

Exploring the Use of Videos for Learning by Teaching

Amélia Caldeira
Department of Mathematics
School of Engineering –
Polytechnic of Porto
LEMA-ISEP, SYSTEC-ISR
Porto, Portugal
acd@isep.ipp.pt

Sofia Lopes
Department of Mathematics
University of Minho
and Center of Physics,
SYSTEC-ISR
Guimarães, Portugal
sofialopes@math.uminho.pt

Isabel Figueiredo
Department of Mathematics
School of Engineering –
Polytechnic of Porto
LEMA-ISEP, SYSTEC-ISR
Porto, Portugal
ipf@isep.ipp.pt

Alexandra R. Costa
Department of Management
School of Engineering –
Polytechnic of Porto
ISEP
map@isep.ipp.pt

Abstract - Using videos engages students, aids student retention of knowledge, motivates interest in the subject matter, and illustrates the relevance of many concepts. In this work, we describe a teaching experience involving videos, where the students made a video about solving a concrete problem of Linear Algebra. In this video, the students should explain the problem solving to their colleagues (playing the role of teacher). We present also the results of the impact of this kind of project in the students' motivation.

Keywords – Learning, Mathematics, Teaching, Video.

INTRODUCTION

The student's motivation is a key element within the learning process (Pintrich, 1999). The modern world is becoming a place where a huge variety of technologies emerges. The education, as an integral part of the world, also has a direct bearing in the new technologies. It is widely accepted that using new technologies is a support tool for enhancing learning efficacy (Targamadze & Petrauskienė, 2010). Among these tools, video has been used for many years to support student learning (Barford & Weston, 1997 and Bravo et al, 2011). Using videos engages students, aids student retention of knowledge, motivates interest in the subject matter, and illustrates the relevance of many concepts. In this work, we describe a teaching experience involving videos, where the students made a video about solving a concrete problem of Linear Algebra.

METHODOLOGY

In this project, the students teach the lesson. They present in the video the solution of the proposed problem so their classmates will understand the resolution of the problem and the explication. The students can learn as they watch each other's videos. The goal of this video is very specific and have a short mathematic problem resolution. The students have to create it in a very short period of time and they have

few resources. It is a Low-cost educational video (Simo et al, 2010).

In this project we have the participation of 71 students. Teams of two or three students were formed and each team received a project worksheet. The worksheets were all different for each team. The students have two weeks to accomplish the work.

For communication with the students we use the Moodle e-Learning platform providing supporting material and for the delivery of the final work. We create in this platform a proper space, accessible to all persons involved, to help the management of the process, of delivery of the final work and its logistics.

FINDINGS

The results obtained by the participating students were generally positive. Students' involvement in the project was notorious. With this kind of challenge, students had the opportunity to develop a reflexive thought to overcome difficulties and, in this way, to develop knowledge and skills.

In fact, many different skills have been developed by students throughout the execution of this project. As an example, we can point out the ability to work with others, to solve problems and conflicts and also the ability to make public presentations.

By the end of the project, students' opinions regarding the challenge they had faced was assessed using a survey in the form of a questionnaire. In this survey, students were asked to give their opinion:

Question 1: about the nature of the project and its objectives;

Question 2: about the satisfaction concerning the personal involvement in the project;

Question 3: about the impact of the project in motivation to learn Linear Algebra;

Question 4: about the satisfaction in learning by teaching;

Question 5: global opinion of the project.

These questions were assessed using a Likert scale, being 1 "very unsatisfied", and 5 "very satisfied". Fifty-one students

answered the questionnaire. The average score was over 4.2 considering all the questions, reaching 4.4 in those questions where students assessed the objectives of the project, and 4.2 in the global opinion of the project (Fig. 1).

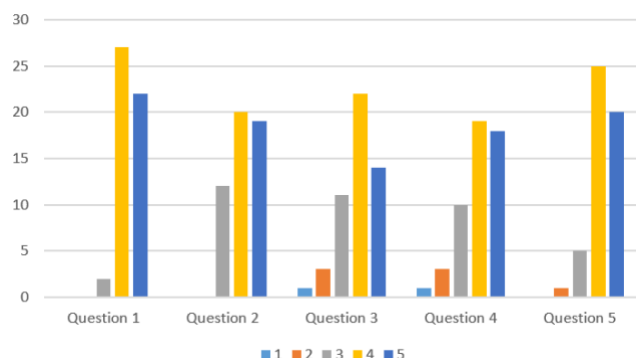


Figure 1: Feedback from the students

Students were also asked to provide general feedback on the project as well as to identify strengths and weaknesses. As for strengths, students highlighted the relevance of the project for learning and consolidating Linear Algebra concepts. Although many of the respondent students did not mention any weakness, some pointed that the time impose for the duration of the video was short as aspects to be improved in future editions.

CONCLUSIONS

This work demonstrated that the use of videos has a positive effect upon students' perception regarding the enhancement of their learning motivation.

We may conclude that students recognized the importance of this project not only to develop personal and teamwork skills, but also to consolidate knowledge of Linear Algebra.

ACKNOWLEDGEMENTS

We acknowledge support from FEDER/COMPETE2020-POCI/FCT funds through grants POCI-01-0145-FEDER-028247 - To Chair

REFERENCES

- Barford, J. & Weston, C. (1997). The use of video as a teaching resource in a new university. *British journal of Educational Techonology*, vol.28. pp 40-50.
- Bravo, E., García, B. & Simo, P., Enache, M. & Fernandez, V. (2011). Video as a new teaching tool to increase student motivation. 2011 IEEE Global Engineering Education Conference, EDUCON 2011. 638 - 642.
- Pintrich, P., (1999). The role of motivation in promoting and sustaining selfregulated learning. *International Journal of Educational Research*, vol. 31 pp 459-470.

Simo, P., Fernandez, V., Algaba, I., Salan, N., Enache, M., Albareda-Sambola, M. (2010). Video stream and teaching channels quantitative analysis of the use of low-cost educational videos on the web. *Procedia Social and Behavioral Sciences*, vol. 2, pp 2937-2941.

Targamadze, A. & Petrauskiene, R. (2010). Impact of information technologies on modern learning. *Information Techonology and Control*, vol. 39, pp 169-175.