A first experience of flipped classroom in numerical analysis
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Introduction

Flipped classroom is a pedagogical model that modifies the way that time is spent both in and outside the class, working with active learning, centered on students. Questions like “Do students accept flipping the classroom?”, “What do they think about learning with recorded classes?” arise when we think about changing the way of teaching from the classical model of classes to the flipped methodology. With the purpose of determining the acceptability of this methodology, a first experience was implemented in a numerical analysis course, belonging to the career Industrial Engineering, at Facultad Regional San Nicolás, UTN, from Argentina. The issue “interpolating polynomials and spline functions” was selected.

Methodology

To carry out the experience, videos were created with appropriate tools, and a didactical sequence was given to the students in a virtual platform. This sequence included links to the videos –some containing theory and others, solved exercises–, the order that must be followed to watch them, and some questions about the subject being studied, together with some suggested exercises to be done, following the ones given in the videos.

Then, during the class, definitions and properties were reviewed and active participation of students was reached when exercises were solved. After that, a survey was conducted so as to gather the students’ opinions.

Results

The experience showed a high degree of students’ acceptance with respect to the methodology of the flipped class. Ninety-six percent of students watched the videos and eighty-six percent of students said they had understood the issue from the given videos.

Students were satisfied with the videos presented, and in general they preferred to work in class on their own, with the assistance of the faculty, rather than having the assistant solving exercises on the whiteboard. Some of the reasons they exposed were:
- “Concepts are better fixed to me, besides it is comfortable to be at home…”
- “Note-taking was easy”
- “Because I could pause the explanation whenever I wanted and go backwards as often as necessary to understand what was being done”

![Preferred methodology](image)

Conclusion

From the students’ point of view, the survey showed a high degree of acceptance with respect to the methodology of the flipped class. In class the students showed their enthusiasm, and their interest was noted from the moment the experience started. Students were satisfied with the material offered, and in a high percentage, they preferred to work in class on their own, with guidance, rather than having the assistant solving exercises on the board.

From the academics’ point of view, the videos developed for this experience, together with the material offered on the websites of the subject, gave the students the necessary tools to achieve autonomy in the study of theory, making it possible to change the way of working in class. But the experience turned out to be a major challenge. On the one hand, the development of our tailor made videos involved a great time spent on finding the right tool and learning how to use it. On the other hand, it was not easy to change the role when exercises have to be solved: we had to let students work alone –with our assistance–, and that takes more time than that spent when exercises are explained on the board.

This brief experience not only helped to obtain the opinion of students. From the teachers’ experience, we found that it was needed to devote much more time to preparing material for a flipped classroom –videos to watch as well as activities to carry out in class– at least for the first time. It was also found that the classes were much more dynamic.