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Implementation of Interactive Methodology in Medical Education: Blended Learning Approach, e-Learning, and Conventional Learning

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ABSTRACT

Aims Nowadays, the acquisition of innovative approaches and techniques that use the Internet is one of the main goals for the development of higher medical education in Ukraine. This paper aimed to describe the effectiveness of blending learning in the preparation of medical students.
Instrument & Methods The authors designed a course "Medical English for Specific Purpose" and implemented it into the educational process.
Findings The majority of students and teachers agreed that the developed course should be integrated into the educational process.
Conclusion From this research, it can be concluded that blending learning is an integral part of modern education with the ability to use collaborative and critical thinking skills. In such kind of education, the role of a teacher changes to the facilitator who involves and stimulates students to go through real problem solving and meaningful lifelong learning experiences.

Keywords Medical Students; Interdisciplinary Placement; Online Learning

CITATION LINKS

[1] Impact of a mobile health application Mobile and printed dichotomous ... [2] Teacher-demonstration and ... [3] Perspectives on blending ... [4] A comparative analysis of the attitudes ... [5] Sensory perception and ... [6] New perspectives – approaches to ... [7] Structurally constrained effective ... [8] Difficulties in Kawasaki disease ... [9] English as a foreign language ... [10] Distance learning of ... [11] Oxford English for careers ... [12] Towards continuous medical ... [13] Medical students' attitudes about ... [14] Teaching communications skills ... [15] Innovation in evidence-based ... [16] Role play, a teaching strategy ... [17] Teaching and training how ... [18] Communication skills training ... [19] The role of virtual interactive ... [20] A qualitative analysis of an ... [21] Global health values of a ... [22] Feasibility and sustainability ... [23] ICBLS: An interactive case-based ... [24] Virtual reality technology and remote ... [25] Geriatric educational interventions for ...

Introduction

Improving the standards of professional training of future doctors by the international and common European standards would increase the competitiveness of the country's higher medical education. One of the possible ways of implementing positive changes in the professional training of future doctors is to take into account the results of scientific investigations of other countries.

Modern tech-fluency plays an increasingly important role in higher medical education. For this reason, blended learning is promoted by Dnipro State Medical University (DMU). The words of Richard Otto could explain the importance of blended learning: "Blended learning aims to orchestrate an effective composition of learning experiences. Instructional design has a long history of blending classroom work with homework, field trips, labs, reading assignments, and audio-visual media. However, what is new in this era of blended learning are the powerful modes of online synchronous and asynchronous activities and technology-based instructional methods which can now be added to the mix" [1]. Although, it has advantages and disadvantages. Before their evaluation, it is necessary to analyze what is blended learning for medical education. Blended learning is a way of learning that combines conventional classroom lessons with lessons that use computer technology and may be given over the internet. Blended learning is a way of breaking down education [2]. It should be noted that the concept of "blended learning" is interpreted by our department as a modern approach to teaching medical English that is used by teachers and students for receiving it to acquire new knowledge and skills. This method of blended learning taught our teachers to shift from teacher-centered learning to student-centered learning with the ability to train soft skills such as social and communication skills, emotional intelligence, and personality traits. The method combines technological advances and face-to-face learning. Blended learning brings benefits and challenges on many levels. A frequently mentioned benefit of online learning is flexibility in time and learning environments [3].

E-learning means studying at home using computers and courses provided on the internet. It is a comprehensive investigation of course developers'. Language teacher trainees' views regarding the usefulness and effectiveness of a multimedia self-tuition course. *Distance education* was introduced in 1981, starting with 91 students at the time. The primary purpose of using video in "*distance education"* is to improve understanding and comprehension synchronously or asynchronously [2]. This type of learning requires technical equipment and an internet platform which requires: some budget, self-motivation, digitalized materials, internet access, and tech-fluency for both participants of the educational process. This type of learning has the advantages which allow having an independent place and own pace of completion of each task, instant feedback from the platform with own progress which could be seen by the teacher and the owner of the results, and media context increase motivation and the possibility of having reworks and analysis of the mistakes.

Conventional education means the formal educational process determined by the institution of higher education when students and instructors are in the same physical setting (face-to-face) for the majority [2]. This method is also called face-to-face classroom education where the learner could ask a question during completing a difficult task and it might well increase the student's motivation if it was correct. And the main thing that each student must be encouraged by the teacher, this is the greatest possibility to rise motivation. The drawback of this method is dullness we have only two tools a teacher and a book in our case without pictures. And this way of education is not acceptable for the digital generation. This method could be characterized by good social contact, interference between a teacher and a student, asking questions, and immediate teacher's reaction, this type of education for adults who are not well acquainted with the usage of digital equipment. Consequently, it can be said that by combining all types of learning we could upgrade our courses and make them interesting, reliable, and essential for their vocationally oriented learning.

Different learners have preferences about learning styles (i.e., auditory, visual, kinesthetic, tactile; introvert/extrovert; independent/social collaborative). inventory includes the following learning styles as a combination of the characteristics of observation, experience, thinking, and action: assimilating style (planner), converting style (decision-maker), diverging style (creator), and accommodating style (doer). These preferences are based on how a learner processes information. Providing learning events that engage the learner's strengths is always desired. The blended approach allows a wide variety of learning styles to be engaged [1].

One of the possible ways of implementing positive changes in the professional training of future doctors is to take into account the results of scientific investigations of other countries. Future doctors couldn't realize all their potential without being knowledgeable in this area. That is why, according to the requirements of the DMU, at the department of language preparation, a course on Academic Medical English Preparation was designed. This course is carried out through the educational program and curriculum and was approved by the council for each specialty. The educational program includes 5 components that

give acquisition of competencies under the National Qualifications Framework. A good general course should contain an introduction, needs analysis, independent learning, education technology, discourse analysis, and genre analysis, and should develop an awareness of individual learner characteristics and the frameworks of inter-cultural differences – all highly relevant to LSP teaching [4].

This research aimed to increase the competitiveness of domestic higher medical education and to optimize the conditions for the international mobility of medical students in the national and international labor markets with the help of studying English due to the Ukrainian government's declaration of the European integration path.

Instrument and Methods

A course on Academic Medical English Preparation was designed by the Department of Language Training, Dnipro State Medical University. It includes a course "Medical English for Specific Purpose" which aims to teach students to combine conventional face-to-face learning with distance education in developing productive and receptive skills.

To reach the purpose of this course a medical English classroom was created. The designed course contains lexical and grammatical materials on the following topics: 1. Medical Education in Ukraine; 2. Medical Education in the USA; 3. Medical Education in Great Britain; 4. History of Medicine; 5. Human Body; 6. Skeletal System; 7. Cardiovascular System; 8. Digestive System; 9. Health Care System in Ukraine; 10. Health Care System in the UK; 11. Health Care System in the USA; 12. Hospital. Specialties; 13. Surgery; 14. Medical Emergencies; 15. Injuries; 16. Drugs; 17. Nutrition; 18. Vitamins.

80 medical students of the first course have taken part in this research. The participants were selected by the random sampling method. They were randomly divided into 4 groups. Two of them used an interactive DIGIBOOKS Platform, authentic materials, and books, and at the end of the course passed an occupational English text such as the OET Cambridge exam. The other two groups had a conventional way of study with a standard book without interactive techniques with usual textbooks such as "English for medical students" [5]. The goals and activities were already designed and added to the educational program of each group. Each member of the experimented groups had both types of tasks collaborative and individual tasks which have been done with a help of the interactive platform and contributed to the fulfillment of the group work.

Findings

The results of the survey conducted by the authors show different kinds of attitudes of both participants of the educational process teachers and students to the integration and implementation of the modern course in medical teaching and studying. All students from experimented groups of Dnipro medical university were engaged in e-learning activities and actively working with the Digi book's platform and had online classes. At the end of the course, 85% of students passed successfully an occupational English text the OET Cambridge exam. 80% of them used online platforms mostly every day. It is important to know how much time students use for practicing new material and how much time the teacher used for analysing the students' progress.

The time spent by participants practicing English varied (Table 1). It is worth noting that for students, this time was spent hours practicing not only medical English but at the same time training their clinical subjects themes in English. And such kind of work helps them to prepare themselves for Crok 1 and 2 in English. For teachers, the amount of time they spent was bigger, at the same time a teacher saves time on checking exercises such as grammar or vocabulary because the platform gives feedback instantly after each task. Students noted that it is very convenient to have your task checked at the same time after you did it, it motivates us to finish all tasks quicker and become more fluent in each language component. The participants were asked to name problems they faced that are connected with blended learning (Table 2).

Table 1) The time spent by participants practicing English

Participants	Hours spent per week	% of participants
Students	10	50
	15-20 (3-4 hours a day)	27
Teachers	15-25 (3-5 hours a day)	50

Table 2) Frequency of response to problems and advantages connected with blended learning

The feature of blended learning	Who named it	Percent
Problems		
Technical problems	teachers	51
	students	38
It is impossible to follow strict deadlines	students	48
Lack of time for monitoring the student's work	teachers	40
Advantages		
The course is a crucial and very important part of modern teaching and learning and it should be integrated into the educational process of each group at Dnipro medical university	teachers	90
	students	80
The course is very useful not only in medical English but to practice clinical theoretical skills and for learning in general	students	99
The opportunity to have free access to the material and tasks anywhere and anytime	students	95
Medical students become more motivated and involved in the learning process by killing two birds with one stone by studying medical English and gaining new knowledge in medical science	teachers	91
E-learning is an effective and reliable tool for increasing students' academic and scientific performance in future	teachers	85

Discussion

Researchers from around the world are paying attention to interactive methods that are proving effective in teaching medical students. A detailed investigation of medical schools in the UK was conducted by Howe *et al.* [6]. The authors compared their approaches to medical education, their policies, curriculums, learning methods, and assessment. Crimi *et al.* considered art and science integration in medicine [7]. The study created ways to improve the skills of future doctors in resolving conflicts, reporting bad news, patients' health education, and communicating with families. It is important to clarify that the learning and assessment of students' skills took place using a wide range of methods, which improved the results. The specific of doctors' work with different types of patients is an important aspect of training [8].

The studies also pay attention to medical English which is an important discipline, especially for students whose native language is not English [9-11]. They need to be able to convey instructions to patients and their relatives, have the necessary vocabulary to describe common signs of illness and be able to communicate in English with patients and colleagues, which requires appropriate communication skills. The method of teaching in the courses of continuous medical education needs special attention. Zeiger identified such important features of continuing medical education courses as interactive potential, and flexibility in time and place [12]. However, the scientist is convinced that online learning cannot fully meet the needs of education participants, so, in his opinion, more attention should be paid to continuing education.

Parmelee *et al.* paid attention to the role of team-based learning in medical education [13]. The authors explored changes in the program related to using team-based learning, their impact on students 'working within teams, and their sense of professional development. Regarding communication skills, it is worth noting that they are essential in dealing with patients, thus, such skills need to be nurtured in medical students and future practitioners [14].

Gagliardi *et al.* [15] focused on Evidence-based medicine, showing how special techniques can promote critical thinking, decision-making, and understanding of the evidence. The authors recommend the use of role-playing games and training. In their opinion, interactive seminars are the most effective. Such methods allow to optimize the learning process and maximize the preservation and use of skills.

Many scientists show the effectiveness of interactive methods compared to other methods [16-18]. A comparison of traditional teaching methods with the role-play method showed positive feedback from students on interactive methods. Abreu *et al.* [19] investigated such a method of student assessment as virtual interactive patients and compared it with testing with several answer options. The results showed that medical students were interested in learning regardless of the method used, but the interactive method allowed students to gain and memorize more knowledge and, consequently, to have a higher final score. The method of virtual interactive patients has proven to be effective for the formation of medical students necessary knowledge and skills. Damodar *et al.* [20] analyzed the views of teachers on the current state of medical education. The reason for the authors' concern is the inconsistency of educational programs with the needs of society and the lack of motivation of medics. Elharram *et al.* [21] developed an international program that combined surgery, pathology, anatomy, and research methodology and explored its value in improving medical education. The program was based on interactive classes. Thus, positive results were revealed, in particular, the career development of medical students, their skills and abilities improved. The importance of the learning environment was emphasized.

The ability of future medics to work in a team is important, which determines the relevance of the interactive team-based learning methods [22]. It facilitates the training of highly qualified physicians, allows them to effectively acquire new knowledge on topics of varying complexity, and is available for use in educational institutions in low-income countries. The developed interactive case-based learning [23] is interesting in the context of the use of interactive methods, which have proven effective in improving the skills of clinical reasoning, interpretation, and diagnosis. The peculiarity of this method is that students receive real-world scenarios while studying and try to solve them online.

Techniques using virtual reality technology need a lot of attention. Thus, Almousa *et al.* have developed a prototype for clinical telesimulation, the advantage of which, above all, is accessibility for students [24]. The virtual space simulates the hospital environment and allows changing the settings as needed. Students and teachers can communicate in real-time, in particular, during live broadcasts. The study showed the need to expand the use of such systems to provide an interactive experience and facilitate the learning process. When creating a methodology for geriatric training of doctors, Ong *et al.* paid attention to the use of mixed methods [25]. The authors considered studies involving combinations of didactic or independent approaches with interactive, simulation, experimental, and group learning. They all had positive results.

Conclusion

The findings of our study suggest that medical students and medical teachers are open to new methods and interactive blended learning and tech fluency is a skill of the 21st century and the modern digital generation couldn't live without these up-to-date devices. That is why blended learning is an effective method and a great decision of combination of online learning and face-to-face learning for modern life. Students get an opportunity to practice their medical knowledge at their own pace and instantly get feedback. Furthermore, blended learning adds to the educational process several important plusses for both students and teachers and actively involves them in the learning process. This type of education provided participants with several advantages such as the opportunity to analyze, synthesize, and evaluate ideas and from this research, it can be concluded that blended learning fosters the development of soft skills and critical thinking. The role of a teacher changes to a facilitator who creates a meaningful learning experience and stimulates students' motivation through problem-solving tasks. The results of this study have to encourage the rest departments of DMU to apply blended learning in teaching not just only medical English but all clinical subjects. Even though the development of such kind, admittedly, is time-consuming for all departments, for monitoring groups to control the process, it allows teachers to optimize their time on checking the home task and to maintain the quality of the teaching process. The suggested course helps to keep pace with the time and correspond to new requirements of the educational system where information technologies and the use of online resources play a great impact on our modern life.

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Ethical Permissions: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. A study was approved by the National Ethics Commission of the Ministry of Health of Ukraine, January 13, 2022, No 1301-7.

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