

# Cognitive and affective development of Accounting students - influence of the case method in the light of Bloom's Taxonomy.

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## Abstract

**Objective:** To evaluate the cognitive and affective development achieved when using the case method teaching technique, based on Bloom's Taxonomy, in Accounting students from a Federal Higher Education Institution (IFES).

**Method:** Quasi-experiment in a group of students (intact without selection), in the subject Structure of Financial Statements, taught in the 4th course semester, during the first semester of 2018.

**Results:** The results reveal that the use of an active teaching technique, as a complementary tool, can influence the level of cognitive and affective development the students achieve, also stimulating decision making, communication and problem solving, and also provide a more interactive, dynamic, reflective and motivating learning environment, making students responsible for their own learning, thus allowing the subject to act and interact with their area of study, which are essential and relevant elements for the construction of knowledge.

**Contributions:** The data collected in this research allow us to infer that the use of the case method, as a complementary teaching technique, contributed to the development of superficial learning, as it expanded the most basic level of development, also helping to partially expand all cognitive levels and motivating the students.

**Keywords:** Case method. Cognitive and affective development. Bloom's Taxonomy.



In this scenario, the complementary use of active teaching techniques can represent a promising strategy to maintain the field of accounting in the academic setting, besides helping to prepare teachers' didactics, given the challenges imposed by Reuni, by recent changes in accounting legislation and also by the expectations of a new generation of students. In this sense, this study aimed to answer the following question: **How does the use of the case method, as a complementary tool to the traditional method, influence the level of cognitive and affective development accounting students achieve?**

In an attempt to answer this question, we evaluated the ability of the case method technique to influence the levels of cognitive (learning) and affective (motivation) development Accounting students attained in the light of Bloom's Taxonomy. Thus, the research contributes to the educational practice, indicating that it is beneficial for accounting teaching to use the case method technique as a complement to lectures and exercise solving, as it furthers the students' profound cognitive development, allowing teachers to use this data as an analytic tool, in view of the educational objectives they intend to achieve, and feel stimulated by the possibilities, as the results found demonstrated that the use of this active methodology contributes to the teaching and learning process, enabling teachers to reflect on their practice.

As a theoretical contribution, we highlight the recovery of how knowledge is constructed, highlighting Constructivism as a format that allows the student's cognitive development and, consequently, the construction of knowledge, demonstrating its effect through the evaluations performed. The study also collaborated with the students, who, through the application of the experimental technique, obtained a learning environment with integration, group work, development of the experience of solving problems and making decisions, improving communication, conducting research and mainly providing an environment capable of improving cognitive development, bringing satisfaction. Satisfaction can be an indicator of quality. In this sense, this analysis was fundamental to understand the processes that need to be improved, serving as a basis for the management of IFES to review educational plans and proposals.

## 2. Theoretical Framework

Based on Cognitive theory, when it comes to the study of learning, concerns focus on how subjects interact with the research subject through their mental structure (Moreira, 2011). Thus, cognitivism is based on the assumptions that current learning depends on previous learning, analyzing how subjects process information and assign meaning to it (Lefrançois, 2016). In this sense, development is seen as a result of the interaction between the subject's thought processes and external actions (Piletti & Rossato, 2011). Thus, knowledge is understood based on human cognition as a process of construction (Moreira, 2011).

Knowledge is developed through mental mechanisms, which the subject uses to translate the world, and therefore cannot be transferred, as it is a consequence of the information the subject incorporates and assimilates during all stages of his life (Piaget, 1970). Within this context, it becomes relevant to discuss the development of knowledge in the subject, addressing issues such as the cognitive and affective development of students; and to present a form of learning assessment deriving from the subjects' experience.



Based on the above, it is appropriate to use competency-based assessment models, which focus on the student. In this perspective, Bloom's Taxonomy is highlighted - a methodological tool that allows the establishment of educational objectives (Oliveira, Pontes & Marques, 2016). This taxonomy evidences "in a learning hierarchy ranging from simpler cognitive skills, such as memorized knowledge, to the most complex, such as the act of analyzing or evaluating" (Oliveira, Pontes & Marques, 2016, p. 13).

## 2.3 Bloom's Taxonomy

Bloom's Taxonomy is an instrument designed to classify what students are expected to learn as a result of instruction, enabling them to measure the educational goal: learning (Krathwohl, 2002). This instrument acts as a plan to classify educational outcomes by investigating changes in the students as a result of their educational experiences (Bloom Engelhart, Furst, Hill, & Krathwohl, 1977) (Bloom *et al.*, 1977). According to the authors, the limits of the taxonomy are the objectives: knowledge, intellectual skills and intellectual technical capacity, called "cognitive domain". It also considers affection, which is related to individual interest (Bloom, Hastings & Madaus, 1971).

The development of cognitive domain elements joins the educational objectives in six categories: (1) knowledge: ability to remember or recognize facts, methods and processes in the same way as they have been learned, (2) understanding: represents a capture or interpretation, based on previous knowledge, (3) application: refers to the use of abstractions in specific or concrete situations, recalled from memory and applied to a circumstance., (4) analysis: expresses the relationship between ideas, comparing information, (5) synthesis: brings together elements and parts to form a whole, constituting a scheme that was not clear or present, and (6) evaluation: formulates judgment, conceptions for certain proposals, based on determined or suggested criteria (Bloom *et al.*, 1977). The taxonomy underwent a review 45 years after its elaboration, being analyzed based on two dimensions: knowledge and cognitive processes, that is, knowledge becomes related to all ranked elements (Krathwohl & Anderson, 2010).

In this new construction, the degrees presented by Krathwohl (2002) refer to: (1) recalling, characterizing the process of retrieving relevant knowledge contained in long-term memory; (2) understanding by elaborating meaning for instructional messages through interpretation, exemplification, classification, summary, inference, comparison, and explanation; (3) applying by performing or using a procedure in a given situation; (4) analyzing, breaking up the material into constituent parts, to detect it as related parties that either constitute a general structure or represent a purpose; (5) synthesizing, reaching judgments based on criteria and standards, through verification and criticism; (6) creating, assemble the known elements into an original product.

Anderson and Krathwohl (2001) explored the two-dimensional structure of the revised taxonomy, based on the association between the dimensions of the cognitive process: (1) the dimension of knowledge, (2) facts, (3) concepts, (4) processes and (5) meta-cognitive) and the degree of knowledge the student considers to have acquired - remembering, understanding, applying, analyzing, evaluating or creating.

As for the affective domain, educational objectives describe changes related to interest, attitudes, and values, emphasizing feeling and emotion, to a degree of acceptance or rejection, expressed as interests (Bloom *et al.*, 1977). Thus, the resulting educational objectives in this domain refer to the development of an attitude of trust - in the power of reason and methods of experimentation and discussion; intelligent self-critical attitude - related to one's own affective expression and written communication (Bloom *et al.*, 1977) as well as to the feelings and rights of others; possession of deep sources of feelings and affects - manifested through their contentment and discontent; interest in reading; and, finally, ability to appreciate a song (Bloom *et al.*, 1977).



### 3. Methodological Procedures

This research aimed to apply an active teaching technique - case method - in addition to lectures and exercise solving, to the same group of students (intact without selection), in the fourth semester of an Accountancy program, taught in the discipline Structure of Financial Statements during the first semester of 2018 at a Federal Higher Education Institution (IFES), due to the easy access to the university. Forty-two students were enrolled in the class and 35 participated in the experiment.

The study is a quasi-experiment, which is performed for treatments involving the same subjects, analyzing them before and after the intervention (Martins & Theóphilo, 2016). In this research, an experimental technique was applied to the same subjects, without controlling the variables, which, according to Campbell and Stanley (1963), is a data collection procedure in which the researcher does not have complete control over the experimental stimuli, and can be used with the same group.

For the observation of the data, the design of the quasi-experiment used the developmental levels presented in Bloom's Taxonomy (cognitive and affective domain), analyzed in the pretest (after the lecture, plus exercise solving) and post-test phases (after use of treatment / experimental technique). The application of the case method was used in the teaching of content on the Income Statement (I.S.), after a lecture on the subject (concepts, objectives and structure), followed by a content evaluation through a questionnaire. Subsequently, the case method was applied by means of an I.S. that contained structural problems with one (real) case.

The case method is a technique that focuses on experience, that is, it concentrates on a specific case, aiming to stimulate student participation, through the analysis and decisions proposed during the action, providing the development of students' analysis, judgment and decision-making skills (Hassler, 1950).

Regarding the assessment, the development of (cognitive) learning took place in two steps: after the lecture and exercise solving, to verify the cognitive development achieved; and at the end of the application of the case method, used to identify if the use of the complementary technique influenced the level of cognitive development achieved, based on Bloom's Taxonomy. The evaluation of the affective domain happened after the application of the experimental technique to verify the student's satisfaction with and evaluation of each applied technique. To evaluate the data, categories were established in the cognitive and affective domain, as presented by Bloom et al. (1977), to classify and analyze the content presented in the questionnaires, seeking to understand the effect on performance and satisfaction.

The quasi-experiment was carried out by using a teaching technique to complement the explanation of the content addressed in the lecture plus exercise solving, in a class with 42 enrolled students. For the purpose of this research, only the 35 who participated in all evaluations were considered though, aiming to monitor the students' cognitive and affective development.

Historically, the discipline in which the quasi-experiment was applied has a high failure rate (more than 50% on average), so that students were present who had repeated the subject more than once. Thus, the number of dropouts and absences in class is high. This factor was noticed in the evaluations performed, with variations in the number of participating students. There was no resistance or discomfort concerning the application of the quasi-experiment. On the contrary, when they found out about the proposed application, the students were receptive and motivated.

The dynamics to apply the cognitive development assessments took place in two steps: after the lecture plus the exercise solving, and after the application of the technique, aiming to compare the results obtained through one technique and the other.

To identify the level of cognitive development the students achieved, as indicated by Anderson and Krathwohl (2001), it was considered that the student reached the desirable level in those situations in which the answer to the question was correctly and completely elaborated, regardless of the words used (in accordance with the teacher/legislation). When the student answered the question asked only partially, it was considered that he partially reached a certain level; and when he did not answer or answered wrongly, it was considered that he did not reach the desired level.

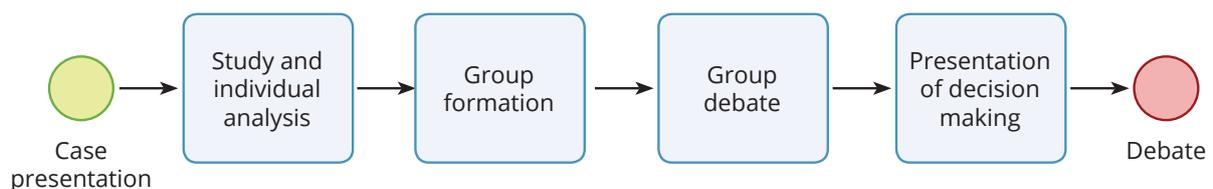
To perform cognitive and affective assessments, analysis instruments were developed, applied in the form of a questionnaire based on Bloom’s Taxonomy, which served as a basis for the verification of the results obtained - which were arranged in tables, showing the levels of cognitive and affective development attained at each step and in each technique used (lecture + exercise solving and the case method).

The application of the case method involved three steps (Leal, Medeiros & Ferreira, 2017). The first step was based on an individual study by the students, who were expected to read the case initially and carefully to become familiar with the presented contents; in the second, a more careful reading took place, focused on the details, analyzing the most important ones to identify the problem. Subsequently, discussions were held in small groups in order to ascertain the elaboration of the case. From this moment on, complementary bibliographies were suggested, exchanging ideas with the students, based on situations already experienced or studied; and, finally, the groups presented their proposed solutions, which were discussed in class.

The script followed for the application of the case method was indicated by Leal, Medeiros and Ferreira (2017): (1) **Planning** (occurs before class, this moment is intended to choose the case and the reading material, as well as to prepare the class and the teaching plan); (2) **Case presentation** (availability of bibliographic material, separation of groups, case analysis and solution finding); (3) **Presentation and discussion** (of the arguments raised); (4) **Conclusion** (conclusion of discussions, assessment of student participation, application of assessment and self-assessment of the method as well as learning assessment through a questionnaire).

As for the objective of the method, this was to discuss the concepts, objectives and structure of the Income Statement, offering the student: contact with real and possible situations in search of a solution for a problem; develop teamwork skills; and analyze problems and propose solutions (Leal, Medeiros & Ferreira, 2017).

The application of the case method technique was presented to the students through PowerPoint, indicating its concept, benefits, educational objective, application and evaluation, according to the steps shown in Figure 1.



**Figure 1.** Steps of the Case Method

Source: elaborated by the authors, based on Leal, Medeiros and Ferreira (2017).

The steps illustrated in Figure 1 show the development steps of the case method, detailing its application, as proposed by Leal, Medeiros and Ferreira (2017). Thus, at the end of the presentation on the technique, its application began by giving students a real Income Statement - which was unstructured and contained a missing element (a value) - for the student to calculate the result, characterizing the first stage of development of the case method. Two statements of renowned and popular clothing and accessories companies were used. Each student individually received a random statement containing a letter, for example, Case Method (A) and should restructure it and calculate the unreported value.

In total, there were six different statements, randomly distributed among the students, with the indication of a letter (A, B, C, D, E, F), so that, after the individual resolution, the students would form the groups based on this information. Six groups were formed, which discussed and sought to solve the question, according to one of the propositions used: "Analyze the present situation of the company based on the individually prepared statement, and then compare it with a new situation, in which selling expenses should be equal to zero".

Based on the case presented, each group should carry out a new restructuring of the statement and compare both situations, seeking to identify the consequences of this change in the other accounts of the company's structure and reality. Then, they should discuss the reflection of the proposed changes and present the decision making, indicating whether or not the company should make the new change. Each group defended its ideas, based on the concepts discussed, and an intense debate was held with the whole class. The application took place during four 50-minute classes.

## 4. Results and Discussion

Questionnaires were applied to analyze the cognitive and affective development of the case method, which served to identify the level the students had reached at each step in the evaluation and to verify if the use of the technique was able to influence the cognitive and affective level the students had reached. For this analysis, an evaluation instrument was elaborated, containing the questions that permitted verifying each level proposed in the Bloom Taxonomy for the Cognitive Domain, according to Table 1.

Table 1

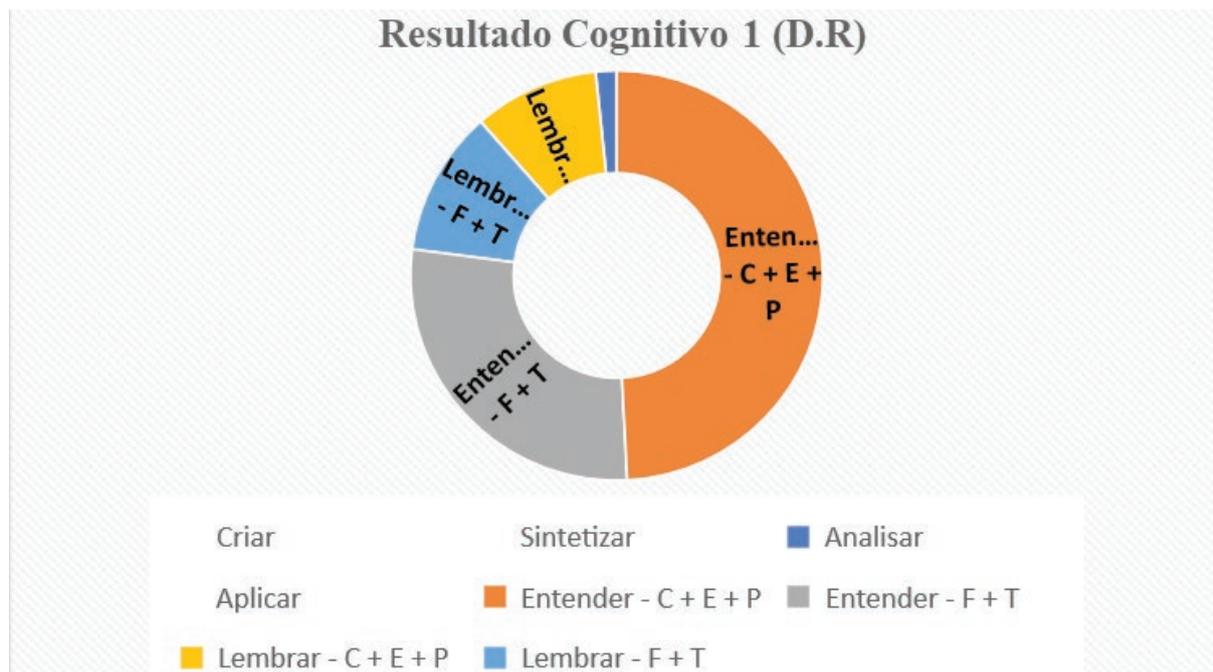
### Cognitive Assessment Tool - I.S

Cognitive Dimension	Knowledge dimensions	
	Facts and Terms	Concepts (structure) and processes
Recall	Q1. Define what the net income is?	Q2. Describe where the company should classify the equity account in the structure of the Income Statement?
Understand	Q1.1 Explain what the net income represents for the company?	Q2.2 Interpret: If the company has a negative result, how does this affect the income taxes?
Apply	Q5. Elaborate the Income Statement.	Q5. Elaborate the Income Statement.
Analyze		Q3. Comparing the company results in steps 1 and 2 of the individual and group activity, identify which presents the best situation and growth capacity
Synthesize		Q.4 Propose solutions to improve the result of the company with the worst income.
Create		Q3.1. Justify the answer to question 3.

Source: elaborated by the authors, based on Bloom *et al* (1977) and Krathwohl (2002).



To analyze the last level, the ability of the student to “Create” based on the concepts discussed, relating their criticism to the standards, the students were asked to justify the answer given to the question (Q.3) about which company (from the I.S. exercise) was in the best situation with the best growth potential, according to (Q3.1). What this item is concerned, none of the students presented a justification or argument to defend his/her answer. This step, proposed by Bloom et al. (1977), requires the student to present a judgment based on specific arguments, previously developed at each level, defending a proposal that contains concepts the students recalls, understands, applies and is able to synthesize. Hence, the cognitive level the students achieve as a whole, based on the lecture and exercise solving on the content of the Income Statement is displayed in Figure 2.



**Figure 2.** Cognitive Assessment - Lecture + Exercise solving - (I.S)

Source: research data.

(Translation: Cognitive Result 1 (I.S) – Create – Synthesize – Analyze – Apply – Understand – Recall)

In these results, it is noteworthy that most students reached or partially reached the level “Remember”, when questioned on facts and terms (F + T); When it came to concepts, structures and processes (C + S + P), 62.86% did not reach this level. At the “Understand” level, on the other hand, this result was different as, in both cases, most or part of them reached the “Analyze” level. It is noticeable that, based on the knowledge developed, none of the students was able to reach the level “Create” - the most complex and difficult to reach, according to Bloom et al. (1977).

Regarding the analysis of the student’s satisfaction with the lecture, followed by the solution of the exercise resolution on the I.S., an assessment tool was elaborated based on the affective domain of Bloom’s Taxonomy, as shown in Table 2.

Table 2

**Affective Assessment Instrument – Lectures + Exercise Solution - (I.S)**

Levels	Self-assessment
Receiving	Q2. Do you believe that the lecture and solution of exercises helped to improve the understanding of the content? <input type="checkbox"/> Yes <input type="checkbox"/> No
Responding	Q1. Score the application of the lecture + exercise solving: <input type="checkbox"/> 5 - Highly satisfied <input type="checkbox"/> 4- Satisfied <input type="checkbox"/> 3 - Partially satisfied <input type="checkbox"/> 2- Dissatisfied <input type="checkbox"/> 0 -Totally dissatisfied
Valuing	This item was used after the application of the case method technique to verify the student's preference of either the lecture + exercise solving or the case method.
Organizing	This item refers to the organization of preferences. This element was not used in the experiment.
Characterizing	Q3. Do you like to participate in group activities? <input type="checkbox"/> Yes <input type="checkbox"/> No

Source: elaborated by the authors, based on Bloom *et al.* (1977).

These questions were used to understand how the student received and responded to the stimulus deriving from the teaching strategy, as well as to understand how the student organizes his preferences. Through the item “Characterize”, the change in his/her behavior can be identified.

The self-assessment results (Q.2) revealed that 100% of the students believe that lecture plus exercise solving helped to better understand the content on the I.S. This level highlights the student awareness of a situation where, according to Bloom *et al.* (1977), (s)he should evaluate the characteristic of the stimulus, perceiving it as a completed activity.

Regarding satisfaction, verified in the “Answer” level (Q.1), 94.24% of the students were satisfied with the explanation of the content and 5.71% partially satisfied, indicating, according to Bloom *et al.* (1977), the students’ willingness to participate in that activity. According to Bertolini (2007), satisfaction may indicate the students’ commitment to their learning and influence their performance.

The element “Characterize” (Q.3), according to Bloom *et al.* (1977), is associated with the student’s conviction regarding a situation, being used in this case to identify the student’s behavior towards his participation in group activities. This level revealed that 77.14% of the students enjoy participating in group activities, compared to 22.86% who said they did not like this. Figure 3 illustrates the general results of the affective assessment.



**Figure 3.** Affective Assessment – Lecture + Exercise solving (I.S)

Source: research data.

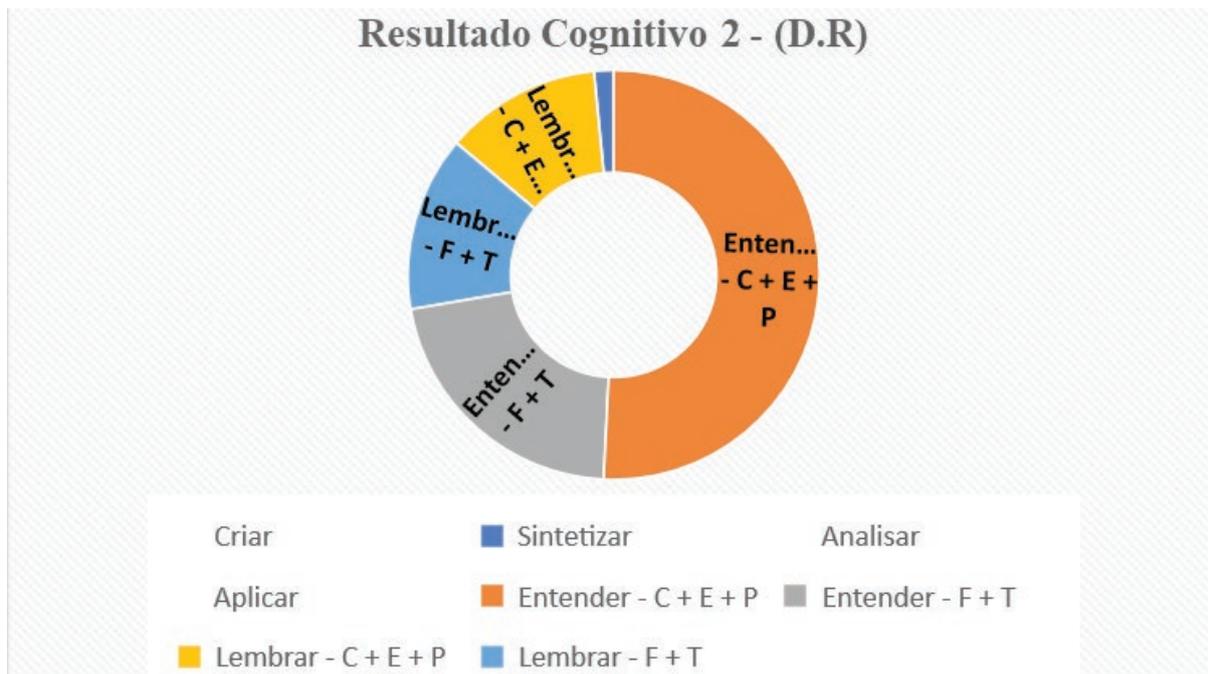
(Translation: Affective Result 1 – I.S – Characterizing – Receiving – Responding – Characterizing – Organizing – Valuing – Responding – Receiving)

The results shown in Figure 3 summarize the attitudes the students attained and perceived regarding the stimulus deriving from the lecture and the exercise solving in the study of the income statement, showing that the students believe in the ability of the strategy to help understanding the content. Most were satisfied with the experience, indicating their commitment to the activity, and 77.14% say they enjoy participating in group activities.

Regarding the second assessment performed after the application of the case method, the questions used to assess cognitive development were the same or similar to those asked in the first assessment (Table 1). In this sense, the results show that, of the 35 students who participated in the case method, regarding the “Remember” level of facts and terms, 25.71% answered the question (Q1) completely, thus reaching the level, while 71.43% partially reached and 2.86% did not reach the level. This result is close to that achieved by the lecture plus exercise solving, which indicated that 20% fully and 80% partially recalled facts and terms.

Regarding the concepts, structures and processes, still at the “Remember” level, it is clear that the results achieved through the technique were more significant than the previous evaluation, as 22.86% reached the level completely and 74.29% partially. In the previous case, these results amounted to 17.14% and 20%, respectively, indicating that the use of the technique in this subject and level influenced the cognitive development. The results verified for the levels “analyze”, “synthesize” and “create” were similar to the result evaluated after the lecture plus the resolution of exercises.

At time one, 97.14% of the students had partially achieved the analyze and synthesize levels, while none had reached the create level. Variance was found though between a student who reached the “analyze” level previously and one who achieved “synthesize” with the case method. Thus, the general result of the cognitive development achieved is shown (Figure 4).



**Figure 4.** Cognitive Assessment – Case Method

Source: research data.

(Translation: Cognitive Result 2 – Create – Apply – Recall – Synthesize – Understand – Recall – Analyze - Understand

Analyzing the case method, a technique that focuses on experience and seeks to stimulate decision making, as indicated by Hassler (1950), it is clear that the educational objective has been achieved. The students experienced decision making, as they proposed to maintain or not the new situation indicated in the proposed exercise. Regarding the cognitive development, although they did not reach the “Create” level, at the levels “Remember and Understand”, the technique was able to positively influence the students’ cognitive development, because it increased the percentage of students who, at these levels, understood the content better.

Based on this context, it can be inferred that there was a transformation in the students’ mental structure, as indicated by Piaget (1970), verified by comparing the results of evaluation 1 with 2, before and after the application of the case method, considering the evolution of the students who used their memory (acquired in the lecture or before) to build a concept (reach the level understand).

Thus, according to Piaget (1970), in these cases, students are assimilating knowledge, because they use previous knowledge to build new structures. Thus, it can be appointed, due to the initial assessment regarding the “Understand” level, that in this element, the students had to accommodate new knowledge, which did not exist previously, so they transformed their cognitive structure.

The analysis regarding student satisfaction with the application of the case method was verified through the self-assessment questions, seeking to identify the attitudes developed, based on Bloom’s Taxonomy, according to Table 3.

Table 3

**Affective Assessment Instrument – Case Method**

Levels	Questions
Receiving	Q2. Do you believe that the case method helped to improve the understanding of the content? ( ) Yes ( ) No
Responding	Q1. Score the application of the case method ( ) 5 - Highly satisfied ( ) 4 - Satisfied ( ) 3 - Partially satisfied ( ) 2 - Dissatisfied ( ) 0- Totally dissatisfied
Valuing	Q4. Which of the applied techniques do you prefer? ( ) Lecture + Exercise solving ( ) Case method ( ) No preference
Organizing	Not used in this research.
Characterizing	Q.3. Did you like participating in the group activity, considering the exchange of ideas and cooperation from colleagues? ( ) Yes ( ) No

Source: elaborated based on Bloom *et al* (1977).

These questions were intended to analyze how the student received the stimulus through the Case Method (Q.1), answered it (Q.2), valued his/her preferences (Q.4) and modified his/her attitude or not (Q.3) towards participation in a group activity. To this end, the instrument allowed us to analyze whether the student who said he did not like to participate in this type of activity reviewed the evidence, such as the benefits of the technique, and also changed his/her attitudes, starting to like it.

The results of the affective domain revealed, regarding the “Receive” level (Q.2), that 100% of the students believed that the case method helped to better understand the content about the income statement, similar to what was evaluated for the lecture and exercise solving. The same can be said of satisfaction. The results obtained are identical to those achieved by the lecture and exercise solving on the I.S., as 94.29% were satisfied with the technique and 5.71% partially satisfied (Q.1).

On the other hand, in the evaluation regarding the characterization (Q.3), there is a slight change in the students’ attitude, as 88.57% said they liked participating in the activity against 11.43% who did not. Earlier, in the self-assessment performed after the lecture and exercise solving, these results amounted to 77.14% and 22.86%, respectively, showing that, after participating in a group activity, some students changed their attitudes, starting to like the strategy.

When asked about the preference (Q.4) between the lecture and exercise solving or the case method, the students who reached the “Value” level were those who preferred the case method, corresponding to 42.86% of the students, while 8.57% partially reached the level, because they indicated that they liked the two techniques equally, and 48.57% indicated preferring the traditional method.

Given the analysis of the affective domain, it can be concluded that the students were satisfied with the technique, indicating that the case method can be a motivating strategy for students, as it granted satisfaction. This result is compatible with the study by Rios (2011), who used the case method in the subject Financial Statements Analysis, revealing that the technique contributes to the students’ development and motivation, making them more active and responsible for learning.

In addition to these factors, Hassler’s (1950) notes indicate the need for students to work with incomplete data, such as those presented in the case method, as they face situations in which they need to carefully analyze information that may be incomplete. For these reasons, according to the author, students end up accepting this type of technique.



The findings suggest that the use of the case method as a complement to lectures and exercise solving benefits the learning process as it enhances the students' cognitive development, allowing teachers to use these data as an analytic tool, in view of the educational objectives they intend to achieve, and to feel stimulated by the possibilities. Thus, the use of the case method contributes to the teaching and learning process. The study also collaborated with the students who, through the application of an active technique, obtained a learning environment with integration, group work, developing the experience of solving problems and making decisions, improving communication and research skills, and especially provided an environment capable of improving cognitive development, bringing satisfaction. Satisfaction can be an indicator of quality. In this sense, its analysis was fundamental to understand the processes that need improvements, serving as a basis for the management of IFES to review educational plans and proposals.

The limitations of this research are related to the fact that it was performed in only one class, without being able to compare its results with other classes that were not influenced by applied techniques, which would permit verifying the development achieved in both cases. Another limiting factor was the sample size which, because it is only one class, does not allow for generalizations. As a suggestion for future research, an experiment using a complementary technique could be applied in one class group and not another, and in a public and a private institution, so that the effect on cognitive and affective development can be compared between classes and institutions. Another suggestion is to identify the students' learning styles, allowing them to select teaching techniques that are tailored to the students' learning forms.

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