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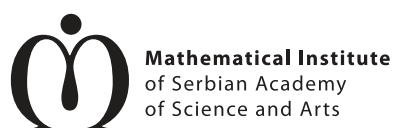


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The annual conference eLearning 2014 is an international forum for researchers, developers and educators to discuss about technology, innovation and best practices in e-learning, distance education and new learning opportunities. This year, the conference will pay special attention to Technical Concepts such as Learning Management Systems (LMS), Virtual Learning Environments (VLEs) and mobile learning technology, Instructional Design, including design and development of online courses, simulation and gamification of learning, and Pedagogical and Psychological Aspects of e-Learning.

The Scope of the Conference

The scope of the conference includes the following topics:

Technical Concepts

- Learning Management Systems (LMS)
- Virtual Learning Environments (VLEs)
- Mobile learning technology
- Personal Learning Environments
- Infrastructure of E-Learning Environments
- Authoring tools
- Social networks and Web 2.0 technologies
- Security and Data Protection
- Learning objects
- Standards and Interoperability
- Semantic Web
- Learning Analytics
- Mobile Learning Analytics
- Learning Networks

Instructional Design

- Design and development of online courses
- Adaptability
- Experiential Learning
- Simulation
- Gamification of learning
- Content Development
- Organizational strategy
- E-Portfolios
- Curriculum development
- Quality assurance in e-Learning
- Assessment in e-learning
- Effective Learning Strategies

Pedagogical and Psychological Aspects of e-Learning

Pedagogical models and strategies

Pedagogical and Psychological Requirements for e-Learning Systems

Learning/Teaching Methodologies and Assessment

Learning Theories, Teaching Methods and E-Learning

Implementing Pedagogical Methods in e-Learning Systems

Didactical Issues of e-Learning

Personalized e-Learning

Motivation and e-Learning

E-Teacher Skills and Competences

Educating the Educators

Brain, Lifestyle&Cognition

Information Skills

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Language

The official languages of the eLearning-2014 is English. English will be used for all printed matters, presentations and discussion.

DESIGN ON MOOC FOR MANDATORY UNIVERSITY COURSE AT UGD

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Abstract: As a result of the rapid development of new technologies nowadays, there are lots of new trends in higher education. Massive open online courses (MOOCs) are one of them. MOOCs are online courses aimed at unlimited participation and open access via the web. This paper discusses this MOOC trend and its implementation in higher education. Moodle is one of the platforms used for creation of MOOCs. In the paper we are also explaining the use of Moodle platform at University "Goce Delcev" (UGD) - Stip and we are discussing about what is necessary for one course to be MOOC; so we are comparing the characteristics of MOOCs with the course Computer Science that we are creating on Moodle aimed for the UGD students. Also, we are explaining in details the procedure of designing a MOOC, and show how these steps are applied in the creation of our course. At the end we conclude that the design of a Massive Open Online Course is not easy and that many factors should be taken into consideration and sometimes many people are included. But, anyway, the trend of the Massive Open Online Courses is present now and his appearance will grow even more in the future.

Keywords: E-Learning, MOOC, Moodle, Computer science

1. INTRODUCTION

The continuous development of new technologies has brought new challenges for the higher education. The development of the Internet has played the main role in bringing new ways of communication and information sharing. Different kinds of digital platforms (like Moodle) are now part of peoples' everyday lives and have significantly improved the availability of data from all fields.

These trends haven't bypassed the higher education. The wide use of computers and the Internet have made distance education easier, faster and available to a big number of users from any part of the world. Distance programs become more popular with the beginning of the new century and their popularity grows every day. Another trend associated with higher education emerged in 2008, with the creation of the first Massive Open Online Course, "Connectivism and connective knowledge", by George Siemens and Stephen Downes [11].

2. WHAT IS A MOOC?

Massive open online course or MOOC is an online course aimed at unlimited participation and open access via web. MOOCs integrate social networking, accessible online resources, and are facilitated by leading practitioners in the field of study. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for students, professors, and teaching assistants.

There are two kind of MOOCs: xMOOCs and cMOOCs. xMOOCs is a business model, while cMOOCs is a pedagogical model. Also, xMOOCs usually have a higher education institution behind them (and, in some instances, a for profit corporation) and cMOOCs have groups of people delivering the course. From these, we can see that xMOOCs are more significant for higher education, because they are closer to the traditional education i.e. face to face education.

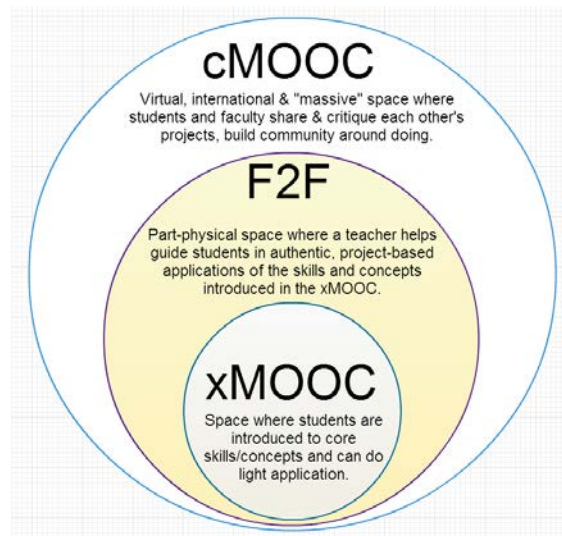


Image 1 Retrieved from [16]

<http://www.educause.edu/blogs/mcaulfield/xmooc-communities-should-learn-cmoocs>

3. WHAT IS MOODLE LMS?

Moodle LMS is one of the most popular Learning Management System. A big reason for that is that it's open source and it is customizable. The LMS can be used to conduct courses online or to support face-to-face teaching and learning. Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments in which they will manage online learning and online training. It can also be extended with modules for assignments, quizzes, grading, certification, social and collaborative learning in an engaging manner. And also, we can use Moodle as platform for creating MOOCs.

The first Moodle site was developed in November 2001. Since then Moodle has grown to become a powerful set of learner-centric tools and collaborative learning environments that empower both teaching and learning. The philosophy of Moodle includes a constructivist and social constructionist approach to education. Constructivism means that people actively construct new knowledge when interacting with their environments, while constructionism asserts that learning is particularly effective when constructing something for others to experience. Social constructivism extends constructivism into social settings, wherein groups construct knowledge for one another, collaboratively creating a small culture of shared artefacts with shared meanings. This philosophy basically emphasizes that learners, not just teachers, can contribute to the educational experience.

Moodle is used by variety of institutions and individuals including: universities, high schools, primary schools, government departments, healthcare organizations, military organizations, airlines, home schoolers, independent educators etc. There are tens of thousands of registered Moodle sites; however it's impossible to know the exact number of sites, since Moodle is an open source, free to download and distribute, and doesn't force registration on its users. The popularity of Moodle is due to many factors like: the ease of use, the support for teaching and learning, it's free with no licensing fees, it's always up to date, it's available in more than 120 languages, it's highly flexible and customizable, scalable to any size, robust, private and secure, you can use it anytime, anywhere and on any device, it has extensive amount of resources available, it's backed by a strong community etc.

4. USE OF MOODLE AT UGD

Starting from September 2008 until today (August 2014), at University "Goce Delcev" in Stip, exists an e-learning system, which uses the Moodle 2.7 platform. Over the years this system has become popular for both professors and students, and therefore its services are increasingly utilized. Initially the system served only for posting news, learning materials and test results, but today it is used for online exams, seminar assignments, surveys, discussion forums and it enables a 24 hour interaction between students and professors.

Our goal is to create a MOOC for the subject Computer Science at UGD. Computer science is a mandatory subject for all departments, except for the Faculty of Computer Science. The course is taught in the first semester, the format of the classes is 2+2+1, and it adds 6 credits. It is taken from approximately 3500 to 4000 students annually. The University Senate decided that this course should be taken online, because of the big number of students who take it, and with the goal of achieving better results. The traditional way of teaching the course has shown that only 10% of students who take it actually finish it. With the new electronic way of taking the course and having exams, it is expected this number to grow and even achieve 100%.

On the Moodle platform there is already a Computer Science course which is adequate and active. This brings up the question, is this course a MOOC or not?

4.1. WHETHER THE UNIVERSITY COURSE ON MOODLE IS MOOC OR NOT?

For a course to be MOOC, first of all it needs to be massive, that is to have a large number of users. It needs to be open, with free registration, available to anyone, with free content (videos, documents etc.) and with no paying fee. It needs to be online, which means available anytime, anywhere in the world. The MOOC needs to possess all the features a course should have: continuity, beginning and end, credits, own identification (ID), lecturer, group of students, assignments and feedback.

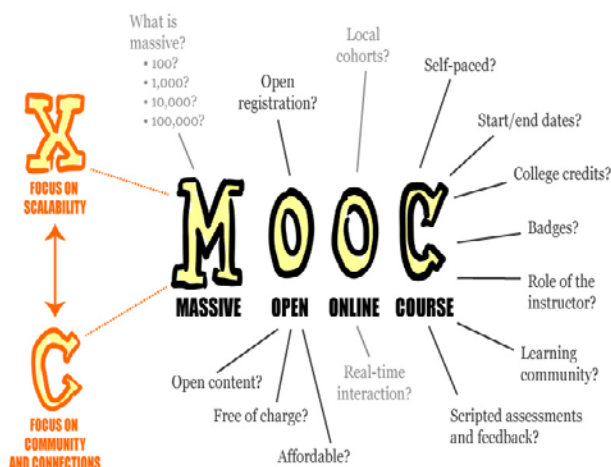


Image 2 Retrieved from [11]

<http://en.wikipedia.org/wiki/MOOCs>

To answer the question whether our course is MOOC or not, according to characteristics we mentioned, we give the following conclusions:

- Our course is massive. This is supported by the fact that the course is taken by 3500 to 4000 students annually.
- There is a deviation from the rule that the course should be open with free registration, free content, free of charge and available to anyone. Our course only partially meets these requirements because it is available and open for registration just for the students of UGD, which

have already paid the participation and enrolment costs. For these students all of the course content is free and available.

- The course is online and accessible anytime (24/7) and anywhere for the registered users.
- Last, but not least, the course possesses all the features a course should have.

According to these we come to conclusion that our course is only partially MOOC, because it is not free and available to anyone, but meets all the other requirements.

5. DESIGN AND IMPLEMENTATION OF MOOC FOR THE SUBJECT COMPUTER SCIENCE

In this part we will explain the procedure of designing a massive open online course and its implementation for the subject Computer Science. The procedure is as follows:

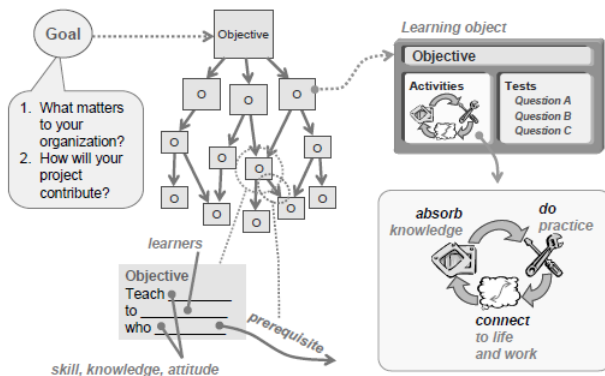


Image 3 Retrieved from [15]

- I. At first a **subject (topic)** about the course is chosen and **the goals** of the course are decided. Our chosen subject is Computer Science and the main goal is “students to gain knowledge through e-learning and to pass the exam in bigger percent”.
- II. The next step is defining of course **objectives**. The course objectives include:
 - 1) Definition of the course **audience** – Computer Science is a compulsory University subject, which means that if it’s present in the study program, all the students from that study program at the University should take it. At UGD Computer Science is present in all the study programs, except at the Faculty of Computer Science, and it is taken by 3500-4000 students annually.
 - 2) Some **prerequisite** about enrolling the course may or may not exist. For university subjects preconditions are usually passing an exam of another subject or enrolling into the semester etc. The main condition students should fulfill for taking the Computer Science course, is to be enrolled into first semester of studies.

- 3) **Defining course lecturers.** In addition to the main lecturer (the course creator) there should be at least one or two people who will assist him in the job. This is mainly because the courses are massive and online, so studying materials should be regularly uploaded and updated, assignments should be created, and feedback given about them, participation in the discussion forums is sometimes necessary etc.

The lecturers of the Computer Science course are one professor and two assistants. The professor uploads the studying materials for the course, defines the deadlines for the assignments and term papers and deals with the final grading of students. The assistants check the assignments and term papers take part in the discussion forums and are the main people for students to contact if they need help with the course. The presence of the lecturers in the course should be minimal, i.e. they need to monitor the events and to be active, but not dominant in any way.

- 4) Defining the **learning object** of the course which includes a) **Testing** and b) **Course activities**.
 - a) **Tests.** Whether we call them tests, assessments, quizzes, drills, examinations, competence monitors, or demonstrations of mastery, they, nonetheless, remain essential for gauging a learner’s progress. The Computer Science course has electronic tests with 4 types of questions (matching, true/false, rounding and multiple choice) and so far this method has proven to be very effecting for evaluation. Here are some reasons for testing. Some are good, and some are not.

Table 1 Good and bad reasons for testing

Good reasons	Bad reasons
Let learners gauge progress toward their goals.	Fulfill the stereotype that all e-learning courses have tests and all tests are unpleasant.
Emphasize what is important and thereby motivate learners to focus on it.	Reinforce the instructor’s power over learners. Pay attention or else.
Let learners apply what they have been learning—and thereby learn it more deeply.	Torture learners. Training is supposed to be painful. Tests can ensure that it is.
Monitor success of parts of the e-learning so that the instructor and designers can improve it.	Artificially bolster learners’ self-esteem by giving them easy tests with gushingly positive feedback.
Certify that learners have mastered certain knowledge or skills as part of a legal or licensing requirement.	Use a testing tool you paid a lot of money for.
Diagnose learners’ skills and knowledge so they can skip unnecessary learning.	You can’t think of any other way to add interactivity.

b) **Course activities.** Course activities include assignments, proposal topics for papers and proposal topics for projects. The Computer Science course has 9 assignments like: discussions on given topics; adding a new word in the dictionary of terms; making a presentation with pictures and effects; attaching a text document prepared in Microsoft Word; and making a print screen of a sent email. One of the activities is the creation of reading materials (pdf and doc files, power point presentations etc.), uploading useful links to additional studying materials and creation of short videos. Further, within Moodle we have implemented the Big Blue Button module, which allows interesting ways of presentation.

The videos can be in form of lectures (given by the lecturers), tutorials/demonstrations (resolving a problem step-by-step), interviews with experts in the field of the courses' topic, discussions on the topic etc. The videos should be short (10-15 minutes), so they can keep the listeners attention. It is important to mention that tutorials are better if they are written on board step-by-step, instead of making print screens from every step.

There are three general types of activities:

- Absorb activities - are activities during which the learner reads, listens, and watches.
- Do activities - Exercise, experiment, and discover.
- Connect activities - Link to prior learning, to work, and to life.

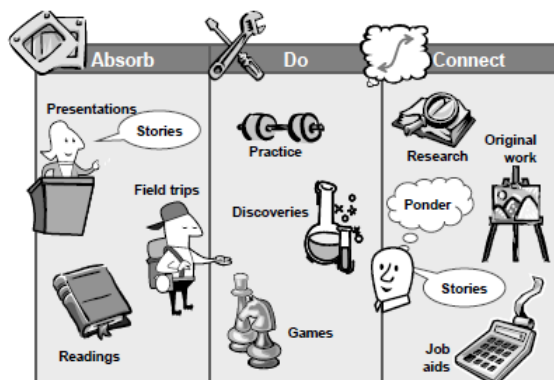


Image 4 Retrieved from [15]

Absorb-type activities

Absorb activities are the ones closest to pure information. They usually consist of information and the actions learners take to extract and comprehend knowledge from that information. In absorb activities the learner absorbs some of the knowledge offered by the content. Several types of absorb activities which are established in conventional education and have made the leap to online learning are:

- **Presentations** during which learners watch or listen to a slide show, demonstration, podcast, or some other organized explanation. They are

analogous to a classroom lecture or an explanation by an expert.

- **Story telling** during which the teacher tells a story relevant to the subject of learning. Story-telling activities relate individual human experiences. They make information real and personal.
- **Readings** include activities for which the learner reads from online or paper documents, such as textbooks, research papers, or technical manuals.
- **Field trips** take us to educational examples and intriguing displays. Field trips include activities for which the learner visit museums, parks, battlefields, zoos and greenhouses, archaeological digs, manufacturing plants, and ancient ruins, historic sites, and other places to examine many relevant examples. Although the learner may be physically active on a field trip, the learner learns by absorbing information.

In our course we often use a presentation and readings. Sometimes we are telling a story, but we do not use a field trips.

Do-type activities

While absorb activities provide information, do activities transform that information into knowledge and skills. They elevate learning from passive reading and watching to active seeking, selecting, and creating knowledge. In do activities, learners discover, parse, decode, analyze, verify, combine, organize, discuss, debate, evaluate, condense, refine, elaborate, and, most importantly, apply knowledge. Common types of do activities are:

- **Practice activities** give learners experience applying information, knowledge, and skills. They include drill-and-practice, hands-on, guided-analysis, and teamwork activities. Practice helps learners strengthen and refine skills, knowledge, and attitudes by applying them and receiving feedback.
- **Discovery activities** are times for experimenting and exploring. Their goal is to lead the learners to discover concepts, principles, and procedures for themselves. They include virtual laboratories, case studies, and role playing activities. Discovery activities do not present ideas, but lead learners to discover ideas on their own.
- **Games and simulations** allow learners to practice tasks, apply knowledge, and infer principles—all while having fun. These activities include quiz show games, word puzzles, jigsaw puzzles, adventure games, software simulations, device simulations, personal-response simulations, mathematical simulations, and environmental simulations. Games and simulations let people learn by playing.

The course Computer Science offer a practice activities like guided-analysis and teamwork, discovery activities like case studies and some kind of games and simulations (quizzes, word puzzles).

Connect-type activities

Connect activities lead learners to link what they are learning to prior learning and to situations in which they will apply the current learning in subsequent courses or on the job. Connect activities range from simple stop-and-think questions to complex real-world work assignments. Here are types of connect activities that have proven themselves in classroom and online learning:

- **Ponder activities** require learners to think deeply and broadly about a subject. They require learners to answer rhetorical questions, meditate about the subject, identify examples, evaluate examples, summarize learning, and brainstorm ideas. They are typically used for connecting to what the learner already knows.
- **Stories told by the learner** require learners to recall events from their own lives and to draw on their own experiences. They require the learner to connect the subject of learning to personal experiences.
- **Job aids** are tools that help learners apply learning to real-world tasks. As such they help connect learning to work. They include glossaries, calculators, and e-consultants.
- **Research activities** require learners to discover, identify and use their own learning resources. They require accessing and interpreting outside resources.
- **Original work** requires learners to perform genuine work and submit it for critique. It fully connects learning to the life of the learner.

After course completing, the student will be able to answer rhetorical questions, meditate about the subject, identify and evaluate examples, summarize learning, and brainstorm ideas, also will be able to connect the subject of learning to personal experiences, interpreting outside resources, to perform genuine work and submit it for critique.

- III. The next thing is defining **the length and duration** of the course. Our course is 14-15 weeks (or one semester) long and the number of classes is 2+2+1 or 6 hours a week.
- IV. Defining **accreditation and certification**. Since the course is a compulsory University subject, after the successful passing of the exam, the student gets a grade and specified number of credits. The number of credits for Computer Science is 6.

V. The **interaction** during the course can be written or face-to-face.

a) Written interaction. This type of interaction is facilitated by discussion forums, blogs, email messages or social networks. The participants in the written interaction must have an internet connection.

b) Face-to-face interaction. This type of interaction is desirable but not necessary for every course. The face-to-face interaction is present in our course, with possibility for the students to have a direct consultation with the professor or to visit classes and exercises.

VI. **Promotion** of the course to the general public and sharing it through social networks and email is also very important for increasing the number of students and the interest for the course.

VII. **Repetition and improvement** of the course. After one group of students finishes with the Computer Science Course, the course continues to exist and it's ready for the new students. The forum has a thread for recommendations and suggestions, where students can post ideas for improving the course functionality in the future.

Име на курсот

- Информатика
- задолжителен универзитетски предмет

Цели на курсот

Слушатели

- Студенти запишани на прв циклус на студии

Предуслови за упис

- упис на семестар и платена партиципација

Предавачи

- Професор
- Асистент 1
- Асистент 2

Присуство на предавачи

- активно
- не доминантно

Објекти за учење

- Тестирање
 - електронско тестирање
- Активности
 - апсорбирачки
 - практични
 - поврзувачки

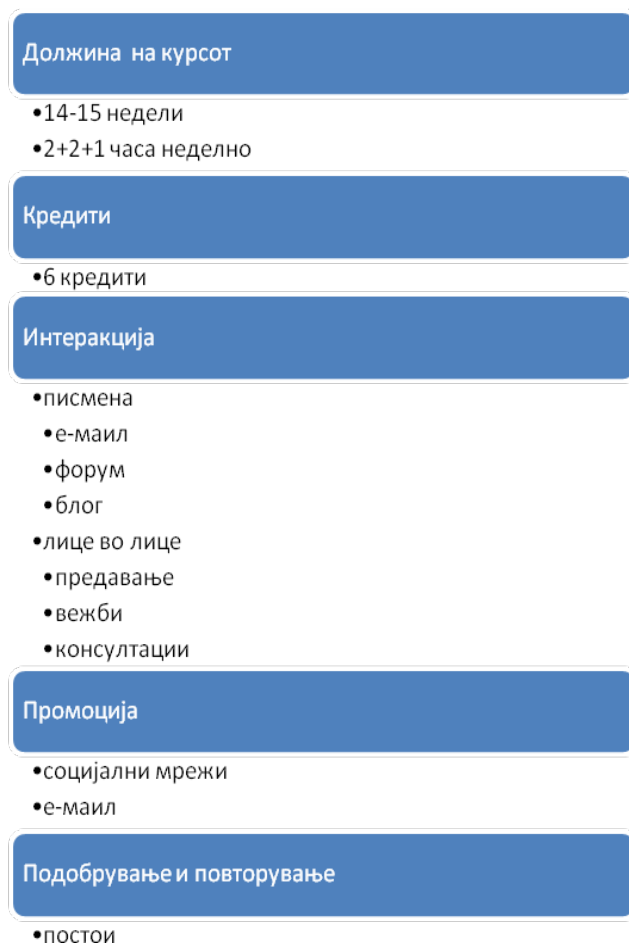


Image 5 MOOC for Computer Science

6. CONCLUSION

As we have shown in our paper the design of a Massive Open Online Course is not easy at all. Many factors should be taken into consideration and sometimes many people are included. Anyway, the trend of the Massive Open Online Courses has been going up since their appearance and it has the potential to grow even more in the future. This is especially important for the higher education institutions that want to stay up to date and offer modern and quality education to their students. Creation of MOOCs enables customization of studying and inclusion of more students. It is also important for the University staff because it lets them learn new pedagogical techniques, gain significant experience in the use of modern technologies, which also leads to enhancing the traditional methods of teaching.

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