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Medical Informatics Distance Training Under COVID-19 Lockdown Conditions

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Abstract

The method of organizing distance learning in computer science disciplines on the basis of interactive technologies and the combination of synchronous and asynchronous modes of distance learning during quarantine restrictions is studied are discussed. The results of the student survey were analyzed, which, in order to maximize the objectification of the study, was conducted after the study of computer science disciplines during quarantine, which was announced due to COVID-19. The effectiveness of the developed and implemented original methods of distance learning during quarantine restrictions.

Keywords: *Medical Informatics; Distance Learning; Student Survey; Information Competence; COVID-19 Lockdown; Educational Multimedia Content*

Introduction

Informatics training of future specialists in the field of health care was the subject of systematic research of the Department of Medical and Biological Physics and Informatics (hereinafter – MBPI) of the National Medical University named after O.O. Bogomolets (hereinafter – NMU named after O.O. Bogomolets), whose research was focused on the synergetic principles of modernization of teaching natural disciplines forms in higher medical education [1], teaching of Medical and Biological Physics and Medical Informatics in European Universities [2], justification and implementation of competency models for teaching Computer Science disciplines [3], methods of forming information competency [4], adaptation of the information design principles in the development of electronic educational content in Medical Physics [5], development of interactive, computer-oriented and cloud tools learning [6], the use of technologies of blended, distance, mobile and personalized learning.

As part of the research work (R and D) of the department during 2017 - 2019, in order to implement a blended learning system, online courses in computer science disciplines were developed, covering all necessary types of educational activities and containing interactive multimedia educational content, tools for online -diagnosis of student achievement, formative assessment and feedback. G Suite for Education was chosen to develop online courses in computer science, which includes Gmail, Google Drive, Google Meet, Google Calendar, Google Docs, Google Spreadsheets, Google Presentations, Google Sites, and the digital interactive whiteboard Jamboard. Google Classroom Virtual Learning Environment was chosen to create tasks and organize distance learning.

Methodical system of teaching computer science disciplines at the department of MBPI during 2017 - 2021 was focused on the competence approach and application of modern information and communication technologies in the development of multimedia teaching aids, organizational forms and control of students' knowledge. Computer-based testing was part of the current and final control in computer science disciplines. To systematize the knowledge, videos on certain topics of the course were created and posted on YouTube (the total number of views of educational videos in computer science on YouTube is 39,627, the total duration of all views - 3622 hours, of which before the spring-summer semester 2019 - 2020 academic year - 22,610 views, duration 1660 hours). Developed during 2017 - 2019,

online courses in computer science disciplines and educational multimedia content have created the preconditions for the introduction of a blended learning system in the period of the COVID-19 pandemic during 2020 - 2021.

Study objectives

For the IT training of future health professionals we have taken as a basis the model of blended learning "inverted classroom", developed a method of its implementation using interactive technologies and created online courses in computer science disciplines, which was introduced into the educational process since 2019 by means of G Suite for Education services. Developed interactive online courses, each class in which students had to study before the relevant topic in the classroom, contained multimedia learning content on each topic of practical classes, videos on the formation of theoretical and practical skills and online tools for measuring student achievement in computer science disciplines. Practical classes in the classroom were aimed at active learning of students, performance of competence-oriented tasks and project activities.

The target audience of the pilot study were 989 students, of which 580 (58.6%) domestic and 409 (41.4%) foreign with English-language education, for whom the study of computer science disciplines was provided in the spring-summer semester of 2020 academic year according to the curriculum. In the most difficult period of the first half of 2020, the study of the discipline "Medical Informatics" under quarantine restrictions was organized for 815 students, of which 419 (51.4%) domestic and 396 (48.6%) foreign students with English-language form of study.

Results and Discussion

Introduced in 2019 - 2020 academic year at the MBPI department mixed learning system, as well as developed online courses in computer science disciplines, registration and training in which students began in the beginning of the semester in January 2020, was favorable for effective and rapid adaptation of students and teachers to distance learning under social distancing circumstances. The use of the Google Classroom virtual learning environment and Google services was continued to organize distance learning. With the help of Google Classroom, students were created tasks for each practical lesson, which contained the topic, detailed learning objectives of the practical lesson, multimedia learning content, didactic materials and a set of practical and test tasks that students had to work before the video meeting with the teacher. It was convenient for students to receive instant notifications about assigned tasks, deadlines and feedback from the teacher.

The video meetings with the teacher were organized with the help of Google Meet after mastering the relevant topic of the practical lesson in the online course and watching the educational video content. This approach, based on a combination of synchronous and asynchronous modes of distance learning has made it possible to more effectively organize the study of computer science disciplines and ensure interactive learning. The interactive component of distance learning in computer science disciplines was associated with online quizzes and games, for which the cloud service Kahoot Learning games was chosen, which provides the opportunity to implement game teaching methods and assess the level of students' knowledge based on performance indicators.

In order to identify the attitudes of students to the organization of distance learning in computer science disciplines during quarantine in accordance with the proposed methodology, we developed a questionnaire using Google Forms services. To objectify the study, an online survey was conducted in June 2020 after the completion of the study of disciplines. The survey involved 406 students of medical (280 people, including 198 domestic and 82 foreign), medical and psychological (94 people) and pharmaceutical (32 people) faculties.

According to the results of the survey, 79.1% (321) of respondents said that they managed to successfully master computer science disciplines and acquire quality knowledge and practical skills, but 10.3% (42) respondents could not decide on the answer, and the rest

- 10.6% (43) students gave a negative answer to the question. At the same time, 82.0% (333) are satisfied with their own level of knowledge acquired in the discipline in a remote format, 9.9% (40) were undecided on the answer to this questionnaire. For 84.3% (342 out of 406) of respondents, the Google Classroom virtual learning environment was convenient for distance learning.

Conclusion

The proposed method of organizing distance learning in computer science disciplines, based on the use of interactive technologies, a combination of synchronous and asynchronous distance learning modes, technically implemented through G Suite for Education, has proven effective in developing information competence in future health professionals.

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