The flipped classroom and its application to financial analysis course: Empirical evidence to improve financial culture

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Abstract. Flipped Classroom, Twenty first century teaching technique, oriented to transfer a slice of the learning component to the person within his comfort zone and/or family environment; it is an activity or transference that pretends to stimulate individual tasking of the learner through the use of the technologic element, in such a way that the face to face course time in the classroom is significant to deeply develop the topics object to study. This initiative is relevant to be applied in the teaching process of financial sciences, particularly the financial analysis learning, activity developed by means of reviewing accounting data, which is vital in order to manage and to understand companies, inasmuch as from the holistic understanding of the company itself, it is possible to build survival business strategies; therefore it is necessary that the apprentice deeply comprehends the business complexity and fragility, also that he can use the analysis to take different decisions to improve the business dynamics, with the application of this methodology within the subject of financial analysis, it was possible to demonstrate that it effectively brought visible, positive and general interest results for the professors and other members of the academic year, visualized these in significant improvements in both numerical and of participation and commitment on the part of the student.

1. Introduction

The flipped classroom technique poses its roots in the blending of e-learning (asynchronous learning) and face to face meetings (synchronous) denominated by the education slang as Blended Learning, this technique harmonize greatly the face to face teaching along with technology, it means that its purpose is to alternate some learning tasks with others aided by multimedia components of individual approach and with specific goals and objectives [1]. The value proposal of the technique lies in the concept that each student can appropriate knowledge and review the contents at a pace adjusted to each personal condition, added to this, the learning activities could be held in the preferred place, as many times as the learner wishes, interacting with a studying tool that he dairy uses, for instance YouTube. This learning freedom is extrapolated to the financial analysis subject environment from the business management program where the class is being imparted, finding significant advances and explicit improves in the results, which will be explained precisely in the upcoming paragraphs.

2. Background

There is empirical evidence from numerous authors who have contributed to the object of study. The foregoing focuses in the fact that the student is favored by different didactic strategies that scholars build and propose to improve the students learning. The developed review in holistic way about the flipped classroom subject drops as factual evidence that there is a significant improvement in the learning
indexes, in the specific places where the educative model was applied. It is necessary to start from a key concept in the education equation, it needs to suffer a change, in which the professor is no longer seen as the center of the formative process, or the source of fragmented and barely inspiring knowledge, but the principal variable of the education equation is the student. This kind of criteria covers the main idea, which is that this method propose that the actual source of knowledge can be found in the right use of technology. However it is false that the student can truly learn simply by obtaining knowledge through this practice, it is greatly essential the existence of a guide that educates the student so he develops abilities within the competences presented, to accomplish this, the flipped classroom method was described in 2000 for the first time by Baker, who tried to provide the students the learning material for external class and the opportunity to work more in collaboration with teachers and between them during class. According to [2] expose that students must be actively involved in class, since the flipped classroom offers more opportunities to the students to develop a critic and independent thinking and to improve their own learning processes interacting in collaboration with their classmates. Also, teachers offer flexibility and freedom to the students to learn from specially designed activities to improve their skills at overcoming problems.

By other hand, indicate that flipped considers the classroom as a space where the students have previous knowledge of the topic being subject of the class, and that knowledge was given previously, providing an additional plus to all technology we have nowadays to our disposal, but “A way to encourage commitment from the students and ease active learning is by giving them the opportunity to choose what they will do to study and practice [3].

Authors said [4] precise that flipped classroom methodology move some learning processes of learning in environments off class, activity that potentizes spaces in classroom so the teacher can explain concepts that were not understood, allowing a collaborative learning. The previous approach gets its s sustentation from [5] when precise that if structured education within the traditional system of teaching, where learning and its interaction is the transmission of knowledge in one way (professor – student), this process gets truncated, weakening the appropriation of thinking skills. In this very line [6] warn that within traditional models, learners can retain little pieces of curricular content, wasting the learning potential, scenario which can be improved by using video, that lead to debate and move the knowledge.

Consider that teachers should use professional judgement in the same measure they offer options, because limited options are more appropriated for most students that possess absolute autonomy [7]. In this very line [8-10] indicate that a practical way to ease the limited election is through selection tables or list selection, in which the teacher must guide the students, teaching to look for the best information restricting the search spectrum to make sure students get the most optimum learning, to have key tools that they can use and they can enjoy such as videos, since a study proves “students generally have positive attitudes towards videos previously used before course class.

In [11], they identified that the students who received classes with video aids as a complement in education, came to the class more apt than when they received readings from textbooks or traditional learning, but unfortunately, in the observations of [12] they found in their analyzes that university students generally do not comply with the reading tasks, which was precisely found in this study.

Finally and as a reference and incentive to this proposal it is necessary to cite the findings in [13], who developed an exercise of inverted class in the course of computational interaction, for which the students developed learning activities with self-taught content aided by the factor technological, obtaining as results an improvement both in the development of the tasks, as in the workshops and of course an improvement in the results of the exams.

With the previous analyzed approaches, a relevant interest in applying flipped classroom methodology to financial analysis course was generated, course chosen principally for two reasons, this is the spine of business dynamics knowledge, and a second reason is that the university where it was held exhorts teachers to develop activities that potentize learning processes using TICs acquired for the professional labor.
3. Methodology
To develop the present study a timeframe of two semesters was consider, July to December (2016) and January to June (2017), for four courses which have 26 students in average per classroom each semester, 106 students in total. For such a study it was implemented a quasi-experimental design with qualitative approach, since what is pretended is to teach the academic community the obtained results from the teachers and students experiences involved in the learning dynamics.

For this study a measuring instrument was built, which was applied to both cohorts of students that were inscribed to the financial analysis course, during the timeframe previously mentioned, the work looked for axioms in standardized scales like the student cohesion, innovation and academic performance. The previous referred studies were analyzed, along global scoring of the instrument, determining a p. valued (p<0,05); in the other hand, to review the consistency of the instrument, it was developed a recognition through the verification of alpha coefficient from Cronbach, to then proceed applying it to the target subject of study, task held in means of using e-platforms. Due to a strict methodologic application of the work, it is considered that the general lecture of the exercise is well aligned with qualitative results.

4. Results
The 106 questionnaires addressed by the students from which men: 58%; age: 19.6±4.13 years and women: 42%; age: 20.5±4.11 years. The global evaluation of the flipped classroom exercise and its variables drops important results, said results provide guarantee of the methodology efficiency proposed to improve the learning process.

Regarding the inferential analysis, the non-parametric statistic applied was the Chi-squared test from Pearson, for independent sampling, with the objective to identify and or establish significate statistical differences among the participating students of the technique measure and the traditional model concerning the self-perception scale of initial learning. To measure significate statistical differences, it was considered a confidence level (1–α) of 95% and alpha (α) of 5%. However, one of the three elements evaluated in the exercise was to determine the students' perception with reference to the use of the technique and the appropriation of contents using the technological element, the work was addressed by the Likert scale measurement, with four possible answers; The hypothesis proposed for this stage was the identification of the existence of significant differences between the opinions of the two groups studied, information that can be specified in Table 1 and Table 2.

| Qualification          | Observed frequencies | Expected frequencies |
|------------------------|----------------------|----------------------|
|                        | Student G1 | Student G2 | Total | Student G1 | Student G2 | Total |
| 1-Strongly disagree    | 0         | 2          | 2     | 0.9245     | 1.0755     | 2     |
| 2-Disagree             | 1         | 4          | 5     | 2.3113     | 2.6887     | 5     |
| 3-Agree                | 15        | 35         | 50    | 23.1132    | 26.8868    | 50    |
| 4-Strongly agree       | 33        | 16         | 49    | 28.1981    | 32.8019    | 61    |
| Total                  | 49        | 57         | 106   | 49         | 57         | 106   |

**Table 1.** Observed and expected frequencies referent to the actualized content.

**Table 2.** Analysis.

| Statistic | Value     |
|-----------|-----------|
| Chi squared | 8.1035   |
| Chi tabled  | 7.8147   |
| Degrees of freedom | 3        |
| P-value     | 0.0439   |
| Valid cases | 106      |
With a level of significance of 5%, it resulted, a test statistic \( \chi^2 = 17.1921 \), that is, the hypothesis that there are significant differences between the opinion of the groups addressed in this work is rejected. It is concluded that there is no difference between opinions; a \( p \)-value = 0.0006, evidence that the Ha, is rejected. That is to say, the evidence indicates that the perception of the group studied in the second semester of 2016 and the group of the first semester of 2017 has a high correlation in terms of their appreciations regarding this first scenario.

A second stage that we wanted to review with the research work was the perception of the students with reference to the correlation of the technique with their academic performance; by applying the same nonparametric statistical method \( \chi^2 \), and a level of significance of 0.05, the results achieved in this exercise (see Table 3 and Table 4), indicate that the calculated \( \chi^2 \) is 8.1035 and the \( \chi^2 \) Critical is 7.8147, a result that indicates that the hypothesis regarding significant discrepancies between the groups studied is rejected, meaning that they agree with a high degree of significance that they noticed significant changes that led to improve academic performance.

| Table 3. Methodology perception and impact on academic performance. |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Qualification   | Observed frequencies | Expected frequencies |
|                 | Student G1 | Student G2 | Total | Student G1 | Student G2 | Total |
| 1-Strongly disagree | 0 | 2 | 2 | 0.9245 | 1.0755 | 2 |
| 2- Disagree | 1 | 3 | 4 | 1.8491 | 2.1509 | 4 |
| 3-Agree | 13 | 26 | 39 | 18.0283 | 20.9717 | 39 |
| 4- Strongly agree | 35 | 26 | 61 | 28.1981 | 32.8019 | 61 |
| Total | 49 | 57 | 106 | 49 | 57 | 106 |

| Table 4. Analysis. |
|--------------------|-----------------|-----------------|
| Chi squared | 8.1035 | 7.8147 |
| Chi tabled | 7.8147 | 3 |
| Degrees of freedom | 3 | 0.0439 |
| P-value | 0.0030 | 106 |
| Valid cases | 106 | 106 |

Lastly, to measure the academic performance, the students were asked: Do you consider that a change in the traditional methodology can influence your content retention, improving it? With a significance level of 5% (0.05), it drops as result, a statistical proof \( \chi^2 = 0.00 \) i.e. the hypothesis that states that there are significant differences among the students linked to the research process is rejected. It is concluded that there is not any difference among the opinions from students treated with flipped classroom and students oriented with traditional methodology, the previous one obtains its virtue in the result of the statistic \( p \)-value = 0.000, which evidences that the Ha, is rejected. (See Table 5 and Table 6).

With a significance level of 5% (0.05), it drops as result, a statistical proof \( \chi^2 = 0.00 \) i.e. the hypothesis that states that there are significant differences among the perception of change of traditional methodology from students. It is concluded that there is not any difference among the opinions from students; a \( p \)-value = 0.000, which evidences that the Ha, is rejected.

| Table 5. Change of methodology and content retention. |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Qualification   | Observed frequencies | Expected frequencies |
|                 | Student G1 | Student G2 | Total | Student G1 | Student G2 | Total |
| 1-Strongly disagree | 0 | 1 | 1 | 0.4623 | 0.5377 | 1 |
| 2- Disagree | 1 | 1 | 2 | 0.9245 | 1.0755 | 2 |
| 3-Agree | 22 | 44 | 66 | 30.5094 | 35.4906 | 66 |
| 4- Totally agree | 26 | 11 | 37 | 17.1038 | 19.8962 | 37 |
| Total | 15 | 91 | 106 | 49 | 57 | 106 |

| Table 6. Analysis. |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Chi squared | 13.8897 | 7.8147 | 3 |
| Chi tabled | 7.8147 | 0.0030 | 106 |
| Degrees of freedom | 3 | Valid Cases | 106 |
5. Conclusions
The use of the technological element to improve the appropriation of knowledge, multiplied this with innovative techniques in the learning processes, are a guarantee of a significant improvement in education, this is the case that was evidenced in this exercise where the application of the Flipped Classroom technique to the course of financial analysis for the program of business administration, obviously led to improve not only the notes of the students, but to implement self-taught methodologies by the student, along with a marked discipline in pursuit of your own learning; in this way, the main variable of the educational equation is linked to its formation process, which is the student along with the level of appropriation of knowledge at a particular speed of each individual; The study showed that the technique worked in synergy with the technological element showed positive results in each one of the study groups, and additionally I see that there is no statistically significant evidence of discrepancy between the perceptions of the groups under study.

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