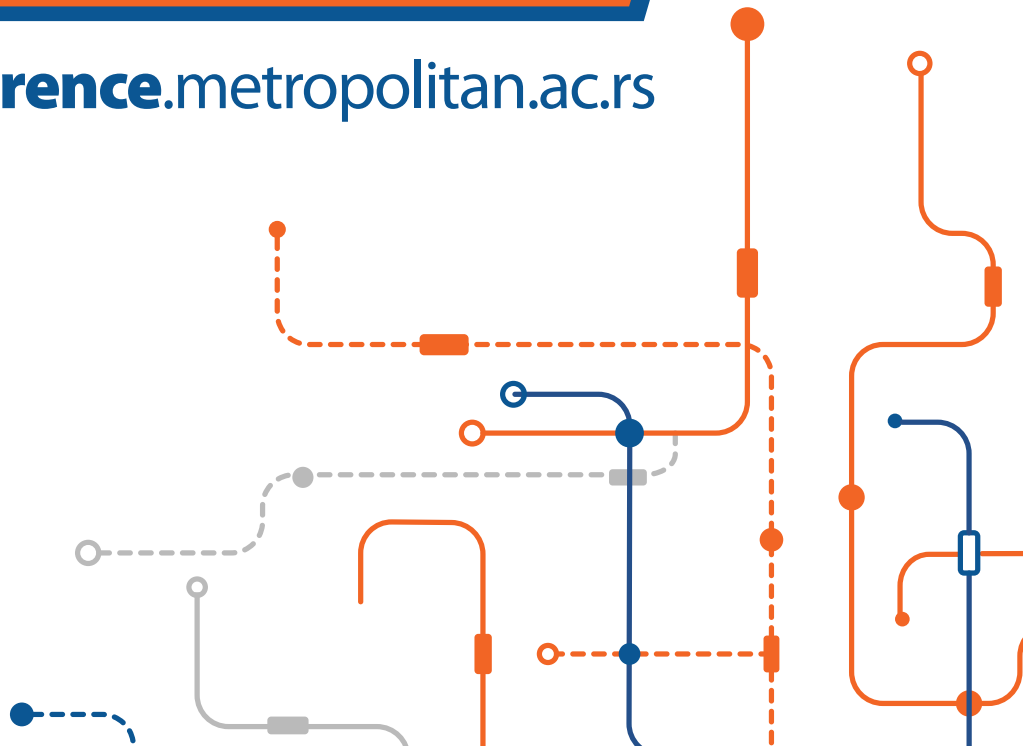# BELGRADE
METROPOLITAN
UNIVERSITY

eLearning
8th Conference on e-Learning 2017

28-29 September 2017 / Belgrade

econference.metropolitan.ac.rs

PROCEEDINGS
The Eighth International Conference on e-Learning

eLearning

8th Conference on e-Learning 2017

Belgrade Metropolitan University

Belgrade, 28-29 September 2017.
www.metropolitan.ac.rs

CONTENT

ORGANIZERS

BELGRADE
METROPOLITAN
UNIVERSITY

Mathematical Institute
of the Serbian Academy
of Sciences and Arts

Open Universiteit
www.ou.nl

PARTNERS

OPEN DISCOVERY SPACE

*Vlada Republike Srbije
Ministarstvo prosvete,
nauke i tehnološkog razvoja*

eLearning INDUSTRY
The Leading source in the eLearning Industry

conforganiser.com

УНИВЕРЗИТЕТ У БЕОГРАДУ - РУДАРСКО-ГЕОЛОШКИ ФАКУЛТЕТ

COORDINATOR OF THE INTERNATIONAL PROGRAMME COMMITTEE:

Prof. Dr. Marcus Specht, Open University of the Netherlands, Netherlands

MEMBERS:

Dr. Martin Wolpers, Fraunhofer Institute for Applied Information Technology, Germany
Anthony F. Camilleri, EFQUEL – European Federation for Quality in E-Learning, Belgium
Prof. (CN) Dr. Christian M. Stracke, Open University of the Netherlands, Netherlands
Dr. Thomas Richter, University of Duisburg-Essen, Germany
Laura Fedeli, University Macerata, Italy
Dr. Tomaž Klobučar, Jozef Stefan Institute, Slovenia
Dr. Klara Szabó, University of Szeged, Hungary
Mart Laanpere, Tallinn University, Estonia
Elaine Silvana Vejar, Northeastern University, Boston, MA, USA
Prof. Suzana Loskovska, University Ćirilo i Metodije, Macedonia
Prof. Sime Arsenovski, University FON, Macedonia
Prof. Božo Krstajić, University of Montenegro, Montenegro
Prof. Dr. Kavitha Chandra, University of Massachusetts Lowell, Lowell, USA
Dr. Eitan Simon, Ohalo College of Education Science and Sports, Katzrin, Israel
Prof. Dragan Domazet, Belgrade Metropolitan University, Serbia
Prof. Dr. Slobodan Jovanović, Belgrade Metropolitan University, Serbia
Prof. Krneta Radojka, University of Kragujevac, Serbia
Prof. Miroslav Trajanović, University of Niš, Serbia
Prof. Đorđe Kadijević, Institute of Mathematics of Serbian Academy of Science, Serbia
Prof. Dragana Bečejski-Vujaklija, University of Belgrade, Serbia
Prof. Mirjana Ivanović, University of Novi Sad, Serbia
Prof. Zoran Budimac, University of Novi Sad, Serbia
Prof. Radovan Antonijević, Faculty of Philosophy, University of Belgrade
Prof. Miroslava Raspopović, Belgrade Metropolitan University, Serbia
Prof. Božidar Radenković, University of Belgrade, Serbia Dr. Kai Pata, Tallin University, Estonia
Dr. Sofoklis Sotiriou, Ellinogermaniki Agogi, Greece
Prof. Vassilis Moustakis, Technical University of Crete, Greece
Prof. Saridakis Ioannis, Technical University of Crete, Greece
Prof. Constantin Zopounidis, Technical University of Crete, Greece
Prof. Pier Giuseppe Rossi, University Macerata, Italy
Prof. Dr. Krassen Stefanov, Sofia University, Bulgaria
Prof. Dr. Elissaveta Gourova, Sofia University, Bulgaria
Prof. Nada Trunk Šica, International School for Social And Business Studies, Celje, Slovenia
Pipan Matić, Jozef Stefan Institute, Slovenia
Tanja Arh, jozef Stefan Institute, Slovenia
Dr. Danijela Milošević , University of Kragujevac, Serbia
Prof. Miomir Stanković, University of Niš, Serbia

Language

The official language of the eLearning-2017 Conference is English. English will be used for all printed materials, presentations and discussion.

TECHNOLOGY ENABLED FLIPPED CLASSROOM TOOLS AND METHODOLOGIES

ZORAN ZDRAVEV.,
Goce Delcev University in Stip, Faculty of Computer Science, zoran.zdravev@ugd.edu.mk

ALEKSANDAR KRSTEV.,
Goce Delcev University in Stip, Faculty of Computer Science, aleksandar.krstev@ugd.edu.mk

DALIBOR SERAFIMOVSKI.,
Goce Delcev University in Stip, Faculty of Electrical Engineering, dalibor.serafimovski@ugd.edu.mk

Abstract: *The transformation of teaching and learning in higher education is inevitable with the use of Web-based and mobile communications technologies. Fundamental redesign based on blended approaches to teaching and learning represent the means to address the challenges associated with providing a quality learning experience. Although the catalyst for change in teaching and learning has been technology, the need to enhance quality standards is drawing attention to the potential of blended approaches. Because blended learning is an approach and design that merges the best of traditional, Web-based or mobile learning experiences to create and sustain vital communities of inquiry, many higher education institutions are quietly positioning themselves to harness its transformational potential. The transformational potential leads to creating a model called flipped classroom where lectures goes under control of the students: they can watch, rewind, and fast-forward as needed.*

Keywords: *E-Learning, Distance learning, Flipped Classroom, video presentations*

1. INTRODUCTION

Higher education institutions must address changing expectations associated with the quality of the learning experience and the wave of technological innovations. Participants in the higher education enterprise are questioning traditional approaches and whether they are achieving the high levels of learning promised. Those who have grown up with interactive technology are not always comfortable with the information transmission approach of large lectures. Students expect a relevant and engaging learning experience.

Administration, faculty, and students in higher education know there has to be change in how we design educational experiences. Most recognize that the convergence of the classroom and communications technology has the potential to transform higher education for the better. However, blended learning is more than enhancing lectures. It represents the transformation of how we approach teaching and learning. It is a complete rethinking and redesign of the educational environment and learning experience. Blended learning is a coherent design approach that openly assesses and integrates the strengths of face-to-face and online learning to address worthwhile educational goals.

2. CONCEPT OF THE FLIPPED CLASSROOM

There are two related movements that are combining to change the face of education. The first of these is a technological movement. This technological movement has enabled the amplification and duplication of information at an extremely low-cost. Most research on the flipped classroom employs group-based interactive learning activities inside the classroom, citing student-centered learning theories. There is wide variation in what is being assigned as "homework". The flipped classroom label is most often assigned to courses that use activities made up of asynchronous web-based video lectures and closed-ended problems or quizzes. In many traditional courses, this represents all the instruction students ever get. Thus, the flipped classroom actually represents an expansion of the curriculum, rather than a mere re-arrangement of activities. We define the flipped classroom as an educational technique that consists of two parts: interactive group learning activities inside the classroom, and direct computer-based individual instruction outside the classroom.

An effective way to start the (re)design process is to reflect on a series of key questions about the course:

- What do you want your students to know when they have completed your blended learning course?
- What types of learning activities will you design that integrate face-to-face and online components?
- What means will you use to assess these integrated learning activities?
- How will information and communication technologies be used to support blended learning?

For most students, blended learning will be a new experience; therefore, it is important to provide them

with a proper orientation to the course. Our experience has shown that students who understand what the teacher plans for the course and why are in a much better position to engage positively in the learning activities and to achieve the course learning outcomes.

The theoretical foundations used for justifying the flipped classroom typically focus on reasons for not using classroom time to deliver lectures.

3. WEB – BASED TOOLS

In a study on course redesign, Twigg (2003) indicated that learning management systems, such as Blackboard and Moodle, can increase student opportunities for feedback and assessment, while decreasing the amount of time that faculty and teaching assistants spend preparing assessment activities, grading, recording, and posting results. Traditional assessment approaches in large introductory courses often involve only a midterm and final examination. But when a Web-based assessment tool is used, components of the assessment and feedback process can be automated to enable repetition and practice and frequent feedback. Research has consistently proven that repetition and feedback enhance learning. A Web-based tool can also significantly reduce faculty workload and increase free time for interaction with students.

Students can be regularly tested on assigned readings and homework with the use of online quizzes designed to probe their preparedness and conceptual understanding. These brief quizzes motivate students to keep current with the course material, as well as aid study structure and encourage more time spent on the task at hand.

Using online quizzes encourages a "do it until you get it right" approach because students are allowed to take quizzes as many times as required to master the material. These types of online activities provide consistent, automated grading across sections and allow instant feedback for students when they are concentrating on the task. [1], [2], [3].

4. CASE STUDY IN THE CLASS ON SELECTED GROUP AND SUBJECT

In this paper, the examinations are specifically aimed at comparing the knowledge of students in the subject of Informatics from two faculties observed in two different study years 2015/2016 and 2016/2017. We will work with a sample of about 600 students from the Faculty of Medical Sciences at the University "Goce Delcev" - Shtip, of which 300 students have attended the Informatics course in the academic year 2015/2016, and 300 in the academic year 2016/2017.

In the paper, we start with the assumption that students in both study years come with approximately identical forewords from Informatics and we neglect all other facts that influence the acquisition of knowledge from various types of learning and gaining basic knowledge on the topics covered in the Informatics course. In the following given below are

In the study 2015/2016, the classes are realized with a classic method, using methods of lectures through presentations and minimal use of web technologies in this case, created e-course on the Moodle platform.
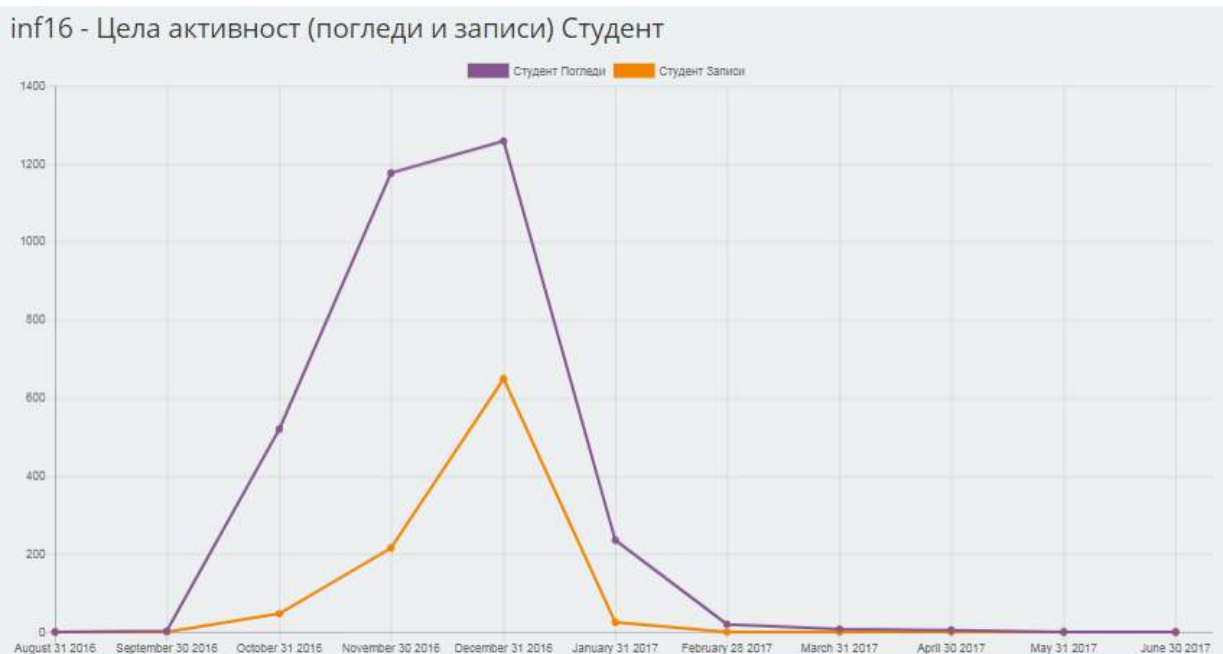
Figure 1. Course activities by students 2015-2016

Table 1. Course activities by students 2015-2016

The period ends (Month)	Student Views	Student Records	Reports
June 30 2016	**0**	**0**	**Reports**
May 31 2016	**1**	**0**	
April 30 2016	**4**	**0**	
March 31 2016	**7**	**0**	
February 28 2016	**20**	**0**	
January 31 2016	**236**	**25**	
December 31 2015	**1258**	**650**	
November 30 2015	**1178**	**215**	
October 31 2015	**520**	**47**	
September 30 2015	**2**	**0**	
August 31 2015	**1**	**0**	

In the 2016/2017 study, the teaching was realized in combination of the classical method using methods of lectures through presentations and using web technologies as an e-course in which besides presentations and standard forms of electronic testing of knowledge, they are complemented with activities in the form on: questionnaires, discussion groups, blogs, forums and video presentations. As advanced forms of activities such as granting privileges to the users themselves - students to be creators of discussions and forms of voting, or active on-line activity, which would actively develop joint projects with other colleagues on the course itself and evaluating final seminars or projects between each other. [4], [6], [7],[9] , [14], [18],[19], [21], [22].
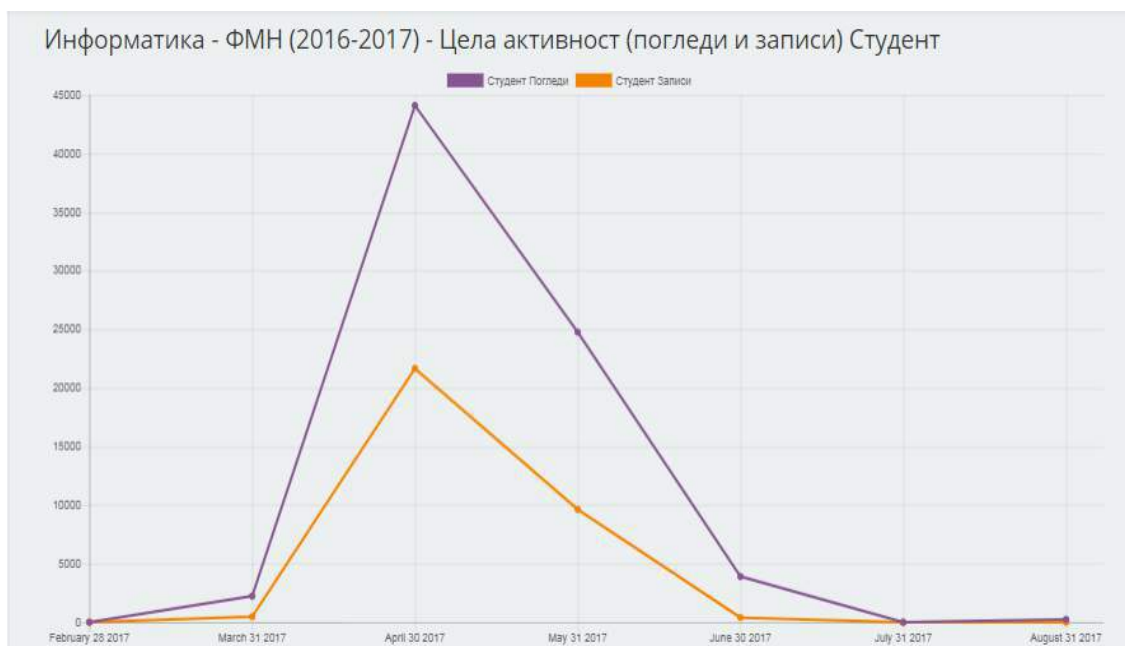
Figure 2. Course activities by students 2016-2017

Table 2. Course activities by students 2016-2017

The period ends (Month)	Student Views	Student Records	Reports
August 31 2017	**200**	**3**	Reports
July 31 2017	**18**	**2**	Reports
June 30 2017	**3869**	**387**	Reports
May 31 2017	**24808**	**9662**	
April 30 2017	**44105**	**21703**	
March 31 2017	**2220**	**503**	
February 28 2017	**20**	**1**	

The results were dramatically visible according to the results achieved after completing the course within a given period. In Table 1 and 2 are given results: Student Views and Student Records from the course in which is visible that in the student year 2016-/017 the views and records from the students are significantly higher than 2015/2016.

Figure 3. Achieved results after completing all activities for 2015-2016

Figure 4. Achieved results after completing all activities for 2016-2017

Based on the overall results achieved by students, this is how the final table of success looked like for all examined students in both study programs with and without the use of the flipped classroom method:

Class 2015/2016 – Overall average = 30.49 points (out of 100 max)
Class 2016/2017 – Overall average = 61.15 points (out of 100 max)

5. CONCLUSION

We suggest that in order to ensure progress, future research on the flipped classroom should employ controlled studies that objectively examine student performance throughout a semester, with both traditional and concept-inventory style problems. Further, we recommend that researchers employing the flipped classroom leverage the existing research and theoretical frameworks to guide their use and design of in-class activities. The affordable state of recording technology and ubiquity web-based dissemination tools make research on the flipped classroom both timely and cost-effective. Even though the survey data and the grades cannot be used to make any substantial conclusions about differences between the flipped and non-flipped classroom, we think the difference between grades and student's results from the flipped classroom warrants further interest and research in its use in the higher education classroom. This study illustrates that using the Flipped classroom concept gives about fifty percent better results and it is a great help for the students in their overall success . Some students do not grasp the concept in the beginning but the Flipped instruction concept facilitates interaction among students, and between students and their Instructors. Flipped instruction leads to better learning results.

6. REFERENCES

[1.] M. Ronchetti, ―Using video lectures to make teaching more interactive, ‖ International Journal of Emerging Technologies in Learning (IJET), June 2010.

[2.] G. Topp, ―Flipped classrooms take advantage of technology, ‖ USA Today, Oct. 6, 2011.

[3.] Flipping the classroom, The Economist, Sep. 17, 2011.

[4.] D. Mehta, Video in the Class Keeps Savvy Students Engaged, Toronto: The Canadian Press, Sep. 8, 2011.

[5.] D. Pink, ―Flip-thinking - The new buzz word sweeping the US, ‖ The Daily Telegraph, London, Sep. 12, 2010.

[6.] A. Brenda, ―Flipping the classroom: Homework in class, lessons at home, ‖ National Education Association, February 22, 2012.

[7.] B. Tucker, ―The flipped classroom, ‖ Education Next, Winter 2012.

[8.] J. Olsen and S. Gross, ―Skills practice - Alternative history as narrative, ‖ New York Times, March 21, 2014.

[9.] The Flipped Classroom: Turning Traditional Education on Its Head, Knewton.

[10.] T. Rosenberg, ―Turning education upside down, ‖ New York Times, Oct. 9, 2013.

[11.] E. E. Scida and R. E. Saury, ―Hybrid courses and their impact on Student and classroom performance: A case study at the University of Virginia, ‖ CALICO Journal, vol. 23, no. 3, pp. 517–531, 2006.