

Flipped classroom goes sideways: reflections on active learning methodologies

Active learning
methodology

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Abstract

Purpose – The present study aims to investigate an unsuccessful implementation of an active learning methodology. Active learning methods have emerged in order to improve learning processes and increase students' roles in the classroom. Most studies on the subject focus on developing learning strategies based on successful implementations of such methods. Nevertheless, critical reflections on unsuccessful cases might also provide material for developing further contributions to this literature.

Design/methodology/approach – The authors conducted an intrinsic case study of an unsuccessful application of the flipped classroom method to an undergraduate basic statistics course at a Brazilian business school. The data collected comprised the course's syllabus, evaluation forms and two rounds of interviews with students and the professor.

Findings – The findings indicate that, apart from that which had been mapped by past literature, three additional aspects may limit the chances of successfully implementing a flipped classroom methodology: students' educational backgrounds, the course's structural issues and methodological and relational issues.

Originality/value – The present study contributes to the literature on active learning methodologies mainly by mapping additional aspects that should be considered in the implementation of the flipped classroom methodology. Additionally, the authors investigate an unsuccessful case of such an implementation, an investigation that is still scant within this literature.

Keywords Active learning methodologies, Flipped classroom, Management education, Learning

Paper type Research paper

Introduction

Technological, economic and social developments can disrupt the educational process. Changes in information technology, interactivity tools, analytical capacity and customization are pressuring higher education to change (Fini, 2018; Leupin, 2016). Teaching practices exclusively based on content are already becoming considered inefficient for preparing students for contemporary societal demands. Students do not seem interested in the content they need to learn and get easily distracted by mobile phones and social media

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(Goundar, 2014). In a context where change is urgent, universities and business schools are engaging in a race for innovation in the teaching process. Different teaching methods are being developed and implemented to engage students in the learning process and to assure that they can acquire, expand and practice the skills required by future managers.

Active learning methodologies that put the student in a central role can benefit those changes (MacVaugh & Norton, 2012). Two poles of this debate are traditional teaching methods and active learning methodologies, which have been compared exhaustively in academic literature (Dimitrios, Labros, Nikolaos, Maria, & Athanasios, 2013; Goldfinch, 1996; Michel, Cater, & Varela, 2009). Methods such as design thinking (Glen, Suci, & Baughn, 2014), creative learning (Auster & Wylie, 2006) and flipped classroom (Swart & Wuensch, 2016), among others, were also studied and praised as effective ways to deal with recent changes in the educational system. However, there is a need for critical reflection on these methods to corroborate their use and predict possible problems and pitfalls that may occur when adopting them without critical reasoning.

Most published cases of flipped classrooms considered successful experiences (e.g. Burke & Fedorek, 2017; Findlay-Thompson & Mombourquette, 2014; Swart & Wuensch, 2016). However, disregarding what can go wrong during the implementation of active learning methodologies limits the development of related theory and the advancement of good practices. This raises the following question: how can a flipped classroom fail? In this sense, our aim in this paper is to map the aspects that limit the chances of the successful implementation of the flipped classroom methodology. We contribute to the literature on active learning methodologies by exploring a case in which the implementation of the flipped classroom method was not successful, based on the aggregated perspectives of students and professors. Its description may generate reflection, which could lead to new behaviors in teachers who want to flip their own classrooms. Moreover, this study contributes to active learning methodologies by opening the discussion to those that have suggested that it is not a straightforward solution for the contemporary transformation in our educational system (De Faria, Venâncio, Schwarz, & De Camargo, 2021).

We found three aspects that may limit the chances of successfully implementing the flipped classroom methodology: students' backgrounds, undergraduate courses' structural issues and methodological and group-related issues. Additionally, we discuss the size of the classroom and the technical and emotional elements that need to be thoroughly considered in any innovative approach to education.

Active learning methodologies and the flipped classroom method

Active learning methodologies have been adopted to change students' roles from passive to active participants in the learning/teaching process. It comprises a variety of techniques that actively involve the student in the teaching and learning process. The intention of an active learning methodology is usually to solve problems of dullness and lack of attention by encouraging students to take part in the learning process (Urias & De Azeredo, 2017). These methods are centered on learning with the active participation of students, placing them in a more central role and giving them more autonomy (Guedes, De Andrade, & Nicolini, 2015). However, applying active learning methodologies is not an easy task. Active learning methods are likely to demand higher cognitive efforts from students than traditional methods. This leads students to think that they are learning less in active learning classrooms when they might be learning more than they would with the traditional method (Deslauriers, McCarty, Miller, Callaghan, & Kestin, 2019).

In general, there are three underlying assumptions supporting active methodologies. The first is that students must be interested in the content to engage with the activities (Sivan, Wong Leung, Woon, & Kember, 2000). Silva and Ramos (2015) show that affinity with the

content and the amount of time spent studying positively impact the relationship between teaching and evaluation. The second assumption is that teachers need to take the role of facilitators, creating a connection with those who are there to learn (Kelly, 2016; Rogers, Lyon, & Tausch, 2013). The third assumption is that the learning process involves planned activities that use technology, dynamics and group formation (Goldfinch, 1996; Spinelli, 2001).

These underlying assumptions of active learning can be applied to different active learning methods. For example, team-based learning has been used to develop dissertations which discovered that different types of students would be more willing to participate in active learning methods (Hartz & Schlatter, 2016). Problem-based learning helps students to develop critical and reflexive thinking and motivation to study (Guedes *et al.*, 2015; Silva, Bispo, Rodriguez, & Vasquez, 2018). A third example is the multidimensional teaching technique used to teach entrepreneurial skills. This method enhances the learning process of personal capabilities and the applicability of the taught material to real life (Mineiro, Antunes, Vieira, & Andrade, 2018). Other active learning methodologies can have different approaches and outcomes.

The flipped classroom is one such active learning methodology, in which students use their time outside of class to study for the next class. Therefore, in-class time “is used for some form of interactive group learning activity for which the instructor acts as a learning coach and consultant” (Swart & Wuensch, 2016, p. 68). Exposure to new material outside of class is usually done through reading or lecture videos (Westermann, 2014). Students who are not familiar with those tools need training to adapt to these new forms of learning (Bergmann & Sams, 2012).

The flipped classroom was disseminated by Bergmann and Sams (2012) to increase contact between teachers and students, deepening students’ learning of essential abilities, such as working in groups and using time inside and outside of class differently and more efficiently. With this method, students should control their own learning rhythm (Tucker, 2012). The flipped classroom can be aligned with students’ overall goals in university education which aim to go beyond programmed content, such as personal development, active engagement in academic activities and the nurture of interpersonal relationships (Junqueira, Saiani, & Passador, 2011; De Moraes, De Lourdes, & Paiva, 2020). Other cases, such as problem-based learning, already showed that teamwork is essential for building those skills. It can also be a pitfall in a culture of transmissive learning (Silva *et al.*, 2018).

Studies show that the flipped classroom draws students’ attention without prejudice to learning outcomes. There is evidence that the flipped classroom attracts the attention of millennial students (Phillips & Trainor, 2014). Nevertheless, it needs to be structured to use in-class time efficiently (Butt, 2014), and if the courses are well planned, flipping the classroom can be effective (Spinelli, 2001).

Flipping the classroom demands more preparation of materials by the professor and outside class preparation by the students, which is time-consuming for everyone involved (Findlay-Thompson & Mombourquette, 2014). The experience in class puts less focus on the teacher, who will lecture only at specific moments, and more focus on the students, who must be prepared to help their colleagues by presenting or engaging in group activities in class. Thus, flipped classroom implementation relies on collaboration and cooperation among its participants (Bosch *et al.*, 2008).

Although the flipped classroom method depends heavily on technology, such as videos, applications and computers, this is not the only success factor. Educators need to integrate all the material designed for the course into an overall approach (Findlay-Thompson & Mombourquette, 2014), communicate the purpose and the responsibilities implied by the new method, listen to and deal with the concerns of their students and be trained to implement a flipped classroom effectively.

[Table 1](#) summarizes relevant aspects found in flipped classroom literature that can affect the methodology.

Past literature on active learning methodologies and, more specifically, on the flipped classroom, have focused on mapping relevant aspects of applying the methods to classrooms and discussing mostly successful cases of such applications. However, the investigation of unsuccessful cases can also bring new insights for improvements in the implementation of active learning methodologies. We developed our study to create such contribution.

Methodology

We investigated an experience of the flipped classroom method that was perceived by both students and the professor as difficult, complex and having many opportunities for improvement. To understand this phenomenon, we conducted an intrinsic case study ([Stake, 1998](#)) of the flipped classroom method in an undergraduate basic Statistics course at a Brazilian business school. Other studies that investigated unsuccessful cases were [Fry \(2010\)](#), who analyzed a program for supporting new teachers, and [Towey \(2015\)](#), who also reflected on a case of the flipped classroom. We differ from those studies by basing our case on the perception of the students.

Our unit of analysis was two Statistics courses in which the flipped classroom methodology was adopted. The data collected comprise transcriptions of interviews conducted with students and the professor in two rounds: one at the beginning of the course, a few weeks after it started (March, 2015) and one at the end of the semester (June, 2015). Interview time varied from 30 to 45 minutes, which resulted in 175 single-spaced pages after being transcribed. We also examined the course syllabus to understand and describe the objectives of the course, and we examined the course's evaluation forms which students answered at the end of the semester.

Aspect	Implication	Authors
Number of students in class	Small classes might offer a better environment for communication	Goldfinch (1996)
Use of technologies	Technologies such as videos provide additional support to the learning process	Goldfinch (1996) , Spinelli (2001) , Westermann (2014)
Outside classroom activities	Demand more time and dedication from students and professor Students must be prepared to participate during in-class activities	Findlay-Thompson and Mombourquette (2014)
Professor's material preparation and training	Professor's material and organization are central during the application of in-class activities	Findlay-Thompson and Mombourquette (2014)
Collaboration	Students must collaborate among themselves so that they can support each other in the learning process	Bosch et al. (2008)
Interest in the content	The level of interest in the course's content can implicate the degree of engagement students will have in outside class activities	Silva and Ramos (2015) , Sivan et al. (2000)
Professor's role	The professor as a facilitator has to develop a connection with students to sustain their learning process	Kelly (2016)
Prior communication with students	Students need to be aware of the purpose of a new methodology so they can be fully committed to it	Findlay-Thompson and Mombourquette (2014)
Source(s): Written by the authors		

Table 1. Relevant aspects mapped in literature and their implications on the implementation of the flipped classroom methodology

Data were coded using ATLAS.ti software, whose tools help to encode large volumes of data. In the codification process, we compared each student's first interview to their second interview and each participant's interview to those of the other participants. This iterative process allowed us to get an account of the case description from the individuals' perspectives (Charmaz, 2000). We analyzed the data sources, looking for points of similarity and contradictions within the interviews. In that sense, we compared the narratives told by our informants, looking for relevant facts that contributed to the problems faced in this case.

Some categories, such as lack of time/interest (Silva & Ramos, 2015; Sivan *et al.*, 2000), technological tools (Ramalho, Abrantes, Ferreira, & Ramalho, 2015) and professors' didactic methods (Kelly, 2016) were described by our informants, reinforcing previous findings. Other categories were found in the analysis process that compared students' perceptions to the perceptions found in previous cases. The resulting categories and aggregated subcategories from this analysis are depicted in Table 2.

In the following sections, we describe the case and analyze the data. The school's name was preserved, and in the quotations, each participant has an alternative name. Their alias is followed by the number 1 or 2, representing the interview round of the quote.

Case description

The mandatory course of Statistics I was held in four groups in the second semester of a four-year course in Business Administration. Two of those groups used the flipped classroom methodology, while the other two had traditional lectures. Because Statistics is often seen as a demanding course that needs to be attached to the practice (De Oliveira Júnior & Araújo, 2018), the professor decided to flip the class to invite the students to participate more actively in their learning process. The groups had approximately 45 students each and were held over one semester, twice a week, with classes lasting for one hour and forty minutes. The classrooms had regular infrastructure, with desks and chairs arranged in rows, a blackboard and audiovisual equipment. The students were not consulted or informed of any changes to the course's methods and had not chosen to be part of their assigned classes.

The professor created a schedule for the course, indicating the classes' topics and the materials that should be previously studied. This set of nominations included chapters in textbooks, online videos, tutorials and exercise lists. For the groups in which the flipped classroom methodology was adopted, no formal lecture was held on the indicated topics. In-class time was spent conducting group exercises that reflected problem situations in the daily life of a business manager. Students could use whatever resources they wanted to complete the activities, and the professor was present to assist the groups. He also offered brief explanations when observing a recurring question and was available to answer questions in the virtual environment or scheduled extra appointments.

Categories	Subcategories
Students' educational backgrounds	Students' trajectories
Course's structural issues	Institutional system
	Lack of time/interest
	Technological tools
Methodological and relational issues	Assessment
	Group work
	Professor's relationship with students
	Professor's didactic methods

Source(s): Written by the authors

Table 2.
Categories of the codification process

The learning outcome was composed of three indicators: a grade for participation, measured by quick assessments and group activities during the classes; a mid-term and a final exam. The mid-term and final exams were unified among all Statistics classes from the semester. As the implementation of this method took place simultaneously with other groups that were being taught using traditional methods, it was possible to compare student performance among groups. According to the professor, the different groups presented a homogeneous performance regarding grades as predicted by [Findlay-Thompson and Mombourquette \(2014\)](#). However, there are studies that suggest students learn more with active learning methodologies than with traditional ones ([Deslauriers et al., 2019](#)).

Still, considering the course's evaluation, the flipped classes were severely criticized. Students evaluate courses at the end of the semester. The evaluation consists of a five-point Likert questionnaire, so the course's grade can range from 1.0 (worst) to 5.0 (best). By the school's standards, courses evaluated below 4.0 are considered unsatisfactory. Both flipped classes were within the three-point range (3.5 to 3.7). The interviews also demonstrate the overall sentiment of failure, which can be seen in the data analysis. Our interpretation of the failure is based on this perception of failure, which we detail in the following section.

Data analysis

The perception that the flipped classroom method failed is supported by the aggregate perception of most students and the professor. We provide a sample of those impressions next:

"To me, the class has been useless; it is a waste of time because I go there, and I learn nothing." (Ruth 1). The student's perception was the same throughout the semester as the second-round interview shows: *"Terrible. It was terrible. Impossible to be worse."* (Ruth 2). Other students reinforce the feeling: *"I think it [the course] is bad because of the method that is being applied. I have talked to my colleagues, and almost no one is enjoying this method."* (Oswaldo 1)

The professor also confirms this negative perception regarding the course: *"Oh, it was stressful, right? [...] in general, it was tiring. We had [to deal with] emotional reactions [which is] a non-objective [part] of the [class] performance. (...) Although it was an interesting experience, I am happy the semester has ended."* (Graciliano 2)

Taking a broader context of when and how the method was applied, we have identified categories of analysis that can better explain the failure of the flipped classroom: students' educational backgrounds, structural problems and methodological and relational issues.

Students' educational backgrounds

The flipped classroom is based on the premise that students are autonomous and the protagonists of their own education ([Guedes et al., 2015](#)). Hence, they needed to study by themselves outside of class to acquire knowledge to be applied with the professor's guidance, and there was no traditional lecture. Such a structure caught students by surprise, as they were not expecting to have a different methodology. Before taking this course, the trajectory of students in the traditional educational system, in which most students are taught throughout their entire school life, was incapable of providing the necessary ability to work independently and autonomously. In this self-directed learning, students must take responsibility for their own learning goals. Hence, the transition from the traditional methods must be well oriented and coherent ([Morris, 2019](#)). One of the students demonstrates this lack of autonomy: *"I believe the students, by themselves, will not take the initiative. They will not do the work. The professor has to help the students to take the initiative somehow."* (Oswaldo 2)

In the professor's opinion, the students' high school educational system works against their ability to be resilient: "*I think they don't have [any resilience] [. . .] Anyway, they still think they are in a [kind of] high school.*" (Graciliano 2) Moreover, the professor sees a gap in the students' abilities to "connect the dots" and "to read instructions," which directly influences their role as protagonists in the pursuit of information and in learning and understanding the course's topics.

The influence of this background is reinforced by the experience of two students who had a significant part of their secondary education abroad or at international schools, which apply active learning methodologies. Student who had done his secondary education in the USA referred to his experience with practical methodologies. For him, the statistics class and the flipped classroom method was easily adapted:

Under the American (sic) teaching method that I experienced, I learned a good base of Statistics, more than what is taught at Brazilian schools. [. . .] the science fair has been part of my life since the 6th grade. I think that makes all the difference now. [At my high school] we learned about hypothesis, [. . .] experiments [. . .] the people who came here without this knowledge [. . .] have a certain learning barrier. (Vinicius 1)

These statements delineate a clear difference between students who had been educated in the traditional method vs those that were educated in a more practical and active learning style help us understand that the implementation of such a method needs to consider students' backgrounds. Students constantly compare their previous life experiences during the learning process, and each one will assimilate the content differently (Trindade, Trevisan, De Lima, & Favarin, 2019). This influence is powerful in the initial semesters of college, when high school culture is still vivid. In our case, students were not prepared for such a transition into the method, and most of them did not receive it well. The specifics of the emergent adult must be intentionally addressed in order to result in an effective learning process (Dachner & Polin, 2016). Therefore, we understand that the individual context of the students also has a strong influence on their willingness to adapt to new methodologies.

Structural issues of the course

Three structural issues have emerged: lack of time or interest to study, the use of technological tools and assessment. Students had classes twice a week, and they were in a situation in which they also had several other courses to take. They spent a significant amount of time in the classroom, and not much time was left to dedicate to outside class activities at the level that this method requires.

Statistics is a heavy course. You must know the topic well to perform the activities. Studying by yourself, for the time required, and not having any previous knowledge ended up taking much of your time, and the time [we dedicate to] other courses has to be a priority too. (Oswaldo 1)

[. . .] this method works well when you have time to study. Anyone who sees our schedule realizes that there are days that we have classes the whole day [. . .]. The chances of getting two hours to study Statistics and get ready for class are almost none. (Ruth 2)

As students did not have the time or motivation to get ready for class, there was a snowball effect as they came to class unprepared to perform as expected. Such an aspect is complementary to the assumption of Sivan *et al.* (2000), that for an active learning method to succeed, it is necessary to have students interested in the topic. Otherwise, there will be no engagement. In addition, our results shows that students must have a balanced amount of outside class work for all courses they take concurrently, especially when active learning methods are used, which demand autonomy from the students (Silva *et al.*, 2018). These structural issues also raise the question of institutional context. The university needs to be prepared to train teachers and have appropriate environments and classrooms to carry out active learning methodologies.

Students highlight the lack of will or readiness to study: “*I am struggling because I am not willing to study.*” (Joaquim 1)

At the beginning of the semester, nobody was very focused on studying. (Oswaldo 2)

The use of technological tools was also a flaw, as students were not prepared to use them. In certain situations, the professor could not assist them, and the preparation needed to learn how to use tools such as Microsoft Excel and R increased the workload. Students had no access to a computer lab, and many of them had an operational system that could not run the application. According to the students, the professor was not prepared to help them with this operational system. The professor, however, expected that the students would be more independent to seek solutions by themselves. This episode also demonstrates the students’ expectations that the professor ought to provide every piece of knowledge.

The professor did not know how to show me how to use the software on my computer [...] technically we could not use a MAC because he [the professor] didn’t know how to help us (Ruth 1).

The use of technology, when well applied, has an essential role in flipped classes (Swart & Wuensch, 2016). In this case, the professor offered online videos with tutorials and online forums to reinforce the learning process. According to some students, such tools compensated for the lack of lectures and helped them better understand the topics.

The videos were good, excellent to understand how to use Excel. (Ruth 2)

I think the videos are excellent in case you miss something [...] I do not understand the class very well, [so] I go through the videos, and I am able to better understand. (Joaquim 1)

The misalignment of the method and the course’s evaluation also emerged as a problem. Although both statistics classes were taught in the flipped method, the school has a standardized assessment applied in every course. Thus, the exams were not aligned with class material, as observed by the students:

He [the professor] [...] is trying to show us how to use the computer [...] [we] need to use the computer, [but] the test is written. It is quite a mess. I think it is very inadequate. (Joaquim 1)

It was an attempt to change the teaching method, but the test was totally out of alignment with this purpose. [...] the test was standardized. (Vinicius 2)

This misalignment of activities, studying tools, books and tests seemed to confuse students. The biggest complaint was related to the usage of statistical software during in-class activities, which had a more practical approach. Even more so, when it came to evaluation, they had to take written tests that evaluated their knowledge of concepts and the use of mathematical formulas. Analyzing the course syllabus, we understand that there were two fronts of action towards the formation of students: first, teaching the use of statistical software to solve practical problems through case studies, which was evaluated through class and group activities; second, the teaching of statistical concepts and the use of formulas, which were taught via the textbook, practiced by a list of exercises and evaluated through a written test.

The students state that this structure was not clear to them. “*It is a methodology not very appropriate. It [could be better] if it were organized like that: today we will have class. Next class, we will have an activity from the exact same topic we saw in class, and a quick test of the activity and the class.*” (Joaquim 1)

One reason for that impression is that they must deal with a more familiar structure in the traditional method. As students could not see how activities and evaluations were connected, they crystallized a negative impression of this method and constantly described it as confusing.

Methodological and relational issues

In this category, three issues emerged as relevant to explain the problems faced when using this method: group work, the professor's relationship with students and the professor's didactic methods.

Students pointed out that constantly working in teams was not productive. From theory, we know that business students understand the importance of group work. However, they may ask for further directions with their assignments (Grzimek, Kinnamon, & Marks, 2019). This practice is incompatible with the concept of autonomy in active learning methodologies. Besides the issue of asking for further directions, other aspects are evidenced in this case, as we show below.

Every class, you have to sit in groups. I think it makes the class worse [...] the concentration you have when you are alone is much bigger than when you are in a group. When you are in a group, you look from one side to the other and people are speaking. (Oswaldo 1)

[...] each group is composed of six or five people. Normally you work with one or two people, the others do nothing and get the same grade. (Vinicius 2)

These excerpts demonstrate students' unwillingness to collaborate and their resistance to working together, primarily due to their difficulty in understanding the subject. The relationship issues were not exclusive among students and heavily reflected how students and the professor related to each other. We understand these issues can be interpreted from two perspectives; the relationship with the professor infused by emotion and frustration, and the perception of the active learning method and didactic approach. These aspects are entangled and reinforce one another.

From the students' perspectives, the professor was not performing the expected role to guide them during the learning process. There was a gap between what students expected and what the professor planned to offer. One student reported: *"I feel he does not provide the basis for the exercises"* (Joaquim 1). Another student reinforced this feeling of miscommunication between professor and students: *"when he explains, he speaks too fast [...]. You cannot pay attention sometimes [...] you listen to him, and then you have to take notes, but you don't understand what is written on the board. You get demotivated and end up giving up"* (Oswaldo 2).

The unmet expectations were in both sides. Students expected guidance based on their experience with traditional methods, and the professor expected engagement from the students. One of the students reported such a mismatch. She spent a day working on the exercises and understood her efforts were not acknowledged by the professor: *"In the second day of classes, he told me I was not going to advance. [...] All that because I did not know how to use the software. Then, he said to me: 'Have you given up already? Acting like that, you are not going to advance'. I couldn't believe what I heard"* (Ruth 1).

Many of the students' feelings towards the professor could be a consequence of the traditional class format that places professors at the center of the class and leaves them as the only ones responsible for the effective conduction of a course. *"Anything different from the strict [way to conduct the class], we see as the professor's deficiency. So, the feeling in our class today is that the professor is bad because he does not lecture; the professor does not know how to teach"* (Vinicius 1).

The relationship between students, professor and methodology directly impacted the perception of the course as a failure. Contextual preparation and even the expectations of students should be considered when applying the flipped classroom. While some of these characteristics were already known in previous literature, others need to be carefully considered.

Discussion and conclusion

Active learning methodologies are central to the ongoing technological transformations experienced within the educational process. However, they cannot be used inadvertently. While we encourage their use, given the growing reports of successful experiences (Phillips &

Trainor, 2014), they can become unsuccessful attempts if not well designed. Thus, this study aimed to contribute to the literature on active methodologies by informing scholars and practitioners about the specifics of a flipped classroom application in the context of an undergraduate business course.

When implementing an active learning methodology, it is essential to consider the context in which the methodology is to be applied, which includes the target audience and the implications for learning, the tools and the space in which the method will be adopted. The teacher needs to understand and accommodate the need of each student in the classroom and build a coherent team (Edmondson, 2012) and a safe space (Kisfalvi & Oliver, 2015) that embraces and acknowledges the difficulties of each member. Evidence shows that active learning methodologies rely on a series of underlying aspects that should be considered, such as the school system implementing the methodology, students' educational backgrounds, group formation and relationships among participants. Conversely, our results illustrate a flipped classroom case that did not consider such aspects and ended up into an unsatisfactory attempt of implementation, with several lessons.

The first assumption of active learning methods is the students' having a central role. Active learning methods are centered on learning with the students with protagonist role and giving them autonomy (Guedes *et al.*, 2015). The intention of adopting such a methodology is to tackle students' lack of interest and attention by encouraging them to participate in the learning process (Urias & De Azeredo, 2017). In contrast, in the way that the experience in this study was conducted, students were not able to play a central role, and the course ended up centered on the professor. The adherence to the active learning method without a clear communicational channel and a psychologically safe environment was prejudicial to the effective participation of the students (Burke & Fedorek, 2017; Sivan *et al.*, 2000).

The second assumption regards teachers ceasing to perform the role of a lecturer and starting to play the role of a facilitator. This approach creates a connection with those who are there to learn (Kelly, 2016; Shinida *et al.*, 2014). The third assumption places learning as a process involving planned activities that use technology, dynamics and group formation (Goldfinch, 1996; Spinelli, 2001). As happened with the first assumption, these two assumptions were limited by students' autonomy and backgrounds despite the professor's attempt to implement them.

The students' objections to group activities added a layer of complexity to the challenges inherent in a flipped classroom. Learning through interaction with peers is fundamental in most active learning methods (Auster & Wylie, 2006; Fimi, 2018; Silva *et al.*, 2018). We understand that there are two possible explanations for the emergence of these objections.

The first concerns the unfulfilled expectations promoted by the course. Students expected the teacher to be the protagonist of the classes. Thus, it did not make sense for them to sit facing each other since they did not recognize the interaction with their colleagues as a legitimate source of learning. Likewise, they did not identify themselves as being capable of cooperating productively with the learning of others, especially in face of the strong negative emotional reactions experienced throughout the course, due to the set of factors that we have been analyzing.

The second explanation refers to the absence of adequate conditions for carrying out tasks in small groups, which are only successful when emotional, social and group factors are considered (Sibbet, 2011; Tuckman, 1965). In the context of formal educational, we can understand that a group task is successful when it can promote learning and contribute to the achievement of the educational program.

In this sense, it is also necessary to highlight the positive effect that a psychologically safe environment has on the learning process, either individually or in groups (Edmondson, 2012; Rogers, 2003). The effects of its absence are present in the formation process and the group process experienced by students. It also impacts the relationships and emotions that are constructed within the classroom.

Regarding the flipped classroom methodology, Bergmann and Sams (2012) state that the essential characteristic of this method is “redirecting attention away from the teacher and putting attention on the learner and the learning” (p. 11). One of the principles of student-centered education is that “the educational situation which most effectively promotes significant learning is one in which [. . .] threat to the self of the learner is reduced to a minimum” (Rogers, 2003). Therefore, the teacher needs to create an accepting climate in which students can feel safe to express themselves authentically. In the investigated, we noticed no effective creation of a safe space (Kisfalvi & Oliver, 2015). Instead, both the teacher and the students were not able to accommodate each other’s emotional reactions. As we know by Deslauriers *et al.* (2019), negative feelings can play an important role, leading the students to a lower perception of learning, even when their grades point to another direction.

Precursors to the flipped classroom, Bergmann and Sams (2012) claim that they do not have a standardized way to deal with reactions contrary to the method, although they admit that these can happen. Thus, to increase the chances of achieving a positive result with the adoption of active learning methodologies, it is important that educational institutions be aware of the aspects mapped throughout past literature (presented in Table 1 in our literature section) and through the present study (students’ educational backgrounds, course’s structural issues and methodological and relational issues).

Finally, in order to create and sustain an accepting climate and to be a supportive coach, the teacher is demanded not only for the emotional structure but also for theoretical and technical preparation, which in this case he most likely did not receive in his initial or continuing education. The lack of this preparation can lead to situations such as those in the case we are analyzing and reinforce the necessity of helping students to acquire responsibility and become protagonists of their learning process (Spataro & Bloch, 2018). Overall, active learning methodologies are an important way to cope with technological advancements and their impacts on the educational system. However, using different activities and methods without attention to their underlying assumptions and their consequences for students and teachers can result in unwanted negative outcomes.

Our study is not without limitations, which could be opportunities for future research. The context we studied is that of an elite school and based on a Statistics course. Future studies could further develop this idea by analyzing other unsuccessful cases of active teaching methods in different contexts, raising awareness of this shift in perspective and possibly mapping more aspects to be considered when adopting such methods. Also, comparing different cases of the implementation of different active learning methodologies could bring new contributions to the field. Following an interpretivist approach, it was beyond our objective to offer statistical data to support our results. Thus, future studies could complement our findings through a more quantitative approach to confirm and generalize the findings of the aspects that may hinder the success of active learning methodologies.

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