

# *An In-Class Flipped Classroom Experience with Engineering Students in the subject ‘Value Chain and Financial Economics’*

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**Abstract**—This communication presents the student feedback on an in-class flipped class activity carried out in the 2023-2024 academic course in the subject ‘Value chain and Financial Economics’. The activity is in line with the frame of the New Learning Context (NLC) implemented at La Salle Universitat Ramon Llull (La Salle-URL) and was designed to be carried in class by means of a group work. Students were organized in groups of three, with no specific regard to their performance on a subject assessment held two weeks prior. Findings suggest that most students favored the in-class flipped class activity, although some of them expressed a preference for a traditional lecture-based instruction.

**Keywords**—*Flipped Class; ICTs Engineering Programs; Management Subject; New Learning Context; Teaching Innovation.*

## I. INTRODUCTION

This work presents a flipped class activity that was carried out in a management subject at La Salle Campus Barcelona, Universitat Ramon Llull (La Salle-URL) with the goal of actively engaging the students in the subject and evaluating if it was a useful tool to be replicated. Diverse research works have pointed at different advantages that resulted from conducting flipped class activities [1]–[3].

The New Learning Context (NLC) deployed during the last years at La Salle-URL is a framework applied to all the programs taught at La Salle Campus Barcelona [4]. This communication presents the student feedback from undergraduates that experienced a flipped class activity in the

context of a management subject during the first semester of the 2023-2024 academic course.

## II. MOTIVATION AND BACKGROUND

### A. New Learning Context at La Salle-URL

The New Learning Context (NLC) is implemented at La Salle-URL in all the different undergraduate programs taught in the campus such as: ICTs (Information and Communication Technologies) Engineering; Software Application Techniques; Health Engineering; Animation; Digital Arts; Business and Management; Architecture. A succinct scope on the NLC is described in [4], [5], and it is configured through five different learning environments: (1) Welcoming; (2) Seminar; (3) Workshop; (4) Project; and (5) Closure). When analyzing the different options available in terms of methodologies, diverse choices are offered to the instructors: (1) Lecture; (2) Class of problems and exercises; (3) Laboratory practices; (4) Pre-professional laboratory practices; (5) Seminar; (6) Self-Paced Learning; (7) Learning by Projects; (8) Flipped classroom; (9) Gamification; (10) Peer Instruction; (11) Real Events; (12) Learning by Challenge; (13) Grow through Experiences; (14) Case Method; and (15) Just-In-Time Teaching. This communication presents the findings associated with the practical implementation of one of the methodologies: a Flipped Class Activity carried out in finance session.

### B. Flipped Classroom Activity

A Flipped Classroom Activity is a student-centered model, in which students play an active role [6]. It can be explained as an instruction model where “students study instructional material before class (e.g., by watching online lectures) and apply the learning material during class” [3]. Diverse research

works have highlighted distinct advantages that resulted from conducting flipped class activities such as positive effects on the students' learning outcomes [1], [3], besides positively affecting their perceptions -*e.g.*, in terms of engagement or satisfaction- [2].

### III. ACTIVITY AND FINDINGS

The in-class flipped class activity was carried out during the first term of the 2023-2024 academic course in the context of a management subject taught to the engineering students of the seven ICTs engineering programs imparted at La Salle-URL. The activity aimed to engage undergraduates, as well as to assess whether the activity was perceived differently by underperforming students. This activity demonstrated the flipped classroom approach, and in addition, was used to evaluate its effectiveness for future sessions, contingent on student feedback about the experience.

#### A. Subject: 'Value Chain and Financial Economics'

This is a second-year subject of 4 ECTS (European Credit Transfer System) taught on an annual basis to all the students of the seven ICTs engineering programs taught at La Salle-URL. The two semesters are quite different in terms of content: the first semester focuses on financial topics, while the second centers on marketing themes. The total number of students enrolled in the subject are divided in five groups which implies that three instructors impart the subject curriculum.

#### B. Design of the In-Class Flipped Class Activity

Since the activity was conceived as a pilot test to assess its effectivity in this subject, it was designed to be executed entirely during the class hours. It was driven by the same instructor in two class groups. Following the first course assessment, a very brief and easy new topic -*i.e.*, 'Break-even Point' - was selected to be taught as a flipped class activity. Students already knew all the concepts involved in the topic, except the distinction between fixed and variable costs. The flipped class activity was deployed as follows: (1) a PowerPoint file including theoretical explanations and examples about the 'Break Even Point' topic was uploaded in the LMS (Learning Management System) of the Institution; (2) when the group class started, the instructor gave a brief explanation about the flipped class activity; (3) students were grouped in teams of three -the instructors joined people in a way that mixed students that overperformed in the last assessed test with those that underperformed-; (4) students were given 20 minutes, instructed to read the 14 slides provided in the slide deck and discuss with their peers any unclear details they came across; (5) if their peers were unable to clarify the point(s) raised, the group was instructed to write down their question(s) for a subsequent Q&A session with the instructor; (6) once all teams had reviewed the slides, the instructor conducted an open session to reinforce the important points and answer any questions raised in group discussions during the flipped class activity; (7) students were given an exercise to calculate a break-even point, which one of them successfully completed in front of the class; (8) once the flipped class activity was completed, students were asked to answer an anonymous survey and give their feedback about the experience.

The in-class flipped class activity was planned to achieve the following goals: (1) to increase the student engagement; (2) to

verify whether all the students learned important new concepts through the flipped class activity; (3) to check if the lower-grade students (from the recent assessment test) had a more favorable perception of the activity; (4) to understand whether the students thought that the activity could be replicated in other subjects;; and (5) to get their input about possible refinements to the flipped class activity in order to improve the overall experience.

#### C. Student feedback on the In-Class Flipped Class Activity

To survey the students, a Microsoft Forms tool was selected and the survey made available to the students through a QR (quick response) code. The instructor explained verbally that survey completion was voluntary, and that data were collected and treated in an anonymous manner; in addition, the survey requested students' informed consent. The questionnaire was properly answered by 31 students (52.6% of the students enrolled in the subject in those two groups; ), whose ICT engineering specializations were as follows: informatics, 15; electronics, 10; telematics, 4; multimedia, 1; and one student who did not mention their specialization. Data about the activity were collected through an anonymous 5-point Likert scale questionnaire, distributed in the classroom after completing the in-class flipped activity. The Likert scale range from 1 to 5, with values as follows: 1 ('Strongly disagree'), 2 ('Disagree'), 3 ('Neutral'), 4 ('Agree'), and 5 ('Strongly agree'). In addition, the survey also included a few open-ended questions. Questions were presented as shown in Fig. 1.

**Survey on the Flipped Class Activity**

Q1: Gender

Q2: Age

Q3: I am studying... Degree in

Q4: Which mark did you get in the first assignment?

Q5: This activity helped me to make easier ... 'Understanding the topics to be studied in the class session'

Q6: Have you found useful this activity?

Q7: Would you recommend other instructors do this activity during the class sessions?

Q8: What would you change about this activity? Anything to include? Anything to remove?

Q9: Would you have preferred an oral presentation by the instructor explaining the content instead of discussing the topics with your classmates?

Q10: Is there any other activity that you would prefer to learn topics during the class sessions?

Fig. 1 Questionnaire on the in-class flipped class activity. Q5, Q6 and Q7 were formulated in a 5-point Likert scale, while Q8 and Q10 were asked in an open-ended format.

Fig. 2 displays a graph showing the students' perception about the understanding of the topic -*i.e.*, 'Break-even Point' -, once they finished the whole in-class activity, including the interaction with the instructor.

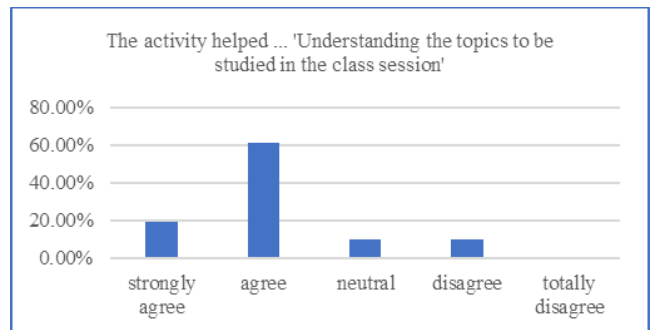


Fig. 2 Percentage of students that selected each option.

Fig. 3 shows the perceived usefulness of the activity in students' opinion. As seen in the chart, most students manifested that the activity was useful (no one strongly disagreed, and just one student disagreed with the statement).

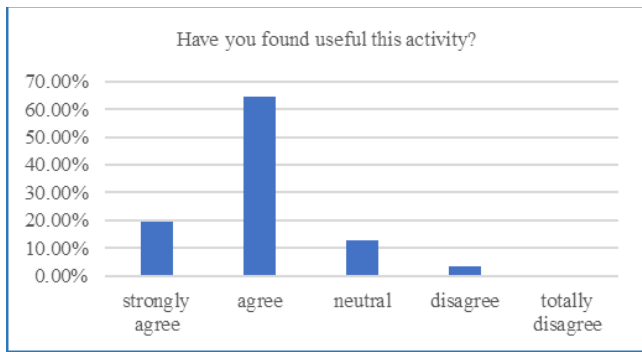


Fig. 3 Usefulness of the in-class activity.

Fig. 4 reflects the students' answer to a question that asked their opinion on applying (or not) this activity in other subjects.

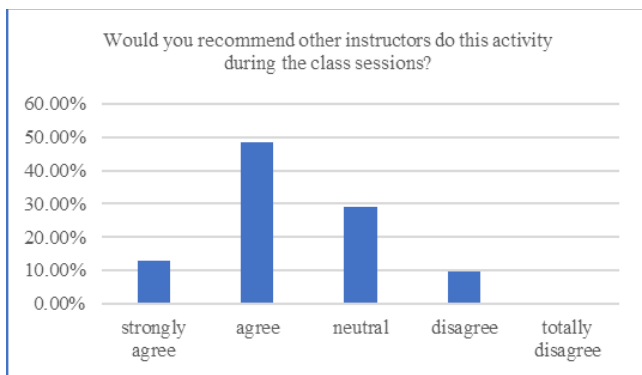


Fig. 4 Preference on replying (or not) this activity in other subjects

Fig.5 presents the students' preferences comparing two class modalities: 'lecture-based learning' (29%) and 'in-class flipped classroom' (71%).

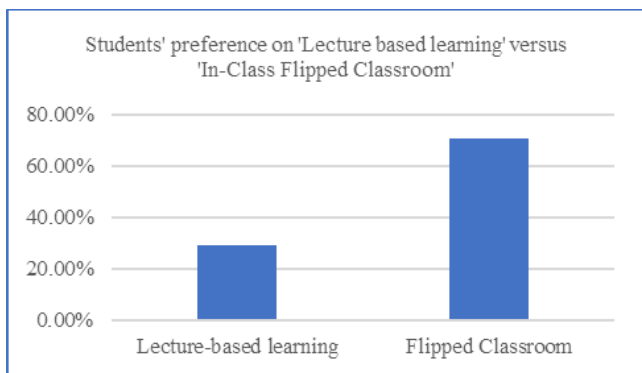


Figure 5. Item Q9: Students' preferences on the two compared class modalities.

There was no observed correlation between the choice of the methodology -traditional lecture-based learning versus in-class

flipped classroom- and student performance in the prior assessment -i.e., first assessment-.

An open-ended question asked for suggestion to improve the on-line flipped class activity. Among the students' opinions are the following statements: 'Including more slides'; 'Including more examples'; 'Including more questions'; 'If we do it at home, we can learn more content'; 'Give a presentation explaining what we have learnt in front of our classmates'; 'To make it mor dynamic. However, a do not like the method'; 'More interactivity; each team preparing a different topic and giving a presentation to our classmates'; 'Adding some questions to be asked and to raise a discussion with the classmates'; 'Including games or activities'; 'To include mechanisms that force the participation of all the members of the group'; 'I found it very useful but we need to see how it plays out in harder lessons'; 'To make sure that everybody participates'; 'It was good not having a 100% regular class. I enjoy learning on my own, then going over everything together'.

Another open-ended question asked for possible alternatives to the in-class activity. It should be mentioned that 77.4% of the respondents had no alternative proposals to the activity. Some of the ideas are listed as follows: 'Including role play examples of business'; 'More examples and less theory'; 'Small class exercises just to try the theory but without handing them up'; 'Kahoots'.

## CONCLUSIONS

This communication is focused on the findings derived from a survey focused on how second-year engineering students perceived a flipped class activity in the context of a management subject. Most of the participants manifested that the activity was useful in terms of learning. In addition, most of the students highly engaged and appreciated the activity, despite a few of them declaring their preference for a traditional lecture-based learning.

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