

## ІНФОРМАЦІЙНІ ТА КОМУНІКАЦІЙНІ ТЕХНОЛОГІЇ ЯК ДИДАКТИЧНИЙ МЕТОД У МЕДИЧНИХ ШКОЛАХ ПОЛЬЩІ

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### Реферат

**Мета.** Дослідження феномену електронного навчання (Е-навчання) як сучасної форми освітніх комунікацій, порівняння його з традиційними шляхами взаємодії студент-викладач, особливо у медичному середовищі.

**Результати й обговорення.** Ми провели оцінку дистанційного навчання як форми навчальних комунікацій, порівняно із "класичними" або "традиційними" способами спілкування "викладач-студент". У статті зазначено, що Е-навчання не може бути єдиною формою комунікації між викладачем і студентом, оскільки існують знання та навички, які можуть бути вивчені лише при прямому контакті, методом практичних занять та семінарів, як технічних, так і та гуманістичних аспектів. Таким чином, змішані форми дистанційного навчання, тобто змішані методи освіти, включають обидві форми спілкування.

**Висновки.** Використання методів та технологій дистанційного навчання зменшує кількість і важливість перешкод фізичного, практичного та інтерактивного характеру. Крім зменшення перешкод у зв'язку "викладач-студент" Е-навчання дозволяє краще пристосовувати дидактичні процеси до потреб і можливостей студентів.

**Ключові слова:** Е-здоров'я, лікар, пацієнт, методи навчання студентів, Е-навчання, ІКТ - технології

### Abstract

#### INFORMATION AND COMMUNICATION TECHNOLOGIES AS A DIDACTIC METHOD AT MEDICAL SCHOOLS IN POLAND

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**Aim.** To examine the e-learning phenomenon as a modern form of educational communication, juxtaposing it with the traditional ways of student-teacher interaction, especially in the medical domain.

**Results.** This study emphasizes the advantages of e-learning, while at the same time pointing out its limitations, i.e. the existence of such skills and content that require the direct contact of a teacher and a student. It recommends using the opportunities created by blended e-learning, being a mixed method of teaching, in the process of educating students, as it involves both forms of communication, direct and indirect.

**Conclusions.** The use of methods and techniques of remote education reduces the number and eliminates the importance of obstacles of a physical, practical, and interactive character. Apart from the reduction of obstacles in teacher-

*student communication, e-learning allows better adjustment of the didactic process to the needs and capabilities of individual students.*

**Keywords:** e-health, e-medicine, physician, patient, methods of teaching students, e-learning, ICT technologies

### Introduction

The digital revolution exerts a very strong effect on the ways of organization health care worldwide. Within the coming decade, the face-to-face patient - physician contact will become less popular than the exchange of health information and services via electronic devices [1].

Figure 1 presents a graphic model of a digital environment of a medical practice, which may soon concern both medical staff and patients in advanced systems of health care. This conceptual model shows that in the majority of modern health care systems the provider of medical services is no longer one physician or a group of physicians, but usually an interdisciplinary team, which is physically or virtually integrated in an organized way [2]. In the model it was also considered that the 'patient' is a part of a family or other social network, which is especially important when health care is long-term and there is a need for multi-generational support [3].

The above-mentioned and similar models will trigger changes not only in the occupation of a physician, or generally in the system of health care. ICT will intermediate in a great many ways of acquiring medical information, and will be the basic source of knowledge for physicians (medical teams) about their patients, and 'the computer will be equally important as the stethoscope' [4]. Information concerning a patient will be available for all medical specialists involved in patient care, with a simultaneous limitation of this access only to the physicians selected by a patient. Patients will be included in the electronic circulation where all medical events will be registered (prior to, during, and after each physician-patient contact (encounter) and will cover 'face-to-face' interaction, both real and electronic. Electronic interactions may be both synchronic, i.e. at the same time and in different place, and asynchronic, i.e. at different times and places. In addition, the patients interested will be able to remotely monitor the course

of their own treatment, and the task of this function will be the strengthening of co-responsibility of a patient for the process of regaining health. The art and science of patient care will change from all aspects: communication, interaction, and flow of information. It will be possible to monitor each aspect with the use of electronic tools [5]. Physicians will have to learn how to use the ICT tools, not only for diagnosis and treatment, but also to support patients in their human needs. Paradoxically, it may turn out that physicians, when 'freed' from many duties due to the ICT tools, will find more time for a patient. The use of modern technologies in medicine will also change communication patterns within medical teams. ICT will allow an easier and more effective coordination of team work, and additionally, the Internet platforms will in a specific way integrate medical teams which are very numerous, variously specialized and distant in time and space [6]. The changing way of physician-patient communication from the classic to remote form will also exert an effect on the character of this relationship. Behavioural "scripts" of the medical staff with respect to a patient,

currently acquired during classes and lectures at medical universities, will soon be inadequate for the need generated and/or stimulated by modern information technologies. The above-mentioned changing information environment of the work of medical staff requires urgent changes with respect to the didactic environment. Considering the didactic goals (overall and comprehensive preparation of a student of medicine in the area of knowledge, skills and motivation), the academic teachers face new important challenges.

There comes to their defence the development of the scope of communication in information technology (ICT, Information Communication Technology), which has led to the appearance of a new form of communication between teacher and student, defined as 'e-learning' (an abbreviated form of 'electronic learning').

This is a way of remote education using both an electronic form of the preparation, collection, and making available the educational content, as well as an electronic path for communication between teacher and student in the didactic process - the path which in the

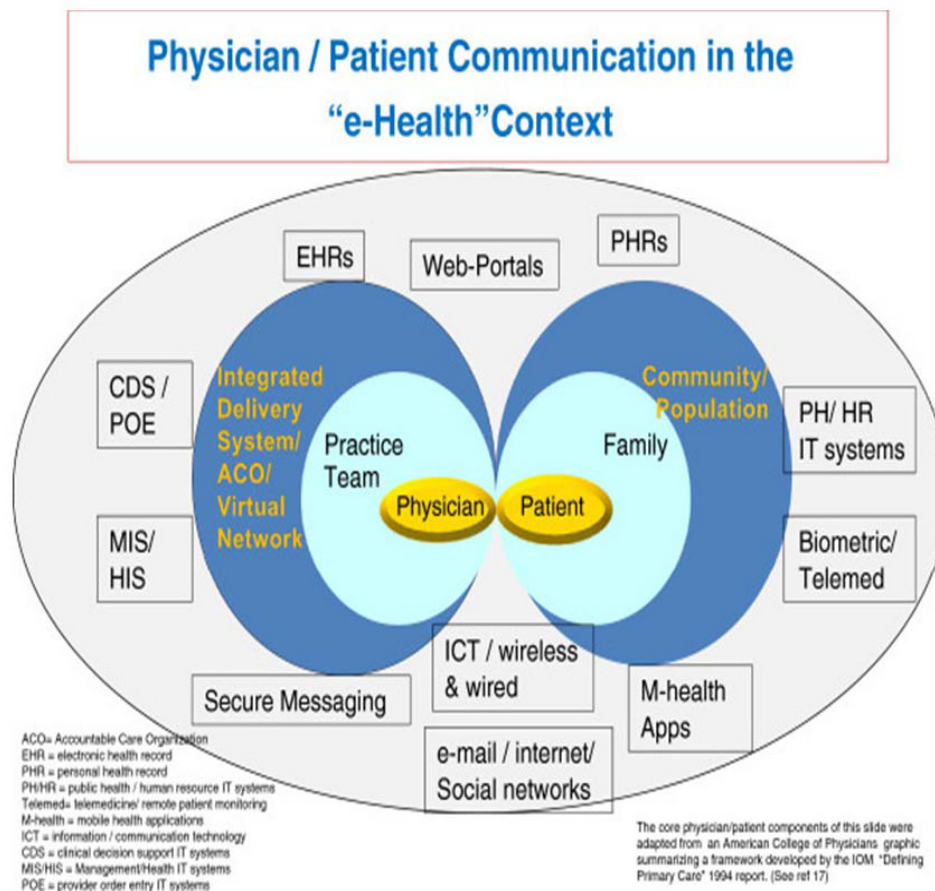


Figure 1

Communication contexts physician/patient in the e-health [Weiner J. P. (2012) Doctor-patient communication in the e-health era, *Isr J Health Policy Res.* 1: 33]

future work environment of the medical professional will become a natural way of communication with a patient, too. Each new method of 'e-learning' evokes controversy, provoking and/or revealing extreme opinions and attitudes, from idolatrous fascination to a hostile negation.

The objective of the paper is to display the technological possibilities in the area of remote didactics, and an analytical assessment of e-learning as a form of educational (and later occupational) communication, compared to so-called 'classic' or 'traditional' methods of teacher-student communication (and ultimately medical professional-patient).

The authors base their subjective analysis on own many-year occupational experience as university teachers, who have come to teach relatively broad and varied disciplines of knowledge: medicine, medical informatics, philosophy, mental health, interpersonal communication, methodology of health sciences. In this sense, the presented study does not approach the problem undertaken in a strict scientific way, but is rather an attempt to present own experiences in the most systematic way possible.

### ***Essence of e-learning as a modern method of remote teaching***

In literature written in English, remote learning is defined as 'D-learning' or 'dLearning' (eng. distance learning). This is learning in the system teacher-student (and not self-education); however, carried out with a physical distance between teacher and student. Therefore, the essential difference, compared to the 'classic' or 'traditional' forms of education, consists in the replacement of the direct interpersonal communication with an indirect communication. It is noteworthy that it is necessary to secure communication in both directions in order to enable an actual dialogue between student and teacher [7].

Previous attempts of remote teaching are known, from before the period of common access to tele-information technologies, consisting in correspondence between teacher and student by post, sometimes with the use of additional audiovisual means, such as films or recordings, also provided by mail or via television (so-called educational television). These attempts were characterized by great shortcomings with respect to the dialogue between student and teacher.

In practice, this 'dialogue' came down to checking and evaluating by the teacher of written assignments performed by a student. The limitations of this method of remote education are obvious, and do not require a more comprehensive explanation.

The essence of e-learning as a modern method of remote teaching consists primarily in the use of the computer networks, and especially the Internet. In other words, by e-learning it is understood the supporting of didactics by means of personal computers and the Internet, i.e. the application of electronic technology in teaching, thus remote teaching (D-Learning) with the use of ICT (Information and Communication Technology) [8, 9, 10, 11].

Where is it necessary to explain the term 'ICT'? Sometimes, it is identified exclusively with the Internet, which is a too narrow approach. Typical, commonly available ICT devices are 'common' or equipped with an access to Internet, with mobile phones, as well as portable computers with the function of a mobile phone (palmtops, tablets). Here, we deal with the specific phenomenon of the convergence of information (computers) and communication (telephones) technology.

Initially, communication via the Internet and the mobile telecommunication system could be carried out in the text mode as a correspondence, i.e. electronic mail (e-mail) or as so-called 'chat', i.e. exchanging short text messages. Currently, both the network of mobile communication and the Internet allow the transmission of previously prepared audiovisual contents, i.e. 'podcats'<sup>1</sup>, as well as direct audiovisual communication, during which the participants mutually hear and see each other in a real time.

While systematizing the described possibilities of communication with the use of ICT they may be divided according to two criteria: 1) communication time, or 2) number of participants in communication.

According to the criterion of time, asynchronous and synchronic techniques are distinguished. Synchronic techniques require that the persons who communicate exchange information in real time, immediately responding to the answers of their partners, therefore, they must be in the same time in "on-line" mode [12]. And to the contrary, asynchronous techniques allow communication between persons who send and receive messages in different time, which means that they do

<sup>1</sup> The word 'podcats' was probably created by combining the words 'iPod' (a media player by Apple) and 'broadcast' transmission, according to the Oxford Advanced Learner's Dictionary.



not have to synchronize time between themselves, thus they may be in "off-line" mode.

Assuming the criterion of the number of participants of the communication process, the following forms are distinguished: "community", in which theoretically an unlimited number of people may participate, and "personal", with participation of only a limited number of people, especially two individuals on equal rights (P2P<sup>2</sup>).

Due to the specificity of asynchronous communication techniques it is used in 'community' forms, such as:

- discussion forums - multi-plot discussion of many people;
- blog<sup>3</sup> - "diary" or a memoir of achievements, opinions, creative activity of one individual made available to others;
- viki<sup>4</sup> - "quick" project (e.g. on a website) performed together by many people.

In the asynchronous technique, a system for transmitting messages electronically is also active, i.e. e-mail. Electronic mail may be sent to one or many recipients.

In the synchronic technique of communication the following forms are applied:

- chat - indirect "conversation" in the text form;
- Skype<sup>5</sup> - service and Internet software enabling video-telephone communication.

On the margin, it is worth bearing in mind that the "regular" mobile telecommunication system provides the possibility to receive and send text messages in the form of SMS (Short Message Service), performing the function of chatting and in the form of multimedia (audiovisual) MMS (Multimedia Messaging Service), which may take the form of podcasts. In addition, new generations of mobile phones offer also video-telephone communication.

Modern remote teaching most often takes a mixed form, defined as "blended learning" or "blended e-learning".

The blended method of teaching uses both direct and indirect (remote) communication. The proportions between these methods of communication depend on the actual needs and are regulated by law. There are many methods and techniques of remote teaching with the use of ICT, which are applied in the method of

blended e-learning.

The assignments are the most basic forms mapping the traditional patterns. In this method, a student obtains the task consisting in, for example, writing an essay, dissertation, or solving a numerical exercise. The assignment may be common for all students of a given course or may be individualized. The tutor specifies the date of performing the task, and having received it via electronic means, checks and evaluates it [13]. "Interactive classes" are a more advanced method of e-learning, where the tutor makes a certain scope of educational contents available on the Internet (an equivalent of lectures), as well as questions testing their understanding. If an individual student provides correct answers to the questions he/she obtains a new set of educational contents and test questions. Otherwise, the student comes on 'withhold', and must again become familiar with the former educational contents and provide replies to the test questions [13]. The following form are "quizzes", i.e. tests of knowledge with the function of explaining mistakes. Students, in the case of making a mistake while providing a reply to the test question, receive feedback information, informing about its essence, but not disguising the correct answer. A quiz may be defined by the tutor in a way that the student has the right to provide a multiple or only a single answer in a specified or optional moment. This method, applied at the university, may be used as a convenient way of carrying out test examinations. The questions may be of a single or multiple choice, and may be optionally mixed, creating practically an indefinite number of versions of examination sets. The results are automatically calculated and presented, both in the form of a list with marks and a graph displaying the distribution of evaluations. It is also possible to analyze mistakes made by individual students [13].

An interesting method is "voting", which is a formalized form of group discussion consisting in an anonymous selection from the list of prepared options (attitudes, opinions). A student may then confront own choices with the choices by colleagues or choices indicated by the tutor. Another form of group discussion are "discussion forums", where it is possible to present own attitudes and opinions. Participation in a forum may

<sup>2</sup> The abbreviation comes from 'peer-to-peer', in communication via the computer network it guarantees equal rights to both sides.

<sup>3</sup> The word 'blog' comes from 'web log', denoting 'web diary'.

<sup>4</sup> The word 'viki' comes from the Hawaiian expression 'viki viki', meaning 'very rapidly'.

<sup>5</sup> The word 'Skype' comes from 'Sky peer-to-peer'.

be anonymous or open, which is up to the tutor who will decide according to the teaching goals or the scope of problems in the focus of discussion [13]. Similar to "discussion forums", blogs may also be used as didactic methods. In the form of a blog, a student may perform own long-term, individual task (project, diploma dissertation). The contents of the blog are available to a group of people, therefore, the student may obtain feedback information in the form of opinions of colleagues. A similar functionality has the method defined as "Viki", with the difference that this is a project commonly performed by a group of students. Such a project may be reversibly evaluated by students from other groups. The method which is useful for the tutor are 'questionnaires' from the students, with which didactic classes are carried out. They provide feedback information (anonymous) concerning the way of conducting the classes by the tutor and the contents which is passed on. This allows the correction of the contents and forms of education, and the distribution of educational tasks specifically, individually for each group of students, into the training of skills, expansion of knowledge and motivation. This is a form of a dialogue between tutor and students, especially valuable for the professional development of a teacher [13].

In certain situations, the tutor may also decide to use synchronic communication techniques, with individual or only selected students, using chat or video-telephone communication. This may be difficult in practice, because it requires synchronization in time [14, 15].

### ***Actual and seeming limitations of e-learning***

Among the opinions indicating the limitations of the method of remote education which is e-learning, there is a common opinion that it may only serve for making educational contents available in the form of electronic scripts, handbooks, multimedia presentations from lectures. In addition, in the opinions of critics, the limitations and shortcomings of e-learning are primarily as follows:

- lack of contact and interaction between student and tutor;
- lack of contacts between students;
- lack of group interaction;
- sense of seclusion of individual students [16].

All these accusations may be answered in the following way: they would be true if:

- a) e-learning communication would be the only form of

contact between tutor and student, and:

- b) there would be no total change in the system of interpersonal and social communication.

However, for two reasons, e-learning cannot be the only way of communication of the teacher with a student.

Firstly, there are contents and skills which may be taught only by direct contact. Here, are obviously meant practical manual skills, ways of behaviour and carrying out a conversation. Thus, practical and workshop classes, both from the technical and humanistic aspect, are a time and physical space in which a teacher has an opportunity to communicate with the students in the most direct way [17, 18].

Secondly, blended e-learning as a mixed method of education assumes in advance both forms of communication, and in the Polish reality, there are also legal regulations concerning the proportion of the amount of classes in direct and indirect communication with the use of remote education techniques. However, it is much more important fact that contemporary young people, who are the majority among students, in a totally natural and obvious way, use tele-information technology in their everyday interpersonal and social communication. The concept of an information society has become a fact. Access to mobile telephone systems, and stationary and mobile Internet has become common. This could not remain without affecting the knowledge, awareness, and the human behaviour of people using new communication technologies [19, 20]. Here is a fragment of an 'e-generation manifest' taken obviously from the Internet<sup>6</sup>: '... we have our own opinion and we are trying to independently and consciously govern our own lives. Not devoid of fantasy and warmth, we act rationally and reasonably. We appreciate originality, but do not accept anarchy. The e-generation consists of all for whom the Internet is a sign of the times, and primarily those whose way of thinking and acting is characterized by openness, acceptance of dissimilarity, independence and scepticism. The state of mind decides about the affiliation to the e-generation, and not the traditional determinants of the value of a man, such as outer appearance, social status, wealth, and education. The e-generation are people in whom the Internet evokes neither fear nor special astonishment, but is a part of their lives, equally natural as a coffee grinder or unmanned space flights. Affiliation to the e-generation does not depend on age. The members of the Internet

<sup>6</sup> <http://e-generacja.onet.pl>

generation have been born at different times, although for many this is an existing phenomenon. Nevertheless, how they perceive the world is more important and how they perceive their role in it, as well as the fact that they live in an information era and are witnesses to its development ...'

Independently of these formal "ideological" arguments it is worth considering if and to what degree e-learning levels up or eliminates certain 'natural' obstacles in the communication between teacher and student [16].

The lack of necessity for the presence of the teacher at the same time in the same place eliminates environmental physical barriers (noise, inadequate sound system, or lighting, uncomfortable furniture, poor ventilation, overcrowding, too low or too high temperature). Outer characteristics and physical status of both the teacher and student become unimportant (indistinct speech, accent, diction, nervous ticks, mimics, clothes, haircut, make-up, hunger, thirst, uncomfortable clothes).

In the e-learning method, the obstacles defined as psychological and intellectual are subject to a similar elimination, which concern maladjustment of the pace of speaking by the teacher to the capabilities of listening, or an excessive amount, complexity, and detailed information passed on by the teacher in a short time, which during direct communication causes on the part of a student the feeling of not following, being overwhelmed and lost, irritation, and in consequence, resigning from the acquisition of the reported contents. The use of methods and techniques of remote education reduces the number and importance of obstacles of an interactive character. The behaviour and emotionality of teacher and student, and ways of their expression in the situation of the lack of a direct contact, do not generate such causes of disturbances in communication as irritability, nervousness, shyness, hostility or aggression.

Apart from the reduction of obstacles in tutor-student communication, e-learning also allows a better adjustment of the didactic process to the needs and capabilities of individual students. This is obtained due to the mobile time and pace of learning, adjusted to the psycho-physical capabilities of individual students, on-going, comfortable access to educational contents, including multimedia material (audiovisual), e.g. in the form of podcasts.

Paradoxically, despite popular opinions, the

method of e-learning teaches students team work, because they may communicate via discussion forums or chats much more frequently and longer than while attending a university. Similarly, the possibility to perform common projects of the 'wiki' type or mutual observance and evaluation of blogs shapes the skills and behaviours necessary for cooperation [2, 18, 21].

### Summary

The development of ICT has led to the occurrence of a new form of communication between teacher and student, which is "e-learning". This is a method of remote education with the use of both the electronic form of preparation, collection, and making available the educational contents, and an electronic way of teacher-student communication. As with every new method, "e-learning" evokes controversy, provoking extreme opinions and attitudes, from fascination to hostility.

The presented report concerning the assessment of e-learning as a form of educational communication, compared to so-called 'classical' or 'traditional' ways of teacher-student communication, shows that e-learning cannot be the only form of communication between teacher and student, because there are contents and skills which, because their nature, may be taught only in direct contact, through practical classes and workshops, both from the technical and humanistic aspects. Therefore, blended e-learning, i.e. mixed method of education, assumes in advance both forms of communication. It is an extremely important fact that contemporary students use tele-information technology in their everyday interpersonal and social communication. The concept of an informative society has become a fact which exerts an effect on knowledge, awareness, attitudes and behaviours of people who use new communication technologies.

The use of methods and techniques of remote education reduces the number and eliminates the importance of obstacles of a physical, practical and interactive character. Apart from the reduction of obstacles in teacher-student communication, e-learning allows a better adjustment of the didactic process to the needs and capabilities of individual students. In addition, despite popular opinions, the e-learning method teaches students team work, develops their skills and behaviours necessary for cooperation and performance of tasks.

In the field of medicine and health sciences, it undoubtedly prepares students for work with patients

in a modern ICT environment, minimizes difficulties and resistance while using ICT tools, and maximizes skill in their use for effective work with patients, their families or medial teams.

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