Original article

Attitudes and Knowledge of Medical Students about Distance Learning

Aleksandra Stanković[1,2], Branislav Petrović[1,2], Zoran Milosević[1,2]

[1]*University of Niš, Faculty of Medicine, Niš, Serbia*
[2]*Public Health Institute Niš, Niš, Serbia*

SUMMARY

Distance learning can be defined as education or training offered to participants at a different place, physically distant from the lecturer or sources of information. The difference in attitudes and knowledge of students about distance learning in relation to gender and year of studying was examined. The study sample included 371 students of the Faculty of Medicine in Niš (165 students were at the first year of studies and 206 students were at the sixth year of studies). Originally structured epidemiological questionnaire was distributed to students. Gender and age had no significant influence on students' knowledge of distance learning. There was no statistically significant difference in taking positive attitudes about distance learning among medical students of the first and sixth year. Gender has statistically significantly affected the attitudes. E-learning does not eliminate the existing methods of learning, but it supplements them and greatly helps in teaching plans and programs.

Key words: **distance learning, attitude, students, knowledge, information technology**

Corresponding author:

Aleksandra Stanković

e-mail: higijena.medfak@yahoo.com

INTRODUCTION

Definition of distance education is not unique and it has been changing over time often depending on the development of technologies that have been realized.

Distance learning represents the performance of learning by electronic means, and it is based on the use of contemporary computer and communication technologies, with particular emphasis on interactivity and customizing the learning to the individual needs.

E-learning consists of various aspects of the use of Information and Communication Technology (ICT) in education, and depending on the intensity and method of use of ICT, we distinguish several forms of e-learning: face to face, ICT-supported teaching and learning, hybrid, mixed and fully online. E-learning is composed of the three basic elements: learning management system (LMS), content of e-learning and collaboration.

LMS is a set of standardized components for learning, which is designed to link learning with the existing information tecnmology (IT) within the institution, or by web portal for learning. The software which is the base of LMS manages all the elements of teaching and records all parameters required for the monitoring process. Based on these parameters, it is possible to monitor the progress of the individual at any time, and at the end of the education process the final achieved results are reliably measured and analyzed. Content is a key part of the learning process. Models of e-learning provide multimedia learning experience using image, sound and animation. Each module can be accessed as many times as necessary in order to get a satisfactory final result. Collaboration within the system is multidimensional, it is conducted between students and mentors, and among the students , directed towards the same goal of achieving success in e-learning using contemporary communication tools (e-mail, forum, chat, etc....). E-learning can be individual (with the help of educational software) or in groups, in the form of online classes, synchronized or asynchronized (1, 2).

Distance learning can be done through: learning courses (regular mail for sending scripts and other textual material) as well as the use of email, learning via radio or TV programs, teleconferences and videoconferences, use of computers specialized programs developed for distance learning and the Internet.

Tools which are used for e-learning are not substitute for traditional books and textbooks, but should be taken as a new way of organizing teaching and learning, quality supplement (innovation) for already existing (traditional) methods. They include programs and data which are used in the training organized on computer, educational software (computer software designed for education) and set of media, books, illustrations, tapes and computer programs necessary for giving instructional modules. The use of these tools provides consistency of data, the possibility of measuring the impact of participants reducing training costs, reducing learning time, and finally better memorizing the content. To allow the transfer from one courseware tool to another, some standards are required. Shareable Content Object Reference Model (SCORM) is the most important market standard at the moment. The majority of big commercial programs support this standard. One of the most widely-used tools in e-learning is Moodle (Modular Object-Oriented Dynamic Learning Environment) and it is free, flexible and fast system for managing open source e-learning (3, 4).

The aim of the study was to analyze attitudes and knowledge about distance learning of medical students, as well as to determine the influence of gender and age.

MATERIALS AND METHODS

The sample included 371 students of the Faculty of Medicine University of Nis (165 students at the first year of studies and 206 students at the sixth year of studies) in 2011.

Originally structured epidemiological questionnaire was distributed to students. The survey was anonymous and with voluntary consent to participate in this study.

For assessing the attitude about distance learning, the five-degree Lickert scale was used. The difference in attitudes of students on distance learning in relation to gender and year of study was examined.

To check the already set scientific hypotheses, statistical methods for quantitative analysis were used. The paper presents the following statistical parameters: arithmetic mean (Xsr), standard deviation (SD) and structure index (%). Statistical analysis was conducted using the computer program Microsoft Excel 2002 and SPSS 10.0. Depending on the type of

statistical characteristics, type of distribution, values and size of the examined groups, the following statistical tests were applied: Students t-test, Mann-Whitney U test, Pearson-s χ2–test, Mantel-Haenszel's modification of χ2–test and Fisher's test of exact probability of the null hypothesis.

The research was conducted at the Faculty of Medicine University of Nis and Public Health Institute Nis.

RESULTS

Out of the total of 371 tested students, 165 students (37.57% males and 62.43% females) were at the first year of studies and 206 students (42.23% males and 57.77% females) at the sixth year of studies. The average age of the students at the first year was 18.72±0.72 years, while the average age of the students at the sixth year was 24.31±0.78 years (p<0,001). At the first year of studies there were 61.21% of the students from Niš and at the sixth year

of the studies there were 55.34% of the students from Niš (Table 1).

Table 1. Demographic characteristics of participants

Demographic		I year	VI year
Gender	m	62	87
	f	103	119
Age (Xsr±SD)		18.72 ± 0.72	24.31 ± 0.78
Place of residence	Niš	101	114
	Out of Niš	64	92

More than 85% of all medical students know what distance learning is. There is no statistically significant difference between the students of the first and sixth year with regard to the knowledge of distance learning (χ2=0.03 i p>0.05). Also, there is no statistical significant distance with regard to gender (χ2=3.45 i p>0.05).
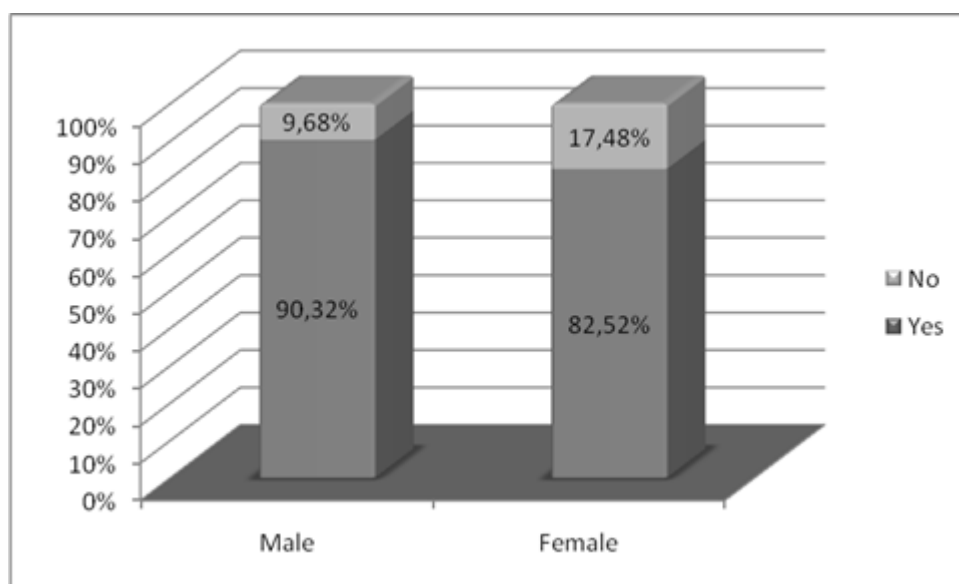
Figure 1. The structure of the number of subjects at the first year of medicine in relation to the knowledge of distance learning
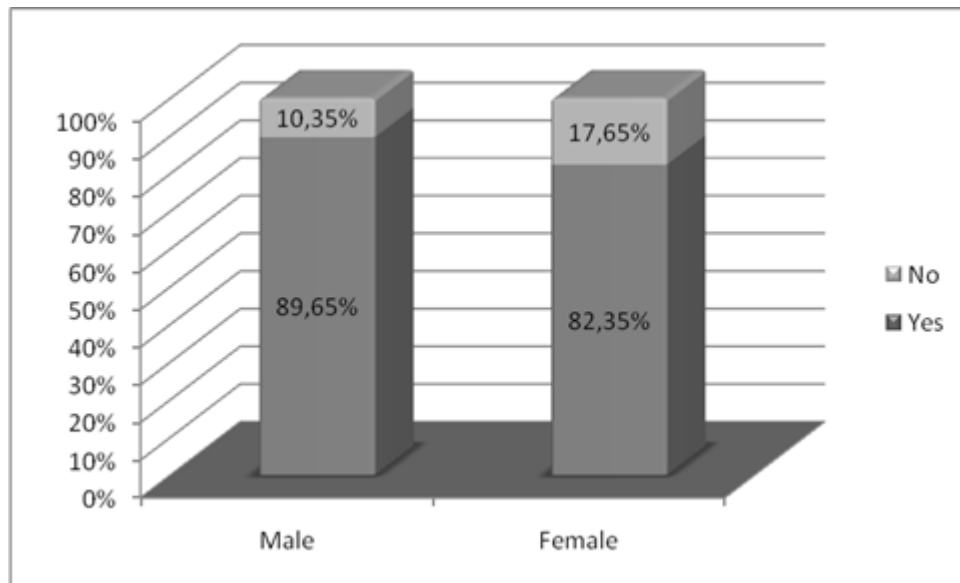
*Figure 2. The structure of the number of respondents
at the sixth year of medicine in relation to the knowledge of distance learning*

After scoring the students of the first year of medicine, the highest average score was found in the statement under d) (4.28±1.09), and the lowest in the statement under g) (2.59±0.45). Also, in the group of students of the sixth year of medicine, the highest average score was recorded in the statement under d) (4.21±1.11) and the lowest in the statement under g) (2.65±0.57). Statistically significant differences in the average scores of statements about distance learning among medical students of the first and sixth year were not found (Table 2).

Table 2. The influence of medical students' age on attitudes about distance learning

Statement	I year Xsr±SD	VI year Xsr±SD	t/Mann Whit. test	p
a) Distance learning provides more motivation for acquisition of knowledge	3.05 ± 0.65	2.94 ± 0.76	1.19	>0.05
b) There is no difference in the quality of acquiring knowledge by distance learning and traditional lectures	2.86 ± 0.77	2.83 ± 0.43	0.37	>0.05
c) Distance learning provides the possibility of independent evaluation	3.79 ± 0.98	3.76 ± 0.55	0.39	>0.05
d) Distance learning provides independence of time and place for instruction	4.28 ± 1.09	4.21 ± 1.11	0.80	>0.05
e) Distance learning requires possessing special skills to work on the computer	3.13 ± 1.65	3.11 ± 1.09	0.13	>0.05
f) Face to face contact is necessary for acquiring and mastering the material	3.58 ± 0.33	3.55 ± 0.44	0.34	>0.05
g) Distance learning provides faster and easier memorizing the material	2.59 ± 0.45	2.65 ± 0.57	1.29	>0.05
h) Distance learning provides faster exchange of information with colleagues	3.96 ± 1.34	3.92 ± 1.96	0.38	>0.05

The male students had statistically significantly higher average scores of statement under b), c), d), e) and f), and statistically significantly lower values in statements under g) and h) with regard to female students. Statical significance between the average scores of statements with regard to gender was not found only in the claim under a) (Table 3)

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Table 3. The influence of medical students' gender on attitudes about distance learning

Statement	Male Xsr±SD	Female Xsr±SD	t/Man-Whit. test	p
a) Distance learning provides more motivation for knowledge acquisition.	3.46 ± 0.11	3.46 ± 0.12	0.1	>0.05
b) There is no difference in the quality of acquiring knowledge by distance learning and classical lectures.	3.71 ± 0.08	3.39 ± 0.66	28.56	<0.001*
c) Distance learning offers the possibility of independent evaluation.	4.02 ± 0.76	3.39 ± 0.78	7.62	<0.001*
d) Distance learning provides independence of time and place for instruction.	3.75 ± 0.22	3.10 ± 0.74	9.90	<0.001*
e) Distance learning requires possessing special skills to work on the computer.	3.99 ± 0.17	3.72 ± 0.44	4.37	<0.001*
f) Face- to- face contact between students and teacher is necessary for acquiring and mastering.	3.93 ± 0.11	3.40 ± 0.29	14.39	<0.001*
g) Distance learning provides faster and easier way to memorize the material.	3.48 ± 0.75	3.73 ± 0.13	4.49	<0.001*
h) Distance learning enable faster exchange of information with colleagues.	4.05 ± 0.13	4.22 ± 0.86	12.34	<0.001*

DISCUSSION

Distance learning compared to the traditional way of teaching brings a lot of advantages and some disadvantages. One of the important advantages is an economic benefit considering the fact that distance learning provides simply 24-hour access to desired information. Also, distance learning provides students with the opportunity to study the subject independently of space and time, i.e. work becomes individual and contact via e-mail between students and teachers can be made. The critics of distance learning consider this an important flaw of tele-education. Namely, the question is, wheather the student is capable to maintain continuity of work without «face-to-face» contact with teacher (5).

Despite providing continuous learning and professional development, the advantage of distance learning is the reduction of spatial and temporal limitation.This provides an opportunity to study outside the place of residence, as well as the country's borders, and the student does not need to reside in an educational institution. Also, this kind of learning reduces the costs of transport and accommodation during the studies so that students can work while studying regardless of the location of the study, as well as to overcome the inability to visit the traditional teaching classes due to permanent or temporary physical problems, disability or illness. Students can organize time and place for learning by themselves. They complete their tasks with their own certain pace of learning. Besides determining their own pace, they are also able to choose a way of learning by determining the degree of interaction with the teacher and the rest of the class. That is the way how students and teachers can change their habits. In addition to getting information about what they are learning, students use different technologies and in that they gain additional knowledge and skills about their usage, as well as the ability to conduct practical testing of the acquired knowledge. Furthermore, they participate in the highest quality and the most prestigious programs for acquiring education (6).

Constant availability of learning materials is one of the advantages of distance learning which provides an opportunity for students to find and attend programs that are interesting for them. Of course, this concept of learning has its disadvantages. In most cases, that is the lack of social contacts among participants, and since some of them are not accustomed to such isolation, they give up. The disadvantages are also connected to technology. Not everyone can have a good computer and sufficient knowledge of how to use it. Malfunction and failures may affect frustrations. We should keep in mind that the Internet environment is not protected, and problems can be caused by viruses and hacker intrusions.

Great motivation of a student, who is sometimes in a position to independently assess his/her own needs for learning, is needed. There is a considerable teaching load in preparing the teaching material, because it is necessary to invest twice more time than for traditional learning.

The research has shown that more than 80% of medical students know what the distance learning is. In regard to knowledge of the concept of distance learning, gender and year of study did not have statistically significant influence. All examined attitudes about distance learning by medical students were evaluated with positive grades. There was no statistically significant difference between students of the first and sixth year of studies in regard to evaluating statement about distance learning. Students of both years have rated the statement that distance learning provides the possibility of independence of time and place for learning with the highest grade. The statement that distance learning provides easier and quicker remembering of material was evaluated with the lowest grade. In general, the attitudes of medical students were different in regard to gender. The following statements were evaluated with higher grades by male students in regard to female students. There is no difference in the quality of acquiring knowledge by distance learning and traditional lectures: distance learning provides a possibility of independent evaluation, as well as a possibility of independence of time and place of teaching; distance learning requires possession of specials skills to operate the computer, and face-to-face contact among professor and students. Evaluating of claims that distance learning provides easier and faster memorizing the material, and that distance learning provides faster exchange of information with

colleagues was statistically significantly lower when graded by the male students compared to female students. There was no significant difference in regard to gender only in evaluation of claim that distance learning provides more motivation for acquiring knowledge.

Liu and Huang (7) have shown that female students are significantly more prone to learning from books than using online sources in regard to males. In Price's research (8), the differences between the sexes were discussed, with regard to acquiring knowledge by distance learning. The results have shown that females were significantly more independent in acquiring knowledge by distance learning and learning by online courses, compared to males, with significant difference in the styles of communication with other people on computer network.

A study conducted in Denmark (9) has shown that male students were significantly more interested in replacing traditional with distance learning. The difference between mean and women in attitude towards using distance education is also very important: 38.7% of males compared to 19.9% of females have had a positive attitude about distance learning as well as significantly better knowledge of IT skills.

Attitudes of medical students about distance learning in most studies mainly point out its advantages in terms of independence of time and place for studying , as well as the determining their own pace of acquiring of knowledge and testing it.

The results of some research suggest that medical students have positive attitudes about distance learning and consider that it should completely replace the traditional way of learning, and become an important method in solving clinical skills (10).

Some studies have examined what the motivation of students to access distance learning is, and what are the factors that may affect the level of motivation. Absence of direct face-to-face contact among students-teacher is a key factor for acquiring and mastering new material, which certainly affects the motivation of the students.

Some studies emphasize the attitude of students that distance learning presents an ideal tool for stimulating active participation in teaching and learning (11,12).

By comparing the attitudes of medical students from the first and third year of studies about distance learning Musal et.al. (13) have concluded that the first

year students had significantly more positive attitudes about distance learning compared to the third year students. Difference in attitudes was interpreted due to the presence of "mental"fatigue, reduced motivation and slowness in accessing appropriate ways of acquiring knowledge using distance learning.

Keller and Cernerud (14) in their research on medical students from Jonkoping University in Sweden have shown that positivity of attitudes about distance learning depends on the level of computer literacy which students possess.

Also, there are studies which have not proven the influence of gender on the difference in attitudes about distance learning, as well as success of doing the final test using online courses. Continuous improvement of teachers in ICT technology and usage of contemporary technology in the teaching process in primary and secondary schools leads to the spread of knowledge resources outside the classroom, which encourages students' critical thinking and promotes a positive attitude towards the concept of life-long learning (15).

In our country, education is still connected to traditional teaching. The model of distance learning has insufficient implementation and it is considered only as an additional service for helping students. Unfortunately, the use of these solutions in conditions typical of our country is limited by a number of factors starting from the high price of software package, the necessity of high level of IT education, knowing English language by teachers and students, demand for having good information and communication infrastructure.

When choosing tools and e-learning software solutions in our country, we must take into consideration the following factors: the price of tools, a localized version in Serbian language, simplicity of posting educational materials on the Internet, a simple interface that will allow easy use of the system by participants, a software solution to be "open source" flexible solution, a proven software with quality lists modeled after reference organizations and universities.

CONCLUSION

The use of distance learning in medical schools in our country has not yet fully come to life because this kind of learning strategies is not yet fully developed. The tendency is that in the near future the conditions, in terms of technical equipment and training of teachers, are provided, which will be sufficient to meet the requirements for the implementation of various models of distance learning.

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Stavovi i znanje studenata medicine o učenju na daljinu

Aleksandra Stanković[1,2], Branislav Petrović[1,2], Zoran Milosević[1,2]

[1]Medicinski fakultet Univerziteta u Nišu, Niš, Srbija
[2]Institut za javno zdravlje Niš, Niš, Srbija

SAŽETAK

Učenje na daljinu se može definisati kao obrazovanje ili obuka koja se nudi polaznicima na različitom mestu odnosno fizički udaljenim od predavača ili izvora informacija. Cilj rada je bio analiza stavova i znanja o učenju na daljinu studenata medicine, kao i utvrđivanje uticaja pola i starosnog doba na zauzimanje određenog stava i znanja. Uzorak istraživanja je obuhvatio 371 studenata Medicinskog fakulteta u Nišu (165 studenata na prvoj godini studija i 206 studenata na sestoj godini studija). Studentima je podeljen originalni epidemioloski upitnik. Starosna dob i polna pripadnost nisu imale statisticki znacajan uticaj na znanja o ucenju na daljinu. Nije nađena statistička značajnost razlika u zauzimanju pozitivnih stavova o učenju na daljinu među studenatima medicine prve i seste godine studija. Polna pripadnost je statisticki znacajno uticala na zauzimanje određenog stava. E-učenje ne eliminiše postojeće metode učenja, već ih samo upotpunjuje i u mnogome pomaže u savlađivanju nastavnih planova i progarama.

Ključne reči: **učenje na daljinu, studenti, stav, znanje, informacione tehnologije**