

The results of teaching of subject “Obstetrics, gynecology and gynecological and obstetric nursing” with the use of e-learning platform at the Faculty of Health Sciences, Medical University of Białystok in 2009–2012

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Abstract. The aim of the study was to compare the method of distance education (b-learning) with the traditional method of teaching of the subject “Obstetrics, gynecology and gynecological and obstetric nursing” held at the Medical University of Białystok. The study was conducted among 220 third-year students of bachelor level in three academic years 2009–2012. The research group (115 people) participated in e-learning course, while other 105 students participated in a traditional manner. For distance education an LMS/LCMS-Moodle class system was implemented. The effectiveness of both forms of training was compared (including assessment of control tests, assessment of practical exercises and the final exams results). After completing a series of lectures anonymous survey was carried out in both groups. The questionnaire included questions about the organization of classes, learning effectiveness, student satisfaction with the activities carried out and the interest of students in distance learning. Mean ratings of practical classes held after the series of lectures were almost the same in both groups (4.59 in the e-learning group and 4.56 in traditional group). The average final exam grades were 3.55 ± 0.50 in the group of distance learning and 3.49 ± 0.54 in the conventional group. 93% students of the e-learning group and 83% students of conventional group positively rated the organization of classes. A high percentage (98%) of positive feedback about the classes conducted distantly and in traditional manner (86%) suggests a high level of technical content and preparation of both of these forms of activity. Based on the survey it can be concluded that both forms of education are equally effective.

Introduction

In the contemporary information society the frequency and variety of Internet activity creates new forms of contacts between the teacher and the student. The traditional methods of teaching are in many cases replaced or supplemented by distant methods. They are increasingly used in education

at different educational levels. Distant learning is gaining more recognition in this process and thus is more and more immersed in our lives. At present, students are accustomed to unlimited access to the information on the Internet. Teachers are also looking for new forms of knowledge transfer and new forms of evaluation. The contents of the lectures are enriched by teachers with elements such as interactive multimedia presentations, audio-video clips and computer animation [1–3, 7, 16].

Educational courses related to the medical disciplines, such as nursing, require students to master large amount of medical knowledge. The acquisition becomes much more effective if the knowledge is transmitted by means of modern forms and media in a wide spectrum of time. The traditional form of teaching does not fulfill such conditions as it is usually limited to specified time unit held in the classroom. On the contrary, e-learning platform usually does not put the time and space constraints in the delivery and the use of the knowledge content [8, 12, 14].

However, despite facilities posed by distance learning (opportunity to learn at any place and any time), it will never “crowd out” traditional teaching. Personal contacts between the teacher and the student are, in fact, priceless. A proposal for a combination of both forms of learning is mixed learning (*blended-learning, b-learning*), which offers great opportunities for both students and teachers [3, 7–8, 17]. This method produces good results for those who encounter difficulties with understanding of the learning material. With mixed-mode learning, the student has the opportunity to repeat and consolidate multiple individual issues that are implementing in the e-learning platform [11, 17]. One of the advantages of this method of teaching is also relatively “mild” timing schedule – studying of the individual modules can be done at a convenient time for the student.

Aim of the study

The aim of this study was to evaluate the effectiveness of teaching the subject “Obstetrics, gynecology and gynecological and obstetric nursing” to students of the Medical University of Białystok. The research was approved by the Bioethics Committee of the Medical University of Białystok (Resolution No. R-I-002/338/2009). The subject was conducted as an experiment during the period of academic years 2009–2012 in the system of complementary learning (blended learning). The lectures were conducted in two manners: as distant (on-line) learning and in a traditional way (*ex cathedra*). Other forms of education, eg. seminars, practical exercises and self-study,

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were carried out using the traditional method only. The choice of form of lectures (e-learning or traditional) was left to the students (the primary condition was access to the Internet). Students, who had chosen e-learning methods, were given free access to the educational platform on which the lectures were placed. These lectures were prepared in the form of interactive presentations embedded in the Moodle system. It was usually the “lesson” supported by video showing the elements of practical activities in the area of the thematic issue. The sequence of topics and period of their availability were set by the academic teacher responsible for the conducted subject. Within the period set, students had continuous and unlimited access to learning materials. Each individual lecture was accompanied by a set of tests which helped the acquisition of knowledge. While solving tests students had no access to the learning materials placed on the virtual platform. Immediately after completing the tests students received the results, which served for better understanding of the content of the lectures.

Final examinations were held in the “traditional form” according to the principles set out in Regulations of Full-time Study at the Medical University of Bialystok [13].

Material and methods

The study was conducted among 220 third-year students of bachelor level in three academic years 2009–2012. The number of participating students in the consecutive years is shown in [Tab. 1].

Tab. 1. Number of students participating in the learning of the subject “Obstetrics, gynecology and gynecological and obstetric nursing” in the years 2009–2012

Academic year	No. of students	E-learning method		Traditional method	
2009–2010	83	43	52%	40	48%
2010–2011	48	25	52%	23	48%
2011–2012	89	47	53%	42	47%
Total	220	115	52%	105	48%

own source

In the study group of 115 people (52%) lectures were held in the form of e-learning. Specially implemented system LMS/LCMS-Moodle class was used [8, 15] [Fig. 1]. In the control group of 105 students (48%) lectures were held in the traditional manner.



Fig. 1. The launch window of e-learning platform Moodle (<http://elearning-umb.pl>)

own source

In the e-learning group students tested their knowledge by solving tests of multiple choice addressing the range of the materials contained in the e-learning platform. The results were recorded in the log and included in the rating system. Students were able to check the results of their educational activities. In the control group (traditional learning) tests were conducted at the end of the lecture series. The results of tests in both groups were expressed as percent. After completing lectures (in chosen form) all of the students had practical exercises. The results were scored in points with maximum value of 12. For all the students of the entire year final examination was held at the same time in the form of a traditional multiple choice test. The results of the examination were expressed in grades from 2 to 5 with 0.5 increment (where 5 means very good).

After completing the full series of lectures the survey of own authorship was conducted in both groups. The questionnaire contained three parts: sociodemographic data, opinions about the activities conducted and opinions about the effectiveness of education, level of student satisfaction with the activities carried out, the interest of students using distance learning and the organization of classes in both forms of education.

Results

The study was conducted on a relatively equinumerous groups of students: e-learning was attended by 115 students (52%), while the traditional

Tab. 2. Ways of using of internet in groups of students in the years 2009–2012 (n = 220)

	E-learning method (n = 115)		Traditional method (n = 105)	
	No. of persons	%	No. of persons	%
Domicile				
city above 80 th. inh.	53	46%	44	42%
city under 80 th. inh.	28	24%	21	20%
rural area	34	30%	40	38%
Permanent access to Internet				
yes	110	96%	92	88%
no	5	4%	13	12%
How often (regularly) do you use the Internet?				
everyday	90	78%	74	70%
almost everyday	17	15%	18	17%
regularly, 2–3 times a week	8	7%	4	4%
once a week	0	0%	2	2%
once a month	0	0%	0	0%
several times a month	0	0%	5	5%
occasionally	0	0%	2	2%
do not use	0	0%	0	0%
For what purposes you primarily use the Internet?				
web browsing	102	89%	89	85%
e-mailing	93	81%	78	74%
downloading files	57	50%	26	25%
chat, SMS sending	42	37%	28	27%
e-learning	52	45%	1	1%
on-line shopping	29	25%	20	19%
e-banking	41	36%	26	25%

own source

method by 105 students (48%). Both groups were dominated by students from cities of more than 80 thousand inhabitants – 53 (46%) and 44 (42%) respectively. Permanent access to the Internet had 110 students (96%) in e-learning group and 92 people (88%) in traditional group. Daily use of the Internet declared more than 70% of students in both groups, while occasional use declared only two students (2%) in the traditional group [Tab. 2]. The main activity of the students on the web was to browse web-

sites: 102 students (89%) in the e-learning group and 89 students (85%) in traditional group, and received e-mails: 93 (81%) and 78 (74%) students respectively. Students devote the least amount of time for shopping on-line: 29 persons (25%) in the study group and 20 (19%) in the control group.

In order to compare the effectiveness of teaching the average results obtained by students from both groups after a series of lectures, after completion of practical training and the final examination of the evaluated subject were compared. Students the of e-learning method scored higher in testes evaluating knowledge contained in lectures. The average score was 92% as compared to 77% in the traditional method of teaching [Tab. 3]. One of the reasons could be the fact that the materials of the lectures was available in e-learning platform for a longer period of time (2–3 days) and could be accessed several times. Traditional group had solely own notes made in the course of a lecture held in the auditorium.

Tab. 3. Results of tests lectures of the subject “Obstetrics, gynecology and gynecological and obstetric nursing” in the academic years 2009–2012

Academic year	E-learning method		Traditional method	
	No. of persons	Score in percent	No. of persons	Score in percent
2009–2010	43	91%	40	85%
2010–2011	25	94%	23	87%
2011–2012	47	91%	42	60%
Mean		92%		77%

own source

The next issue was to check how the material acquired by students during the course of lectures in both forms (e-learning and traditional) was transferred into the knowledge used in practice. Credits (points) earned by students during the practical classes conducted in clinical environment (at bed-side) were compared. Observations made during the three years show that the average assessment of practical skills in e-learning group was 4.59 and in traditional group was 4.56 (max. 5.0) This seems to speak in favor of e-learning methods [Tab. 4]. Still, it must be emphatically stated that both forms of learning rate good.

Average rating of final examination for three consecutive years of teaching was 3.55 ± 0.50 in the group with the method off distance learning, and 3.49 ± 0.54 in the group with the traditional method of teaching [Tab. 5].

Tab. 4. Results of practical training of the subject “Obstetrics, gynecology and gynecological and obstetric nursing” in the academic years 2009–2012 (n = 220)

Academic year	E-learning method		Traditional method	
	score (max. 5.0)	points (max. 12.0)	score (max. 5.0)	points (max. 12.0)
2009–2010	4.61 ± 0.45	10.65 ± 1.4	4.65 ± 0.33	10.75 ± 1.1
2010–2011	4.54 ± 0.42	10.44 ± 1.3	4.63 ± 0.45	10.78 ± 1.4
2011–2012	4.60 ± 0.60	10.35 ± 1.5	4.45 ± 0.64	9.71 ± 1.8
Mean ± SD	4.59 ± 0.51	10.49 ± 1.4	4.56 ± 0.51	10.36 ± 1.5

own source

Tab. 5. The results of the final examination of the subject, “Obstetrics, gynecology and gynecological and obstetric nursing” in the academic years 2009–2012 (n = 220)

Academic year	E-learning method		Traditional method	
	No. of persons	Score in degrees (max. 5.0)	No. of persons	Score in degrees (max. 5.0)
2009–2010	43	3.49 ± 0.59	40	3.26 ± 0.66
2010–2011	25	3.74 ± 0.39	23	3.72 ± 0.39
2011–2012	47	3.43 ± 0.51	42	3.49 ± 0.57
Mean ± SD		3.55 ± 0.50		3.49 ± 0.54

own source

In the end-of-class survey students answered the questions which concerned, inter alia:

- review of the organization of classes carried out distantly and traditionally [Tab. 6], the availability and suitability of these classes [Tab. 7] and the possibility of acquiring new knowledge [Tab. 8],
- interest in participating in the method of classes conducted distantly during the study [Tab. 9], and hypothetically, upon completion [Tab. 10].

Organization of classes was positively rated by 106 respondents (93%) in the e-learning group and 86 students (83%) in the traditional group. In both groups 4 students (4%) negatively referred to the organization of both forms of classes [Tab. 6]. Strongly negative opinion about the classes in the group of traditional teaching expressed one person only.

Tab. 6. The reviews on the organization of distant and traditional classes in 2009–2012 (n = 220)

“Do classes were organized well?”				
	e-learning group (n = 115)		traditional group (n = 105)	
definitely no	0	0%	1	1%
probably not	4	4%	4	4%
I do not know (have no opinion)	5	4%	13	12%
rather	72	63%	58	55%
definitely yes	34	30%	29	28%
Total	115	100%	105	100%

own source

The question “Was the content of teaching the classes were well prepared, available and useful?” positively commented 103 respondents (98%) of the e-learning form and 88 students (83%) of the traditional way of teaching [Tab. 7]. Opposite view had one students in the e-learning group and 8 students (8%) of the traditional group.

Tab. 7. The reviews on usefulness of classes in 2009–2012 (n = 220)

“Was the content of teaching the classes were well prepared?”				
	e-learning group (n = 115)		traditional group (n = 105)	
definitely no	0	0%	0	0%
probably not	1	1%	8	8%
I do not know (have no opinion)	1	1%	9	9%
rather	70	61%	55	52%
definitely yes	43	37%	33	31%
Total	115	100%	105	100%

own source

The respondents were also asked the following question: “Does realization of the lessons enriched your knowledge and skills?”. 111 respondents (97%) of the e-learning and 92 traditional group (88%) gave a positive answer. Answers “definitely no” was given by one student of the an e-learning group and 5 patients (5%) of the traditional [Tab. 8].

Tab. 8. Reviews on the degree of acquisition of knowledge and skills in the prepared course in 2009–2012 (n = 220)

“Does realization of the lessons enriched your knowledge and skills?”				
	e-learning group (n = 115)		traditional group (n = 105)	
Definitely no	0	0%	0	0%
Probably not	1	1%	5	5%
I do not know (have no opinion)	3	3%	8	8%
Rather	59	51%	56	53%
Definitely yes	52	45%	36	34%
Total	115	100%	105	100%

own source

During the 3-year follow-up e-learning training method was accepted by 111 students (96%) of the e-learning and 43 of the traditional group (43%). Opposite view presented 3 students (3%) of the e-learning group. As many as 27 students (26%) of the traditional methods did not accept e-learning, including one student who strongly opposed it. Summary of the results is presented in [Tab. 9].

Tab. 9. Reviews of willingness to use the on-line courses during the study in 2009–2012 (n = 220)

If there was a possibility of using on-line classes during studies, would you use this form of education?				
	e-learning group (n = 115)		traditional group (n = 105)	
definitely no	0	0%	1	1%
probably not	3	3%	26	25%
I do not know (have no opinion)	1	1%	35	33%
rather	45	39%	37	35%
definitely yes	66	57%	6	6%
Total	115	100%	105	100%

own source

The vast majority, e.g. 99 respondents (86%) in the e-learning positively responded to the possibility of extending education distantly (on-line) after completion of studies. 64 students (61%) participating in the traditional form of education have expressed their interest in this form of education

in the future. Almost 1/3 of the students in this group (29%) had no opinion [Tab. 10].

Tab. 10. Reviews on the possibility of using on-line courses after graduation (at work)

If there was a possibility of using on-line classes after studies (eg. at work), would you use this form of education?				
	e-learning group (n = 115)		traditional group (n = 105)	
definitely no	0	0%	1	1%
probably not	1	1%	10	10%
I do not know (have no opinion)	15	13%	30	29%
rather	55	48%	52	50%
definitely yes	44	38%	12	11%
Total	115	100%	105	100%

own source

Discussion

Distance learning in higher education is a more and more challenging problem. It should be widely discussed especially in a view of possible extension of e-learning opportunities for a wider range of students studying different fields of medicine. Such studies are of particular intensity and different types of classes (lectures, seminars, exercises, practical work, professional practice). Increased popularity of the e-learning form in the field of medicine may result from interactive access to the knowledge contained in a course on-line. Various forms of activity (interactive lessons, quiz, chat, forums, etc.) are different from classical ones. This helps the acquisition of knowledge because students can repeatedly track previous issues and problems, which helps in better understanding their different aspects. Students are also able to instantly check their knowledge in a given area [6, 12, 14].

Recently, Kalinowska-Przybyłko *et al.* reported the results of research on online education conducted among the students of the Medical University of Warsaw, Faculty of Health Sciences, majoring in Obstetrics [9]. The results confirmed high scores of on-line classes used in the teaching process. Students participating in the remote learning viewed this form of teaching as very interesting. The authors concluded that the effectiveness of teaching

on-line had a significant impact on the use of various forms of multimedia technology, as well as the length of the seminar. They also noted that e-learning is equally or more effective than traditional teaching.

The results of this study support our views resulting from our previous studies [12–14]. The development of distant education can be a very good form of supplement to traditional education. In some forms of activities, such as lectures or seminars, it can successfully replace traditional classes. The results also confirm the assumption that e-learning methods are as good as traditional method regarding the effectiveness of teaching and student’s satisfaction. The last one can be in part an effect of high level of technical content and preparation of lessons.

It seems that the only matter of time is the change of the role of the university teacher who runs the system of on-line learning. Using previously prepared tests he/she is able to conveniently check the knowledge of students. Both the lecturer and the student can “see” the results immediately after completion [8, 15]. This increases the efficiency of education, and the costs of preparing and implementing activities in the form of e-learning are large only in the initial stage of the development of the teaching materials, but not much more than traditional [4–5, 10].

Conclusions

1. Distant education was seen by students as slightly easier in the course of the learning process due to continuous access to the educational materials.

2. Properly prepared teaching materials placed on virtual platform increases the opportunity to prepare students for the credits and final examinations in the respective field of knowledge.

3. The organization of classes in both forms (e-learning and traditional) was highly rated by students participating in the study.

4. Vast majority of students who have undergone the process of distant education expressed desire to continue this form of learning in the future.

5. The obtained results allow to conclude that the e-learning method can be judged as equivalent to the “traditional” method of teaching of the subject “Obstetrics, gynecology and gynecological and obstetric nursing” at the Medical University of Bialystok.

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