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## The Assessment of the Quality of Health Related Websites by Students of Physical Education and Physiotherapy Using the DISCERN Instrument

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## The Assessment of the Quality of Health Related Websites by Students of Physical Education and Physiotherapy Using the DISCERN Instrument

**Authors' Contribution:**

- A – Study Design
- B – Data Collection
- C – Statistical Analysis
- D – Data Interpretation
- E – Manuscript Preparation
- F – Literature Search
- G – Funds Collection

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**Key words:** *Internet, web site, health, DISCERN, quality of health information, students*

### Abstract

**Background:** *The purpose of the article is to characterise the assessment of the Internet sites by physical education and physiotherapy students using the DISCERN questionnaire. An attempt has also been made to indicate the determinants of the overall final assessment of individual health-related Internet sites from 2005 to 2009.*

**Material/Methods:** *The survey was carried out in 2005 and 2009 among 376 physical education and physiotherapy students at the University School of Physical Education in Poznań. The students assessed five Polish health-related websites. They used the DISCERN questionnaire to rate the quality of health information and filled in the ME & INTERNET questionnaire produced by the author.*

**Results:** *Over the analysed period students' Internet activity significantly increased ( $p < 0.003$ ) in almost all the analysed areas (with the exception of chatting). Physical education and physiotherapy students differ significantly ( $p < 0.05$ ) in their assessment of the analysed websites. The quality of health-related websites rated by the students is above average; however, the quality of the websites related to sport and physical activity is of the average level.*

**Conclusions:** *In the students' opinion, the majority of analysed websites did not improve over the four years. The flaws in the analysed websites noted by the students concerned references and supplementary sources.*

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## Introduction

The Internet is becoming a prevailing source of information, in particular for young people. More and more often they are using various websites to find information, but also to communicate, seek entertainment, services, and for purposes related to work and study. Hence, we witness an expansion of all types of social, service and information websites. The percentage of both young and older people using this form of contact and gaining knowledge is gradually growing [1]. The creation of the Internet network started the age of “the information society”. The increasing number of media messages (items of information) appearing in the mass-media in general, and on the Internet in particular, is nothing but information noise for an average receiver [2]. Thus, the assessment and selection of valuable, reliable and accurate information is becoming an important skill.

It is also noted that apart from its many benefits, the Internet presents a lot of risks, in particular for young people. So a question arises whether a young person is aware of them, can see and assess them and whether he or she is sufficiently prepared to deal with them. More and more often we are coming across social information campaigns on potential risks related to uncritical and incompetent use of the Internet. Such information is also communicated at schools, e.g., in IT classes, but its effectiveness is relatively low.

Health issues are among those quite commonly searched for in Internet resources. Research indicates that the Internet is very popular both among young people and older people as a source of this type of information [3, 4]. Attempts are made to certify reliable and accurate websites. This is done, for example, by the international Health On the Net Foundation, the logo of which guarantees meeting eight criteria significant from the point of view of the quality of health information. There are many tools available on the Internet which are to help both health experts and patients looking for health-related information. However, the tools differ in usefulness, accessibility and adequacy [5, 6].

The Internet is used mainly by young people, 75% of them are aged below 30 [7] and the proportion of users in the following age groups gradually decreases [8]. Students may be thus perceived as a group initiating the development of the Polish information society [9]. Physical education and physiotherapy students belong to professional groups which deal with problems of health and physical education. Like other students, they often use the Internet as a source of information. It seems natural that they should be able to assess the reliability and accuracy of information. Using the DISCERN tool [10] (a questionnaire technique, available in English at [www.discern.org.uk](http://www.discern.org.uk)), developed at the University of Oxford, Division of Public Health and Primary Health Care, Institute of Health Sciences, students' skills were tested by rating the reliability and accuracy of five popular health-related websites. Thus, the aim of this study is to characterise the assessment of Internet sites by physical education and physiotherapy students using the DISCERN questionnaire. An attempt is also made to indicate the determinants of the overall final assessment of individual Internet sites relating to health from 2005 to 2009. The frequency and purposes of using the Internet by the participants were also assessed.

## Material and Methods

The survey was carried out in 2005 and 2009 among 376 3rd-year and 4th-year physical education and 3rd-year physiotherapy students at the University School of Physical Education in Poznań. Students completed the survey during their health education course. The stratification of students in terms of their number in the individual years of the survey, fields of study and gender is presented in Table 1.

Tab. 1. Characteristics of the respondents

Year of survey \ Field of study	2005		2009		All N (%)
	Physical Education	Physiotherapy	Physical Education	Physiotherapy	
Women n (%)	30 (20)	62 (41)	60 (26)	46 (20)	198 (53)
Men n (%)	46 (31)	12 (8)	69 (31)	51 (23)	178 (47)
All N (%)	76 (51)	74 (49)	129 (57)	97 (43)	376 (100)

The students assessed three Polish health websites, so-called medical and health platforms ([www.zdrowie.med.pl](http://www.zdrowie.med.pl), [www.mediweb.pl](http://www.mediweb.pl), [www.poradnikmedyczny.pl](http://www.poradnikmedyczny.pl)), and two Polish websites concerning physical activity ([www.fit.pl](http://www.fit.pl), [www.fitnessclub.pl](http://www.fitnessclub.pl)). The sites were selected on the basis of the GOOGLE search engine (the most popular search engine in Poland) and the data on the popularity of websites in the field of health (GemiusAudience).

In the survey, the students used the DISCERN questionnaire to rate the quality of the information presented on the websites. The DISCERN questionnaire was developed at the University of Oxford, Division of Public Health and Primary Health Care, Institute of Health Sciences by Deborah Charnock and Sasha Shepperd and is available in English at [www.discern.org.uk](http://www.discern.org.uk). It was translated and adapted for Polish conditions by the author of the study. It includes 15 questions in two groups. The first group – 8 questions – relates to the reliability of information presented on the website. The second group – 7 questions – addresses the quality of information about medical treatment or forms of self-care. There was also one general question about the overall rating of the assessed site. The answers to the questions are categorised according to the five-point Likert's scale ranging from "no" through "partially" to "yes".

The respondents also filled in the ME & INTERNET questionnaire produced by the author. The questionnaire contained 6 closed questions relating to their activity on the web and the purpose of using the Internet. The answers to questions are categorised into three groups ranging from "rarely" through "sometimes" to "often".

Statistical analyses were performed using STATISTICA 9. The results were subject to statistical analysis using the Mann-Whitney U test and the Kruskal-Wallis ran-sum test.

## Results

The students of the University School of Physical Education in Poznań assessed the selected websites related to health and physical activity (PA) twice – in 2005 and in 2009. Also the places, purposes, frequencies and the total average time of using the Internet were given. The main places of using the Internet in both years of the survey did not change. They were: home, followed by the university and at friends' place. The Mann-Whitney U test confirmed that over four years (2005-2009) the frequency of using the Internet at home ( $p<0.000$ ), at work ( $p<0.000$ ) and at a friend's place ( $p<0.000$ ) increased significantly and the frequency of using Internet cafés decreased ( $p<0.000$ ). We note a particular increase in the frequency of using the Internet during the week ( $p<0.000$ ). In 2005, 22% of students used the Internet every day, and in 2009 as many as 68%. Similarly, 39% of students used the Internet once a week or less in 2005 and only 5% in 2009. The duration of each connection with the web increased in the studied period. In 2005, 45% of participants spent two or more hours on the Internet and in 2009 the percentage was 58% ( $p<0.003$ ).

The respondents were asked to describe the frequency of using the Internet for the purposes listed below ranked on the scale from 1 (seldom) to 3 (often). Table 2 presents the overall results with the comparison of arithmetic means for the intensity of using the Internet for the given purposes.

The purposes for which students use the Internet differed between physical education and physiotherapy students, and they distinctly changed over the four years of the survey. In 2005 physical education students seemed to be greater enthusiasts of modern technologies, which they used for communication using electronic mail and searching for information related mainly, but not only, to hobbies. The Mann-Whitney U test confirmed that over the analysed period the activity of students significantly ( $p<0.003$ ) increased in almost all the areas (with the exception of chatting). The increase in the overall Internet activity of physiotherapy students ( $p<0.05$ ) in the majority of areas noted in this period had a particular influence on this progress. Questions of health are becoming more and more popular among Internet users. The percentage of students searching for and finding important information on physical activity, nutrition, and prevention ( $p<0.000$ ) increased significantly.

Tab. 2. Purposes of using the Internet by physical education (PE) and physiotherapy (PT) students in 2005 and 2009

GOALS	2005				2009			2005-2009 P-value			
	All M	All M	PE M	PT M	All M	PE M	PT M	All	PE	PT	
Chatting	1.33	1.36	1.29	1.43	1.32	1.33	1.25	.354	.714	.121	
Discussion group	1.32	1.22	1.27	1.16	1.42	1.39	1.6	<b>.001</b>	.135	<b>.004</b>	
Network games	1.29	1.20	1.32	1.08	1.38	1.38	1.35	<b>.003</b>	.312	<b>.043</b>	
Downloading files (music, film)	2.12	1.91	2.01	1.78	2.33	2.34	2.25	<b>.000</b>	<b>.000</b>	<b>.002</b>	
E-mail	2.65	2.55	2.56	2.54	2.74	2.71	2.93	<b>.002</b>	.136	<b>.001</b>	
Browsing www sites	2.56	2.48	2.49	2.46	2.64	2.61	2.78	<b>.003</b>	.106	<b>.005</b>	
Internet shopping	1.52	1.30	1.35	1.26	1.75	1.73	1.88	<b>.000</b>	<b>.000</b>	<b>.000</b>	
Information for study	2.31	2.18	2.19	2.18	2.44	2.42	2.55	<b>.000</b>	<b>.002</b>	<b>.002</b>	
Information for hobby	2.52	2.38	2.57	2.19	2.66	2.67	2.65	<b>.000</b>	.376	<b>.000</b>	
Have you found health information important for you?	2005				2009				2005-2009 P-value		
	PE		PT		PE		PT		All	PE	PT
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)			
47	53	38	62	64	32	68	32	<b>.000</b>	<b>.001</b>	<b>.004</b>	

M – mean score; bold type – statistically significant  $p < 0.05$

Tab. 3. Mean (M) final ratings of selected websites from 2005 to 2009 by the field of study and gender

FIELD OF STUDY		2005				2009				2005 – 2009 P-value		
		All M	PE M	PT M	PE/PT P-value	PE M	PT M	PE M	PT M	All	PE	PT
fit.pl		3.1	3.1	-	-	3.1	-	3.1	-	-	.66	-
fitnessclub.pl		3.0	3.0	-	-	3.0	-	2.9	-	-	.49	-
mediweb.pl		3.6	3.8	3.3	<b>.011</b>	3.8	3.5	3.8	3.2	.73	.77	.55
poradnikmedyczny.pl		3.8	4.0	3.6	<b>.001</b>	3.9	3.5	4.1	3.7	<b>.03</b>	.29	.22
zdrowie.med.pl		3.9	4.2	3.4	<b>.000</b>	4.4	3.5	4.1	2.8	.34	.20	.25
GENDER		2005			2009				2005 – 2009 P-value			
		♀ M	♂ M	♀/♂ P-value	♀ M	♂ M	♀ M	♂ M	♀	♂		
fit.pl		3.0	3.2	.682	3.0	3.1	3.1	3.2	.636	.879		
fitnessclub.pl		2.9	3.1	.542	3.0	3.1	2.9	3.0	.682	.743		
mediweb.pl		3.5	3.8	.110	3.5	3.9	3.4	3.7	.653	.325		
poradnikmedyczny.pl		3.7	3.9	.269	3.7	3.6	3.8	4.0	.364	<b>.025</b>		
zdrowie.med.pl		3.8	4.0	.339	3.7	4.0	3.9	4.0	.328	.883		

M – mean score; ♀ – women, ♂ – men, bold type – statistically significant  $p < 0.05$

In the next stage, we searched for relationships between selected variables describing the participants (sex, field of study) and their ratings of selected websites with the use of the DISCERN questionnaire and differences in ratings between 2005 and 2009. Taking into consideration the final rating in the DISCERN questionnaire, the health website which was described as the best by the physical education students was www.zdrowiemed.pl (mean=4.2). According to physiotherapy students, the best website was www.poradnikmedyczny.pl (mean=3.6). The physical education

and physiotherapy students differ significantly in their assessment of the analysed websites, which was confirmed by the Mann-Whitney U test (Table 3). It can be assumed that over the four years between the assessments, the websites evaluated by the students improved or some defects or flaws were corrected; therefore, the ratings of individual websites made in 2005 and 2009 were compared. The overall list of the main results are presented in Table 3.

In the analysis of the ratings of the websites between 2005 and 2009 using the Mann-Whitney U test, a significant difference was noted for [www.poradnikmedyczny.pl](http://www.poradnikmedyczny.pl). The analysis of mean score ratings made by both physiotherapy and physical education students clearly indicates that the rating of this website is increasing. Such changes were not noted for other sites, although a decline in the rating can be noticed for the website [www.zdrowie.med.pl](http://www.zdrowie.med.pl) (Table 3). Kruskal-Wallis ANOVA also showed significant differences in ratings between the analysed websites ( $p < 0.001$ ). This relates to “general health” websites ([www.mediweb.pl](http://www.mediweb.pl), [www.poradnikmedyczny.pl](http://www.poradnikmedyczny.pl), [www.zdrowie.med.pl](http://www.zdrowie.med.pl)) compared to websites relating to general sport, recreation and physical activity ([www.fit.pl](http://www.fit.pl), [www.fitnessclub.pl](http://www.fitnessclub.pl)). The respondents' gender did not affect any of the studied relations with respect to the final ratings of the analysed websites.

The tool to assess the reliability and accuracy of websites, the DISCERN questionnaire, consists of 16 questions, including the last one, which is an overall, summary rating. In the next stage it was checked which elements of the websites in question assessed in the DISCERN questionnaire were given the lowest rating by the students and which were given the highest one. The overall list of arithmetic means of ratings given by the students (from 1 to 5) and statistical differences between them are presented in Table 4.

Tab. 4. Mean ratings (M) given by the students in terms of individual DISCERN questions

DISCERN QUESTIONS	WEBSITES					Kruskal-Wallis Test <i>P</i> -value
	fit	fitness club	medi web	poradnik medyczny	zdrowie. med	
	M	M	M	M	M	
Are the aims clear?	3.7	3.9	4.1	4.0	4.2	<b>.013</b>
Does it achieve its aims?	3.7	3.9	4.0	3.9	4.1	.087
Is it relevant?	3.7	3.7	4.0	4.1	4.1	<b>.025</b>
Is it clear what sources of information were used to compile the publication?	2.5	2.5	3.4	3.5	3.6	<b>.000</b>
Is it clear when the information used or reported in the publication was produced?	2.8	2.1	3.8	4.1	3.4	<b>.000</b>
Is it balanced and unbiased?	3.1	3.2	3.6	3.8	3.8	<b>.000</b>
Does it provide details of additional sources of support and information?	2.4	2.8	3.0	3.5	3.6	<b>.000</b>
Does it refer to areas of uncertainty?	2.3	2.6	2.8	3.3	3.1	<b>.000</b>
Does it describe how each treatment works?	3.5	3.8	3.8	3.9	3.9	<b>.016</b>
Does it describe the benefits of each treatment?	3.7	3.6	3.7	3.8	3.8	.851
Does it describe the risks of each treatment?	2.7	2.8	3.3	3.4	3.6	<b>.000</b>
Does it describe what would happen if no treatment was used?	2.7	2.7	3.4	3.5	3.6	<b>.000</b>
Does it describe how the treatment choices affect overall quality of life?	3.3	3.3	3.5	3.3	3.7	<b>.023</b>
Is it clear that there may be more than one possible treatment choice?	3.1	3.2	3.3	3.3	3.4	.324
Does it provide support for shared decision-making?	2.8	2.6	3.2	3.2	3.2	<b>.001</b>
...rate the overall quality of the publication...	3.1	3.0	3.7	3.8	3.9	<b>.000</b>

*M* – mean score; **bold type** – statistically significant  $p < 0.05$

The areas of particular neglect in terms of content can be indicated in the case of the websites with the lowest mean ratings of the students. They include: informing Internet users about various opinions on a given subject (including relating to health therapies), providing details of additional sources of support and information, providing support for shared decision-making. On the websites relating to physical activity and sport the participating students noticed a lack of information on references (other than the author or producer) and the date when the information was produced, that is whether it is up to date.

Also areas were indicated where the reviewed websites were particularly well rated by the participating students and had the highest mean rating. They include clearly specifying the aims of the website, achieving its aims, and relevance of the information presented on the website in relation to the problem. The analyzed websites differed in the mean overall quality score ( $p < 0.001$ ) and in most of the other DISCERN questionnaire questions (see Tab. 4).

## **Discussion**

The students of the University School of Physical Education significantly changed the intensity and quality of using the Internet resources between 2005 and 2009. The results confirm a general tendency concerning the availability of Internet services, which translated into an increased Internet use. Students spend more time on the web per week, and a session on the web lasts longer, which is also confirmed by the studies of other authors [11]. This can involve a number of negative health consequences, manifested in a tendency to undertake pro-health activities less frequently [12, 13]. In the studied period the students increased their interest in all the investigated areas of activity on the Internet. The structure of their activity on the web is similar to this of students in other countries [14, 15]. The students also significantly more often searched for and found important health information. The Internet is one of the main sources of health information, in particular for the young generation [16, 17]; however, they notice some limitations related mainly to the quality and reliability of the information presented there [18].

The three analysed websites on general health were rated differently by physical education students and physiotherapy students. It can be assumed that the latter, due to the specificity of their education – of more biomedical focus – have higher expectations for websites of this type as a source of health knowledge than future physical education teachers, sports instructors, coaches and managers. Similarly, in the study of Kuosmannen [19], nurses were more critical of the content, structure and visual appearance of a website than the service users. On the other hand, the lack of criticism and inquisitiveness in the assessment of educational materials about health may result in replicating untrue or unverified information, which will be harmful for its potential recipients – children, young people, athletes. At the same time, physical education students were much more critical about the quality of information on the analysed websites related to sport, fitness and recreation. It may therefore be concluded that their accuracy and reliability are lower than that of the analysed general health websites, or that the physical education students were more critical of educational materials in the field familiar to them. Also, as indicated by Bonnar and Black, the quality of English language websites concerning physical activity is low [20]. Similarly, the accuracy and theoretical quality of PA information presented on the Internet to people with spinal cord injury may not be optimal. Websites should be improved to incorporate accepted PA recommendations and behavioural theory to better deliver health messages about PA [21].

What is interesting, sex did not affect the differences in the analysed ratings. We noted large consistency in this respect between male and female students of the University School of Physical Education in Poznań.

On the basis of the ratings made by students of the University School of Physical Education it can be concluded that the quality of the analysed websites is from average to good. It is worrying that over four years little has changed in this respect. An exception is [www.poradnikmedyczny.pl](http://www.poradnikmedyczny.pl), for which we noted an increase in the ratings, which indicates improved reliability and accuracy of information presented there. It is not so in the case of other websites. However, as shown by the analyses of Zun et al. [22] the completeness and accuracy of online emergency medical

information available to the general public improved from 2002 to 2008. However, we have more reports on the still relatively low quality of many Internet sites devoted to health problems [23, 24].

The DISCERN instrument is perceived as a potential quality indicator with a relatively high specificity related to health [25]. When using it students indicated the flaws of the rated websites, with respect to both the reliability of information presented on the websites and its quality. The assessments made by students indicate that editors of educational materials presented on websites should pay more attention to the presentation of the materials not only “in a nutshell”, but also to indicate various opinions on given issues and possibilities, sources of additional information (e.g. for those interested). Similar flaws are indicated by Gkouskou et al. [26], who assessed the quality of nutritional information on the Internet in health and disease. Also information on the need for support when making health-related decisions, in particular in terms of therapy or training, does not appear sufficiently often. The participating students did not have difficulty indicating the aims of website editors and specifying whether the aims were achieved. They also thought that the information presented on the assessed websites is adequate to the needs of potential recipients. These are the highest-rated advantages of the analysed websites.

The participating students clearly rated the quality of the analysed websites related to physical culture and sport as much lower. It seems to be an important observation, taking into consideration the fact that the Internet is increasingly becoming a prevailing source of information about health and healthy lifestyle, in particular for young people. The ability to select and choose reliable and accurate health information by young people is not generally developed in the Polish education system, thus monitoring this type of messages on the Internet is so important, as is indicating the ways to sensitise young people to this risk. Interesting models of generally available educational programmes in English, e.g. [www.netsmartzkids.org](http://www.netsmartzkids.org) or [www.safekids.com](http://www.safekids.com), or in Polish [www.sieciaki.pl](http://www.sieciaki.pl), [www.helpline.org.pl](http://www.helpline.org.pl) and [www.safeinternet.org](http://www.safeinternet.org), which are co-financed with the European Union funds, can be used in this respect. At the moment this is a gap in the Polish education which is still waiting for interesting home solutions and proposals.

Initiatives and actions are undertaken worldwide and in Europe to oppose the appearance of unreliable and inaccurate health information on websites. They include the Health on the Net Foundation (HON Code), the Health Code of Ethics, EU Quality Criteria for Health-related Websites and others [27]. More and more publishers of health-related websites see the need for and benefits of certifying them as reliable and accurate. However, more social awareness is still needed both on the part of professionals and users.

## **Conclusions**

The students of the University School of Physical Education in Poznań, similarly to their peers in other countries, are spending more and more time at computers for communication purposes as well as browsing the Internet for information necessary to study or develop their hobbies and health. The quality of health-related websites rated by the students is above average; however, the quality of the websites related to sport and physical activity is moderate. In the students' opinion, the majority of the analysed websites did not improve the quality of the presented materials over the four years of functioning. The flaws in the analysed websites noted by the students concern references and supplementary sources.

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