

Experiences With the Integration of MOOCs Into Online Courses Through E-tivity

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Abstract—MOOCs have many benefits for higher education, which is why many universities are incorporating them into their curricula. The University of Rijeka, Croatia, has joined the Coursera for Campus program to provide students and teachers with the opportunity to gain skills, competencies, and certificates for completed courses. There are several models of how a MOOC can be integrated into an online or hybrid course. This paper proposes the integration of MOOCs into online courses through an e-tivity approach, that requires students to collaborate in an online environment to complete a specific task and achieve learning outcomes. A didactic model for the course "E-Learning for Education and Business" is presented that uses MOOC courses in the context of e-tivity. To become familiar with MOOCs and prepare to design their own courses, students first enroll in a Coursera course, keep an individual learning diary of their participation, and are then expected to collaborate on course analysis. Evaluation of the model has shown that students are positive about this approach. The e-activity involving MOOCs was found to be interesting, effective for learning and useful for creating their own online courses. This e-activity also encouraged students to enroll in a Coursera course and learn about the possibilities of MOOC courses, which they found useful for their studies and future work.

Keywords— MOOC, Coursera, e-tivity, online course

I. INTRODUCTION

The strategic implementation of e-learning at the University of Rijeka has a long tradition. From the very beginning, attention has been paid not only to the technological, but also to the pedagogical-didactic aspects of e-learning. Due to the COVID-19 pandemic, e-learning has again become a top priority for university education. Face-to-face/physical classes were suspended, and online learning was introduced. Teachers mainly used e-courses in the Moodle learning management system (LMS) in combination with various video conferencing tools and other digital tools. Given their benefits for learning and teaching, it became clear that models for their use in the post-pandemic period need to evolve and that systematic planning for the future of e-learning is needed [1].

To better prepare teachers and students for hybrid teaching models, from 2022 the University of Rijeka has participated in the Coursera for Campus (C4C) program for universities, offered by the MOOC platform Coursera [2], [3], which is part of a broad institutional support that enables students and faculty to acquire skills and competencies. They can enroll in one of the courses offered and receive one free certificate per year upon successful completion of the course.

Experience to date has shown that student participation has been lower than expected and that there is a need to promote enrollment in Coursera courses. Teachers are encouraged to recommend courses to students to expand their knowledge in areas of interest or to replace or supplement an activity in the course with a Coursera MOOC course. One possibility is to

use e-tivities [4] that include a MOOC course. In the e-tivity based approach, students collaborate with each other and with the instructor in an online environment to complete a specific task and achieve learning outcomes [5].

This paper presents a didactic model for the course "E-Learning for Education and Business" that uses MOOC courses in the context of e-tivities as an example of good practice for students whose task is to plan and create their own online courses. In addition, by introducing MOOCs, students are encouraged to use MOOCs during their studies and in their future personal and professional development.

II. METHODOLOGY

"E-learning for Education and Business" is an online learning course that includes e-tivities related to MOOC course use, in addition to other learning, teaching, and assessment activities. The aim of the study was to find out whether this way of introducing MOOCs into the course is beneficial to students and what their attitudes are towards MOOC courses in general.

To determine students' attitudes, the following research questions (RQ) were investigated:

RQ1) What is the attitude of students towards the inclusion of MOOC courses in the study context?

RQ2) What is the attitude of students towards the use of MOOC courses in general?

A. Participants and data collection tool

The participants of the study were first-year computer science graduate students at the University of Rijeka, Croatia, who took the course in the academic year 2022/2023. To capture their attitudes towards the MOOC, an online questionnaire was completed at the end of the course with a series of statements on a Likert scale. The following Likert scale for attitudes was used: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. The questionnaire also included two multiple choice questions and an open-ended question for comments and suggestions. Of the total 23 students, 15 students (65%) completed the questionnaire.

B. Course context and activities

The course "E-Learning for Education and Business" was designed for senior students of the graduate program in Computer Science. The course has been awarded six ECTS (European Credit Transfer and Accumulation System) credits. The workload indicates the time students normally need to complete all the learning activities required for the course. One ECTS credit is equivalent to 30 hours of student work. The overall goal of the course was for students to acquire basic knowledge and develop skills necessary for analyzing, planning, and creating e-learning in educational and business

settings. It is expected that after completing all assignments in the course, students will be able to:

- O1. Discuss the concepts and theories in the field of e-learning, their interrelationship and relevance to solving the complex current and future challenges of the digital transformation of e-learning.
- O2. Identify the possibilities of modern digital technologies for e-learning (LMS, digital tools, MOOCs, new technologies - augmented reality (AR), virtual reality (VR), digital games) and recommend appropriate technologies for e-learning in the organization and educational institution.
- O3. Design innovative e-learning approaches and models for successful application in organizations and educational institutions.
- O4. Develop a plan to improve e-learning in the organization and educational institution by applying modern approaches and models of e-learning and technological innovations.
- O5. Analyse, identify needs, plan activities, resources, methods, techniques and tools, and design, implement and evaluate e-learning.

Course content included topics such as: e-learning, blended learning, distance learning, modern digital technologies for e-learning, the role of computer experts in the digital transformation of e-learning, instructional design models, application of LMS, digital tools and other technologies in e-learning [6].

The course was delivered asynchronously online by an instructor who moderated all course activities according to the schedule specified in the syllabus. The course is organized entirely online, except for the introduction (kick-off lecture) and an online test - part of the summative assessment, which is conducted in the classroom under the supervision of the teacher. Students were instructed to use the LMS Moodle, where the teacher posted weekly course announcements, learning materials, e-tivity assignments, and other relevant information.

In this course, students had the following tasks:

- regular participation in course activities in the Moodle LMS,
- successful completion of a preliminary theoretical exam (online test),
- participation in an e-tivity prepared as a forum discussion,
- completion of a group assignment (e-tivity *MOOC course analysis*) on a specific topic,
- preparation of a final project (e-tivity *Preparing e-course*).

To plan and create their own online courses, students should apply what they have learned, as well as the experiences gained by attending MOOC courses.

By completing the planned activities (Table I), students could achieve a maximum of 100 points during the semester, and the corresponding grade is formed according to the following scale: A - 90-100, B - 75-89.9, C - 60-75.9, D - 50-59.9%, F - 0-49.9.

C. E-tivities using Coursera MOOCs

In the academic year 2022/2023, two e-tivities were related to the use of Coursera MOOC courses. In the e-tivity *MOOC course analysis*, students in smaller groups of 2-3 members analyzed Coursera courses according to predefined criteria and using the wiki - a digital tool for collaborative writing [6]. Each member of the group had to contribute by writing and editing the content. The analysis of the course was carried out according to the extended framework of the basic model SECTIONS [7], i.e. the following elements had to be described: Organizational aspects, Students, Content and media, Teaching, learning and assessment strategies, Interactivity and communication, and Technology [6].

Before starting the analysis, students should have enrolled in a Coursera course of their choice according to their area of interest and kept an individual learning diary about their participation. This allowed them to become familiar with the concept and elements of MOOC courses.

TABLE I. COURSE ACTIVITIES AND GRADING POINTS

Name	Activity		
	ECTS	Description	Points (max)
Online activities in Moodle LMS	2	Students regularly follow course activities within the LMS. Data in the LMS will be reviewed to determine if students have read the prepared materials and completed the online self-assessment tests.	10
Preliminary exam	0.5	Online Moodle test in which students demonstrate their understanding of basic theoretical concepts related to e-learning and the process of digital transformation of e-learning, and which may include recall tasks, multiple choice tasks, matching tasks, essay questions, and extended response items.	20
E-tivity: Forum discussion	1	Students discuss issues related to e-learning, such as the advantages and disadvantages of specific digital technologies for e-learning, and make recommendations for the successful use of these technologies.	10
E-tivity: MOOC course analysis	1	Group assignment (using a wiki or similar tool) in which students work together to analyze and critically evaluate e-learning approaches, models, and all elements of MOOC courses.	20
E-tivity: Preparing e-course	1.5	Practical group assignment in the form of an e-course in an LMS on a selected topic, created by the students according to the instructional design model.	40
Total	6		100

Students were expected to continue analyzing the courses together as a group, as encouraging collaboration and discussion among students allowed them to engage more deeply with all elements of the SECTIONS extended framework. This assignment for students served as preparation for the more complex e-tivity of preparing their own courses, as the Coursera courses served as examples of best practices.

In the second group e-tivity *Preparing e-course*, the task for students was to design and implement their own e-course in the Moodle LMS on a specific computer science topic, following the ADDIE model for instructional design [6], [7]. The students were given instructions in advance for the creation and criteria for the assessment of the project. Based on the previously created analysis and design (project documentation), they created a prototype e-course.

III. RESULTS AND DISCUSSION

According to their academic results, the success rate was 87% with an average grade of 80.52% points. The students successfully created eleven prototype e-courses in Moodle. Some courses are (Fig. 1): *Introduction to Unity*, *Scratch Games*, *Advanced Photography*, *Basics of Financial Management*, *Introduction to Python Programming*, *Introduction to SQL*.

The statements from the questionnaire used to collect students' attitude towards MOOC are shown in Table II.

To answer RQ1, the statements “You find the e-tivity of analyzing MOOC courses interesting and effective for learning” (S1) and “You believe that the e-tivity of analyzing MOOC courses will be useful for creating your own online course” (S2) were included in the questionnaire.



Fig. 1. Selection of students e-courses

TABLE II. ANONYMOUS QUESTIONNAIRE RESULTS (N=15)

	Questionnaire statements	1	2	3	4	5	Avg.	StDev.
S1	You find the e-tivity of analyzing MOOC courses interesting and effective for learning.	0%	13%	20%	60%	7%	3.60	0.83
S2	You believe that the e-tivity of analysis MOOC courses will be useful for creating your own online course.	0%	0%	7%	60%	33%	4.27	0.59
S3	MOOC courses are useful as an addition to the content learned during study.	0%	0%	7%	60%	33%	4.27	0.59
S4	MOOC courses are useful for lifelong learning (acquiring knowledge after graduation).	0%	0%	13%	47%	40%	4.27	0.70
S5	When choosing MOOC courses, it is important to consider which institution organizes the course.	0%	20%	33%	20%	27%	3.53	1.13
S6	The advantage of MOOC courses is that you can choose the place and time of learning yourself.	0%	0%	0%	13%	87%	4.87	0.35
S7	It is important for you that the MOOC course enables interaction with the teacher and other participants.	0%	27%	33%	33%	7%	3.20	0.94
S8	It is important for you that the MOOC issues a certificate on the successful completion of the course.	0%	0%	13%	27%	60%	4.47	0.74
S9	You think it would be good if you could earn ECTS credits for the completed MOOC course.	0%	0%	7%	27%	67%	4.60	0.63

Almost all students (93%) agreed or strongly agreed that the e-tivity of analyzing MOOC courses is useful for creating their own online course, while 67% of students find the e-tivity of analyzing MOOC courses interesting and effective for learning. A multiple-choice question, “Did you complete the MOOC course in which you enrolled in this course?” (Fig. 2) was also included, with an option to clarify the reason for students who answered “No”. 73% of students responded that they completed the enrolled Coursera course, and reasons given by other students included lack of time and that the enrolled course was too large and demanding for them.

The remaining statements in the questionnaire were related to students' attitudes toward using MOOC courses in general (RQ2). The most interesting results were that almost all students (93%) agreed that MOOC courses are useful as a supplement to the content learned in their studies (S3). 87% of students agreed that MOOC courses are useful for acquiring knowledge after graduation (S4) and that it is important for them to receive a certificate after successfully completing the MOOC course (S8). Almost all students (94%) agreed that it would be good if they could earn ECTS credits for the completed MOOC courses (S9).

On the other hand, most students disagreed with the statement “When choosing MOOC courses, it is important to consider which institution organizes the course” (S5). They also disagree that it is important that the MOOC course allows interaction with the instructor and other participants (S7).

A multiple-choice question “Do you plan to enroll in a MOOC course soon?” (Fig. 3) was also asked. 40% of the students answered “Yes”, 20% answered “No”, while the rest indicated that they could not yet decide.

Students were also asked to write additional comments about what they liked best about using the MOOC course in the e-course and what they thought should be changed. Some of the comments mentioned were:

- “It is good that the course encouraged us to enroll in the Coursera MOOC course and actually attend it”.
- “What I liked the most was the acquisition of new knowledge that is not included in the plans and programs of the traditional college courses”.
- “I believe that attending a MOOC course is very useful because in this way you gain new experience and skills for your future work”.
- “What I liked most was the group analysis of the content related to the MOOC courses we took”.
- “Since the final project was to create a prototype e-course, it was good to see a concept by which it could be organized”.

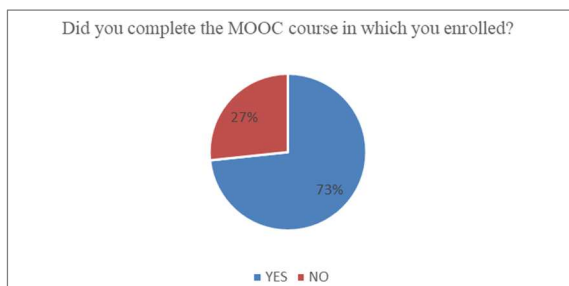


Fig. 2. Results on completing enrolled MOOC

The results support previous studies that found that students generally accept and are satisfied with participation in MOOC courses when they are appropriately encouraged to do so. Regarding the first research question about students' attitudes toward incorporating MOOC courses into their coursework, the results show that most students were happy to participate in e-tivities that included MOOCs and were positive about MOOCs as part of their regular coursework, which is consistent with the research described in [8]. Some previous research [5] has also shown that students are happy to participate in e-tivities if they are carefully designed and integrated in such a way that all learning outcomes of the course can be achieved.

The number of students who earned MOOC certificates was considerable, which means that their motivation was high. The fact that students were free to choose the topic of the MOOC course contributed to this fact, which is consistent with research findings [9] on the influence of motivation, especially internal motivation [10], on the completion of a MOOC course.

However, not all students enrolled in the MOOC course completed it, which was to be expected since the rather high dropout rate has been a known problem of MOOCs since their inception [11]. It is worth considering whether the acquisition of a certificate should be mandatory, as research [12] shows that students are not yet sufficiently willing to use MOOCs for their studies if they are not mandatory.

One of the ways to increase student motivation is to incorporate gamification or game-based elements such as badges and reward points. Reward-based strategies have been shown to be beneficial in educational environments, including MOOCs [13].

Regarding students' attitudes toward using MOOC courses in general, students consider MOOC courses to be very useful because they provide them with new experiences and skills for their studies and future work. It is interesting to note that, contrary to the results of some other studies [2], students were independent and did not think that they needed the presence of a teacher in MOOC courses. It is possible that one of the reasons for the acceptance of MOOC courses is that they are computer science students who have highly developed digital competences [14].

IV. CONCLUSIONS

The main objective of the paper was to present the didactic model for the course “E-Learning for Education and Business” and the results of the research aimed at finding out whether students find this way of introducing MOOCs into the course useful for their learning (RQ1) and what is their attitude towards MOOC courses in general (RQ2).

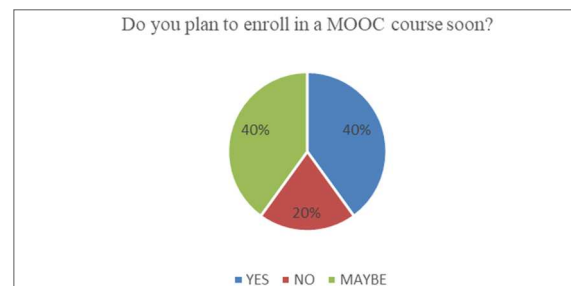


Fig. 3. Results on plans for enrolling in a MOOC

The course used Coursera courses as a best practice example for students whose task was to plan and create their own online courses.

Evaluation results showed that students recognized the benefits of the model used and had positive attitudes about incorporating MOOC courses into the course. They found the e-tivity of analyzing MOOC courses interesting and effective for learning as well as useful for creating their own online courses. In addition, they consider it positive that the e-tivity encouraged them to enroll in the Coursera course in this way. They learned about the possibilities of MOOC courses, which they consider very useful as they provide them with new experiences and skills for their studies and future work.

Due to the small number of participants, the results were not statistically significant, but they helped teachers decide how to continue to integrate the MOOC course into the e-tivities of the course.

To further encourage students to use Coursera courses at our university, it is recommended that teachers try to engage them in their courses in a new way, through e-tivities. The benefits for students are two-sided: they will not only be more successful in achieving the learning outcomes of a particular course, but they will also develop general competencies related to the ability to acquire additional knowledge, skills, and abilities through lifelong e-learning.

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