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MOOC-BASED FOR SCIENCE OF MEDICINE TEACHING

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ABSTRACT

The article describes the practice of utilizing Massive Open Online Courses (MOOCs) at Sechenov Medical University for teaching English. MOOCs on the platform "Future Learn" is intended for specialists, but they also can be used to improve language skills. We analyze how MOOCs affect the learning process in general, and the MOOC "Science of Medicines" being included in the training program "Translational Medicine" for pharmaceutical students, in particular. On completing the course, students were offered to fill in a questionnaire. We ask them whether it is reasonable to use MOOCs this way, to give the pros and cons as well as to assess their achievements.

"Science of Medicines" is a 6-week online course designed for specialists in pharmacy, that's why it was given to the forth-year students of pharmacy, who had got specialist training long enough to cope with the course (3 academic groups comprising 37 students). All the students completed the course on time but 43 percent had to admit that their English was not good enough and 70 percent designated the course as difficult or very difficult. The average rating of their achievements was 3.85, according to their assessment on a five-point scale.

Disciplinary: Multidisciplinary (Education (Teaching English), Information Technology (MOOC), Medicine and Pharmacy).

1. INTRODUCTION

Translational medicine is an interdisciplinary branch of medicine supported by three main pillars: bench, bedside and community – "bench to bedside" (B2B) for short.

The aim is to improve health enhancing the efficacy of biomedical discoveries and application.

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Recently, at Sechenov Medical University many new educational programs have emerged to provide professional training for successfully translating research into improved clinical outcomes, among them “Translational medicine”, “Professional Communication in Medicine”, “Professional Communication in pharmacy”, MSc Program in Biotechnology and some others. For successful communication with colleagues abroad future medical professionals have to master English and Medical English, in particular (Molchanov, 2019). Moreover, they need to keep pace with recent advances in biomedical science like bioinformatics, biotechnology, bioengineering, medical nanotechnology, pharmacogenomics pharmacogenetics, and personalized medicine. Online courses for specialists give the opportunity to solve the problem – students can learn English which is spoken by specialists on the subject of interest. (Basok, 2019) In this article we describe the practice of utilizing Massive Open Online Courses (MOOCs) at Sechenov Medical University.

2. MATERIALS AND METHODS

Nowadays, there are a lot of MOOC platforms – edX, Coursera, Future Learn, Udemy, Openlearning, Standford Online, Yole, etc. (Shcherbinin et al., 2019). The Future Learn platform appears to be a most suitable for medical students, it provides courses on medicine, biochemistry, clinical research, bioinformatics as well as psychology and education. Future Learn is a British platform designed by the British Council in cooperation with the universities of Birmingham, Bristol, London, Manchester, Leeds, Dublin, and some others. Brief information on courses is given in Table 1.

2.1 MOOC COURSE DEVELOPMENT

These online courses are integrated into the training programs for senior students, whose level of knowledge and skills on their specialty is high enough to comprehend the information given and to do tests. Although courses are intended for continuing education of specialists, they may also be successfully used to improve language skills. Our study aimed to analyze how MOOCs affect the learning process in general and the MOOC “Science of Medicines”, in particular.

This course of six-week duration contains 6 Units:

Week 1 – Introduction	Week 4 – Pain
Week 2 – Diabetes	Week 5 – Smoking
Week 3 – Heart disease	Week 6 – Depression

In the introduction, a general approach to drug development is given (Chemistry, Pharmaceutics, Pharmacology). The other Units are uniform in structure – they contain Introduction, Patient Summary, Physiology, Chemistry, Pharmaceutics, Pharmacology. The course is fairly informative, and what is particularly valuable, it contains videos, which show dynamic images of drug molecules, docking, and binding to their target receptors. This is an advanced approach that is used in the so-called rational computer-aided drug design (CADD). On completion of the course, students were offered to fill in a questionnaire. We ask them whether it is reasonable to use MOOCs this way – to give their pros and cons as well as to assess their achievements. (Djevello, 2018).

Table 1: MOOCs on FutureLearn platform for students and specialists in medicine and pharmacy

	MOOC	University	Duration	Reference
1	Food as Medicine	Monash University	3 wks/4 hrs/wk	futurelearn.com/courses/food-as-medicine
2	The Science of Medicines		6 wks/3 hrs/wk	futurelearn.com/courses/the-science-of-medicines
3	Good Brain, Bad Brain: Drug Origins	University of Birmingham	2 wks/ 4 hrs/wk	futurelearn.com/courses/good-brain-bad-brain-drugs
4	Nanotechnology for Health: Innovative Designs for Medical Diagnosis	University of Twente	4 wks/3 hrs	futurelearn.com/courses/nanotechnology-health
5	Biochemistry: the Molecules of Life	UEA (University of East Anglia)	3 wks/ 3 hrs/wk	futurelearn.com/courses/biochemistry
6	Clinical Bioinformatics: Unlocking Genomics in Healthcare	The University of Manchester	5 wks/ 2 hrs/wk	futurelearn.com/courses/bioinformatics
7	Exploring Cancer Medicines	University of Leeds	2 wks/ 2 hrs/wk	futurelearn.com/courses/exploring-cancer-medicines
8	Improving Healthcare Through Clinical Research		4 wks/4 hrs	futurelearn.com/courses/clinical-research
9	Medicines Adherence: Supporting Patients with Their Treatment	King's College London	2 wks/2 hrs	futurelearn.com/courses/medicinesadherence
10	Exercise Prescription for the Prevention and Treatment of Disease	Trinity College Dublin (The University of Dublin)	2 wks/ 4 hrs	futurelearn.com/courses/exercise-prescription

3. RESULTS

"Science of Medicines" is designed for specialists in pharmacy, that is why it was given to the forth-year students of pharmacy, who had got specialist training long enough to cope with the course. (3 academic groups – 37 students). All the students completed the course on time and completion answered the questions of the questionnaire. Some questions require yes/no answers, and they are given in Table 2.

Table 2: Science of Medicines course – general questions: assessments and achievements

N*	Questions	Yes %
1	Did you manage to complete the course on time?	96
4	Was there any information in the course useful/novel to you?	83
5	Does your (poor) English affect your achievements?	43
7	Are there any tasks you couldn't cope with?	48
8	Did you seek help from your classmates?	39
10	Did the course help you to acquire new knowledge in your specialty?	65
13	Do you think that it is reasonable to include MOOCs in teaching English programs?	70
14	Will you use MOOCs for your self-education/continuing professional development?	61
15	Do you have any critical comments on tasks/tests given?	30

* Question number in the questionnaire.

Two other interdependent qualitative assessments are given in Table 3

Table 3: Science of Medicines course: How difficult it is.

The course was	%	How often did you look up in dictionaries?	%
not difficult	30	hardly ever	17
difficult	60	rare	35
very difficult	10	often	48

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In Table 4, we summarized quantitative assessments of the course difficulty (on a 10-point scale, with 10 is the highest difficulty level) and rating of achievements (on a 5-point Likert scale, with 5 is the highest achievement).

Table 4: Level of Difficulty versus Achievements

Level of difficulty	%	Rating of achievements	%	Average rating
4 - 5	22	5	17	3.85
6 - 7	61	4	45	
8	17	3	38	

One more qualitative assessment we are interested in is the improvement in English according to the students' judgment (see Table 5).

Table 5: Progress in English versus Rating of success

My English improved	%	Average rating of success (in a cohort)
significantly	5	3.0
not significantly	78	4.0
not at all	17	3.8

We asked students to rank activities by their impact/usefulness in order of priority (Table 6). It is interesting that each of students focuses on different activities.

Table 6: Rank of activities: How useful they are

Activities	Priority order (%)		
	Group I	Group II	Group III
Watching videos	70	26	4
Doing tasks/tests	26	61	13
Comments & discussion	9	9	82

We also are very much interested in students' critical comments on MOOCs in general and on the course "Science of Medicines", in particular. These are given in Table 7. Students were allowed to mark more than one disadvantage.

Table 7: Critical comments

	Disadvantages	Rating %
1	Tests are formalistic and biased	65
2	No communication with a tutor/lecturer	52
3	I have to pay for the Certificate	39
4	I can learn correct answers from my friend	17

4. DISCUSSION

All the students managed to finish the course, 96% complete before the deadline, most considered the course useful (83%) and 65% said that the course helped them to acquire new specialist knowledge. Nonetheless, about half of the students (43%) had to admit that their English was not good enough and 60% designated the course as difficult or very difficult (10%), that was

why 47% often looked up in dictionaries, and 39% asked their class-mates for help. However there is a suspicion that 39% is not high enough to be true, as the proportion of those who couldn't do all the tasks themselves is 48% (by 10% higher). Only 17% could do without dictionaries, which corresponds with 17% of those who assessed their achievements at 5 points (the highest mark).

Answering the question of whether their English improved 17% said "yes" (by a curious coincidence) - "curious" because these are not those who gave themselves 5 points! Paradoxically, a significant increase in English proficiency level was claimed by those who evaluated their success as limited (3 points). As to the question of whether it is reasonable to include MOOCs in teaching English programs, the negative attitude was demonstrated by those who couldn't cope with all the tasks themselves, they don't plan to use MOOCs for self-education either. Although among them there are some students, who think the other way round – they consider it is reasonable to use MOOCs in teaching/learning English – so this cohort divided into two. "This method is effective in case when trainees are interested in training" – a student from this cohort wrote. Critical comments can be boiled down to one thing – there are some unclear and sometimes ambiguous questions in tasks and tests, and there are no correct answers to choose (in multiple-choice tasks). Such remarks can be found in 30% of questionnaires and made by those students who had to admit that their skills in English were not up to the mark. It seems to suggest they couldn't overcome the shortage of active vocabulary since those who evaluated their success at 5 points didn't have such difficulties and claims (Nazarenko, 2017).

Most students (80%) answered that online courses are useful and effective. As to pros, they mentioned mobility and flexibility (i.e. they can do the course any time, any place) as well as good visualization and the opportunity to listen to native speakers. Here are some citations from their questionnaires to confirm:

"All the time we have learned something new and relevant to our future profession",

"We have known much about clinical trials, drug design, and drug metabolism",

"We got the opportunity to study pharmacy along with English",

"It was very interesting to listen to lectures delivered by native speakers and learn something new".

As regards to cons, the lack of feedback and alive communication is considered to be the main disadvantage of online learning as well as the lack of speaking practice.

5. CONCLUSION

To address the issue of lack of feedback it is reasonable to use the so-called "blended learning" when online training and practical classes with tutors alternate. In communication with tutors and other students, it is possible to overcome the challenges they face. (Dubov, 2019)

Nowadays we cooperate with the English Language Centre in Brighton, developing new joint courses "English for Doctors" and "English for Pharmacy". We test these pilot courses, using blended learning methods in groups of students who joined the program "Professional Communication in Medicine/ Pharmacy". On successful completion of this joint courses, students will get the CPD Certificate (Continuing Professional Development), which certifies that "the

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course gives learners the specific English skills and knowledge they need to discuss the fundamentals of pharmacy/medicine in an English-speaking environment". It improves their outlook in competitive terms and chances to participate in international cooperation in the field of Translational Medicine.

6. DATA AND MATERIAL AVAILABILITY

Data can be provided by contacting the corresponding author.

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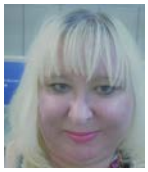

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