

"Use of the Flipped Classroom Training Pilot in the Discipline of Physics"

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Abstract.

The inverted classroom is an instruction procedure whose main objective is for the student to assume a more effective role in education, compared to the traditional one. The student will study the concepts for himself, with the tools that the teacher puts at his disposal, videos or podcasts, the class time is used to solve doubts of the didactic material, practice and open forums. Students become «e-students», people who use new technologies as learning tools in and out of the classroom. In the digital age, the recording and editing of educational materials is relatively simple. Keywords: inverted classroom, flipped classroom, audiovisual material, curricular adaptation.

1. Introduction

With this investigation of educational innovation, an attempt is made to answer a series of requirements and requests at all levels, both for students and at the institutional level. One of these requirements is to consider how to transform and that the student considers himself committed to the university tasks and feel the satisfaction of assimilating any subject, obtaining his maximum opportunities. It seeks tools that benefit a better climate in the classrooms. Improvements that the student develops qualities of work in group and of cooperative way, that awaken in him concerns and needs of learning inside and outside the esteemed surroundings like formally educative, to foment a future active citizenship.

The dizzying development that ICTs are experiencing sometimes surpasses the change we are capable of taking on. On the other hand, the university of the 21st century is not achieved by adapting new technologies to old educational paradigms, but by contributing to education the authentic meaning of communication as transformation **and** change, thus accessing the shared knowledge society (Gutiérrez, Palacios and Torrego, 2010).

2. Inverted class

Already in 1984 Eric Mazur (1991), made use of the computer in his introductory class to the Physics in science careers, to make certain demonstrations in the classroom. These demonstrations were presented as animations created using a graphic animation program called Video Works. These animations had a double purpose, on the one hand, to clarify certain concepts difficult to visualize with static drawings, and on the other to make a parenthesis in the master class and to capture the attention of the students.

His work had such an impact that he developed an entire software package for Apple Macintosh dedicated to physics called The Essence of Physics.

3. Teaching methodology

These actions are carried out regularly in short groups, and are directed and carried by the teacher in the classroom. The professors also manage to use evident test of evaluation of concepts, elaborated after the analysis of videos in house, with subjects on the well-known material included in a set of interrogations in line. Given the analysis of these tests, they are able to understand the main deprivation of the group and difficult points in learning.

When a teacher decides to invest their classes, install flipped classroom methodology, it is recommended that the

first classes be adjusted to this new work model, the teacher must specify how the time in the classroom will occur during the course, what type of work will be done, inside and outside the classroom, and transfer the requirement of discrepancy and obtaining new responsibilities by the student.

4. Presentation and discussion of results

In this research, the arithmetic means of the ratings were calculated, the interaction between the inverted class and the use of the platform was carried out, as well as the statistical analysis ANOVA

	NO FORUM	WITH FORUM
NO INVERTED CLASS	10,2	11,2
WITH INVERTED CLASS	12,7	14,2

Table 1. Arithmetic means of the courses



Figure 1: Interaction between inverted class and educational platform

ANOVA Summary					
Source	SS	df	MS	F	P
Rows	384.46	1	384.46	34.21	<.0001
Columns	52.83	1	52.83	4.7	0.0319
r x c	0.11	1	0.11	0.01	0.9205
Error	1528.34	136	11.24		
Total	1965.74	139			

Table 2. Anova statistical analysis

5. Conclusion

The diverse representations of instruction and the events of interactions of technology with education. The most renewed

information shows that the technological releases give us a new aspect in the instruction. Virtual spaces provide social interactions among collaborators. It is appreciated that the appropriate use of technological systems, strengthen the learning process in a certain percentage. For the application of the didactic model Flipped Classroom and Virtual Platforms it is obligatory to make a compilation of the most notable aspects such as: polls, observations, obligations, and unification of these models in learning.

The usefulness of the technique is indisputable and its validity has remained excessively justified through the studies. This gain increases in cases in which students are in a situation of curricular adaptation. The acquisition of the model demands that the student be 100% involved in the learning process, it is not easy to achieve today in our classes. It can be said that the usefulness of the flipped classroom is directly proportional to the discrepancy and achievement of the students.

6. References

- [1] Bergmann, J. & Sams, A. (2012). Flip your Classroom: Reach Every Student in Every Class Every day. Washington, DC: ISTE; and Alexandria, VA: ASCD.
- [2] Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. En ASEE National Conference Proceedings, Atlanta, GA (Vol. 30).
- [3] Chen, L., Chen, T.-L., & Chen, N.-S. (2015). Students' Perspectives of Using Cooperative Learning in a Flipped Statistics Classroom. Australasian Journal of Educational Technology, 31(6), 621-640.
- [4] Crouch, C. H., Watkins, J., Fagen, A. P., & Mazur, E. (2007). Peer instruction: Engaging students one-on-one, all at once. Research-Based Reform of University Physics, 1(1), 40-95.
- [5] González Fernández, N. & Carrillo Jácome, G.A. (2016). El Aprendizaje Cooperativo y la Flipped Classroom: una pareja ideal mediada por las TIC. Aularia: Revista Digital de Comunicación, vol. 5 (número 2), pp. 43-48.