

Analyzing students' SRL strategies when using a MOOC as a Book

Jorge Maldonado-Mahauad^{1,2}, Mar Pérez-Sanagustín¹
Guillermo Pacheco², Isabel Espinoza², Jorge Bermeo²,

¹Departamento de Ciencias de la Computación, Pontificia Universidad Católica de Chile, Chile

²Departamento de Ciencias de la Computación, Universidad de Cuenca, Ecuador

{jymaldonado, mar.perez}@uc.cl

{guillermo.pacheco, isabel.espinoza, jorge.bermeo}@ucuenca.edu.ec

Abstract. This paper presents a pilot study that shows the use of MOOC as a book as part of a Flipped Learning (FL) approach devoted to promote active learning in class. An analysis of the students' behaviour within the MOOC platform indicates that learners' with a different self-regulatory profile show different activity patterns.

Keywords: MOOC, Self-regulation, Learning strategies, Flipped Classroom

1 Introduction

Higher Education Institutions have started to explore and experiment with hybrid initiatives that encompass MOOCs, either self-produced or produced by third-party institutions. Most of current initiatives described in the literature propose the Flipped Classroom model (FC), to promote active learning and students' self-regulatory skills. According to Bergmann, Sams and Gudentrath [1] the use of the Flipped Classroom pedagogical approach, allows to hybridize the learning space and optimize classroom time, facilitating teachers to reach students in a more personalized way [3]. In addition, students can adapt the course to their own pace and personal learning needs [2]. In order to see how different students organize their own learning in this type of experiences, this paper presents a pilot study of a Flipped Classroom. The pilot study was conducted in a first year course of 8 weeks for learning the fundamentals of algorithm and data structures with N=149 learners in which a MOOC about foundations of programming in Python was used to complement the content delivered in class. Two questions were addressed for the analysis: i. *What is the impact on students' academic performance when adopting a FL approach as part of the class proposal?* ii. *How does different profile self-regulation students' behavior differ when a MOOC is used as part of a FL approach proposal.*

2 Pilot Study

A MOOC entitled "Foundations of Programming" was designed entirely in Spanish for the Open edX¹ platform. The contents delivered, encompassed 35 readings, 18 video lessons and 3 evaluations at the end of each module. This MOOC was used in the context of the subject "Algorithm, data, and structures I" with 149 students of the Engineering Faculty, University of Cuenca. These students were randomly appointed,

¹ Link to MOOC in Open edX platform in the next link: https://educacionvirtual.cedua.edu.ec/courses/course-v1:UniversidadDeCuenca+UDC001+2016_T1/about

through an administrative process, to an experimental group (EG) with 74 students, which followed the FC approach, and to a control group (CG) with 75 students. The Flipped Classroom² was organized through 3 stages that encompassed activities performed before, during and after the class in order to accomplish the learning goal. Activities before the class consisted in the analysis of the topic where the main objective is to analyze the feasibility of developing the content of a particular subject under the FC approach. Also, in this stage is important to know the topics students did not understand properly and plan or re-plan the face-to-face class. During the class the main objective is to aim to take student from the remembering and understanding levels to the applying and analyzing levels, with the guidance and support of the teacher in class. Finally after the class the main objective is to consolidate students' knowledge. To do it, the teacher can offer: (1) explanations and additional resources, (2) share the work done by the students with the whole class, and (3) encourage them to explain what they have learned in a class.

At the beginning of the course, students in the EG were asked to answer a SRL validated questionnaire. This questionnaire indicates the SRL students' profile in a scale from 1 to 4. Academic performance was calculated for both groups considering the following evaluations: (1) the score in the practice exercises that students had to answer during the class within the MOOC, and (2) two quizzes (quiz 1 and midterm exam) that counted for their final evaluation. Both, the control and the experimental group answered the same evaluation tasks.

2.1 Results

i. What is the impact on students' academic performance when adopting a FL approach as part of the class proposal? First, students in the EG showed better results in terms of scores than their counter parts during the first part of the semester. Second, students in the EG obtained better grades in the practical exercises and in quiz 1 than those within the CG.

ii. How does different profile self-regulation students' behavior differ when a MOOC is used as part of a FL approach proposal. Students of the EG with a high self-regulated profile showed the followed patterns: (1) go back to or search specific content before finishing an assessment activity to continue; (2) go back to the very beginning of the module in order to organize or to recap concepts that were learned before; and (3) try to go over the last module in an autonomous way, while, those with a lower SRL profile don't do the last module in an autonomous way.

3 References

- [1] Bergman, J., & Sams, A. (2011). How the flipped classroom was born. The Daily Riff Online.
- [2] Maldonado-Mahauad, J., Pérez-Sanagustín, M., Kizilcec, R. F., Morales, N., & Muñoz-Gama, J. (2018). Mining theory-based patterns from Big data: Identifying self-regulated learning strategies in Massive Open Online Courses. *Computers in Human Behavior*, 80, 179-196.
- [3] Blau, I., & Shamir-Inbal, T. (2017). Re-designed flipped learning model in an academic course: The role of co-creation and co-regulation. *Computers & Education*, 115, 69-81.

² Link to the guide: https://www.dropbox.com/s/dkwuh56cj4exta9/FC_guide.pdf?dl=0