

Comparative analysis of e-learning and traditional teaching methods in the fields of nursing and physiotherapy in the Medical University of Bialystok

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ABSTRACT

Purpose: The aim of the study was to compare e-learning and traditional methods of teaching of two subjects maintained at the Faculty of Health Sciences in the Medical University of Bialystok.

Material and methods: The study included 142 students of third year undergraduate studies. 83 were studying subject "Obstetrics, gynecology and obstetrics-gynecology nursing" and 59 students - "Therapeutic massage" in the field of physiotherapy. The research group (43 and 16 persons respectively) held talks in a way of e-learning. An implementation of the LMS/LCMS (Moodle) system was used to teach the classes. In the control group (40 and 43 persons respectively) lectures were held in a traditional way. Final examinations were conducted simultaneously in each group in a manner of single-choice test for both e-learning and traditional method of teaching.

Results: Almost similar results with a slight predominance of the final average score in the distant learning system were obtained in both groups of students. In the field of nursing average score of students participating in on-line learning was – 3.49, while in the traditional system of education – 3.26. In the field of physiotherapy an average score of students participating in on-line learning was – 4.38, while in the traditional system of education – 4.32.

Conclusion: Our results show that e-learning method is at least not lesser than traditional method of teaching subjects in the field of nursing and physiotherapy.

Key words: e-learning, methods, teaching, students

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INTRODUCTION

In recent time, when a rapid development of computerization of society is observed, more and more people search for new methods of communication via the Internet. The development of this sphere of action changes the ways of transferring knowledge [6,11,12,14]. The search for new approaches to learning and teaching caused that remote methods of education (called distance learning) are increasingly used at the academic level. This kind of teaching is independent of space and time and has the attitude of keeping a constant access to activities. However distance learning (e-learning) is not intended to replace traditional forms of teaching, but is a good form to complete and extend the knowledge carried in the conventional way [1,2,9,14]. Continuous development of multimedia techniques, data exchange systems, intelligent teachers, many free e-learning platforms, makes that distant education and on-line method is seen as important factors to increase the interest of the students in this form of education. Those are also real benefits in terms of financial and organizational practice.

The most popular form of e-learning course is a complementary method (b-learning) and self-study [1-4,9,10]. In the field of on-line training (courses) two models can be used: corporate and university [5]. The characteristic of the academic (university) model follows the training course in accordance with the timetable of the academic year: classes are held in predetermined groups of students. There is the interaction between teacher and students and between students themselves. Final evaluation and exams are provided in the accordance with the principles laid down in the specific institution. All these aspects are fully reflected in the problems of evaluating the effectiveness of training.

The aim of the study was to compare e-learning and traditional methods of teaching 2 independent subjects taught at the Faculty of Health Sciences at the Medical University of Bialystok, Poland. Those were "Obstetrics, gynecology and obstetrics-gynecology nursing" at the field of nursing and "Therapeutic massage" at the field of physiotherapy. There were analyzed the effectiveness of learning, students' level of satisfaction with the activities carried out and the rate of student interest in distant education.

MATERIALS AND METHODS

The study was conducted with the approval of the Bioethics Committee of the Medical University of Bialystok (R-I-002/338/2009). The study group included 142 students of third year

undergraduate studies. 83 were studying subject "Obstetrics, gynecology and obstetrics-gynecology nursing" and 59 students - "Therapeutic massage" in the field of physiotherapy. Students of each field were divided into two groups. The research group (43 and 16 persons respectively) held talks in a way of e-learning. An implementation of the LMS/LCMS (Moodle) system was used to teach the classes [1,7,9]. In the control group (40 and 43 persons respectively) lectures were held in a traditional way. After the series of lectures was finished an evaluation survey was carried out simultaneously in both groups in each field. The questionnaire consisted of three parts: demographic data, reviews the activities carried out and the reviews of the effectiveness of training. Students' opinions of the effectiveness of activities and elements of education were investigated.

Final examination of the each subject was in the form of single-choice test, which was conducted simultaneously in both groups. The results in both groups were compared (i.e. the level of knowledge) and the degree of satisfaction with the process of teaching, availability of material and others) [9,13]. Statistical analysis was performed using SPSS 14.0 PL. Significant probability values were set at $p < 0.05$.

RESULTS

In both groups rated the vast majority of students were women, i.e. 54 (90%) in the e-learning teaching method and 66 (80%) in the traditional method. In both groups dominated people from cities with more than 80 thousand inhabitants. Students attending classes in the traditional group in the field of nursing and coming from rural areas were 14 (35%), while in physical therapy - 6 (14%). All persons from the field of nursing from an e-learning group had continuous access to the Internet, and among the "traditional group" of 40 people only 5 people (12%) did not have permanent access to the Internet. In the field of physiotherapy all persons from e-learning group have access to the Internet. Only 4 persons (9%) from traditional group did not have access to Internet. Daily use of the Internet declared 31 (78%) of students of nursing and 29 (67%) of students of physiotherapy. Most people in both groups used the Internet to browse Web pages. Respondents have ranked their ability to use computers and the Internet as well and very well (Tab. 1).

In the next parts of the questionnaire, students expressed their opinions about the activities carried out. All students in e-learning group in field of nursery declared their wish to participate in this method of teaching. Only 18

(45%) students of the traditional method of teaching in this field declared their interest in e-learning (Tab. 2). Results obtained in the field of physiotherapy were near same – 16 (100%) and 26 (60%) persons respectively.

Good preparation of the content of teaching was judged good and very well by 42 (98%) of students in the group of e-learning and by 38 students (95%) in the traditional group in the field of nursing (Tab. 3).

Table 1. Characteristics of socio-demographic groups of students surveyed.

	e-learning method (n = 59)				traditional method (n = 83)			
Field	Physiotherapy		Nursing		Physiotherapy		Nursing	
	Number of persons	(%)	Number of persons	(%)	Number of persons	(%)	Number of persons	(%)
Gender								
woman	14	88%	40	93%	28	65%	38	95%
men	2	13%	3	7%	15	35%	2	5%
Domicile								
city > 80 thous. inh.	10	63%	25	58%	27	63%	18	45%
city < 80 thous. inh	4	25%	13	30%	10	23%	8	20%
village	2	12%	5	12%	6	14%	14	35%
Permanent access to the Internet								
yes	16	100%	43	100%	39	91%	35	88%
no	0	0%	0	0%	4	9%	5	12%
How often do you use the Internet?								
daily	13	81%	35	81%	29	67%	31	78%
almost daily	2	13%	5	12%	6	14%	4	10%
regularly 2-3 times a week	1	6%	3	7%	4	9%	0	0%
once a week	0	0%	0	0%	2	5%	0	0%
several times a month	0	0%	0	0%	2	5%	3	7%
occasionally	0	0%	0	0%	0	0%	2	5%
do not use	0	0%	0	0%	0	0%	0	0%
For what purpose you use the Internet?								
web browsing	16	100%	38	88%	35	81%	33	83%
e-mail	15	94%	33	77%	27	63%	28	70%
downloading files from the Web	9	56%	20	47%	10	23%	9	23%
e-learning	10	63%	17	40%	0	0%	0	0%
shopping on-line	8	50%	9	21%	9	21%	9	23%
banking on-line	6	38%	19	44%	8	19%	9	23%
How do you rate your ability to use computer and Internet?								
poorly	0	0%	0	0%	3	7%	1	2%
fair	1	6%	1	2%	5	12%	1	2%
fairy well	4	25%	6	14%	7	16%	5	13%
well	8	50%	18	42%	19	44%	20	50%
very well	3	19%	18	42%	9	21%	13	32%

Table 2. Is if it were possible (hypothetical) use of the classes conducted distantly (online) during the entire study would you join this form of education?

field	e-learning method (n = 59)				traditional method (n = 83)			
	Physiotherapy		Nursing		Physiotherapy		Nursing	
	Number of persons	(%)	Number of persons	(%)	Number of persons	(%)	Number of persons	(%)
definitely not	0	0%	0	0 %	3	7%	1	2 %
probably not	0	0%	0	0 %	6	14%	7	18 %
I do not know (I have no opinion)	0	0%	0	0 %	8	18%	14	35 %
rather	7	44%	17	40 %	20	47%	16	40 %
definitely yes	9	56%	26	60 %	6	14%	2	5 %

Table 3. Students' opinions about the quality of teaching.

field	e-learning method (n = 59)				traditional method (n = 83)			
	Physiotherapy		Nursing		Physiotherapy		Nursing	
	Number of persons	(%)	Number of persons	(%)	Number of person	(%)	Number of persons	(%)
Was the knowledge transferred in a meaningful and communicative way (for both forms of learning)?								
definitely not	0	0%	0	0 %	0	0%	0	0 %
probably not	0	0%	0	0 %	0	0%	0	0 %
I do not know (I have no opinion)	1	6%	2	5%	3	7%	1	2 %
rather	9	56%	20	47%	27	63%	22	55 %
definitely yes	6	38%	21	49%	13	30	17	43 %
Were the requirements and rules for receiving credit clearly defined?								
definitely not	0	0%	0	0 %	0	0%	0	0 %
probably not	0	0%	2	5 %	0	0%	1	2 %
I do not know (I have no opinion)	1	6%	1	2%	4	9%	1	2 %
rather	6	38%	17	40%	33	77%	17	43%
definitely yes	9	56%	23	54%	6	14%	21	53%
Was the content of classes well prepared, accessible and useful?								
definitely not	0	0%	0	0 %	0	0%	0	0 %
probably not	0	0%	1	2 %	4	9%	1	2%
I do not know(I have no opinion)	0	0%	0	0 %	7	16%	1	2%
rather	10	62%	23	54%	18	42%	20	50 %
definitely yes	6	38%	19	44 %	14	33%	18	45 %
Did implemented program enrich your knowledge and skills?								
definitely not	0	0%	0	0 %	0	0%	0	0 %
probably not	0	0%	0	0 %	2	5%	1	2 %
I do not know (I have no opinion)	2	13%	1	2 %	6	14%	2	5 %
rather	9	56%	23	54%	22	51%	17	43%
definitely yes	5	31%	19	44%	13	30%	20	50 %

In the field of physiotherapy these values were 16 (100%) and 32 (74%) respectively. Similarly, the possibility of using online methods to increase the effectiveness of education was highly rated by 39 persons (91%) from nursery and 14 persons (88%) physiotherapy (Tab.4). No significant differences between both groups in the

opinion on the effectiveness of training. 39 people (91%) in e-learning group in the field of nursery positively evaluated education as improving knowledge and skills, while 15 persons (94%) judged similarly in the field of physiotherapy were found.

Table 4. Students' opinions about the usefulness of e-learning courses.

field	e-learning method (n = 59)	
	Physiotherapy (n=16)	Nursing (n=43)
Did you like e-learning classes?		
definitely not	0 (0%)	0 (0%)
probably not	0 (0%)	0 (0%)
I do not know (I have no opinion)	1 (6%)	2 (5%)
rather	3 (19%)	18 (42%)
definitely yes	12 (75%)	23 (54%)
Do you plan to participate in e-learning classes in future?		
definitely not	0 (0%)	0 (0%)
probably not	0 (0%)	0 (0%)
I do not know (I have no opinion)	3 (19%)	8 (19%)
rather	5 (31%)	13 (30%)
definitely yes	8 (50%)	22 (51%)
Is e-learning a good way to widen students' knowledge and skills?		
definitely not	0 (0%)	0 (0%)
probably not	0 (0%)	0 (0%)
I do not know (I have no opinion)	1 (6%)	4 (9%)
rather	6 (38%)	21 (49%)
definitely yes	9 (56%)	18 (42%)
Is this a good way to increase the attractiveness of studying?		
definitely not	0 (0%)	0 (0%)
probably not	0 (0%)	0 (0%)
I do not know (I have no opinion)	1 (6%)	0 (0%)
rather	5 (31%)	13 (30%)
definitely yes	10 (63%)	30 (70%)
Is this a good method to increase the effectiveness of education?		
definitely not	0 (0%)	0 (0%)
probably not	0 (0%)	1 (2%)
I do not know (I have no opinion)	2 (12%)	3 (7%)
rather	8 (50%)	22 (51%)
definitely yes	6 (38%)	17 (40%)
Does your attitude on how to learn changed in any way?		
definitely not	0 (0%)	0 (0%)
probably not	2 (12%)	15 (35%)
I do not know (I have no opinion)	1 (6%)	18 (41%)
rather	6 (38%)	8 (19%)
definitely yes	7 (44%)	2 (5%)

Average final score of exam in the subject "Obstetrics, gynecology and obstetrics-gynecology nursing" among 83 students surveyed was 3.38. An average score of 43 people participating in online method of was 3.49 compared to 3.36 among 40 people participating in traditional method. The difference between the averages was statistically significant ($p < 0.05$). The highest score of the test (4.5) has received the person who took part in distant learning system. The highest rating received by the person attending classes in the traditional system was 4.0. Number of people who have to take re-exam of the subject in the e-learning method was 2 (5%) and was three times lower than in traditional teaching – 6 (15%). The average score of that exam was 4.0 in e-learning group and 3.75 in the traditional group.

Average final score of exam in the subject "Therapeutic massage" among 59 students surveyed was 4.34. An average score of 16 people participating in online method of was 4.38 compared to 4.32 among 44 people participating in traditional method. An average score of 43 people participating in online method of was 3.49 compared to 3.36 among 40 people participating in traditional method. The difference between the averages was statistically significant ($p < 0.05$). There were no persons in this group who have to pass again final exam.

DISCUSSION

Conventional methods of teaching, basing on the "teacher-student" model, have well established position. For many centuries they were the only methods of acquiring knowledge and caused the existence of schools in the civilized world. The development of electronic methods of communication led to the development of distant teaching methods, in which there is no need for personal contact between student and teacher. This trend will undoubtedly be deepened, although not entirely predictable is the effect of such training [3,8,9].

Our study is related to the effectiveness of teaching of selected subjects among third year undergraduate students in Faculty of Health Sciences Medical University of Bialystok. Didactic material prepared in the e-learning form of has been offered to students. Almost 99% of students studying on-line method valued the quality of learning content, it's preparation, availability and suitability assessed as well and very-well. The same percentage of opinions (related to method used) was expressed by 85% of students participating in the traditional method of teaching. Students participating in lectures on-line assumed in almost 84% that they would participate in future in such

form training. They expressed that this is a good way to extend the knowledge and skills (87%), increase the effectiveness of education (83%), and that it is a very good way to extend the attractiveness of studying (100%). Above mentioned judgment express a high level of training. In our opinion, the popularity of e-learning classes results from interactive access to knowledge contained in the on-line course (lesson, quiz, task), or simply from page resources. The student can repeatedly refer to the previously analyzed issue, can better learn and acquire knowledge on the topic, and can check his/her knowledge in a given area also [1,6,9,13].

An important issue is a change in the role of university teacher resulting from the on-line education system. Using previously prepared tests he can conveniently check the students' knowledge and the results the student can see immediately [6]. That elevates the effectiveness of learning. The costs of preparing and implementing activities in e-learning formula are significant only at the beginning of the development of teaching materials, but still smaller than the traditional method. Our study covered a fairly large group of students (i.e. 142 people). It provided good results, confirming the hypothesis that the use of e-learning teaching methods gives the level of professional knowledge, student satisfaction with learning, the efficiency of teaching students comparable to traditional teaching. On this basis, it can be concluded that the potential of e-learning tools widen and diversify the education model of full-time programs. There is a rationale to pursue the study on medical lectures and seminars in the form of a distant learning, but professional exercises should remain in the form of traditional practice.

Similar research on attitudes and expectations of students in the teaching of traditional and e-learning model was conducted among students of Poznan University of Economics and Nicolaus Copernicus University in Torun. They concerned the effectiveness of education in economics and pedagogy. The results of these studies confirmed the high scores of e-learning methods used in the teaching process and effectiveness of this method of teaching [8,13,14]. Generally e-learning technologies offer learners control over content, learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives.

Wide use of e-learning in the education and training of health professionals is observed since 2002 year, but there are only few reports about using e-learning techniques in delivering education to undergraduates in medicine [15-18]. Our results show that the development of e-

learning can be a very good form of teaching which rather widens traditional education than replace it completely. It provides means of communication for trainers and trainees, authoring tools, interactive components, course management and role-based sharing concept. Further research in this area and discussing the problem of e-learning in higher education institutions, especially about the extension of distant learning for a wider range of students studying in medical fields are mandatory.

CONCLUSIONS

1. The results show that e-learning method is at least not lesser than traditional method of teaching subjects in the field of nursing and physiotherapy.
2. The method is judged by students as easier in the assimilation of knowledge due to the continuous access to teaching materials in on-line mode.
3. The mechanisms built in e-learning platform increase students' dedication to regular and independent learning. That gives slightly better final results compared to the traditional method.
4. Reliably developed didactic material is available permanently on the e-learning platform which gives opportunities for better preparing for the final exam, and also the establishment and acquisition of knowledge in the respective field.

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