

Internet as the Source for Acquiring the Medical Information

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Abstract—The purpose of the present paper is to discuss the results of research conducted in 2012 in order to determine the role of Internet as the source for acquiring the medical information in a group of students. Obtained results confirm the assumed working hypothesis about big role of Internet as the source of medical information that the searching for medical information in Internet is the principal sign of the use of ICT solutions in health protection (as one of e-health elements). It has been examined what kind of information is searched by the patients, what Internet sources are used, what is the reason of the searching for medical information in Internet, what are the barriers encountered by the patients. Details are included in this paper.

I. INTRODUCTION

IN contemporary world, information and communication technologies (ICT) become more and more popular and are used in almost all areas of human activity. E – trade, bank transactions (e-banking), communication (e-mail and mobile telephony), e-learning etc. are the examples of specific applications. The information and communication technologies can be also successfully used in the health care systems and in the whole sector associated with medical services. Thanks to the development of computer technologies and Internet it was possible to create new possibilities for doctor, health service managers and the patients. In case of patients, it is possible to apply e-health tools in services addressed directly to this group (electronic health accounts, medical information and education accounts, Internet pharmacies). E-health is one of the most significant and complex types of e-business [1-4].

As a result of the creation of Internet network we have been introduced into the period of “information society”. Continuously increasing amount of media messages (information) is perceived by an average recipient like “information noise” generally occurring in mass-media, particularly in Internet [5]. Therefore the evaluation, selection and conscious choice of valuable, credible and reliable information is an extremely important ability today [6].

Internet became one of essential sources of medical and health information [7]. Said information is quickly and easily accessible in network resources. However their quality, reliability and credibility may give rise to many concerns [8]. Therefore the use of media for pro-health education should be associated with the formation of a positive but simultaneously critical attitude toward media messages.

Because the Internet more and more frequently is used as a serious and often the first source of information about diseases and health, the reliability of information available on the Internet is problematic [9]. The growing role of the Internet as a source of medical information and the quality of the information is highlighted in the literature [10–17]. Another alarming phenomenon is the use of information obtained on-line instead of real doctor’s visit.

Increasing group of Internet users search on line for the medical information concerning healthy style of life, nutrition, diseases and their treatment. Internet health services constitute a dynamically developing sector – five years ago they have been visited by every fifth Internet user and currently by the every other [18].

The spectrum of proposals offered in that scope by the Internet is very wide: encompasses comprehensive information about the symptoms of diseases and their treatment, possibility of consultation with the specialist or exchange of experience with other patients, searching of location of medical entities, checking of patients opinions about specified doctor or entity, possibility of drugs purchase etc. without the necessity to leave home.

The fact that the Internet is often used by the Internet users as the source of information about health has been showed by studies carried out in a narrow local scope as well as studies on international level for example Global Health Survey 2011 – the studies carried out in 28 countries worldwide by research institutes associated in Iris network (International Research Institutions). The survey was carried out on population consisting of 22493 adults between August and October 2011 by means of diversified research methods: online questionnaires, CATI and direct interviews. The following countries participated in the survey: Ireland, Hungary, Slovenia, United Kingdom, Finland, Poland, Holland, Lithuania, Greece, France, Romania, Germany, Turkey, Russia, Italy, Ukraine, USA, Chile, Canada, Columbia, Thailand, Indonesia, Pakistan, Malaysia, China, India, Egypt, Australia. In Poland, the survey was completed by ARC Rynek and Opinia on the group consisting of 812 respondents.

The information on health is increasingly popular among Internet users – and searched more often than information concerning the culture and entertainment. The searching spectrum is very wide (information about diseases, their symptoms and treatment, opinions about doctors and medical entities, services offered by the entities, consultations

with specialists and other Internet users, healthy style of life, diet etc.). Acquired knowledge is very often used by the Internet users in practice. Particular attention deserves huge impact of opinions expressed by other persons not associated with medical sector on behaviours associated with the health and treatment – as many as 63% Internet users declare that they search for the opinions of other Internet users who had similar problem [19]. Obtained result have been also confirmed by the studies carried out for the needs of the present article where analogical indicator was equal to 59.6%.

The searching for information about health by the patient out of the doctor's office is nothing new. Only the alternative information sources are changed. Before the family, friends, neighbours were the information sources. Currently, in the period of ICT technology and society development, such role is performed by Internet. Its character is more anonymous. The knowledge obtained from Internet is verified by a part of patients in course of their visit in doctor's office. Unfortunately, some patients use the information found in the network without contacting the doctor and try to cure themselves. It is not problematic in case of minor diseases but is very alarming and negative phenomenon in case of major health problems. The quality of obtained information is also important. The functioning of specialized portals and forums dedicated for specific diseases should be evaluated positively, because they are visited not only by the patients but also by high class medical specialists and can be used as the source of reliable, useful and practical information.

II. RESULTS OF EMPIRICAL RESEARCH

The present article is an attempt to examine the role of Internet as the source of medical information.

The purpose of conducted research was to determine the types of information searched for by the patients, the kinds of Internet sources used, the reasons of medical information searching in the Internet and the barriers encountered by them. The intention of the author was to determine the attitudes and opinions concerning the acceptance of Internet as the source of medical information, the inclination to use this type of solution and awareness of importance of and potential benefits from the information obtained this way.

A. Own research methodology

The results presented herein constitute a fragment of wider studies concerning the social awareness, level of knowledge and perception of e-health.

The respondents group consisted of students subdivided into two groups. The members of the first group were the full-time students of public health field of study in the Medical University in Lublin (MU) and the members of the second group were the students of extramural management studies in Lublin University of Technology (PL).

The first group of respondents has been selected due to the fact that they will be employed in the environment associated with the rendering of medical services in future and that they will among others be responsible for efficient implementation of e-health applications and for use of Internet for the needs associated with medical services. Because e-health is the future of medical services, future doctors, health service managers as well as the patients will be to some extent "sen-

TABLE I.
SOCIAL AND DEMOGRAPHIC FEATURES OF THE RESPONDENTS

Variable	MU		PL		Total	
	Number	%	Number	%	Number	%
Age						
18-25	35	74.5	42	89.4	77	81.9
26-40	12	25.5	5	10.6	17	18.1
Gender						
Female	28	59.6	33	70.2	61	64.9
Male	19	40.4	14	29.8	33	35.1
Size of household						
1 person	3	6.4	5	10.6	8	8.5
2 persons	11	23.4	0	0	11	11.7
3 persons	12	25.5	19	40.4	31	33
4 persons	15	31.9	18	38.4	33	35.1
5 persons	4	8.5	0	0	4	4.3
6 persons and more	2	4.3	5	10.6	7	7.4
Employment status						
Student	47	100	47	100	94	100
Working student	19	40.4	33	70.2	52	55.3
Residence						
Village	1	2.1	23	49	24	25.5
Town up to 20 000 inhabitants.	1	2.1	9	19.2	10	10.6
Town up to 20-50 000 inhabitants.	3	6.4	5	10.6	8	8.5
Town up to 50-100 000 inhabitants.	6	12.8	5	10.6	11	11.7
Town up to 100-200 000 inhabitants.	7	14.9	0	0	7	7.5
Town up to 200-500 000 inhabitants.	29	61.7	5	10.6	34	36.2
Town above 500 000 inhabitants.	0	0	0	0	0	0

Source: own study on the basis of conducted research

tenced" to functioning in virtual environment. Therefore it seems to be interesting to examine among others how is e-health perceived by the students of medical disciplines, what is their knowledge and awareness in that field and what are their attitudes to Internet as the source of medical information.

Obtained results have been compared with those obtained from the group of students in Lublin University of Technology in order to check whether the professional profile of the respondent diversifies the respondents attitudes to Internet as the source of medical information.

The survey was conducted in the both groups in June 2012. The size of each group of respondents was identical and equal to 47 persons. A structured questionnaire form containing the open and closed questions has been used as the research tool (41 questions in the main questionnaire form and 6 questions in demographics).

B. Profile of respondents

The social and demographic features of the respondents are presented in Table I. The women were prevailing group in the survey (64.9%) i.e. in the group of students in the Medical University in Lublin (59.6%) as well as in the group of students in Lublin University of Technology (70.2%). More than one third of respondents were the members of four persons household (35.1%). 55.3% respondents have a regular job. It is obvious that the percentage of working respondents was higher in the group of students of extramural management studies (PL) and was equal to 70.2%. The inhabitants of Lublin prevailed in the group of full-time

students (MU) (61.7%) and the students of extramural management studies came from the rural areas (49%).

C. Use of the Internet for health purposes

The place and intensity of the use of Internet network as well as aims of its use in the context of medical information searching were analyzed in examined group of students. The intensity has been determined through the frequency and the period of experience in the use of Internet network. There is no significant difference in the scope of a/m indicators between the students of Medical University and Lublin University of Technology.

Table II contains the information about the use of computers and Internet by the respondents. All respondents have their own computers and are active users of Internet. Majority of respondents use the Internet everyday (77.7%). Almost one fourth of respondents gained more than 10 years' experience in the use of Internet. Mainly the following places of Internet use are specified: home (90.4%), work place (40.4%), university (24.5%) and the use in any place by means of wireless access (24.5%). 93.6% of respondents evaluated their skills associated with the use of computers and Internet as good or very good. The students of Medical University were more critical in their assessments. Part of them evaluated their skills as sufficient (10.6%) or poor (2.1%).

Internet is used by the respondents mainly for searching of information about health, diseases and treatment methods. Therefore it is used by 89.4% of respondents from MU and 80.9% of respondents from Lublin University of Technol-

TABLE II.
INFORMATION ABOUT COMPUTERS AND INTERNET

Variable	MU		PL		Total	
	Qty	%	Qty	%	Qty	%
Possession of computer						
Yes	47	100	47	100	94	100
No	0	0	0	0	0	0
Frequency of Internet use						
Every day	40	85,1	33	70,2	73	77,7
Several times per week	7	14,9	14	29,8	21	22,3
Experience						
2-5 years	6	12,8	10	21,3	16	17
5-10 years	28	59,6	28	59,6	56	59,6
Above 10 years	13	27,6	9	19,1	22	23,4
Place of use						
Home	47	100	38	80,9	85	90,4
Work	19	40,4	19	40,4	38	40,4
Family / place	3	6,4	13	27,7	16	17
School / university	18	38,3	5	10,6	23	24,5
Everywhere (wireless access)	13	27,6	10	21,3	23	24,5
Access points; hot-spot type	10	21,3	5	10,6	15	16
Café internet	0	0	0	0	0	0
Assessment of skills in the scope of computer and Internet						
Very good	27	57,5	24	51,1	51	54,2
Good	14	29,8	23	48,9	37	39,4
Sufficient	5	10,6	0	0	5	5,3
Poor	1	2,1	0	0	1	1,1

Source: own study on the basis of conducted research

ogy. The aims of the use of Internet are presented in Table III. Obtained results confirmed the studies [20], carried out previously and demonstrating that e-health mainly consists in searching the information concerning the health and healthy style of life and, in further alternative, shopping in virtual pharmacies or performing other activities. Therefore the practical use of Internet in the area of medical services mainly consists in searching for information. High percentage of responses informing about the making use of advices given by other patients (almost 60% of respondents) is an alarming phenomenon without any impact of professional profile of the respondent. The scope of use of Internet is narrower in case of students from Lublin University of Technology – the following activities did not occur in this group at all: checking of dosages and undesired effects of drugs prescribed by doctor, asking questions concerning determined medical problem at discussion forum, advices given to other patients, ordering a prescription, ordering a doctor home visit.

The main Internet sources used by the respondents searching for information associated with the health and medicine are: search engines (70.2%), health portals for everyone (63.8%), general (48.9%) and specialized (31.9%) discussion forums, thematic websites prepared by large portals (39.4%), Internet pharmacies and medical shops (36.2%), websites of doctors and medical entities (34%), Internet portals for patients (17%), community services (8.5%), websites of scientific associations (5.3%), websites of drugs manufacturers (5.3%), websites of National Health Fund (8.5%) and Ministry of Health (4.3%). The search engines, health portals for everyone, the general (48.9%) and specialized discussion forums as well as Internet portals for patients are more frequently used by the students of Medical University. However the community services, websites of

scientific associations, websites of drugs manufacturers and website of Ministry of Health did not occur at all in the group of sources indicated by the students from Lublin University of Technology.

The respondents asked to arrange various elements associated with health protection from the most important to completely insignificant ones gave the answers contained in the Table IV. In the group of students of Medical University, the largest group of respondents (51.1%) finds that the access to information / advices concerning health, diseases prevention or correct nutrition is very important.

The other issues found important by the respondents were: access via Internet to the list of medical entities and catalogue of their services, to personal health records and the possibility to purchase drugs and medical equipment via Internet. The possibility of on-line consultation with the doctor has been found less important and the possession of health card in electronic version completely unimportant.

But none of expressed opinions prevailed as very important in the group of the students from Lublin University of Technology. The access via Internet to the list of medical entities and their services, to information/advices concerning health, diseases prevention and correct nutrition etc. as well as the access to personal health/diseases records was found important by the respondents. The possibility of on-line consultation with the doctor, possibility to purchase drugs and medical equipment via Internet, possibility of discussion on forums about medical issues and appointment of visits at the doctor has been found less important and the possession of health card in electronic version completely unimportant.

The respondents identify the positive effects of applications of information technologies in the health service. The students from Medical University emphasize that said effects improve the health care system (70.2%), make it possi-

TABLE III.
AIM OF INTERNET USE

Aim of Internet use	MU		PL		Total	
	Freq.	%	Freq.	%	Freq.	%
Verification of opinions about specified doctor	28	59,6	13	27,7	41	43,6
Making use of advices given by other patients	28	59,6	28	59,6	56	59,6
Searching for addresses of medical entities	22	46,8	27	57,4	49	52,1
Verification of opinions about specified medical entities and doctors	21	44,7	23	48,9	44	46,8
Searching for information about the effect of specified drug	20	42,6	14	29,8	34	36,2
Checking undesired effects of drugs prescribed by doctor	18	38,3	0	0	18	19,1
Receipt of examinations results	15	31,9	18	38,3	33	35,1
Searching for information about the treatment or diagnostic method ordered by the doctor	15	31,9	9	19,1	24	25,5
Checking dosage of drug prescribed by doctor	15	31,9	0	0	15	16
Asking questions concerning determined medical problem at discussion forum	14	29,8	0	0	14	14,9
Purchase of drugs and medical equipment	11	23,4	6	12,8	17	18,1
Appointment of the visit in medical entity	7	14,9	13	27,7	20	21,3
Giving advices to other patients	7	14,9	0	0	7	7,4
Asking questions concerning health to experts accessible in Internet	4	8,5	5	10,6	9	9,6
Ordering a prescription	2	4,3	0	0	2	2,1
Checking a place in queue waiting for sanatorium or surgery	1	2,1	4	8,5	5	5,3
Online access to his/ her medical documentation	1	2,1	9	19,1	10	10,6
Ordering a doctor home visit	1	2,1	0	0	1	1,1

Source: own study on the basis of conducted research

ble to save the doctor's and patient's time (66%), improve the quality of medical services (57.4%). They also make the contacts with health service and medical services providers more efficient (55.3%), reducing the functioning costs of medical entities (51.1%) and increasing the access to medical services (46.8%). Almost every third respondent (29.8%) reported a positive impact of Internet on the society education in the scope of health protection. In the opinion of respondents the competition on medical services market is also positively affected by ICT technologies (23.4%). According to the natural order of things, the students from Medical University emphasized the positive aspects of computerization from the point of view of the suppliers or organizers of medical services not from the patients' point of view.

In the opinion of the students from Lublin University of Technology, the most important effect of health service computerization is better efficiency of the contacts with health service and medical services providers (70.2%) and saving the doctor's and patient's time (61.7%). Then they report the improvement of the health care system (48.9%) and increased access to medical services (48.9%). The next effects are: reduced costs of medical entity operation (40.4%), assistance in maintenance of health (21.3%) and improved quality of medical services (19.1%). The positive effects of applications of information technologies in the health service are identified with the society education in the scope of health protection in the scope of health protection and with the improvement in competition on medical services market by every tenth respondent only.

Due to the awareness of existence of the effects of applications of information technologies in the health service, 44.7% of respondents in the group of students from Medical University strongly believes that Internet is the future of medicine. Similar group (48.9%) is more sceptic but also

can see the chances for health care development in Poland by means of Internet.

However the attitude presented by the students from Lublin University of Technology is a little bit different. The answer: Definitely YES to the question whether Internet is the future of medicine was given in this group by every tenth respondent only. The answer: YES was declared by 38.3% of respondents but as many as 40.4% did not expressed any opinion about this subject.

As appears from the conducted research, Internet is a medium most frequently and preferably used by the respondents gain the knowledge in the scope of health, diseases and treatment. The network as the preferred source of information about health, diseases and treatment is indicated by 77.7% respondents. The next answers were as follows: doctors/ representatives of health service – 74.5%, family – 56.4%, friends – 44.7%, books/handbooks – 29.8%.

The hierarchy of knowledge sources was different in the both groups of respondents. The following hierarchy occurred in case of MU students: doctors/ representatives of health service (80.9%), Internet (72.3%), family (40.4%), books/handbooks (40.4%). The following opinions prevailed in case of the students from Lublin University of Technology: Internet (83%), family (72.3%), doctors/ representatives of health service (68.1%), friends (63.8%).

As many as 85.1% of respondents (89.4% of MU students and 80.9% of the students from Lublin University of Technology) searched for health information in Internet. Such information is searched by 40.4% of respondents (MU students) frequently and as many as 61.7% of the students from Lublin University of Technology do it always if it is necessary.

Most frequently information about health encompass the information about diseases and their symptoms (78.7% MU and 91.5% PL), location and the offer of medical entities (59.6% MU and 59.6% PL) as well as effect and composi-

TABLE IV.
OPINIONS ABOUT VARIOUS ELEMENTS ASSOCIATED WITH HEALTH PROTECTION

Topics	Very important		Important		Less important		Completely unimportant	
	MU	PL	MU	PL	MU	PL	MU	PL
Access via Internet to the list of medical entities and their services in your voivodship	18	15	24	22	5	10	0	0
Access via Internet to the information / advices concerning health, diseases prevention and correct nutrition etc..	24	15	18	24	4	4	1	4
Appointment of visits at the doctor via Internet/email	12	0	23	18	10	25	2	4
Access via Internet to the to personal health / diseases records	13	4	24	24	8	10	2	9
possession of health card in electronic version	10	0	14	13	16	20	7	14
Possibility to purchase drugs and medical equipment via Internet	8	0	24	9	13	29	2	9
On-line consultation with the doctor	8	0	19	13	18	30	2	4
Possibility of discussion on forums about medical issues	7	0	18	15	17	28	5	4

Source: own study on the basis of conducted research

tion of drugs (55.3% MU and 61.7% PL). Other areas of medical information searched in Internet are presented in Table V.

The great majority of respondents (87.2%) reported Internet as the most popular information source due to the fact that the information are accessible quickly and easily. For almost the half of respondents (47.9%) it is also important that this medium makes it possible to enhance the knowledge about health. Such information is searched by 35.1% of respondents driven just by curiosity.

The respondents placed also the value on: lack of necessity of waiting in queue for doctor's visit (27.7%), time saving (25.5%), possibility to maintain anonymous status (9.6%) and quick diagnosis (8.5%). The quick and easy access to information prevails in the answers given by MU students (83%) and PL (91.5%). The next answers are characterized by differences. The next item specified by MU students is the lack of necessity of waiting in queue for doctor's visit (55.3%), time saving (40.4%), possibility to enhance the knowledge about health (36.2%) and curiosity (31.9%). The next important reasons for the students from Lublin University of Technology is the possibility to enhance the knowledge about health (59.6%) and curiosity (38.3%) only.

The respondents search for medical information in Internet but almost $\frac{3}{4}$ never arranged a doctor's visit by means of Internet or E-mail. The reason of this state of things in case of MU students is the fact that medical entity being their service provider does not accept the registration in such form (76.5%). However almost every third respondent informs that he/she never checked if it is possible to use this form of registration. However the students from Lublin University of Technology who do not arrange the doctor's visit in this manner prefer conventional methods (55.9%), do not use the entities offering such possibilities (44.1%), or did not check if it is possible to use this form of registration (44.1%). Every fifth respondent in this group informs that it is more

quickly and convenient to arrange the doctor's visit by phone. It should be noted that the lack of computer skills or impeded access to Internet is not reported as the reason of failure to arrange the doctor's by means of Internet or E-mail in any group.

The barriers in use of the state of art technologies (Internet, telephony, computers) are also identified by the respondents. What's interesting is that no barriers were reported in that scope by as many as 42.6% respondents in MU students group but such answer was not given at all by the students from Lublin University of Technology. How to explain such optimistic opinions of MU students? Probably it is caused by poor knowledge and awareness of potential hazards. In the present research phase it is possible to suspect the reasons of this state of things i.e. wider knowledge and consequently awareness of potential hazards in the group of students of technical university. Certainly, the issues presented herein can constitute an interesting subject of further research. In the opinion of MU students reporting the barriers in use of the ICT technologies, the principal barriers are the personal data safety concerns (46.8%), hazards associated with viruses, hackers, undesired mail (34%) and doubts regarding Internet transactions safety (19.1%).

The same three barriers are also specified by the students from Lublin University of Technology but in different order i.e.: personal data safety concerns (78.7%), doubts regarding Internet transactions safety (59.6%) and hazards associated with viruses, hackers, undesired mail (21.3%).

III. CONCLUSION

Conducted research demonstrated that Internet is a valid source of medical information for potential patients. It also appears that searching for medical information in Internet is the principal sign of the use of ICT solutions in health protection and practical use of Internet in the area of medical services is limited to the searching for information mainly. It

TABLE V.
THEMATIC AREAS OF MEDICAL INFORMATION SEARCHED IN INTERNET

Topics	MU		PL		Total	
	Freq.	%	Freq.	%	Freq.	%
Diseases and their symptoms	37	78,7	43	91,5	80	85,1
Interpretation of examinations results	17	36,2	24	51,1	41	43,6
Effect and composition of drugs	26	55,3	29	61,7	55	58,5
Alternative treatment methods	13	27,7	5	10,6	18	19,1
Physical activity – fitness, sport	20	42,6	23	48,9	43	45,7
Healthy style of life, diet, weight loss, vitamins, diet supplements	23	48,9	19	40,4	42	44,7
Stimulants, addictions	8	17	0	0	8	8,5
Stress, mental health, depression	9	19,1	10	21,3	19	20,2
Sexual life	8	17	19	40,4	27	28,7
Location and the offer of medical entities	28	59,6	28	59,6	56	59,6
Opinions about doctors	24	51,1	13	27,7	37	39,4
Health insurance	5	10,6	5	10,6	10	10,6
Alternative medicine, herbs, homeopathy, acupuncture	6	12,8	0	0	6	6,4
Medical procedures	9	19,1	9	19,1	18	19,1
Plastic surgery	2	4,3	5	10,6	7	7,4
Child health	6	12,8	0	0	6	6,4
Allergic reactions	8	17	5	10,6	13	13,8

Source: own study on the basis of conducted research

can be questioned whether it is caused by poor spectrum of e-health services or lack of awareness of the respondents in the scope of such opportunity or the respondents are unable to change their previous habits. These issues can constitute an interesting subject of further research.

There are no significant differences between the students from Medical University and the students from Lublin University of Technology in the scope of indices characterizing the place and intensity of Internet use.

It seems that the attitude of respondents toward Internet as the source of medical information is diversified by the Professional profile of respondent, as demonstrated in course of the research.

Significant differences in examined groups have been observed in the following:

- 1) subjective evaluation of their own computer and Internet skills:
 - the students from Lublin University of Technology better assess their ability to use computers and the Internet,
- 2) searching spectrum width:
 - the scope of use of Internet is narrower in case of students from Lublin University of Technology – the following activities did not occur in this group at all: checking of dosages and undesired effects of drugs prescribed by doctor, asking questions concerning determined medical problem at discussion forum, advices given to other patients, ordering a prescription, ordering a doctor home visit,
- 3) size of catalogue of Internet sources used by those who search for medical information:
 - students from Lublin University of Technology also exhibit limited range of online sources used in search of medical information,
- 4) identification of positive effects of information technologies application in health service:
 - the students from Medical University emphasized the positive aspects of computerization from the point of view of the suppliers or organizers of medical services not from the patients' point of view,
- 5) forecasting of the future of medical services rendered by means of Internet:
 - the students from Medical University are more confident that the Internet is the future of medicine,
- 6) structure of medical knowledge sources:
 - for the students from Medical University the main sources of medical knowledge are doctors/representatives of health service, for the students from Lublin University of Technology the main source of medical knowledge is Internet,
- 7) structure of reasons causing that the Internet is the most popular source of information:
 - for all respondents the main reason why the Internet is the most popular source of information is the fact that it provides quick and easy access

to information; however, for other reasons, both groups of students give their different structure,

8) identification of barriers in use of the state of art technologies:

- no barriers were reported in that scope by as many as 42.6% respondents in Medical University students group but such answer was not given at all by the students from Lublin University of Technology.

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