University Context, Teachers And Students: Links And Academic Success

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Abstract

The promotion of quality education in higher education institutions promotes self-efficacy. The objective of the work was directed to the analysis of the characteristics of the faculty and the academic success of students at the end of the first year in the university context. The population studied was 6690 students and 256 professors, the data set had 15 variables between numerical and categorical. Descriptive statistics, metrics designed to evaluate meaningful data and advanced visualization techniques were used. The results revealed the essential profile of experienced and mature teachers, both in teaching and age groups. Experienced teachers who participated in teaching at a rate of more than 66%, influenced with 72% certainty the academic success of the student body. In the short term, novice teachers whose participation rate was 33% showed a positive effect. In the long term, students changed (8%) or dropped out (59%) of the university degree. The usefulness of these results provides suggestions for meaningful and timely teaching, provided that the distribution of experienced and mature faculty corresponds to two to three thirds of the total number of first-year faculty in the university degree program.

Keywords: academic success; university context; educational analysis; visualization techniques.

1. Introduction

Education, as a fundamental part of the progress of modern societies and economies driven by innovation and scientific development, has never been as omnipresent as now (Marginson, 2014). Therefore, higher education institutions have dedicated themselves to promoting good education for various reasons. Firstly, because they are interested in demonstrating that they are reliable providers of good quality education, while serving multiple stakeholders with different expectations (university degrees). Secondly, because they must respond to the growing demand for meaningful and timely education. Finally, because research results are insufficient to maintain the reputation of higher education institutions, it is essential to balance the results of teaching and learning with those of research (Nasser-Abu, 2017). In this sense, educational researchers have managed to create technological tools, pedagogical and/or curricular plans, predictive models, etc., since academic leaders are provided with resources to use controlled and proportionate strategies that retain students in the initial university degree. (Araque et al., 2009; Mishra and Sahoo, 2016; Van den Berg and Hofman, 2005). From this point of view, the university context managed by higher education institutions is diverse, therefore, the application of policies and standards that regulate their activity facilitate the progress of the institutions. However, its most widespread and complex diversity is located in human, service, infrastructure, economic, and technological resources, among others. This complexity transcends the degree of impact and acceptance in modern society; in fact, prestige can be achieved by adjusting the resources of the university context. To achieve the profile of institutional acceptance, it is planned to study the university context based on two essential human resources: teacher and student.

Starting from this point, there are five types of research in the educational field that have allowed the discovery of revealing information in academic data. First, there is social network analysis that studies different iterations and general implications (Mishra, 2020; Trolian et al., 2021). Second, longitudinal studies aimed at improving student outcomes, for example, (Amida et al., 2020; Souchon et al., 2020). Third, the study of factor analysis to investigate the hidden factors in the interactions between students and teachers (Le et al., 2017). Fourth, the meta-analysis examines characteristics related to the implementation of strategies for learning students' academic performance (De Boer et al., 2014). Finally, data mining explores the discovery of knowledge through two techniques: (i) unsupervised techniques, divided into two sub-techniques. a) clustering based on distance or vector similarity studies (Vo et al., 2016). b) association rules, to discover the events that occur within the data ((Aleksandrova and Parusheva, 2019; Alyahyan and Düştegör, 2020; Guanin-Fajardo et al., 2019; Sanvitha Kasthuriarachchi et al., 2018)). (ii) supervised techniques, which predict the data using a dependent variable (Shetu et al., 2021). The convergence of research has coincided in the flexibility of improving academic results, the quality of the relationships of the university community, the improvement of communication channels, good teaching, the projection of objectives, among others.

1.1 Objective of the study

The main objective of the work is focused on analyzing the variables that determine the academic success of students and teachers within the university context. Consequently, the existing link between students and teachers will be examined, so the following research questions have been raised:

• What are the faculty factors that have influenced the student's academic success?

• In the university context, what type of faculty compatibility corresponds to the academic success of students?

To do this, the data is examined in depth to extract useful and relevant information about the teacher's characteristics. At this point, the study is divided into three stages: (i) data recovery from the computer system; (ii) analysis and application of procedures to extract significant data using the proposed metrics; and, (iii) presentation of the main results using visualization techniques. The proposed data analysis aims to obtain significant information about the factors of the teaching staff and the impact on the students to complete the university degree at the end of the first year. The present work motivates decision making and is a precursor to future exhaustive data analysis studies to test possible theories. To this end, a custom data analysis library was created using the statistical program R, which is a freely available language for statistical computing and provides a wide variety of statistical and graphical techniques: linear and nonlinear modeling, statistical tests, classification, grouping, among others (R CoreTeam, 2019).

2. **Related works**

Higher education institutions focus their efforts on the development of skills or curricular attributes so that students have a high probability of academic success (Leal et al., 2016). Starting from this point, the academic offering and scope of services of higher education institutions are crucial for academic success. In view of the work of (Respondek et al., 2017), the conceptualization of academic success is outlined in two parts: (i) low intention to drop out; and, (ii) high academic performance. Both, properly synchronized, respond positively to the academic success of the students. Hence, the harmonization of academic performance and student motivation rests significantly on the teaching staff. This relationship

transcends the perceived clarity of the teacher's teaching, capacity and support, as well as the implication of the level of satisfaction and the university experience (Livengood, 1992; Pascarella et al., 1996).

2.1 University context

The university context associates multiple factors to strengthen and influence the academic success of students (Struyven et al., 2003). Following the work of Winterer et al. (2020), the authors suggest practices and norms that have facilitated academic success: (i) improving the student climate; (ii) the quality of access, student knowledge and guidance service (Korobova and Starobin, 2015); and, (iii) increasing and improving the quality of academic assistance programs and services (Kara et al., 2020). These practices stimulate quality in the relationships of the university community and promote socially acceptable spaces (Pineda et al., 2014). Incorporating project-based learning within the curriculum has also been considered a successful approach (Konrad et al., 2021; Leal et al., 2016). In fact, this learning exposes numerous useful knowledge, in addition to the contribution to professional growth and the learning of meta-skills (Salminen-Tuomaala and Koskela, 2020). On the other hand, it is difficult not to value tutoring as a factor linked to the academic success and leadership of students during the university phase, given that it has been empirically related to professional development (Campbell et al, 2012; Cunha et al., 2018; Jacobi, 1991). In general terms, in any university context the teaching staff had a high percentage of participation in the training of the student body, that is, the entire teaching process and professional development of the student body relies on the teaching staff.

2.2 Academic success and teaching staff

Regarding the expectations of the academic success of the students, there is underlying discouragement as a consequence of the type and context of the iterations with the teaching staff. The importance of a good quality teaching group and its influence is well seen by students (Cho et al., 2011). This was reinforced by Lizzio et al. (2002), who within their findings stated that good teaching had a positive effect on academic results and was strongly associated with academic success. Substantially, the quality of the teacher is a precursor to the student's academic success, since the prospect of completing studies is strengthened. In this way, many investigations have emerged to understand the influential factors between teachers and the academic success of students (Chickering and Gamson, 1987; Crispet al., 2015; Tinto, 1975; Walder, 2017). However, works have also been found that highlight the negative influence (Glogowska et al., 2007; Young et al., 2007). In a way, the educational system constantly seeks to promote teacher-student and student-student communication channels, which is the key link to achieving academic success. In some way, the collaboration and mutual participation between them generates an environment of trust and cooperation to achieve the projected objectives (Abarca et al., 2015). Hence, the consolidation of the fluidity of the different communication channels has promoted iterations that have encouraged students to achieve academic success (Chickering and Gamson, 1987; Mishra, 2020; Trolian et al., 2021; Winterer et al., 2020). At the same time, this fact has an important consequence, since they can benefit from opportunities outside the classroom that emphasize the value of intellectual work and academic support (Nagda et al. 1998). Of all that has been said about the effectiveness of communication and iteration between teachers and students, another point to take into account is related to the factors and quality of the teachers. Hence, for

example, studies have emerged on: age (Campbell et al., 2005), academic qualifications and teaching experience (Angervall, 2018; Darling-Hammond, 2000; Jepsen, 2005; Korhonen and Törmä, 2016) that are three factors that have influenced the academic success of students.

3. **Methodology**

3.1 Context

To carry out the study, the Higher Education Institution (IES) has been considered as part of the study; University policy and compliance with minimum requirements allow students to pass each academic year. The IES study modality is face-to-face and the academic cycle consists of two semesters. Students will pass both semesters to move on to the next higher year, and must achieve the minimum grade required in each subject (7, on a scale of 0 to 10). . The dependent variable that determines the student's academic status has been defined based on the academic activities of each semester and course. The status Passed is when all the courses of the initial degree have been passed. Drop out, when from the first registration there is an absence of academic activities; and, Change, when the courses of a degree other than the initial one are passed. The IES is geographically located in the Quevedo canton, Los Ríos, Ecuador.

3.2 Data collection

The data collection process was carried out by extracting information from the IES computer system, where all academic activity between teachers and students was stored. Hence, the information derived from the evaluation process developed throughout the academic degree between the two was first obtained. The Human Resources Department then provided qualitative information from faculty that was pooled and related to form the final data set. Finally, the data filtration was

established in six academic periods between the first and fifth years of the university degrees offered. In turn, data protection policies were applied in accordance with the criteria of the Academic Planning Department of the University, which approved the data collection.

3.3 Data

The original data set had 6,690 records and 15 categorical and numerical variables (see Annex 1). In this study, the students who were enrolled in the first year and who completed the academic degree have been used as the population. In addition, the total population of professors was incorporated, which was 286, including full professors, associate professors and occasional professors.

3.4 Data preparation

This is an important stage of the study, since it is essential to have clear and good quality data. To this end, corrective measures have been applied for missing values, since it is common in real problems to involuntarily omit transcription or automatic recovery of data that are left without values; these data have then been given uniformity according to equation 3.

3.5 Metrics

In this study, six types of metrics have been proposed to transform and evaluate data quality. Equation 1 has weighted the qualifications of the teaching staff, where x = number of teachers with an academic degree (bachelor's degree, engineering, biology, etc.); y = number of teachers with master's degrees; z = number of professors with doctoral degrees; and, finally, n = total number of teachers who have taught classes in the academic year.

$$w = \left[\left(\frac{x}{n} * 0.10 \right) + \left(\frac{y}{n} * 0.30 \right) + \left(\frac{z}{n} * 0.60 \right) \right]$$ (Equation 1)

Equation 2 is the lift metric that is commonly used in data mining, since it serves to improve the confidence of the association rules, where both x and y are elements of the data set (Brin et al., 1997). The equation is defined as:

$$Lift(X \rightarrow Y) = \frac{Confidence(X \rightarrow Y)}{Support(Y)}$$ (Equation 2)

$$confidence = \frac{Support(X \cup Y)}{Support(Y)}$$

Where $\frac{Support(X \cup Y)}{Support(Y)}$, y, $Support(Y)$ is defined as the proportion of transactions in the data set that contains Y. On the other hand, equation 3 proposes the formula that has served to obtain uniform data. Where z_i is the normalized variable [0-1], with x_{min} and being x_{max} the minimum and maximum value of the variable respectively.

$$Z_i = \frac{x_i - x_{min}}{x_{max} - x_{min}} \quad \text{(Equation 3)}$$

Equations 4, 5 and 6 were proposed for a deep analysis of the information, where the disorder of the data (information entropy), the information gain and the gain rate were analyzed (Romanski and Kotthoff, 2016). With these equations, the behavior of the variables has been quantitatively obtained.

$$Symmetrical\ uncertainty = 2\frac{H(Class) + H(Attribute) - H(Class, Attribute)}{H(Attribute) + H(Class)} \quad \text{(Equation 4)}$$

$$Information\ gain = H(Class) + H(Attribute) - H(Class, Attribute) \quad \text{(Equation 5)}$$

$$Gain\ ratio = \frac{H(Class) + H(Attribute) - H(Class, Attribute)}{H(Attribute)} \quad \text{(Equation 6)}$$

3.6 Procedure

To achieve the objective proposed in this work, a personalized library has been created with the R statistical program; This library has several functions for

processing, data analysis and visualization of results. To do this, six steps are considered: First, replace the missing data in the data set with approximate data using statistical measures of central positioning (mean, median and mode) (Breiman, 2001), depending on the type of variable. Second, normalize the variables to obtain homogeneous data [0-1]. Third, initially study the variables through the hierarchical cluster, which has served to concentrate the variables according to the degree of similarity using the Euclidean distance. Fourth, analyze the behavior of the variables with the metrics: kurtosis, asymmetry, uncertainty, gain ratio and information gain, this for filtering the three main variables that will be used for the analysis. Fifth, categorize the variables to calculate the contingency table, in order to obtain the proportions of the categories compared to the dependent variable (Abandon, Change, Overcome), in addition to calculating the lift metric (equation 2) to obtain the degree of confidence between the data found. Finally, manage to project the significant results in graphs to improve the understanding of the findings obtained.

4. **Results**

In this section the main results obtained through the in-depth analysis of the data have been presented. In response to the initial questions of this work, the proposed metrics have been used to understand the behavior of the variables. Likewise, the statistical techniques studied are, on the one hand, the form and general distribution of the data and, on the other, the relationship that has existed between them.

4.1 Exploratory study

As a starting point for exploring the data, the information has been evaluated from two perspectives. The first was to create the hierarchical cluster by calculating the

similarity between the variables using the Euclidean distance that has helped to understand the groups of variables. In line with the above, as shown in column 3 of Table 1, the average participation of teachers with respect to their ages has been higher in Age2 and lower in Age3 and Age1. However, the standard deviation (column 2) in Age1 was higher, indicating that there was also significant teacher participation in this age group. On the other hand, the average teaching experience and teaching qualification was 16 years and 0.26 respectively. The fundamental reason for these values was given by the participation of a greater number of teachers in the Age2 group.

Table 1. Centrality and trend metrics of the independent variables*.

Variables	Typical deviation	Half	Minimum	Maximum
Faculty			1	5
University degree			1	22
Age1	2.9127	2	0	fifteen
Age2	2.3867	5	0	eleven
Age3	1.8906	2	0	10
Teaching experience	4.2912	16	4	26
MiddleAgeTeacher	6.2228	53	35	64
QualificationTeaching	0.0943	0.26	0.1	0.6
MediaNotes	1.3044	7.33	0.03	10
MediaAssistance	6.5976	97	twenty-one	100

Variables	Typical deviation	Half	Minimum	Maximum
TimeSupera	0.4911	1	1	5
Exceeding Rate	0.2440	1.05	0.052	2,708
AccountDegrees	0.2490	0	0	2
ChangeGrade			1	2

*Categorical variables have empty values in the mean and standard deviation column.

Source: self made

In Graph 1, the hierarchical cluster was divided into four groups of variables according to the degree of similarity. To do this, the variables were calculated and grouped according to the Euclidean distance. That is, the distance between one variable and another is measured. Two groups related to teachers (G2 and G4) have stood out here. The academic performance of the students was grouped in G1. Finally, G3 was composed of variables linked to academic performance (Time to complete, degree count), teaching staff (Age2) and academic qualifications (Faculty, university degree).
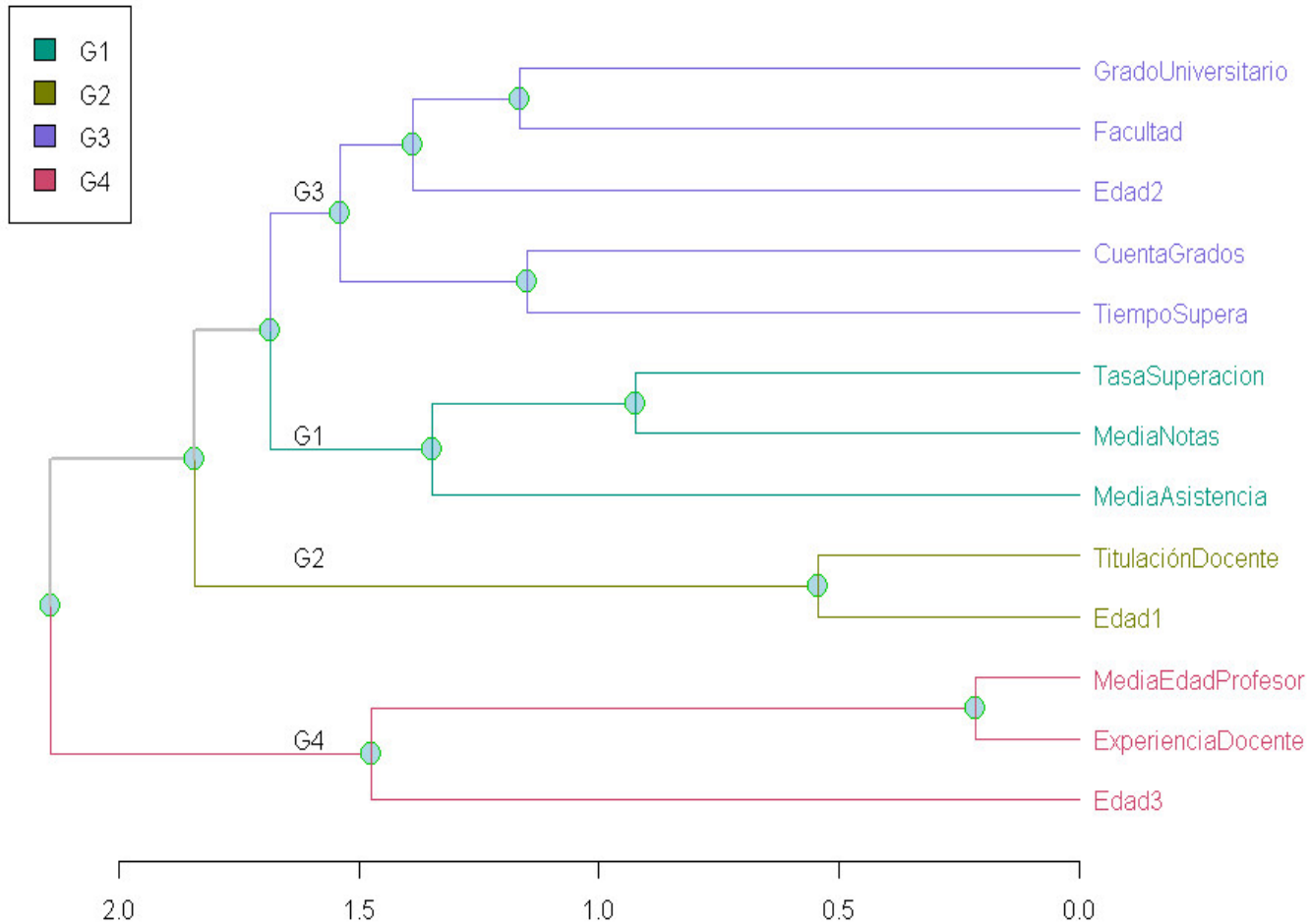
Graph 1. In the hierarchical conglomerate, four subgroups of variables have been differentiated. Subgroups G2 and G4 have been linked to the characteristics of the teaching staff, G1 was associated with academic performance, and G3 has involved a mixture of variables between students and teachers.

Source: self made.

4.2 Analysis of data related to teaching factors

In this section, the variables that have been linked to teaching staff are examined in depth. To do this, the Sankey diagram has visualized the loading and distribution

of data between the variables. In turn, Table 2 has studied the variables with the metrics: asymmetry, kurtosis, uncertainty, information gain and gain rate. According to this analysis, the first three variables were filtered to examine the impact of teachers on students who have had academic success.

Table 2 . In-depth study of variables related to teachers, ordered according to the level of uncertainty (Uncertainty).

Variables	Asymmetry	Kurtosis	Uncertainty *	InforGain	GainRatio
Age3	1.0079	0.6380	0.0229	0.0213	0.0218
Age2	0.0790	-0.6948	0.0294	0.0333	0.0241
Teaching experience	0.2699	0.0489	0.0486	0.0557	0.0394
MiddleAgeProfessor	0.4500	-0.2568	0.0609	0.0703	0.0492
QualificationTeaching	0.8466	0.7942	0.0701	0.0813	0.0564
Age1	1.7087	2.8320	0.0742	0.0662	0.0731

* Ascending order

Source: self made

The variables associated with the teaching staff, for example, the asymmetry of Age3 was 1.0079, where it was initially evident that few teachers of that age range participate in the students' classes. However, the opposite has happened with Age1 with an asymmetry of 1.7087, which showed a greater presence of teachers in this

age range. On the other hand, Age2 and TeachingExperience also presented little teacher participation.
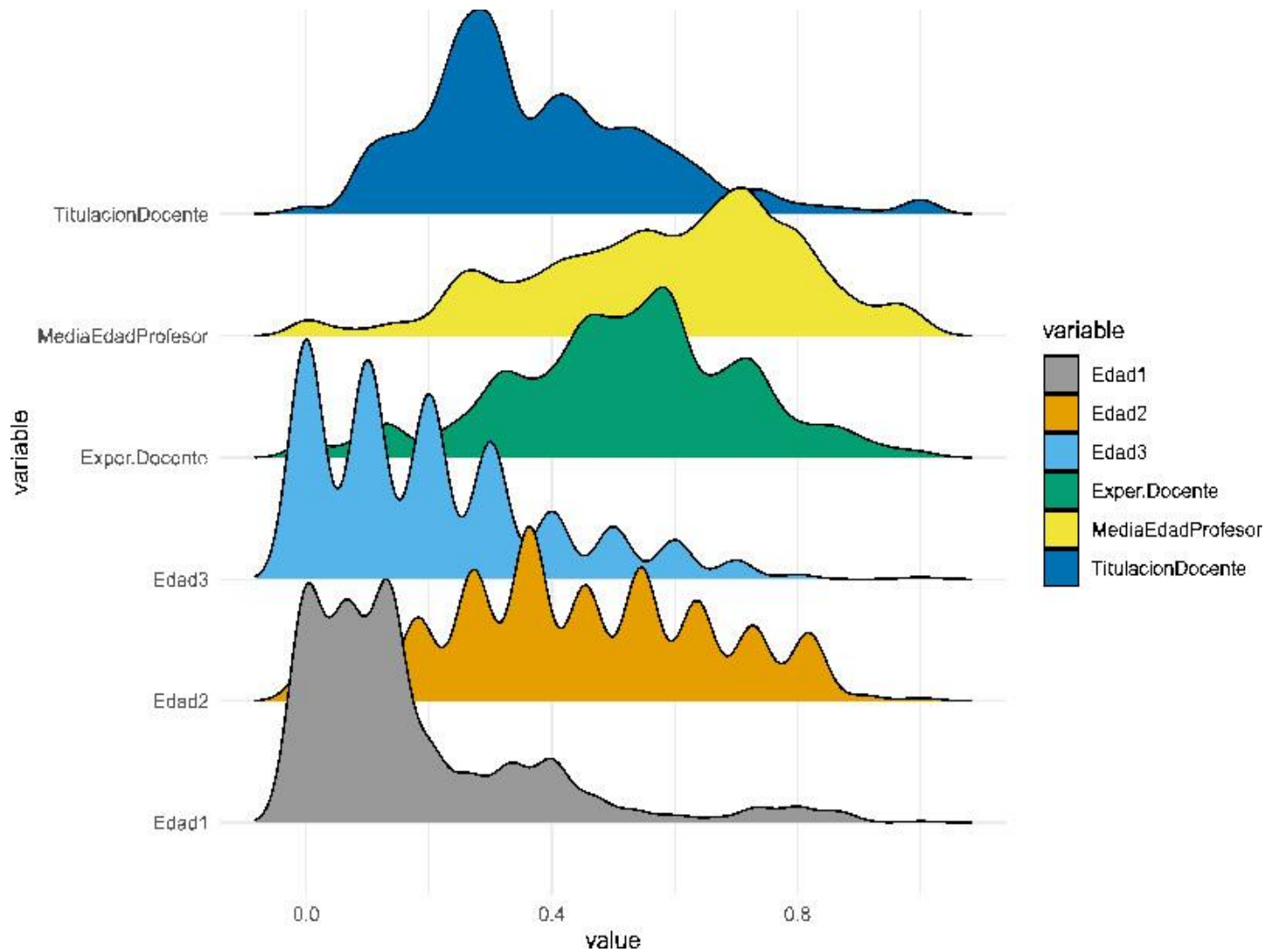
Graph 2. Density of variables related to the characteristics of the teaching staff. The asymmetry of the variables TeachingExperience and AverageAgeTeacher are shown to the right, while the rest of the variables are shown to the left.

Source: self made.

In Graph 2, the results of Table 2 are condensed, specifically those related to asymmetry and kurtosis, where the distribution and trend of the data has been assessed graphically. On the other hand, in the Sankey diagram (Graph 3) six groups of data draw attention: first, Age1[0-0.33) has shown 79.1% of teachers under 45 years of age; second, Age2[0.33-0.667] has concentrated 53.8% of teachers between 45 and 60 years old; third, Age3 [0.00-0.333] has been presented by 80.9% of teachers over 60 years of age; fourth, MediaAgeTeacher[0.33-0.667) has concentrated 45.52%; fifth, TeachingExperience[0.33-0.667) has grouped 58.1% of data related to the teaching experience variable; Finally, the category Teaching Qualification [0-0.333) has concentrated 51.53% of data related to the teacher's academic qualification. In the data flow, the trend and distribution of teachers throughout the academic grades of the students is confirmed, therefore, the objective variable "Class" groups the percentage of students who have passed, changed or abandoned the academic grade.

Sankey diagram associated with teacher characteristics
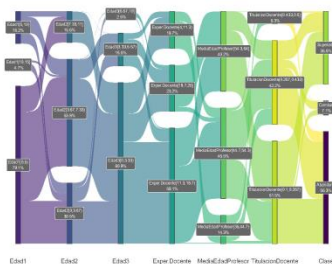
Graph 3. Data flow and loading with teacher characteristics. The variables were normalized in a range between 0 and 1, subsequently they were separated into three categories, then the loading (%) of the categories is presented, which facilitates the understanding of what happens between the categories. At the end of

the graph, the variable called "Class" is shown, which represents the final academic status of the students.

Source: self made

As shown in Table 3, the categories of the "Age3" variable that represent the number of teachers over 60 years old, where 80.90% of the data are concentrated in the category "[0-0.33)", that is, the first third of the total teachers. At the same time, two relevant categories have been verified: (i) the category "[0.33-0.667)" that of the total 16.50%, 48% have passed the academic degree and the category/total ratio was 1.311; (ii) the category "[0.667-1.00]" that of the total 2.60%, 72.30% have passed the academic degree, and the category/total ratio was 1.975. In general terms, it is shown that the participation of the third third of the teaching staff in the teaching process has positively influenced the students to pass the university degree.

Table 3. Results of the relationship between the categories of the Age3 variable versus the student's academic situation (Passed). The Lift metric has highlighted the least significant ones whose value is less than 1 and the most significant ones greater than or equal to 1.

Age3		Academic status			
		Abandon	Change	Overcome	Total
[0.00-0.33)	Number of cases	3188	431	1791	5410
	Frequency over the total	58.90%	8.00%	33.10%	80.90%
	Distribution over the	84.60%	90.90%	73.20%	

	category				
	Category/total ratio* (Lift)	1,046	1,127	0.904	
[0.33-0.667)	Number of cases	536	38	529	1103
	Frequency over total	48.60%	3.40%	48.00%	16.50%
	Distribution over the category	14.20%	8.00%	21.60%	
	Category/total ratio (Lift)	0.863	0.479	1,311	
[0.667-1.00]	Number of cases	44	5	128	177
	Frequency over total	24.90%	2.80%	72.30%	2.60%
	Distribution over the category	1.20%	1.10%	5.20%	
	Category/total ratio (Lift)	0.442	0.394	1975	
Total		3768	474	2448	6690
Percent b		56.30%	7.10%	36.60%	

*Category/total ratio = (a / b)

Source: self made

Table 4. Results of the data relationship between the category of the variable Age2 versus the academic status of the students (Passed). The Lift metric is used to

highlight the least significant ones whose value is less than 1 and the most significant ones greater than or equal to 1.

Age2		Academic status			
		Abandon	Change	Overcome	Total
[0.00-0.33)	Number of cases	1446	124	473	2043
	Frequency over the total	70.80%	6.10%	23.20%	30.50%
	Distribution over the category	38.40%	26.20%	19.30%	
	Category/total ratio* (Lift)	1,258	0.859	0.6344	
[0.33-0.667)	Number of cases	1761	256	1585	3602
	Frequency over total	48.90%	7.10%	44.00%	53.80%
	Distribution over the category	46.70%	54.00%	64.70%	
	Category/total ratio (Lift)	0.869	1,000	1,202	
[0.667-1.00]	Number of cases	561	94	390	1045
	Frequency over total	53.70%	9.00%	37.30%	15.60%
	Distribution over the	14.90%	19.80%	15.90%	

category				
Category/total ratio (Lift)	0.954	1,268	1,019	
Total	3768	474	2448	6690
Percent b	56.30%	7.10%	36.60%	

*Category/total ratio = (a / b)

Source: self made

As can be seen, in Table 4 the categories of "Age2", with "(0.33-0.667]" being the one that had a density of 53.80% of the data. As a result of having explored this variable, there are two relevant categories: (i) the category "[0.33-0.667)" of which of the total 53.8%, 44% have passed a university degree, while the category/total ratio was 1.203. (ii) The category "[0.667-1.00]" of the total 15.6%, 37.30% have passed the academic degree, and the category/total ratio is 1.02. In other words, the second and third third of teachers between 45 and 60 years old positively influenced the students to complete their university degree. Although it is observed in Table 5 that the categories of the teaching experience variable are examined, the density of the data was 58.10% in the category "[0.33-0.667)". Taking into account the data in the table, it is detected that two categories were relevant: (i) the category "[0.33-0.667)" which of the total 58.10%, 37.20% have passed a university degree, and the category/total ratio was 1.016; (ii) the category "[0.667-1.00]" of the total was 23.20%, 54.30% had passed a university degree, and the category/total ratio was 1.484. An important distinction to make in the teachers' experience was that the second and third categories predominated in the students who passed the university degree.

Table 5. Results of the data relationship between the category of the teacher's experience variable versus the student's academic situation (Passed). The Lift metric is used to highlight the least significant ones whose value is less than 1 and the most significant ones greater than or equal to 1.
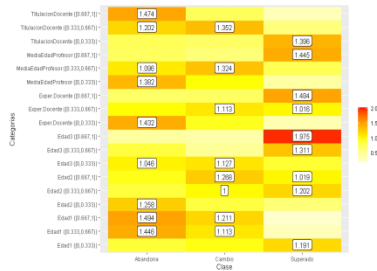
Age2		Academic status			
		Abandon	Change	Overcome	Total
[0.00-0.33)	Number of cases	1007	84	159	1250
	Frequency over the total	80.60%	6.70%	12.70%	18.70%
	Distribution over the category	26.70%	17.70%	6.50%	
	Category/total ratio* (Lift)	1,432	0.944	0.347	
[0.33-0.667)	Number of cases	2134	307	1445	3886
	Frequency over total	54.90%	7.90%	37.20%	58.10%
	Distribution over the category	56.60%	64.80%	59.00%	
	Category/total ratio (Lift)	0.975	1,113	1,016	
[0.667-1.00]	Number of cases	627	83	844	1554
	Frequency over total	40.30%	5.30%	54.30%	23.20%

Distribution over the category	16.60%	17.50%	34.50%	
Category/total ratio (Lift)	0.716	0.746	1,484	
Total	3768	474	2448	6690
Percent b	56.30%	7.10%	36.60%	

*Category/total ratio (Lift) = (a / b).

Source: self made

In light of the results presented in Tables 3, 4 and 5. Although it is observed, the "category/total relationship (Lift)" has managed to capture significant categories in the teaching variables, the consolidated and understandable transmission of the results has been presented in Graph 4. Hence, the labels with a value greater than 1 and shown with darker (reddish) colors have stood out. Specifically, the label Age3 [0.667-1.00] with 1.976 in the academic status Passed has been highly significant for the data analyzed. In general, both the second and third third of the variables teaching experience, average age, Age2 and Age3 have influenced the improvement or change of the university degree. That is, the channeling of the academic success of the student body is enhanced when the participation of this group of variables is greater than or equal to two thirds. On the other hand, Graph 5 presents the impact that experienced teachers (Age3) had on the final academic status of the students. According to the results obtained, it is confirmed that the greater their participation in the teaching process, the students had greater cases of academic success.

Graph 4. Heat map with the variable categories and the academic status of the students, the darker color (reddish) indicates a high association between the category and passing the university degree. The highest concentration of associations has occurred in the second and third third of the categorized variables. The Age3 category [0.667-1.00] shows a high association.

Source: self made

Group of teachers aged over 60 years
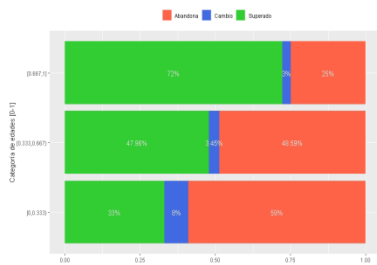
Graph 5. Proportion of participation of experienced teachers in the student teaching process and the academic status of the students, each category contains three horizontal bars that go from left to right. The first related to those who have passed the academic degree, the second to those who have changed degrees and the third to those who have dropped out. The largest proportion of students who have passed the academic degree was centered on teachers with participation higher than ٪٦٦, specifically the category [٠،٦٦-١].

Source: self made

5. **Discussion and conclusions**

In response to the research questions about compatibility and what faculty factors were influential for students to achieve academic success. To a certain extent, there are analogous studies as shown in the cited literature, however, the work focuses on demonstrating and facilitating the understanding of relevant results on the significant factors and links that lead students to pass the university degree. In this sense, the teaching process in university degrees is effective when of the total number of professors who taught in the first course are distributed proportionally between the second and third third, both of professors with experience and academic maturity, as well as the groups of ages.

While it is true, the difficulty of finding a universal distribution of teachers to guide students towards academic success is complex. The provision of a flexible strategy adjusted to the IES is an alternative route. In fact, Trigwell et al. (1999) emphasize the importance of working with academic staff to encourage the adoption of higher quality approaches to teaching. At the same time Gutiérrez et al. (2018) say that this environment promotes confidence and that, in addition, it consolidates positivity and motivates students to greater academic commitment to complete their education without abandoning their studies.

Regarding the experience of the teaching staff, our results coincide with Pascarella et.al. (1996) who among the findings have suggested that effective teaching practice positively influences learning, in addition to also increasing the number of students with academic success. In fact, Roksa and Whitley (2017) affirm that the teacher's maturity and type of teaching, through student-teacher iteration, have contributed as a precursor for students to pass the university degree. On the other hand, Boluda and López (2012) in their research express that

the "quality" of the teaching staff is a powerful predictor that is directly related to the performance of the students and is possibly one of the most decisive components of any training process. Likewise, academic success is not only linked to the activities and qualities of the teachers, but also to the quality of the effort made by the student (Valadas et al., 2017). Despite these findings, the results of this study should be interpreted with some caution, as the data only represent one institution and the results of this study may not be generalizable to other universities.

Regarding the ages of the teachers, a clear idea is established, it is convenient to distinguish between experienced and new teachers. Given that age, as such, can be discriminatory if not properly contextualized. This distinction is close to the study by Fogarty et al. (1983), which indicates that experienced teachers took into account a greater variety of objectives and instructions for decision-making in the classroom; Curiously, the opposite occurred with novice teachers. However, novices were more likely to detect signs of student academic performance than experienced teachers. That said, and in line with the results, mature (Age2) and experienced (Age3) teachers were effective in helping students improve their academic grade, as long as their participation comprised the second and third third of the total number of teachers who taught class. . In general terms, teachers with maturity and educational experience generate a reliable and positive academic environment for students.

As has been observed, the results obtained in this study have relevant importance. The reasons to believe that the implications associated with the academic success of the students must be adjusted to the context, policy and university regulations and that, despite this, the distribution of the teachers

assigned to teach classes in the first year is suggested. More specifically, two significant alternatives are proposed based on the results: The first was related to the age of experienced and mature teachers who had a participation rate greater than 33%. All of this, in order to retain the student and rule out university dropouts. The second is to suggest that teachers with a level of maturity in education higher than the second and third third of the total number of teachers participate in the teaching process.

From another perspective, the study of socioeconomic characteristics and the profile of students are topics of interest to deepen the analysis of academic success. Both are considered limitations of this work. Thus, in the study by Roksa and Kinsley (2019) they indicate that a greater possibility of academic success is achieved in students with greater resources. In turn, Van Herpen et al. (2017) have examined the profile of students focused on self-efficacy due to the correspondence with the characteristics of the teaching staff. As a subsequent study, the family and socio-economic factor of the students could be examined, since reinforcement with extracurricular programs, access to resources and aid stimulates the completion of the university degree and, in turn, will allow the university center to promote the student's channeling. towards academic success .

6. **Acknowledgments**

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