments of intensive learning and to give them possibilities of meeting their educational needs through various learning methods, the Internet including. Citizens, being aware of the lack of knowledge in some aspects of different disciplines, should have an ability to critically evaluate their knowledge. They have to be able to define their educational needs and independently search for the ways of satisfying them. The ability to manage time, which consists in defining the importance and urgency of tasks which learners are supposed to realise through gaining necessary information, plays a very important role. It is connected with a change in the organisation of working and learning time, which is often flexible in many new situations. [7]

Many joint projects require mutual collaboration and that is why the division of labour, which consists in doing tasks in teams, plays a very important role in new society. It is also necessary to improve citizens' communication abilities through teaching linguistic competence and thus creating possibilities of unlimited access to the world's network and

making it possible to benefit from international exchange of experience. Contemporary education is faced nowadays with a basic task to make learners aware of the above mentioned need and it is directly connected with globalisation processes. [7]

In Poland, 5 competencies, which were considered to be especially important for efficient functioning in quickly changing reality, were chosen in the Kreator programme and they are as follows:

- planning, organizing and evaluating one's learning process
- successful communication in different situations
- effective collaboration in a team
- solving problems creatively
- using computers and information technology skilfully

In Poland, civilisation evolution has just started and features typical of information technology have developed only in a small percentage of citizens. Thus, can distance learning be dynamically developed nowadays? Are members of our society prepared to use that form of education? Can distance learning systems satisfy the needs and expectations of the society? Many research centres in our country are currently seeking answers to those difficult questions.

3. EVOLUTION OF DISTANCE LEARNING SYSTEMS IN EDUCATION IN RELATION TO CIVILISATION TRANSFORMATIONS.

Civilisation transformations and requirements the society has to satisfy, provide the contemporary educational system with more of a challenge and they call for radical changes in the attitude towards the organisation of a didactic process. On the one hand they result from the dynamic development of information technology, which creates quite new conditions for the realisation of the educational process. On the other hand it is necessary to remember that global information society demands creativity, interdisciplinary attitude, independence and ability to collaborate with others from the organisers of the educational process and that is why contemporary education must use active methods which enable learners to develop creative thinking. It entails a change of the paradigms, which have been obligatory in our education for many decades.

Interactive educational media are very helpful in it because they, if applied properly, stimulate learners to act creatively. In many studies, a special emphasis is put on the necessity to develop in citizens "originality and highly reward it", [10] because such features play a decisive role on the labour market.

Parallel educational system, which uses various forms of the Internet communication, plays a special role in the realisation of that task. Non-stationary synchronous education connected with distance learning, which uses the Internet and interactive and non-interactive methods, is an alternative to the synchronic stationary education and asynchronous non-stationary education. Anyway, its functioning still arouses many emotions and reasonable objections.

Earlier distance learning methods, aimed at self-learning, were asynchronous and were based on the assumption that the information exchange between teachers and learners was

not to take place in real time. Asynchrony entails a lack of contact between a student and a teacher and co-learners who could be of any assistance if a problem arises. The above solution is not conducive to developing social features since it favours individual work in isolated environment. With the passing of time, asynchronous systems gave way to technologically advance synchronous ones including chat, so-called board, applications and group browser.

Asynchronous DL systems included a mechanism of logging in to the educational institution's or teacher's website by means of the standard Internet browser, centralised database with multimedia packets including knowledge intended for learners, connections with external sources of information (www pages), chat groups and finally e-mail system integrated with the website of a person who runs the course. The system of tests, monitored in real time, is produced by a generator, which randomly chooses questions. Asynchronous tools often support data transformation between various media. Some authors of asynchronous DL systems recognise the need for standardisation in the process of preparing the course content and working out the course structure as well. That standard enables to prepare multimedia packets in the same way in which software is created. Thus, we have got such tools at our disposal, which can be used to produce educational applications by means of learning objects-oriented programming languages. It seems that such tools are gaining more and more popularity in the educational circles. Creating learning modules, which can be verified and used in different configurations, is a rival idea.

Synchronous solutions enable learners to communicate freely and they create a feeling of community (virtual classes come into being). The systems usually include in-built, browser-based mechanism of voice communication, access to application also by means of a browser and a mechanism synchronising learners' browsers. A browser plays a role of a board. Lessons conducted in this way are formalised, supervised by the teacher and similar to lessons at school or seminars. Video films can support lectures but in such cases data transfer rate of at least 128 Kb/s is required. The technologies in question are currently quite expensive and seldom used because of poor infrastructure. It must be admitted, however, that teleinformation technologies break new ground nowadays. It should be also noticed that modern technological solutions allow to gradually bringing DL courses closer to traditional education.

Psychological barrier is yet another factor, which has to be broken down since many people still cannot fancy replacing traditional classroom with the virtual one and they do not believe in effectiveness and high quality of virtual education in comparison to the traditional methods. Low expenses and many possibilities of using multimedia materials speak in favour of virtual form of education.

In most cases, many people do not know anything about possibilities of using such tools and they do not put trust in them as it was in the early 90s when computers appeared in offices. Well prepared and well run virtual courses which take advantage of the latest DL achievements (possibility of voice and picture interaction) may, anyway, compete with the traditional method of education and be even more effective. Unfortunately, in Poland DL system still encounter many obstacles and problems which, in turn, reduces its usage. That situation refers both to educational institutions (mainly higher schools and universities) and companies. For the time being only international companies based in America offer distance

learning methods. Fortunately, there are some exceptions e.g. Institute of Technology in Warsaw, Institute of Technology in Wrocław, University of Łódż and Institute of Technology in Gdańsk introduce DL systems to their educational offer.

The following solutions by means of which distance learning may be realised have been worked out up till now:

- Direct learning (individual, asynchronous), which denotes self-learning without any contact with a teacher. Such courses are offered on CDs. Those are predominantly correspondence courses and the "Click-to-learn" system makes use of the Internet. Knowledge acquisition may be supported by asynchronous contact with a teacher through e-mail or voicemail.

- Teacher-supervised learning (synchronous teaching and learning in real time) assumes direct teacher's control over the didactic process and a real interaction between him and his student. Learners may communicate by means of chat. A teacher can make necessary changes in the educational content and thus, adjust it to learner's current needs. This method corresponds with the traditional model of education realised in school classrooms or lecture halls.

- Collaboration in small groups is a method comparable to students' informal meetings organised to acquire knowledge together. Informal transfer of knowledge which takes place then works on the assumptions concerning collaboration in small groups. This teaching method focuses on a task allotted to the whole group using the collaboration mechanisms in a group and fighting for a position in the group. Such a model of learning may include elements of asynchronous studies (e-mail, chat groups) and of synchronous knowledge acquisition (telephone line, Voice over IP and chat).

- Distance learning systems often include elements of all three educational methods. Distance learning encounters many methodological, technical and organisational problems and that is why the most effective solutions to them are still being sought out.

4. PEDAGOGICAL CONDITIONING OF DESIGNING EDUCATIONAL MULTIMEDIA PACKETS IN DISTANCE LEARNING SYSTEMS

It is necessary to consider a few questions in order to find the optimum, most effective solution. The analysis of them may considerably help to prepare good DL systems.

The first question, which calls for explanation, refers to the authors of distance learning systems. According to the contemporary paradigm of a higher school and a role a teacher plays in it. Each teacher works out educational objectives of his subject and selects educational materials, adjusting them to his own view on what a graduate should be like, [18] while in distance learning systems one course is designed by a few professionals in a given academic discipline. It involves into this process methodologists, computer programmers and even educationalists and psychologists because of high individualisation of the educational process. It is beyond doubt nowadays that only collaboration of many

specialists and intensive scientific research which can define optimum functioning of an individual in the virtual environment will allow working out the best scheme of educational materials deprived of methodological or any other mistakes. Unfortunately, those suggestions are not always realised in practice in Polish reality.

Designing educational process always requires a thorough analysis of the subject of the didactic process Educational aims and syllabus are created on the basis of the in-depth knowledge about the learner, situation on the educational market and social expectations. [18] The most important information includes:

- general information on age, sex and cohesion of a group taking a given course,
- needs, i.e. motives for the participation in such a form of education; e.g. professional training, need for self-learning through acquiring new competencies, professional status, learner's knowledge and expectations, motivation level which depends on the possibility of achieving aims set before [12],
- learners' characteristic features, their knowledge, background, education, experience, extent to which they are familiar with a given subject.

Effectiveness of teaching depends on the degree to which individual personal features of learners, their preferences, knowledge, experiences, environment and culture were taken into consideration. It can be assumed in all probability that people who decide to take up distance learning will have to possess well-developed features characteristic of information society members. It is going to be a strongly motivated group, which differs in age, professional, experience and with different cognitive abilities and which expects definite, useful, well-prepared information given to them in a very clear way. Motivation and emotions, which are aroused during the transformation of information, play a very important role in the educational process.

Hence, we are faced with a question: How? How to present educational content? Do multimedia presentations, which are part of knowledge base offered to learners, meet their expectations? Does the form of presentation bring about desired effects? Are work and financial input into the preparation of presentation in a given form profitable?

Defining the rules governing the proper choice of multimedia educational programmes is a very difficult problem, which consists in defining the receptivity of the educational content in different disciplines to multimedia presentation forms. Educational materials, which are available in the network, are most often connected with maths, science and technology. Humanistic multimedia presentations, which are based mainly on multi-aspect analyses and interpretations of scientific texts, are still a big problem. Defining criteria of receptivity for subjects such as: maths, science and technology is not a problem whereas the Arts are still a big challenge to authors of distance learning programmes. In such a case, synchronous distance learning systems ensuring a high level of interaction between a teacher and learners in real time would be the best solution. Because of social needs, problem-solving teaching, adjusted each time to the aims and educational content of a given subject, should be the leading educational model in distance learning. [13]

Multimedia materials are only part of distance learning systems. It is assumed that educational materials' structure should be dynamic and continually updated. It should also allow the learner to select the educational content to a certain degree; however, the educational scheme most suitable for a given discipline must be preserved. All DL systems

should include the system for checking and evaluating teaching and learning results. Principles of cognitive and constructive theories which constitute the paradigm of contemporary pedagogy and which take into consideration the achievements of cognitive psychology define the main rules referring to the organisation of the educational process and influence the teacher-learner relationship in distance learning systems. Accepting such a way of viewing the educational process "directs" the way of thinking about effectiveness of the educational process and generates conditions for the deep analysis of the perception of information reaching the learner. [14] The way of perceiving things results from the individual learning style of each man, [16] [21] since each student learning individually, but in social context, develops a certain system of meanings during the educational process. According to the constructive model of the educational process, learning means building knowledge structures in the learner's mind. The learning process should move from the general to the particular; newly- generated structures should be full, mutually correlated and should refer to the surrounding reality and their components parts should be understood in the general context. [16] It must be also assumed that according to the contemporary theory, learning means actively building knowledge and abilities through the integration with the environment and through the restructuring one's framework of mind. [8] Computer systems should support constructive assimilation processes in learners.

5. CONCLUSIONS

All educational principles discussed above are related to technological principles of educational resources development that were presented in other papers. As we observe a big rush round the e–learning technologies development it is obvious that the educational factors of these services and products have also to play very crucial role in these processes.

Computer education should create favourable conditions for the learners to develop their cognitive abilities. Thus, there is an urgent need for theory-oriented research aiming at better understanding and detailed analysis of constructive learning processes stimulated by new forms of education.

Distance learning process imposes certain restrictions. One of its drawbacks is the fact that it is not possible to learn all educational content by means of the Net. [3] Another problem is the necessity to create such learning conditions in which students can work in groups, do tasks in teams and solve problems by means of the wide network while working in synchronous and asynchronous systems. The new educational systems should allow learners to have a dialogue with each Internet user (lecturers and other Net users) and to have an access to different sources of information. [19]

Distance learning is enjoying little popularity in Poland. There are at least a few reasons for it:
- higher procedural requirements,
- abilities and technical know-how about e-learning technology,
- personal features and approach towards learning (awareness of the needs and aims of learning, self-discipline, motivation, isolation of the learner, poor educational

offer which does not satisfy the learner's needs and which, in turn, results in bad experiences, disappointment and resignation from this form of learning).

Hence, it is necessary to properly educate citizens and develop in them features ascribed to information society. Popularisation of trainings in information technology, which place special emphasis on various forms of the Net communication, will undoubtedly contribute to it. A strong focus should be put on practical application of the knowledge acquired and on making the learners aware of their personal features and their own learning style.

Hybrid teaching (blended system) is gaining in popularity nowadays and it results from the experience gained while introducing distance learning systems, based exclusively on the Internet technology and other telecommunication media. In many institutions such as Open University in Great Britain and Centre Nationale d'Enseignement á Distance in France, elements of traditional education and The Net learning are blended. [18]

Taking all that into account makes it possible to design intelligent educational materials, which take into consideration contemporary pedagogical theories. Focusing mainly on the learner and his functioning induces a change in the way the educational process is perceived and results in creating DL systems, which satisfy his needs.

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