OPEN INNOVATION: TOWARDS IMPROVEMENT OF LEARNING AND BUSINESS QUALITY

Saul Rick Fernandez Hurtado[1], Regine Adele Ngono Fouda[2], Luz Angela Martinez Martinez[3]

Abstract

The article emerges and oriented to the students' perception of the creation of a company and the application of practical theoretical knowledge seen during the race. The usual problems in the educational stages are related to the competence of the professionals in the face of the diverse labor situations in the 21st century. Innovation in methodologies applied to teach is the priority tool. The study was conducted with a significant sample of 138 university students from semester 1 to 10 in the Economic and Administrative Sciences Program, in addition to Engineering. The results of the descriptive and empirical study, show the behavior of solution variables by the students and the teachers that was used during the study. The research itself encourages teamwork with active methodologies where the continued participation of teachers and university students in the classrooms broadens knowledge for its subsequent application. The study, based on the sample obtained, highlights that there are many factors that inhibit the full development of an integral education that influences the student so that he/she can successfully complete his/her university education, having a

[1] *Post-doctorate in World History Research Mobile Station with Research Field on Globalization and Regional Development, Center for Global Studies, Shanghai University (China). Ph.D., in Management Science and Engineering, Shanghai University (China). Master in Economic and International Commerce. Professor and Researcher Affiliation at UNIVERSIDAD DEL VALLE (Colombia). Avenida 6ta Norte No. 40-30 Apart. 101. saul.fernandez@correounivalle.edu.co, Cel. +573153828778.*
[2] *Ph.D., in Logistic Management and Engineering, Shanghai Maritime University – China. Master in international trade, East China University of Science & Technology, China. Email: reginemilena@yahoo.fr*
[3] *Professional in Industrial Engineering, Facultad de Ingeniería, Universidad Autónoma de Occidente (Colombia). Cll 25#85 Km 2 Vía Cali – Jamundí. luz_angela.martinez@uao.edu.co. Cel. +573184307435*

practical approach to learning during training, for which, there are many causal components that inhibit such development.

Keywords: university students, innovation, problems, teaching, education.

INTRODUCTION

Education in the 21st century has to adjust and focus on jobs perspectives. That is, having a cluster or an integration among all the managers of the economy. A cluster of the generators of the economy is essential for social support; open innovation uses the growth of economic games as factors related to Universities and Companies (generators of the economy) for the disposition of competitiveness variables with a productivity environment that impacts globally.

Studies in economics, administration and productivity (Martínez Martínez et al., 2019; Pinquart, Juang, & Silbereisen, 2003; Levin & Stephan, 1991) reiterate that the labor context of the 21st century requires offers from professionals with high adaptability, autonomy and management as well as management position business. The new role of education - business is indispensable, given the correlation of the variables (self-study; personal problems; economic factor; university image; capacity for synthesis; preparation for work); Management theory and practice today demand a greater degree (Osher et al., 2020; Darling-Hammond et al., 2019) compared to other historical moments.

The 21st century demands competitiveness; change in academic and business environments can be complex but necessary; the strategies must aim towards continuous improvement of society. The purpose of the study is to observe the variables that affect the evolution of the national economy and implement innovative mechanisms for business development in an educational environment, with an impact on the benefit of the economy (Fernandez Hurtado & Martinez Martinez, 2018).

It can be seen that the academic orientation has had a closed innovation, which is not the object of deep reflection in higher educational institutions, especially in research, for the generation of ideas and promoting open innovation, in an educational and business environment (Chesbrough & Schwartz, 2007). The competencies are visible in work environments; being and doing are remarkable variables in the search for competitiveness, both professional and business. Chesbrough & Schwartz (2007) study does not disagree with the analysis carried out by Voogt et al. (2015), who express that education is lacking collaboration between the theory and practical's due to the isolation between practice and theory. Therefore, what is taught in the classrooms and the responsibility in generating positive or negative impacts on the economies (Voogt et al., 2015; Levin & Stephan, 1991) generate a particular development that will be put into practice with the acquired competences, energizing and employing critical thinking that contributes objectively to society. Precise variables that contribute to the competitive development of companies are identified, as well as teaching and parenting strategies that contribute directly to university students.

This work seeks to explain the different factors that are related to higher education, based on the criteria for quality and relevance in teaching, as expressed by Martín-Rubio, Nogueira-Goriba, & Llach-Pagès (2013), in addition, to open innovation as a value factor. On the other hand, the relationship established by each student with the teacher, the development within the classes, family support in the development of academic activities, the influence of external problems on academic performance, professional vocation, is established. More overs, entry into the work environment, interest in reading and the ability to synthesize information is also established.

The research is divided into four fundamental points. As a first step, we portray the literature referring to education of the 21st century, its evolution and then its contribution. The work done is described below, using empirical analysis of the information that was collected with the university students. An analysis of the data with the results obtained is presented as well, and finally we present some conclusions.

LITERATURE REVIEW

The history of education in Colombia has shown us the evolution and changes in terms of its structure. The different methodological forms in the adaptation of concepts are reflected in each of the periods (Bakah et al., 2012). A period of great importance for the country was the period between 1930 and 1946, where the value of it was a fundamental axis for the construction of new knowledge, where culture and its dissemination was vital for the development and evolution of the education, promoting in people impulses towards knowledge (Darling-Hammond et al., 2019). The refreshment towards new ideas and new academic models allowed a better vision for the training of professionals with quality and with an explicit idea about the needs of the market.

The different changes, over time, have been framed by cognitive capitalism, understood as a mechanism by which the market captures the world of life (Alaref et al., 2020). Institutions in Colombia have undergone various transformations, taking into account the type of university that each student enters (public or private); the number of university students, a few years ago, was higher in public universities (Adams et al., 2017 Thornton, 2016; Svetlik & Braček Lalić, 2016), and today coverage has permeated many regions with few academic opportunities; In the last two decades, coverage has increased in all Latin American cities, including virtual and national education opportunities. Ead (2019); Weldon et al. (2011) states that in general, it can be estimated that more than 2 million students study in private institutions, of which approximately half belong to Brazil. Private institutions are characterized by their great varieties. It is often distinguished between confessional universities, mostly Catholic, old and new; elite institutions, not confessional, as they exist in Mexico, Venezuela, Colombia, Peru and Chile; and private market institutions, created during the last two decades. The latter concentrate their offer on high-demand careers and low production costs and sometimes operate as true “title factories”.

The different realities that university students face today are many, taking into consideration the different factors that influence then so much so that a student does not complete his/her studies. Liu & Wan (2019); Harland (2012) mention that notorious that at the national level, taking into account all types of higher education, attrition is significantly concentrated in the first four semesters and is similar in men and women. Therefore, the different problems at present, concerning desertion, constitute obstacles to the progress of education and to achieve integration between academia and society (Schwartz & Tinto, 1987). Therefore, education must be a vital part in the development of the student, since a student who for different reasons misses the career he/she is studying for, is a student who will be frustrated, and probably in the set society, does not have an acceptance in the labor scale due to dropping out; and on many occasions, the dropout factor is linked to other mechanisms as expressed by M. A. Adams & Ghaly (2007) for many years, university dropout was associated with quality and demand. Nowadays it is seen as a sign of inefficiency and is part of the evaluation criteria in the accreditation processes, and in general, it can be affirmed that there is consensus around the idea that desertion generates a huge cost for the country, universities, students and their families. Therefore, it is pertinent to ask questions about this problem in our continent, particularly in our nation, as well as to inquire about the measures taken to address it.

According to the above, the incidence of student dropout has a negative impact on the life of each student, constituting a great problem for the different environments that will surround the student. A determining factor in Colombian education is the economic as well as the situation of the country, the employment situation, and the socioeconomic stratum of the student. The situation of many university students due to the high educational costs, obstructs access to education, creating great inequality in terms of student quotas, this inequality is constantly reflected in the high unemployment rates and the large percentage of informality currently in the country (Fernandez Hurtado et al., 2018). A great limitation for an average university student

in Colombia is that, despite the great efforts of the state, it is difficult for him to sustain his/her career due to the lack of resources he/she must undergo to achieve the entire training session. According to Taylor (2013) “everywhere fear of debt tends to be a greater brake for students from poorer strata than for those who have sufficient solvency to cushion potential financial shocks” (p. 43). The empowerment of public universities and the construction of new universities in regions of little development must be done immediately to achieve inclusion in professionals who wish to contribute to society; moreover, remote regions of the country must be taken into account for social equity and sustainability in the society too.

The educational system in the 21st-century demands changes based on collaborative learning and teamwork. According to Opdyke et al. (2018); Lightner et al. (2007) the learning activities that are presented to university students in the class should promote the construction and acquisition of knowledge in the shared collaborative workgroups. Therefore, the evolution of academic activities requires greater incentives and stimuli, as one of the fundamental axes for the reinforcement of knowledge where there must be an integration between the academic and research field. The stimulus to education must prioritize new teaching strategies that are consistent with the new demands of the modern world that are aimed at internationalization (Fernandez Hurtado & Martinez Martinez, 2017). In this, the university student must be prepared for new cultures, learn different languages and be linked to the field of research. Another of the great stimuli to education is to promote student mobility, which confronts the university student in cultural situations that contribute to their professional training. Educational stimuli should point to a more equitable education, where the offer in official higher education quotas is proportional to the amount of low-income university students, who have a desire for continuity in their studies. However, the latter from remote areas of different the regions (hillside areas), in many cases have no necessary tools to enter the universities causing them to fail to complete their studies satisfactory, generating constant attention.

Current education requires permanent support for students, the creation of mechanisms that prevent university student dropout should become a priority. That is why, the creation of new educational models and policies of greater access to the free education, must become a key strategy for the generation of a better quality of life in people for the construction of a better future and that in many families, the basic needs must be met and in many cases the education coverage is not achieved. Taking into account the high educational costs today, the large social gaps are increasing, identifying the lack of education as one of the major problems today and that over time will become unmanageable as young people are the future of a country, which is why a country without education will have great difficulties and will obstruct the development of a country since it is linked to the most important thing that a human being must have: education.

Education according to Aragonés-González et al. (2020); Spreen & Vally (2006) is an essential tool for the eradication of social inequalities, for the promotion of democracy and for the development of people and peoples, but, at the same time, it can become a focus of inequalities and an enhancer of the social gap. For this reason, education demands a new way of seeing life, achieving timely minds with different conceptions. Mautner (2005) states that "restructuring has already become a new buzzword that has many different meanings and consequences. Some use it to empower schools; greater relevance to the students, as partners in their learning". Nowadays, it is very common for the student to only look for a job and establish himself in an organization, indicating that the tools he learned during his/her training process were not enough for him to become an employer, but an employee. According to Chapman & Aspin (2013) large companies weigh more and more, and professionals sell their services to them, instead of doing it to their individual clients, and do so as to wage earners instead of supporting themselves as self-employed workers. Therefore, the creation of entrepreneurs must become one of the great objectives offered by the academy in the search for suitable, innovative professionals with a business vision for

society, the academy must assume as a priority the incentive and promotion of entrepreneurs who provide impact on the creation of companies. The mission for an education that helps the student to transcend in business life must contain several key factors, as stated by Puente & Schneider (2020); Titus & Koppitsch (2018) for graduates of an educational institution to produce an effect that transcends, it is required that they not only transfer knowledge to students but educate them, so that they develop both attitudes (commitment, leadership and taste for self-learning), as intellectual abilities (critical thinking, and scientific thinking), coupled with the ability to apply them in dealing with real problems, that concept is known as competition (Martinez Martinez & Fernandez Hurtado, 2018).

This generates different expectations in the different fields of action, urgently needing a change in the educational system, in which, a panorama dominated by new technologies can be envisioned, where learning that generates innovation and entrepreneurship is the basis and the road to better opportunities for strengthening the educational-entrepreneurial system. With the strong influence exerted by the skills acquired in university education, the main factor in the gear of the university, company and state must provide a broader vision that does not focus on theoretical knowledge, but instead strengthens all knowledge acquired by integrating the tools that massify new entrepreneurial strategies that generate a high impact on society.

Teachers today must be strong drivers towards the use of different technologies that promote knowledge and use of the different tools that a student has for the path to entrepreneurship. Therefore, the work of the teacher during the development of the classes must adapt to the new educational environments seeking the generation of greater interest on the part of the student, in order to identify characteristics that should be potentialized in the course of training and should become a challenge for every teacher.

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METHODOLOGY

Sample and information collection:

The research is carried out in universities located in the city of Santiago de Cali which are accredited according to the information available at the Ministry of National Education. The data were obtained by physical means, delivering a structured questionnaire addressed to each student, in order to guarantee the validity of the study with questions related to their educational environment. The sample had 138 students, according to semesters from 1 to 10 in the program of Economic and Administrative Sciences, and the selection of participants in the research was random, for which variables with major problems in the environments were taken into account and that in the same way, they will be of great importance for the strengthening of teaching and the incentive to create better opportunities for new professionals in training with the following hypotheses:

H_0 = The student does not do self-taught work. Therefore, he/she does not understand the development of the class.

$H_1 \neq$ The student performs a self-taught work. Therefore, understands the development of the class.

In this regard, the tools were used to find the linear correlation coefficient and also the R^2 to obtain the deviation provided by the variables measured in the study as shown in Figure 3 and shown by the coefficient of determination in Table 4, these results were found according to the 15 observations during the data collected in the study as reflected in Table 1, under the variables that were addressed (explanation of the classes against self-taught work, learning tools as a dropout factor, synthesis capacity and academic performance versus occupational safety), as a result we obtained $r = -.1476$ (Pearson's correlation coefficient) calculated by Anova in the t-test for means of two paired samples (Table 2), therefore, having a negative correlation and equal a

negative t-test t= –.3489. This is how there is enough evidence to reject H_1 considering that the t-test is negative. In addition, the correlation coefficient is also negative (Table 2) and, R^2 is close to 0 as will be shown in Table 4 and Figure 3, and this proofs that there is no correlation.

Table 1.
Linear Correlation Coefficient to find r

n	X	Y	X^2	Y^2	XY	x_i-x	y_i-y	$(x_i-x)^2$	$(y_i-y)^2$	$(x_i-x)(y_i-y)$
1	134	43	17956	1849	5762	87,9	-8,4	7720,6	70,6	-738,1
2	1	65	1	4225	65	-45,1	13,6	2037,0	185,0	-613,8
3	2	116	4	13456	232	-44,1	64,6	1947,8	4173,2	-2851,0
4	82	34	6724	1156	2788	35,9	-17,4	1286,4	302,8	-624,1
5	6	18	36	324	108	-40,1	-33,4	1610,7	1115,6	1340,5
6	53	9	2809	81	477	6,9	-42,4	47,2	1797,8	-291,1
7	76	27	5776	729	2052	29,9	-24,4	892,0	595,4	-728,7
8	60	55	3600	3025	3300	13,9	3,6	192,3	13,0	49,9
9	1	69	1	4761	69	-45,1	17,6	2037,0	309,8	-794,3
10	59	57	3481	3249	3363	12,9	5,6	165,6	31,4	72,1
11	79	90	6241	8100	7110	32,9	38,6	1080,2	1490,0	1268,7
12	1	31	1	961	31	-45,1	-20,4	2037,0	416,2	920,7
13	111	42	12321	1764	4662	64,9	-9,4	4207,7	88,4	-609,7
14	26	100	676	10000	2600	-20,1	48,6	405,4	2362,0	-978,5
15	1	15	1	225	15	-45,1	-36,4	2037,0	1325,0	1642,9
	692	**771**	**59628**	**53905**	**32634**			**27703,7**	**14275,6**	**-2934,8**

Source: Own elaboration (2019)

Process:

The 2 Universities that have high-quality accreditation received a personal notification, for participation in this study. From each classroom, 10 university students completed the questionnaire. (Taking into account that in other universities it could not be done due to institutional restrictions). From there, the communication was constant to get a complete sample of the information. We then proceeded to the organization and tabulation of the data, performing the corresponding analysis through the Excel 2013 program and Statgraphics 16, which yielded explicit results that give us a scenario of the educational situation.

Table 1.

T-test for means of two paired samples

Statistics	*Professional Vocation*	*Abandonment Factors*
Means	46,1333	51,4000
Variance	1978,8381	1019,6857
Observation	15	15
Pearson correlation coefficient	–.1476	
Hypothetical difference of the means	.0000	
Degrees of freedom	14,0000	
t-test	–.3489	
P(T<=t) a tail	.3662	
Critical Value t (a tail)	1,7613	
P(T<=t) two tails	.7324	
Critical Value t (two tails)	2,1448	

Source: Own elaboration (2019)

Under the 15 observations, a perfect negative correlation was obtained given the progressive increase in the variables corresponding to professional vocation and abandonment factors such as work, economic and academic aspects. This causes an inverse relationship that is similarly demonstrated by the deficiency of the mean of the data (Table 2) compared to the total samples of 138. This goes on to show the negative dispersion reflected in Figure 3, where the data of the samples observed have dispersion therefore broadcasting a negative relation of the variables.

Table 3.
Pearson Correlation

Variables	Dynamism Classes	Academic performance	Professional Environment	Work Capacity	Abandonment Situation
Dynamism Classes	1				
Academic performance	–.294	1			
Professional Environment	–.561	–.027***	1		
Work Capacity	–.380	–.242	–.350	1	
Abandonment Situation	.064**	–.154	–.319	.333*	1

*p<0.10., **p<0.05., ***p<0.01

Source: Own elaboration (2019)

Table 3 shows a weakness in the variables which is the evidence that the hypotheses reflect a nullity compared to the alternatives presented by the sample obtained in the

development of the research. Therefore, the student dropout settings are prone; given the lack of quality in the dynamics of the university´s faculty. On the other hand, this university abandonment (dropout) is reflected by the need for students to obtain a better quality of life in view of the urgency of entering the work forces. Figure 2 portrait the stimulation of university student's drop-out at 60% was due to the lack of financial mechanisms and stable academics. Therefore, the level of significance is of 0.60 as noted in Table 1, its means that hypothesis H_0 is not rejected.

Table 1.
Regression

Resume

Regression Statistics	
Multiple correlation coefficient	.148
R^2	
Coefficient of determination	.0218
R^2 tight	–.05
Typical error	32,78
Observations	15

Source: Own elaboration (2019)

Table 5.
VARIANCE ANALYSIS

	Degrees of freedom	*Sum of squares*	*Squares average*	*F*	*Sig.*
Regression	1	310,90	310,90	.29	.60
Waste	13	13964,70	1074,21		
Total	14	14275,60			

Source: Own elaboration (2019)

Table 6.
RESULTS OF THE COEFFICIENTS OF THE REGRESSION

	Coefficients	Typical error	*t statistic*	*Probability*	*Lower 95%*	*Higher 95%*	*Lower 95,0%*	*Higher 95,0%*
Interception	56,29	12,42	4,53	.00	29,47	83,11	29,47	83,11
Variable X 1	–.11	.20	–.54	.60	–.53	.32	–.53	0,32

Source: Own elaboration (2019)

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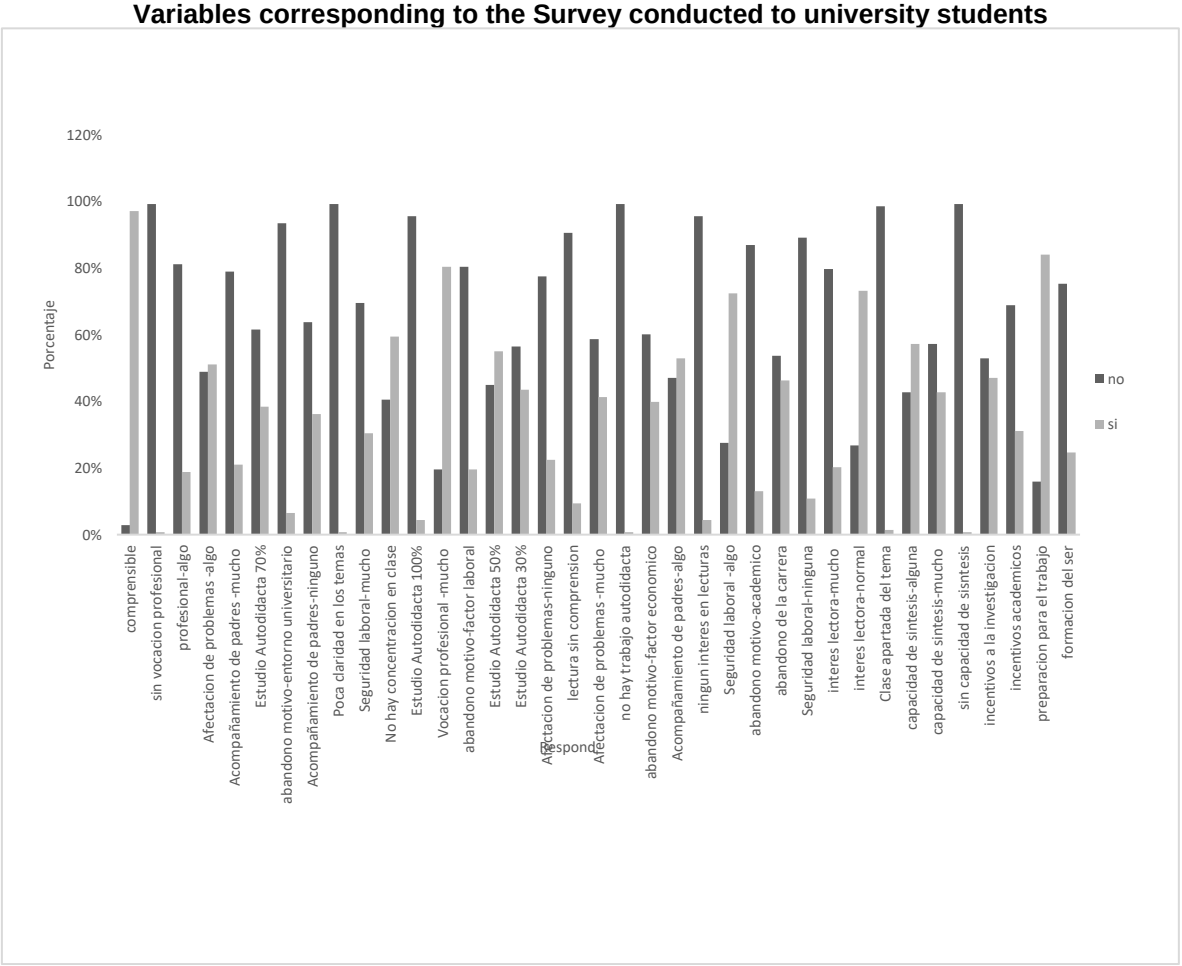
RESULTS

The survey was accepted by 138 university students of different academic programs; therefore, different study variables were evaluated. From the data, results were obtained for the variables corresponding to the explanation of the classes, percentage of self-taught work, a parental follow up, affectation of personal problems in performance, factors for abandonment of the career, professional vocation, safety of the work environment, interest of reading, synthesis ability, learning tools.

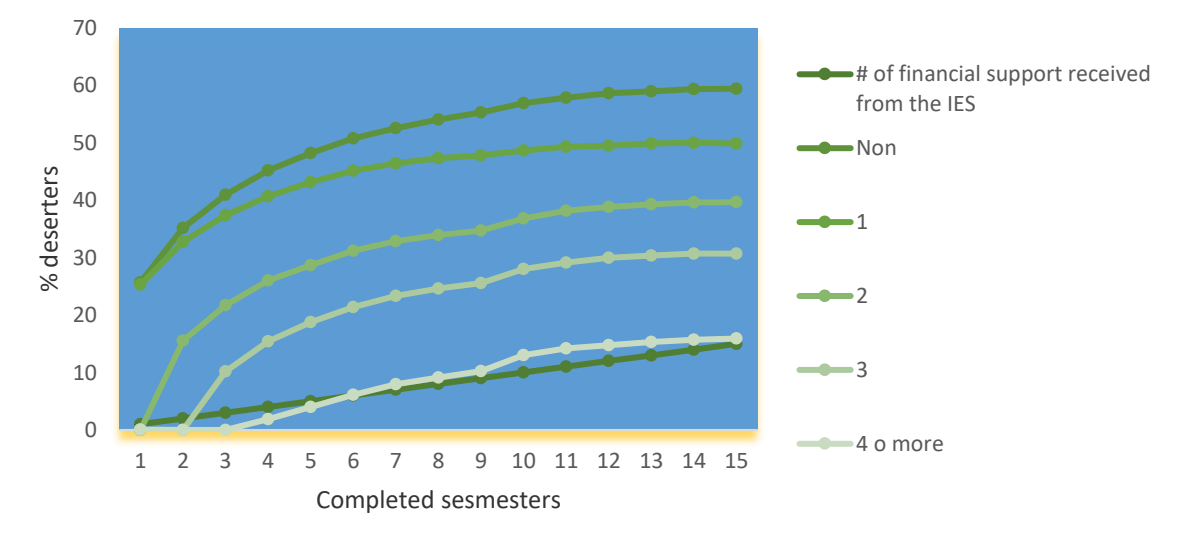
Figure 1.
Variables corresponding to the Survey conducted to university students



Source: Own elaboration (2019)

The results in refer to the Survey conducted at two Universities in the city of Santiago de Cali. Responses corresponding to the explanation provided by the teacher in each class and their level of understanding are identified; the percentage concerning the self-taught work performed by each of the university students is identified; as well as the a parental follow up from the beginning of the academic stage; the involvement of academic problems in academic performance; the factors for the abandonment of the race; the professional vocation; the security generated by the university in a work environment; interest in reading; the ability to synthesize the different problems posed in the classroom; Learning tools for training as a professional are also identified. The previous answers were evaluated at different scales. According to the Ministry of National Education, dropout in higher education is one of the biggest problems today as shown below.

Figure 2.
Dropout percentage according to the Educational Institution



Source:: Ministry of National Education (2015)

Figure 2 shows a 60% drop-out of students in 2014 corresponding to university students who did not receive any financial support from educational institutions. Meanwhile, there was only a 16% drop-out of students who received support from their institutions in advanced semesters.

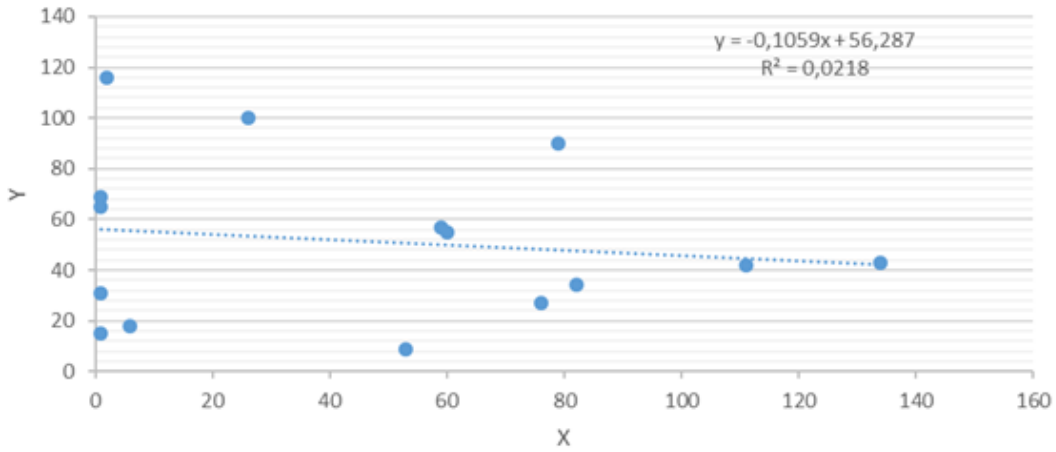
Data analysis:

According to the different problems raised, it can be inferred that a great inconvenience (corresponding to 96%) comes from joint work. Moreover, university students declared not to practice self-study, as reflected by the value of p between the variables of academic performance and professional environment p = 0.27*, this indicates that there is little student commitment to self-learning and the use of new technologies. This therefore aligns Jewell et al. (2020); Tierney & Kan (2016) who stipulated that we say that a person is prepared in his/her profession when he is able to use knowledge self-management skills to do what he needs, at the time he needs it, either inside or outside the educational system (academic - research - work), This is achieved with the management and self-management of knowledge, to form a more competitive and comprehensive graduate.

Therefore, self-management must be a priority in the different educational fields for its strengthening. Another variables analyzed was the interest in reading (of the students) with questions. How much interest do you have in reading? and what's your level of understanding?; and what argumentation do you have? (On a scale of a lot, medium, I don't like to read). 73% affirmed an interest (in reading) and 27% for medium level of understanding (while reading). This actually many inconveniences for the university students, since a student that lacks reading comprehension will go thru struggle in different areas of his/her field of action. Therefore, it is of great importance for integral student training, where through different mechanisms it contributes to better results. Another question in the questionnaire was: What learning tools do you think they should include contributing to their professional training? Academic incentives, research incentives, preparation for working environment and transmission of knowledge to others. 75% responded that the transmission of knowledge to others must have higher priority and 84% responded that they must prioritize preparation for working environment. For the identification of desertion problems, the following question was: What factors have you considered to leave your career? Academic factors?; labor factors?; economic factors?; has not thought about leaving the career. In this case, 20% said they were leaving the career due to work; 40% due to economic factors, 7% due to the academic environment, 13% due to academic reasons and 46% have not plan to leave their career yet.

Compared to the behavior referred to in Figure 1 and the variables presented, the dispersion (Figure 3) shows the following behavior which is a negative correlation between the variables studied, as well as Table 2 where the mean is less than half of the sample under an inverse relationship, and the mean of the observations measured in Table 1 corresponds to the result obtained by the coefficient of determination R^2= 0.0218 of Table 4 and according to the sample studied (138), Figure 3 reveals a dispersion of the data near 0.

Figure 3.
Correlation between Variables, professional vocation and abandonment factors



Source: Own elaboration (2019)

The university population requires teachers with better quality of pedagogy, promoting research in different fields of training with a need for consistent teamwork that goes hand in hand with the environment of creating sustainable businesses. The purpose of each student entering the university involves collaborative learning perspectives with the support of teachers, a work that must be joint and of great relevance for both parties. The support of each student's family contributes positively in business environments to train a qualified professional who is not only prepared for the great challenges of the academy, but also for the strengthening of human values and their application with projects run.

CONCLUSION

The 21st century seek to provide the labor market with competent professionals, at have management skills and management training, also with criteria to identify problems in the different scenarios of professional practice. It is necessary to contribute to the changes that

are required for innovation and the development of competencies that potentiate the sectors that promote the economy. Due to the above, one of the great inconveniences faced today is linked to the lack of jobs in the different economic sectors for which there is not enough demand for the many students who constantly graduate from universities. Consequently, the great contributions that a student can generate become a great frustration that can end in informality. Entrepreneurs are needed, capable of turning difficulties into great opportunities for the creation of new ideas that strengthen the productive chain of the regions, giving people opportunities to expand the various possibilities offered by the environment around us, constantly working on the establishment of values, and that strengthen the entrepreneurial spirit of each of the graduates of each institution.

In the results obtained by the study at a descriptive and empirical level, the needs for the development of competencies and the commitment of university students in their studies and teamwork are detailed. The analysis involves considering teachers, the family and society; also, regarding the solution of problems related to productivity in work and business environments. The lack of stimuli to research has created a lack of motivation on the part of university students. The society and the emerging market, need professionals with quality standards demanded today. To achieve this, strategies are required from different sectors of society, enabling the promotion of new training scenarios for the preparation of new challenges. Educational equity must be a priority in order to reduce the large gap in access to education by creating easy access mechanisms, strengthening the offer of scholarships, increasing opportunities for development.

The training of professionals with quality implies that graduates of the different programs strengthen a system of human values, prioritizing education with social responsibility, transcending traditional models. In this way, the formation of the competency model that currently evaluates the performance of each student in the different forms of learning, can also change and adjust new trends of contemporary teaching that promotes better preparation for university students in their training as a challenge of the current system. Moreover, the new learning environments constantly demand the creation of a stronger of entrepreneurship, which is an educational (vision) that expands the possibilities of each person, as well as turning them to great managers that will be able to identify opportunities.

Teacher training; therefore, should be one of the main priorities for joint learning; so that there is profound quality in education an important factor aimed at strengthening the quality of teachers. Here, the work does not only echo (throw light) to the university students but also, to the strengthening (evolution) of the pedagogical work by teachers that produce an impact on each university student. The constant and innovative change in pedagogical work, is a key point for a collective learning, the teacher as a transmitter of knowledge, must generate innovative proposals in education that create greater dynamism during classes and there is no "static state" this is true because knowledge is constantly changing and therefore urgently needs the degeneration of new ideas that contribute to the growth of the current knowledge. Teachers are responsible for educating and transmitting the knowledge that the student assume (absorb - learn) in order to graciously apply to the surrounding society (working environment).

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