Interpretative Study Of First Semester Civil Engineering Students' Learning Process At The Universidad De Sucre

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Abstract: The purpose of this research is determining the factors by which learning strategies contribute to be one of the causes of academic desertion in first semester students of civil engineering at the Universidad de Sucre, Colombia. The population is made up of approximately 700 students of the program and the sample is made up of 45 students entering in the first semester. The relationships of each of the explanatory variables of the teaching-learning strategies will be studied. In addition, for the present research, a survey was conducted and applied to first semester students of the Civil Engineering program at the Universidad de Sucre. The questionnaire consisted of questions about socioeconomic characteristics, parents' educational level, weekly dedication outside the classroom, learning styles and strategies, methodologies to prepare for classes and exams, as well as their participation in the classroom and interaction with teachers outside the classroom. They were also asked about their appreciation of the methodologies and strategies of the classes, among other questions, which serve to have a perception of the situation, the experiences and the experience that the students live in this stage of their studies.

Keywords: Learning, strategies, methodologies, 3.0 student

1. INTRODUCTION

The awareness about the socioeconomic and academic conditions will make it possible to establish the different profiles of students entering the Civil Engineering program at the Universidad de Sucre, which could implement pedagogical strategies to facilitate the regular progress of students. One of the serious problems facing higher education today is the low graduation rate of students in relation to the massification of admission. Therefore, it is not clear from the institutions, what didactic and pedagogical strategies can accompany the teaching-learning process so that students who enter the system can remain in it and achieve the objective with their graduation. If we start from the concept of subject as an explanatory

construction of the constitution of networks of experiences in individuals and groups, it would be affirmed that current educational practices in terms of their homogenization characteristic do not contemplate this heterogeneity of subjects (Carruso, 2004). Subjects are constructed in experiences, and these experiences grant the category of subject (Dewey, 1986). Experience is not exclusively empirical: the things that happen to us are always thought from a network of concepts, a network of previous experiences that give meaning to these new experiences (Samaja, 2005). The process of construction of learning is nourished by the modeling pre-conception of the subject. In every experience there are conceptual elements that organize it.

2. IDEAL SITUATION THAT CONTRIBUTES TO RESOLVE THE SITUATION

It is not a student who attends the university so that the professor explains the new subject. He is not a student who is predisposed to sit and listen in a passive attitude, like someone who knows that it is up to him to obey orders, being willing to accept the imposed agenda by the teacher in charge. Universities are not only investing in technology to detect plagiarism, but also to adapt to a new reality, which is that of the connected student. In the European university they call it the student 3.0. "The student assimilates the contents at home and does the homework in the classroom, where he no longer comes to sit and listen, but to generate multimedia content: apps, videos, maps" (Otiniano, 2015). On the other hand, there is another student, who at home and with the technological and traditional means at his disposal, accesses the information and the various topics mentioned, and attends school or class to expose, discuss, find the necessary explanations from the teacher. Learning, elaborations and productions are carried out in the presence and with the direct guidance of the teacher, who can certify the learning. The passivity and homogeneity of classroom work is abandoned in order to install multiple and varied activities in the same scenario but with a teacher who moves around looking for the students. The axis or center of the classroom is closed, and the classroom becomes a laboratory where materials are produced, using different supports (Noro, 2015a). These would be two important points of view to take into account in order to detect possible solutions to motivate the student to learn through more dynamic teaching and learning strategies that can contribute to the student remaining active in his or her professional training process.

It is not the teacher himself who waits for the students, or it is not a teacher whom the students wait for. For a 3.0 student to be possible, it is necessary to have 3.0 teachers. It is a teacher who has not been programmed only to expose the subject that according to the program must be developed. He is not someone who releases what he has and knows without being interested in the audience. He is a dynamic actor who sets the group's agenda, who pre-assigns the obligations, who sets the debates in motion, who articulates the spaces and the work, who organizes the shared time and the individual or group times. It is a teacher who knows how to move from homogeneous and frontal discourse to a plurality of discourses, from language for all, to dialogue with each student or group of students, and who is accustomed to building with everyone, to set up the meetings adapting to the rhythm and reality of his students6. All of the above is what occurs to a greater degree in Colombian universities and should be adapted so that the teacher is a more dynamic actor.

A teacher, who looks at the world, education, his professionalism, assumes the flexibility demanded by change. It is flexible to understand the ideas of the students in terms of substance and form, in terms of content and support (Noro, 2015b). It is very important that the teacher has a mentality of continuous change and improvement, taking into account the ideas and comments of the students.

Every change brings about other changes, and requires another concept of distribution in space and time. Students do not come just to sit and listen, but to work, to produce. If you change something, you have to change everything, because if it is a real change, it has repercussions on everything (Zitarrosa, 1978).

The teacher's role is multiple and requires preparation according to this new scenario: to indicate the obligations for each meeting; to suggest sources and resources for the preparation work of the classes; to supervise the fulfillment of the previous tasks; organizing the work of the class; to accompany the processes; carrying out advisory, correction and evaluation tasks. It is a teacher who is present, who guides, accompanies, points out, corrects the work done by the students; who sits with them, who anticipates a doubt, who points out a methodology, who takes them out of a situation in which they cannot move, who gives them guidelines for using new technologies, who helps them to organize their time and their ideas, who learns with the students, because every process is always bi-directional (Noro, 2015).

There is a transformation in the organization: Instead of attending the planned and known ceremony, where there is a minister who manages everything and the parishioners only have to attend the ceremonies from the pews, without being able to produce any change or modification, and without being able to intervene in the ritual, here the ceremony, the ritual, the liturgy, is the fruit of collective creation. It breaks with the logic of the sacred ritual where the actions must respond to the established order to be infected with the logic of creation, spontaneity, intellectual production, art and celebration. In this way, students know what the theme they will work on is because they have been required to do the previous tasks, but they do not know what the dynamics they will implement will be. Neither do the teachers or professors know, because they depend not only on their projects and their preparation, but also on the ideas, proposals and previous work of their students. This is another organizational format, in which planning and projects are closed at the end of the meetings (Noro, 2015a).

University: Although this scheme should work in all schools and formal education, it should be contagious to students and teachers at the university, because when students get used to another ritual they cannot think of another ceremony, nor do they endure it. The modern school does not arise as a projection of the university format, it is not a replica or a copy of the university, but a construction that responds to another model of temporal space, there is much of the university that was projected in the school, because with its evolution and development it became an obligatory preparation. Then, some university practices had to be anticipated in the previous training. The chair and the students at its disposal, with knowledge in the hands of the teacher and the book, and the students willing to listen disciplined to the teachings without further intervention and debate was reproduced in the school, although children and adolescents had other conditions of development and learning. The university always reserved

the word and the knowledge to the professors, to the owners of knowledge, of texts, of the word, and demanded silence, registration, discipline, understanding from the students. The learning was displaced for the later stage, for the inner and private process (Noro, 2015b).

This necessary correlation educator - learner, became a task's educator who played an almost exclusive role, like the act on the stage of the theater or the priest at the altar, in the presence of the students whose "activity" is limited to expressing their doubts or responding to the questions or indications of the teacher. With the books, the notes and records of the class and the lessons understood and their memory, the student must carry out the learning process and face the evaluation meetings (Noro, 2015a).

Different practices are proposed here, with the possibility of the University abandoning these unidirectional and consecutive processes, to promote bidirectional or multidirectional and simultaneous processes: we have all previously accessed the subject, we have all encountered the work material and we all access the class to build the object of knowledge, through diverse methodologies: expositions, debates, versions, production, writing, gathering of materials, systematization and among others (Noro, 2015a).

3. CURRENT STATE OF THE UNIVERSITY REALITY

At the Universidad de Sucre there are teachers who transmit their knowledge in a repetitive and rote manner without thinking that there is a transforming reality that leads today's world to live in the renewal of understanding.

The academic programs of the Universidad de Sucre were created to respond to the professional needs of the environment, leaving aside the revolutionary human component that generates a great social impact in response to the problems of the environment.

The curricula of the academic programs as a whole are well defined and are currently showing improvements in their flexibility.

The curricular contents of the University's academic programs need a greater implementation in terms of humanizing the topics without losing the specific nature of each subject.

The University does not have an action plan for the re-accommodation of teachers, with the firm purpose of leading the entire teaching population to change their thinking, activities, attitudes and aptitudes about what the new way of teaching-learning requires for the pedagogical strategies of the careers.

The principle of authority in the student-teacher relationship has been lost at home, and the parent-child relationship of respect is reflected in university communication.

4. SURVEY, RESULTS AND DISCUSSION

In order to have a clearer panorama of the problem addressed by the present research, the researchers designed a survey in the Google Forms Platform and it was shared via Whatsapp, to first semester students of Period II of the year 2021 of the Universidad de Sucre, the total number of responses obtained was 44, which corresponds to 98% of the study sample. The questions of the questionnaire were aimed at characterizing the socioeconomic conditions of

the students, as well as the educational situation of their parents and the rest of the questions were focused on observing the students' perception of the educational model they have lived in the university during the first semester and compared with their experience lived in their last study of secondary school (high school). The data collected in the survey are presented below.

The ages of the participants ranged from 16 to 27 years old, with 66% of the students being 17 and 18 years old, which are the most repeated ages. Additionally, 64% of the students were male and the remaining 36% were female. With respect to the students' place of origin, the survey showed that 77% of the students live in an urban area and 23% are from a rural area. In this sense, it must be taken into account that the Universidad de Sucre is a regional higher education institution, which attracts many students from outside the city and from other departments of Colombia. In relation to the housing ownership situation, 59% responded that the house where they live is their own or owned by their parents, 27% live in a family-owned house and only 14% live in a rented house. In addition, 34% of the students live in a boarding house during the course of their classes. Also with regard to the dedication of the students, it was found that 18% of the students, in addition to studying, perform some form of work to obtain economic resources.

Figure 1 shows the level of schooling of the students' parents, showing that more than 80% of the parents have completed high school and more than 45%, in both cases, have continued their studies after completing high school.
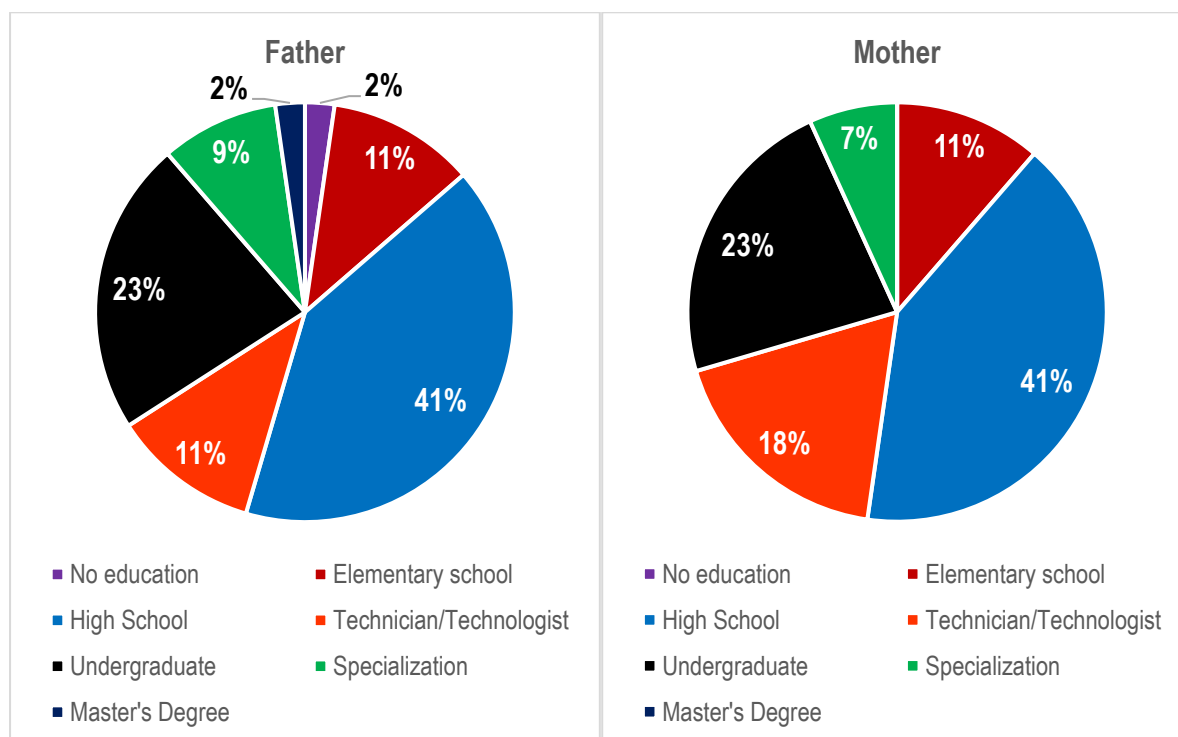

Fig. 1. Level of schooling of the students' parents

In Figure 2, we can find the monthly income of the students' families, expressed in millions of Colombian pesos (COP), and it can be observed that families with economic income corresponding to the minimum wage (1 million COP) or with income between 1 and 2 times

this value predominate, which gives us a vision that the first semester students of the program have a low economic income, which can be compared with the information of the levels of schooling, where 34% of the fathers have a pregraduate or higher degree and 30% of the mothers are in this condition.
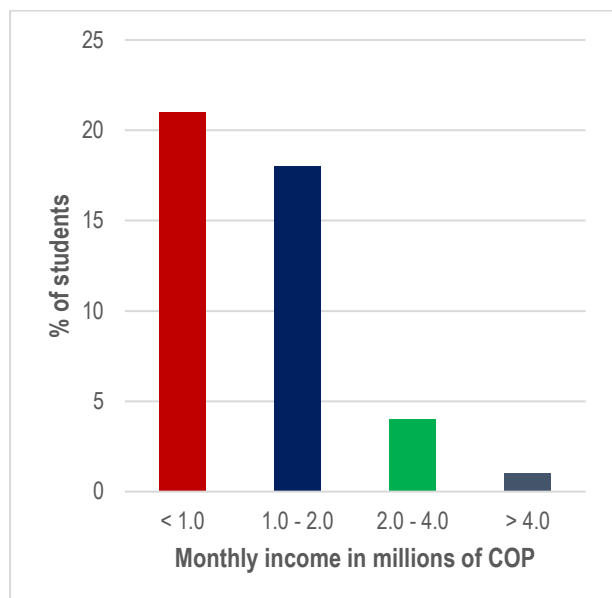

Fig. 2. Monthly income of students' families

From here on, the survey questions were more directed to the academic component of the students, making reference to the subjects of the first semester of the career and making a contrast with some points of their academic experience in high school. In the first instance, the students were asked from which schools they came from, and it was found that 25% came from private schools and the rest from state-funded (public) schools. Additionally, they were asked about the learning methodology during the last school year, due to the restrictions that were taken due to the Covid-19 pandemic, where it was found that 30% of the students received their classes in person and the rest, remotely through digital platforms (virtual classes). It was also possible to establish, regarding the way of receiving the classes, that 90% of the students prefer to receive the classes in person, instead of virtual classes.

On the other hand, an attempt was made to make a comparison between the performance obtained by the students in their last year of high school, with that obtained in the first semester of college, for which one of the essential subjects within the Civil Engineering career was selected (mathematics and calculus), asking the students to rate their performance and performance in the categories of Excellent, Good, Fair and Poor. Figure 3 presents the results, where slight differences are shown and it is observed that the average performance is more discouraging at the University than at the College, because their performance in the Excellent category decreased, while that of the Regular category increased.
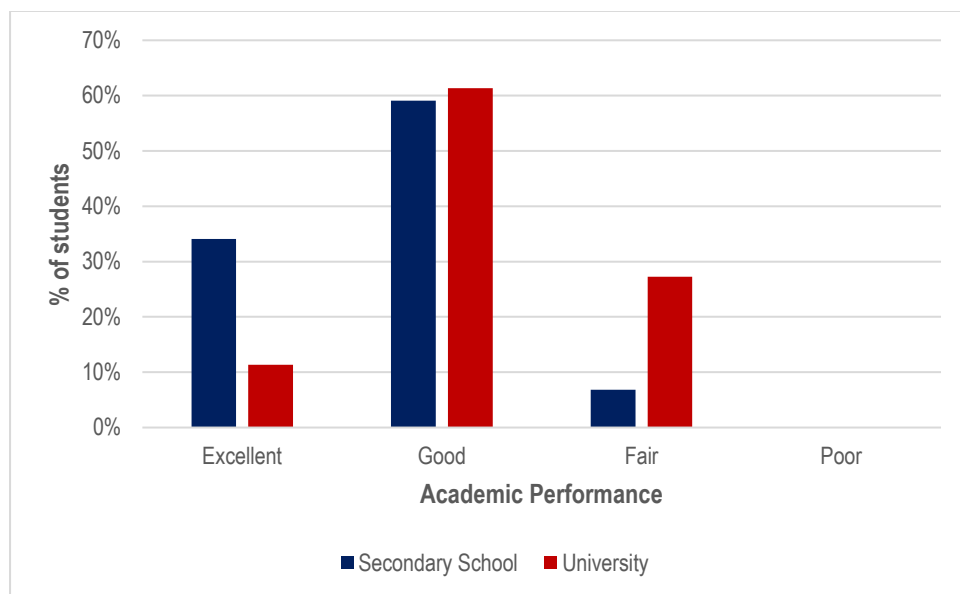
Fig. 3. Students' academic performance in the subject of mathematics.

Students were also surveyed about the number of hours they invest in their independent study, both in the periods they have attended their classes in face-to-face and virtual form, and complementing this information with the number of hours they invest in other activities on the network. The results are presented in Figure 4, where it can be seen that the variations between the number of hours spent outside the classroom do not vary much regardless of the form in which they teach their classes. In addition, the hours spent in other (non-academic) activities for a large number of students exceed 20 hours per week.
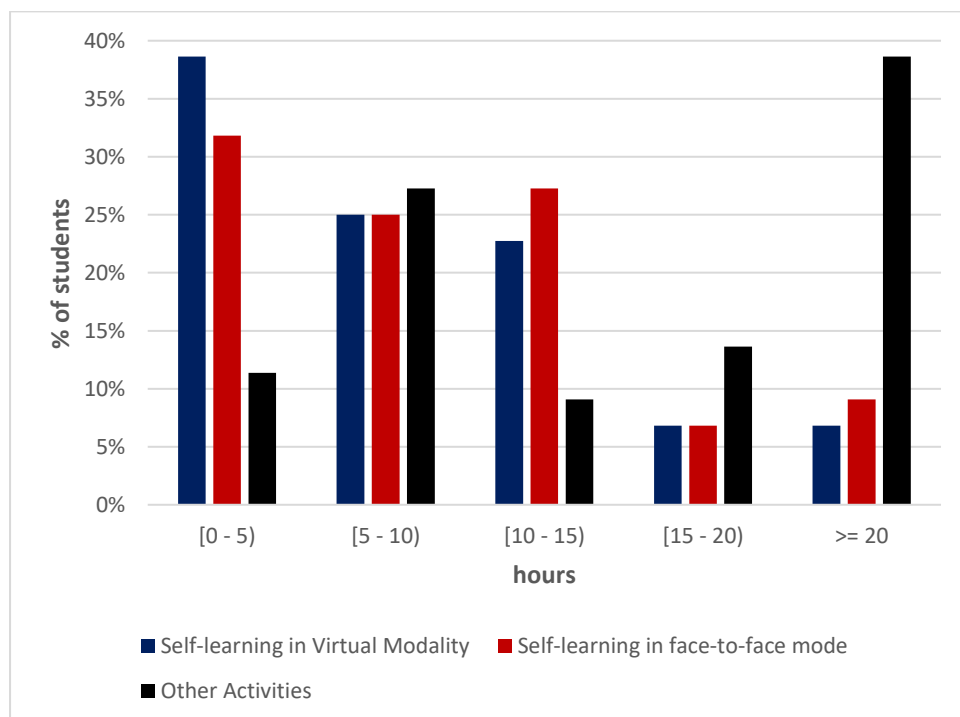

Fig. 4. Weekly hours that students dedicate to different activities

The next part of the survey was aimed at collecting the learning styles and strategies with which the students identify themselves, as well as the strategies and activities they carry out to prepare themselves to attend their classes and to study for an exam. Figures 5, 6, 7 and 8 show the data found. It can be said that students prefer teaching styles that are practical and visual to those that are theoretical and auditory; in addition, of the learning

strategies, they prefer questions and answers together with explanations, although other alternatives such as summaries, diagrams and Internet searches are widely used. On the other hand, of the study strategies outside the classroom, the preferred one is to complement the information received with other sources on the Internet, as well as to consult text guides and class notes. Regarding the strategies used to study for exams, students prefer to read their class notes or do the practice exercises from the guide texts.
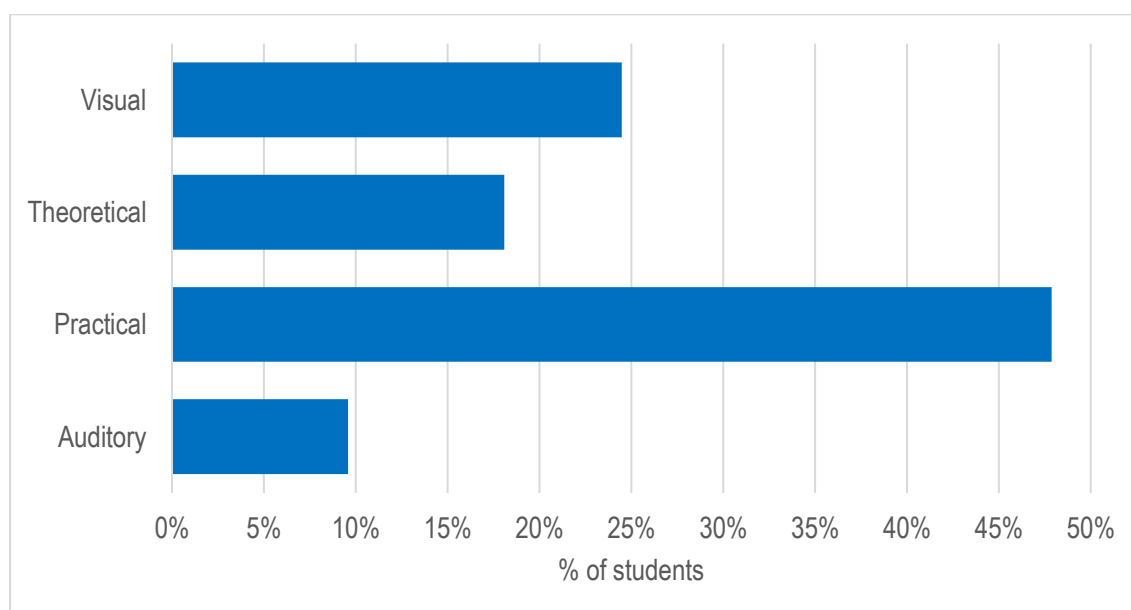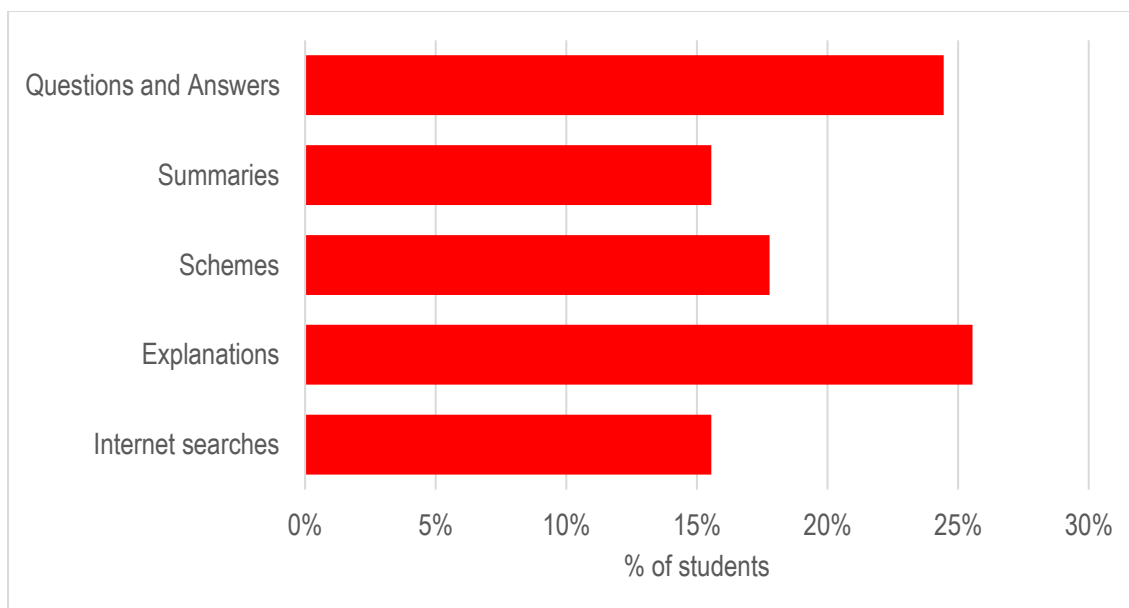

Fig. 5. Students' learning style
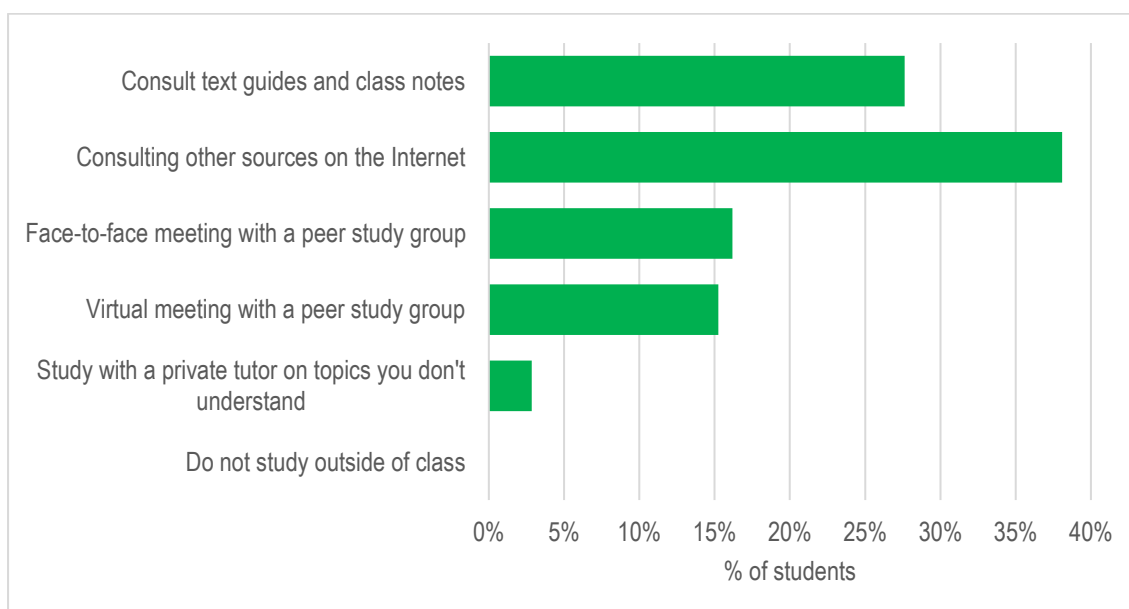
Fig. 6. Students' learning strategies

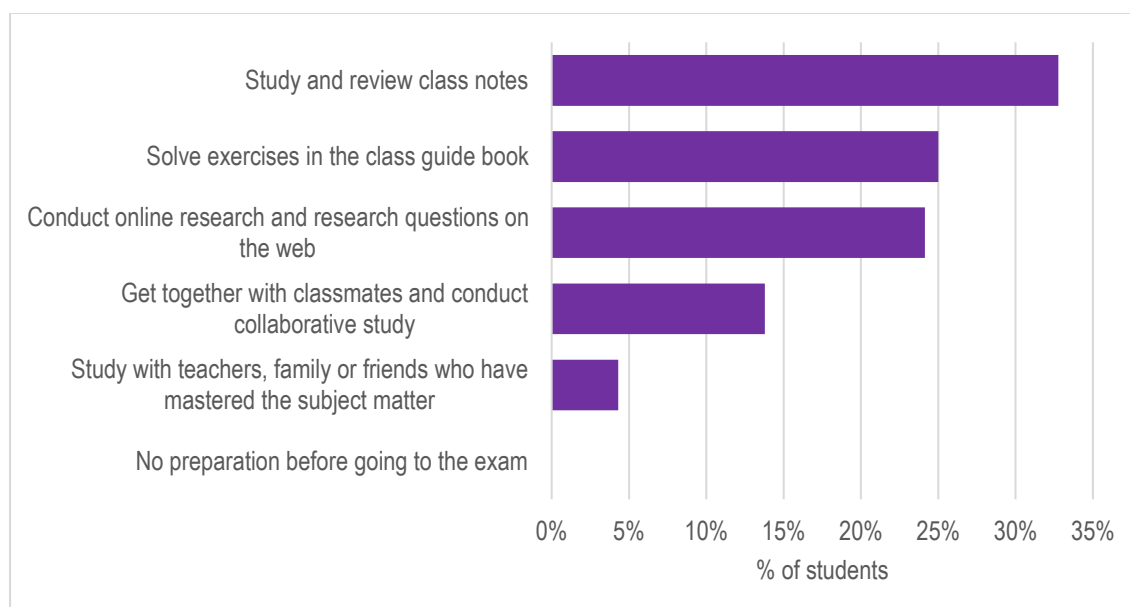**Fig. 7.** Study strategies outside the classroom

Fig. 8. Strategies used for exam preparation

In relation to the students' previous preparation before going to class and their participation in the classroom, it was found that 78% of the students prepare sometimes before going to class, 9% read the notes of the previous class, another 9% research the topics they will see in the next class, and the remaining 4% do not study before class. In terms of participation, 67% of the students participate when the occasion warrants it, 22% participate only when asked by the teacher, 9% participate constantly in all classes, and the remaining 2% never participate. From this it can be noted that both the preparation prior to class and participation in class exceed 50%, which is an indication that the students have an active performance during the course of the class.

Another important aspect that we wanted to investigate is the conception of students where they can become active agents during the development of the class, not only individuals who go to the classroom to listen to the teacher, but people who propose ideas, participate and interact. Figure 9 shows the response to the questions of whether they would like to study in an environment where classes are directed by the teacher and the students are the ones who actively develop it with their contributions, and whether they would like to be in a learning environment where creativity, autonomy and interactivity of the students is what prevails in the classroom, noting the positive attitude of many students towards wanting to be in learning environments with these characteristics or having the intention of trying it out.
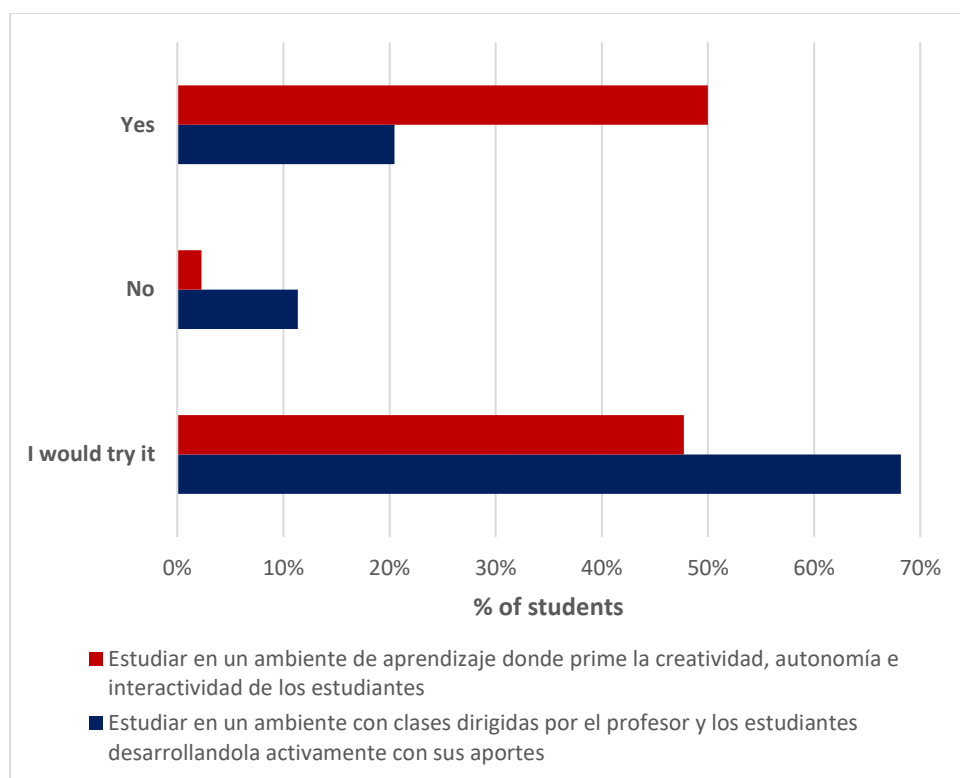
Fig. 9. Respondents' intention to become 3.0 students.

It is also worth highlighting other relevant results within the research, such as the fact that 54% of the students usually ask for assistance from the teachers in subjects they do not understand, 4% always solve their doubts and 42% stated that they do not interact with the teacher outside the classroom. They were also asked if the methodologies used by the teachers in the teaching-learning exercise were in agreement, to which only 20% think that the methodologies followed are in agreement, 76% think that the methodologies could be improved and 4% say that they do not like the methodologies followed, which reflects that a large number of students have a negative perception of the way engineering classes are taught for the first semester of engineering, which may be linked to the fact that they come from a change of teaching offered by secondary education with university education where the student is more autonomous and responsible in their studies.

5. CONCLUSIONS

The survey conducted and applied to first semester students of the Civil Engineering program at the Universidad de Sucre allows us to have a socioeconomic characterization of the student population entering the University, in addition to providing valuable information about how students perform their learning activities and how they perceive the teaching methodologies of their professors, It also provides valuable information about how students carry out their learning activities and how they perceive the teaching methodologies of their professors, giving tools to detect which could be the main reasons for future desertion of students in the program and to implement programs or strategies that help the University so that its first semester students adapt better to it and have an enriching experience, both academically and personally, and at the same time, that the professors achieve their objectives as teachers.

It is important to carry out an interpretative study of the teaching-learning process of the first semester students of civil engineering at the Universidad de Sucre, because it will lay the foundations for changes in the curricular structure of the program, knowing the aspects of each particular student. As a first step, the institutions are

fundamental, because these are the entities that regulate and direct the institutional educational policies, which goes from level to level until reaching the student. Teachers are fundamental actors in teaching for a good understanding of the curricular topics, because depending on the way they face the subject matter, the student will be able to understand it better. The students are the center of the research, having external actions such as family, economic aspects, fellow students that contribute positively or negatively to better learning.

The learning process, in addition to focusing on the student, also requires a teacher with an attitude of grace, with a concept not only of himself, but of a healthy concept of good judgment according to the measure of listening to his students so that there is a chemistry and this leads to the correlation or interconnection of student - teacher, which will allow the exchange of knowledge to flow naturally and the students are uninhibited and can participate, contributing their ideas and knowledge studied, without losing the teacher the status of authority. The teacher must go further in getting to know the student, so that, through the subject, he/she can guide the person. In the process of knowledge, it is not only about intellectual knowledge, but also about teaching, guiding and forming a better human being. Teaching and learning must go beyond the boundaries of the classroom in the future, so that knowledge is reflected in a better society. To go further, this process will be reflected in the labor field, where the student, already a professional, will be projected in better conditions of service, because the teacher, with the example of service in humanity, will reap the fruit that one day he sowed. Let us not forget that the teaching at the university is an important percentage, complementary to the teaching at the student's home, since the university ends up being a transcendental space of their formation. All of the above must have an integral formation, resulting in a human being of peace.

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