Prediction of emotional competence in future education teachers through a multiple logistic regression model and classification trees

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ABSTRACT

In order to know the level of emotional competence of future education teachers and evaluate the incidence that different personal and academic factors, we have used binary logistic regression and classification trees. Non-experimental design was carried out, with a sample of 359 students from the Faculties of Education of the University of Malaga and Almería. The results show that variables such as university access scores, the average mark of the first four-month period of the first year of the degree, the effort before the study, being a repeater, the choice of the degree as the first option and having siblings are significant predictors in the logistic model, where the last variable has the greatest determination capacity. Furthermore, in the segmentation tree it has been obtained that those students who do have siblings have a higher level of development of emotional competence, with a probability of 69.2% and if they have also chosen the degree as the first option, this percentage is increased to 75.9%. It can be concluded that it is essential to institutionally establish sufficient conditions so that teachers can detect the predictor variables and establish training strategies that allow increasing the level of development of the competence emotional.

Keywords: competence, student teachers, vocational school, research method, quantitative research

Predicción de la competencia emocional en futuro profesorado de educación a través de un modelo de regresión logística múltiple y árboles de clasificación

RESUMEN

Para conocer el nivel de competencia emocional de los futuros docentes de educación y evaluar la incidencia de diferentes factores personales y académicos, se ha utilizado regresión logística binaria y árboles de clasificación. Se realizó un diseño no experimental, con una muestra de 359 alumnos de las Facultades de Educación de la Universidad de Málaga y Almería. Los resultados muestran que variables como las puntuaciones de acceso a la universidad, la nota media del primer cuatrimestre del primer año de la titulación, el esfuerzo previo al estudio, ser repetidor, la elección de la titulación como primera opción y tener los hermanos son predictores significativos en el modelo logístico, donde la última variable tiene la mayor capacidad de determinación. En el árbol de segmentación se ha obtenido que aquellos estudiantes que sí tenían hermanos tienen un mayor nivel de desarrollo de la competencia emocional, con una probabilidad del 69.2%; y si también han elegido la titulación como primera opción, este porcentaje se incrementaba al 75.9%. Se puede concluir que es fundamental establecer institucionalmente las condiciones suficientes para que los docentes puedan detectar las variables predictoras, y establecer estrategias de formación que permitan incrementar el nivel de desarrollo de la competencia emocional.

*Palabras clave***:** competencia, futuros profesores, escuela de formación profesional, método de investigación, investigación cuantitativa.

Introduction

In recent years, since Spain was incorporated to the European Higher Education Area (EHEA), higher education institutions have undergone a great transformation in relation to the predominant educational models, since now they are focused on competences, in which, through the different subjects, general or transversal and specific competences are developed (Pérez *et al.*, 2009).

In regard to the training of future teachers, studies show that not only are general and specific skills are necessary, the fact of being a teacher implies the need to acquire emotional skills in order to intervene and develop educational work in different professional contexts (Pérez-Escoda *et al.*, 2019). Teachers must not only master the content of a discipline, but also know how to apply it according to the needs of the environment (Nurmi *et al.*, 2012; Nikolayeva *et al.*, 2018), and educate their students to face and respond to a society in continuous change. That is, it is not enough to deeply know and understand what they are and how to promote educational processes, to know how to design, develop and evaluate educational proposals, but training is required to become emotionally competent and to create environments promoting authentic learning experiences, as well as to manage the classroom environment adequately; for such purposes, teachers must rely on an adequate emotional balance (Fernández-Molina *et al.*, 2019). Emotional competencies can be defined as "the set of knowledge, abilities, skills and attitudes required to understand, express and regulate emotional phenomena in an appropriate way" (Bisquerra & Pérez-Escoda, 2007, p. 69; Bisquerra, 2009). Five dimensions of emotional competence can be identified: emotional awareness, emotional regulation, personal autonomy, interpersonal intelligence, and life skills and well-being. As such, emotional competencies are formed by the emotional intelligence construct together with emotional and social attributes.

At this point, it is necessary to clarify that the term 'emotional intelligence' is a construct that belongs to the field of psychology but that is increasingly extending to the educational field, resulting in the concept of emotional competence. In this sense, it can be stated that the more developed the emotional competences of teachers are, the better they will be able to manage their intrapersonal and interpersonal intelligence and have an impact on the integral education of students in a more appropriate way, as well as to carry out their educational tasks. As stated by Pérez-Escoda & Sabariego (2015), emotional education is based on educational strategies promoting the development of emotional skills, which enable individuals to resolve everyday situations and contribute to reducing the effects of those factors that hinder the development of personal and social well-being. Such education can be understood as a form of primary prevention that minimises vulnerability to certain situations and ensures that life's difficulties are faced (Shek & Ma, 2016), increasing resilience, school performance, coexistence, adaptation to context, and subjective well-being (Pérez-Escoda *et al.*, 2013). However, in order to design adequate emotional education in the university environment, it is necessary to know the variables that influence the process of acquiring emotional competence, a priority objective of this work.

Variables influencing the development of emotional competence

Due to the new educational demands and uncertainties that are experienced in today's post-modern societies, it is necessary to know the variables that influence the effective performance of a future professional (Pérez-Escoda *et al.*, 2019), since academic intelligence does not guarantee success in a profession, and specifically in the teaching profession, as a wide range of competencies come into play which, in many cases, are not acquired in formal education. Emotional competencies, therefore, can be considered as determining factors of academic performance, health, improvement of coexistence and conflict resolution, as well as learning and development of human relations (MacCann *et al.*, 2020).

After analysing the studies carried out on this topic, it was observed that some studies have focused on identifying the level of development of the emotional competencies of university students by testing the dimensions this student body activate to face the different situations in which they develop. Through these investigations, it can be appreciated that the development of emotional competences has not been highly present throughout their schooling process. Thus, for example, we can highlight the study carried out by Ruiz (2019), in which 425 students from 10 university degrees in the city of Quito-Ecuador participated. The results showed that the students had an acceptable level of emotional competence. That is, the students understood and interpreted the different situations and confronted them by using their emotional capacities, skills, and knowledge in a basic way. The degrees that achieved the best scores were related to the field of health and well-being, such as pharmacy, child development or tourism; that is, those areas in which interpersonal intelligence, life skills and well-being are crucial for the performance of professional practice. On the other hand, this study also revealed that gender was a variable that influenced the development of emotional competence, with the female sex obtaining statistically significant differences, as also concluded by the work carried out by Gutiérrez (2020), Malinauskas *et al.* (2018), and Andrade *et al.* (2016). In the latter study, age was also found to be a determining variable. However, conflicting results were obtained by Kahraman & Hiçdurmaz (2016), with a sample of 312 Turkish adults, where it was found that there were no significant differences between the level of emotional competence and demographic variables, such as age or gender (Tisocco *et al.*, 2019).

In the light of the work carried out, it seems clear that emotional competencies allow for better processing of emotional information in certain life situations; that is, the higher the level of emotional intelligence, the greater the possibilities of developing emotional competencies, since, as Sánchez *et al.* (2018) state, these "involve the application of emotional intelligence" (p. 976). This relationship favours, among other aspects, a higher academic performance (Mayer *et al.*, 2008; Trigueros *et al.*, 2019), being affected by multiple variables such as mood, motivation, dedication to study, as well as the emotional relationships that are put into play in the teaching-learning process (Cabrera, 2019). However, it is true that many of the documents consulted assimilate emotional intelligence to emotional competence, treating the two as synonymous concepts (Vaida & Opre, 2014).

Del Rosal *et al.* (2018), after carrying out a study in which 500 education students participated, to reveal the relationship between emotional intelligence and academic performance, concluded that there were statistically significant differences according to gender in the dimensions of clarity and emotional repair, where men obtained higher scores; however, regarding the emotional care dimension, women pointed out. On the other hand, they also found a positive and statistically significant relationship between the level of emotional intelligence and university academic perfor-

mance. Similar results were found in the work carried out by Delgado *et al.* (2019) in relation to academic results; in this study, 513 first-year university students in infant and primary education took part. This relationship was not confirmed in the study carried out by Arntz & Trunce (2019) in a Chilean university; nevertheless, in recent work this relationship has been shown to have great importance and has been observed in the research conducted by Deighton *et al.* (2019) and Zhoc *et al.* (2020). In the most recent, the analysis of data showed that emotional intelligence was a predictor of academic success. Cabrera (2019) also supported this relationship, analyzing the responses of 230 university students and revealing that the two variables, emotional intelligence, and academic performance, were directly, though weakly, related. One of the conclusions of this study was that, regardless of the intellectual level, there were other factors of a personal nature, such as mood or stress management, which had a relationship with academic achievement. Emotional competence therefore came into play since these variables are constitutive of the intrapersonal variables of emotional competence. Navea & Varela (2019) also determined in their research involving 508 students that self-efficacy, another variable considered to be a constituent of emotional competence, could predict academic performance, results which echoed those obtained by Ordun & Akün (2017). The work of Fernández-Lasarte *et al.* (2019), with a sample of 831 students from the Basque Autonomous Community of Higher Education produced similar results. In this study, significantly positive relationships were confirmed between perceived social support, self-concept, and emotional repair with academic performance. Therefore, it can be stated that emotional competencies and academic performance are closely related variables, since emotional intelligence is a significant predictor of cognitive engagement (Maguire *et al.*, 2017).

There is evidence of other variables that influence the level of development of emotional competence. Machera & Machera (2017), after conducting a study with 86 economics students from the University of Botho (Botswana), found that 95% of them had a problem with addiction, 92% had conflicts with peers and teachers, 98% felt distressed when faced with a failure, and 69% considered that it was essential to have a higher level of emotional education at the university, which led the researchers to believe that they had not developed a high level of emotional competence.

On the other hand, it must be taken into account that there are other variables that can also influence the development of emotional competence, some of which are presented below, such as university entrance scores, the choice of degree, the family support received, the number of siblings, as well as the age of the students. Durántez & Pérez (2007) carried out a study in which they surveyed 441 first-year students in the teaching professions whose average university entrance marks ranged from 5 to 6 points, with the students in pre-school education obtaining the highest marks and those in foreign language having the lowest. In this study, only a quarter of the total sample indicated a career in teaching as their first choice, with students in pre-school education standing out, who 94% coincided when stating their choice and studies undertaken. For half of the students of primary education and foreign language, the choice was motivated by a desire to teach, while the choice had been encouraged for a third of the students of early childhood education and physical education. These results support those obtained by Latorre & Pérez (2005).

Family bonding, i.e. perceived family support, may also be another predictor of the development of students' emotional competence, and a number of studies have analysed family bonding, specifically in predicting emotional regulation (Kim, 2014; Ma *et al.*, 2014; Storlie *et al.*, 2016; Garriott *et al.*, 2017; Powers & Myers, 2017). Along these lines, Siddiqui *et al.* (2019) evaluated the influence of attachment and parental relationships on the development of emotional intelligence in a sample of 200 college students. The results showed that parental attachment, social support, and the role assumed as facilitators of independence were positively correlated with the emotional intelligence of university students. In addition, in terms of gender, women perceived their parents were more facilitators and supportive.

Some studies have also found that age and number of siblings are variables that are significantly associated with emotional development (Sawyer *et al.*, 2002; de la Barrera *et al.*, 2019). There are studies which confirm that older people possess a higher level of emotional competence and a greater capacity to know and control the social context by establishing positive social relationships, as well as to satisfy their vital needs and solve conflicts (Muratori *et al.*, 2015; Moyano & Ramos, 2007).

As can be seen in the scientific literature reviewed, the relationships between emotional competencies, emotional intelligence, academic performance, interpersonal and intrapersonal relationships, and other variables that influence the level of development of emotional competence have been analysed (Brackett & Carusso, 2007; Mayer *et al.*, 2008; Durlak *et al.*, 2011). Taking this into consideration, the purpose of this study is to determine those factors that significantly influence the emotional competence of future education teachers at the beginning of their degree. To achieve this, two models of classification techniques are proposed: a multiple logistic regression model to determine which variables are significant in achieving high emotional competence; and a second model based on a segmentation analysis by means of the classification tree technique, with the purpose of studying which specific and categories of variables classify those students who present a greater probability of having a high or low developmental level of emotional competence.

Method

Design. In this work, a non-experimental ex post facto design based on surveys was used to collect students' emotional competence scores. Once the information was collected, different inferential analyses were performed to detect which variables could help to predict the level of development of emotional competence. In this study, in order to respond to the ethical considerations of the research, negotiations were carried out with the students through an informed consent contract, in addition, the research team promised to make the results obtained available to them (Santos & De la Rosa, 2017).

The scores obtained in the survey, on a scale from 0 to 105, were recorded as: good level of emotional competence, 70 points or more; or low emotional state, with less than 70 points. In addition, the level of emotional competence was considered as a dependent variable (DV). Table 1 shows the characterisation of the variables used in the study. SPSS V.22 software was employed to process and analyse the data, and IBM SPSS AMOS V.22 software was used to check the structural equation model (SEM) of the relationships between the variables of the instrument.

Table 1
Variable description

Factors	Variable	Type	Measurement scale	Categories
DV	Emotional competence	Qualitative	Nominal	0: Low
				1: High
Sociodemographic factors	Sex	Qualitative	Nominal	0: Male
				1: Female
	Having teaching relatives	Qualitative	Nominal	0: No
				1: Yes
	Being in a couple	Qualitative	Nominal	0: No
				1: Yes
	Living with parents	Qualitative	Nominal	0: No
				1: Yes
	Having brothers/sisters	Qualitative	Nominal	0: No
				1: Yes
	Choice of degree as the first option (CDFO)	Qualitative	Nominal	0: No
				1: Yes
Academic factors	To retake a previous school year	Qualitative	Nominal	0: No retake
				1: Retake
	Mode of university access	Qualitative	Nominal	0: PAU
				1: Other
	Average score in the first semester (ASFS)	Quantitative	Ratio	Max. 10 p.
	Study effort	Quantitative	Ordinal	Likert 10 p.

To determine the validity of the estimated model, the assumptions that allow this type of technique were checked. These are shown below:

- Multicollinearity. We found that there were no multicollinearity problems with respect to the predictor variables, and no correlations greater than 0.6.

- Monotony. The Hosmer and Lemeshow test determined that the interaction between predictors and their logarithmic transformations was significant in the proposed model (χ^2=14.429; gl=8; sig. > 0.05).

- Normality was verified with the statistician Kolmogorov-Smirnov, which fulfil the assumption (*KS*= 0.045; df = 359; sig. = 0.80).

Participants. To select the sample, purposive non-probabilistic sampling was used to select a total of 359 first-year students of the teaching degrees from the University of Malaga and the University of Almeria during the 2019–2020 academic year, specifically from the degrees of Teacher in Early Childhood Education and Teacher in Primary Education. Regarding gender, 108 male students (30.1%) participated, with an average age of 19.81 years, and 251 female students (69.9%), with an average age of 19.29 years. As for the academic profile, 16.7% had retaken a course at some point, 88.5% had entered university through the University Access Tests (PAU), and 89.1% had chosen to study teaching as a first-choice career. Regarding the social profile, 40.4% of students had a direct relative in teaching, 45.7% were in a couple, 76% lived with their parents, and 72.4% had at least one sibling.

Instrument. The Adult Emotional Development Questionnaire (AED), developed by Pérez-Escoda *et al.* (2010), was used to measure the level of emotional competence of participants. This instrument is a self-report questionnaire built on the pentagonal model. It consists of 48 items classified into five dimensions. The first dimension includes 7 items that measure emotional awareness; the second dimension is composed of 13 items focused on emotional regulation; the third dimension includes 7 items related to emotional autonomy; the fourth dimension is composed of 12 items related to social competences; and, finally, the fifth dimension is composed of 9 items related to competencies for life and well-being. The responses use a 5-point Likert scale, where the value 1 is assigned the qualitative label "totally disagree", whereas the value 5 corresponds to the label "totally agree".

The original instrument was administered with a sample of 1,537 participants aged 17–64, with an average age of 28 years, who fit well for reliability based on Cronbach's alpha and construct validity through exploratory factor analysis (EFA). However, the instrument lacked a confirmatory factor analysis (CFA). For the present study, a sample with completely different characteristics than the one used in the study where the psychometric properties of the instrument were analysed. As the sample was made up of students from two Andalusian Faculties of Educational Sciences, it was essential to double-check the psychometric properties of the instrument. For such purpose, the sample of participants was divided into two sub-samples on a random basis.

Procedure and analysis results. The analysis of the data consisted of three procedures: the first one, the check of the psychometric properties of the instrument through Cronbach's alpha, AFE and AFC; second, a multiple logistic regression model to determine the significant variables in predicting a high level of emotional competence, using the introduce method; and third, the technique of segmentation analysis (tree) to identify groups in the predictor variables of the model, as well as discover the relationships between groups, and be able to predict a high level of emotional competence. The execution of this segmentation technique is not limited to determining those significant variables, as the regression technique does, but in also looks for other variables that help to better distinguish students within these significant variables.

Results

Psychometric properties of the instrument

First, an AFE was carried out to analyse the internal structure of the instrument. For such purpose, the main component method with oblique rotation was used. The Kaiser-Meyer sample adequacy measurement (KMO = 0.782), as well as Barlett's sphericity test (χ^2= 1135.535; gl= 171; sig. = 0.001) evidenced the dimensionality of the instrument. The model revealed the presence of the five dimensions of the instrument, explaining 52.77% of the true variance in the scores. Those items with weights greater than 0.40 were considered adequate to make up the final instrument, thus configuring an instrument composed of 21 items.

The AFC of the theoretical five-dimensional proposal with the 21 selected items was carried out through the maximum likelihood method by the adjustment indicators provided by the AMOS 22 program: Chi-square ratio over the degrees of freedom (χ^2/g.l; CMIN/DF= 1. 49) taking into account that values below 3 indicate a good fit (Bentler, 1989); the comparative fit index (CFI= 0.909) and the incremental fit index (IFI = 0.912), consider-

ing values above 0.90 as a good fit (Hu & Bentler, 1999); and the approximation mean square error (RMSEA, 0.047), where values below 0.06 indicate that the model has a good fit.

Finally, the overall reliability of this version of the instrument with 21 items was calculated through Cronbach's alpha, obtaining a satisfactory value (α = 0.73). Figure 1 shows the model proposed in the AFC, confirming the factorial structure formulated in the AFE, composed of five correlated latent variables.
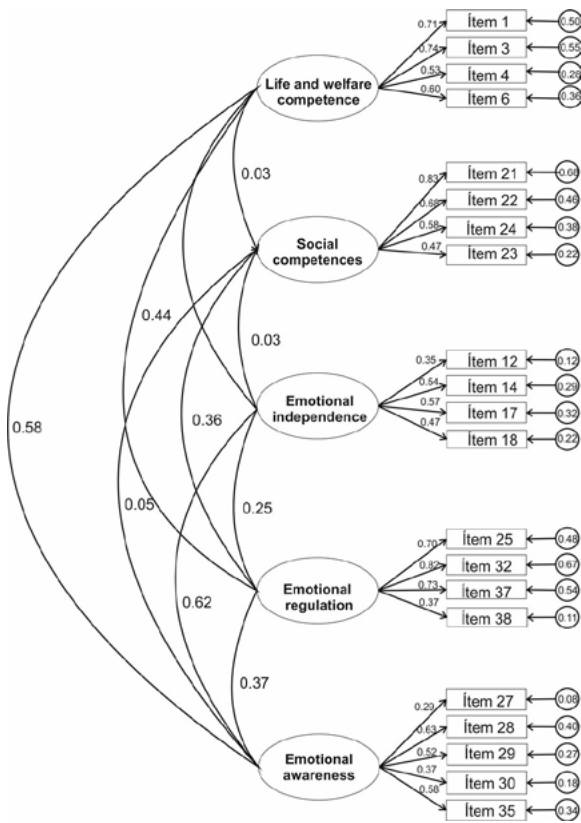

Figure 1. *Structural equation model*

Model determination through multiple logistic regression

The significance of Chi-square in the omnibus test indicated that the model helps to explain the level of emotional competence by making a correct estimate (χ^2 =81.268, p. < 0.05). The value of Nagelkerke's R square showed that the proposed model explains 28% of the variance of the DV. It was also found that it was able to make a correct prediction in 72.8% of the cases, meaning the model is acceptable. In the case of students with low emotional competence, 59.59% (model specificity) and 81.90% in the case of students with high emotional competence (sensitivity) were correctly classified.

As shown in Table 2, six of the eleven independent variables studied in the model were significant in their contribution: average score in the first semester (ASFS), the effort to study, repeating a previous year, choosing the degree as first option (CDFO), and having siblings and having a couple. The model obtained with these significant variables was as follows:

$$P= \frac{1}{1+e^{-(\beta+\beta_1*Couple+\beta_2*ASFS+\beta_3*Effort+B_4*Repeater+\beta_5*CDFO+\beta_6*siblings}}$$

Table 2
Influence of independent variables on the probability of having high emotional competence (n = 359)

	B	E.T.	Wald	gl	Sig.	E x - p(B)	95% C.I. for EXP(B) Lower	Higher
ASFS	0.343	0.113	9.252	1	0.002	1.408	1.127	1.750
Effort	0.199	0.092	4.649	1	0.031	1.220	1.018	1.460
Repeater	-0.734	0.342	4.600	1	0.032	0.480	0.246	0.941
CDFO	0.583	0.273	4.556	1	0.033	1.791	1.046	3.046
Siblings	1.515	0.275	30.441	1	0.001	4.547	2.639	7.723
Couple	0.557	0.252	4.892	1	0.027	1.746	0.371	0.991
Constant	-5.716	1.349	17.946	1	0.000	0.003		

The significant coefficients determine that having a high emotional competence is closely related to the variable average grade of the first quarter (Exp (0.343) = 1.408); this indicates that students' odds who have a higher score on the average score is 1.41 times higher than students' odds who reached a lower score on the average score.

With respect to the effort of students when carrying out their academic tasks, this predictor presents a positive coefficient and an odds ratio greater than the unit -Exp(β) = 1.220. This indicates that, for every one-point increase in motivation on the scale, their odd ratio would increase by 1.22 times. According to the predictor variable "Repeater", an inverse relationship is established (β= -0.734), indicating that students who repeat a previous course present a lower level of emotional competence (Exp(β) = 0.480); that is, the odds ratio of students who repeated courses is 0.48 times lower than those of students who did not repeat.

The variable of having siblings had the greatest determination capacity, specifying a positive relation (β = 1.515). This shows that those students with siblings showed an odds ratio 4.55 times higher than those who had no siblings. The option of choosing the degree as the first option had a positive ratio, indicating that for those students who enrolled on their preferred study course, their odds ratio was 1.79 times higher than those who did not choose teaching as their first option. Finally, having a partner had a positive ratio, showing that for those students with a stable partner, their odds ratio increased 1.75 times versus those who did not.

The analysis of the results showed that with the multiple logistic regression model, for a student who had obtained a 7 out of 10 maximum grade point average in the first four-month period, who had not repeated a course, who had chosen teaching as a first option, who had at least one sibling and whose effort on the study was 7 out of 10, the probability of having a high level of emotional competence, according to the specification established in Table 2, would be:

$$P= \frac{1}{1+e^{-(-5.716+0.557*1+0.343*7+0.199*7-0.734*0+0.583*1+1.515*1)}} =68\%$$

Classification tree analysis

Segmentation trees seem to have better predictive probabilities than other classification techniques, mainly when data are treated at a categorical level (Richard *et al.*, 2008). In this study, the model used the same categorical independent variables; the quantitative variables (grades and effort) were coded as dummy variables with values greater and less than seven points, that is, obtaining at least an average grade and effort of grade B. Finally,

eight nodes were obtained (Figure 2). Of all the variables considered, the first variable that determined emotional competence was having siblings, with which two initial nodes are linked.

Figure 2 shows that 40.7% of students had a low level of development of emotional competence (less than 70 points in the instrument scores) compared to 59.3% who had a high level of development of this competence (more than 70 points).

Node 1 ranks students with no siblings at 27.6%. In addition, it determines with a 66.7% probability that these students have a low level of development of emotional competence; while only 33.3% of have a high level of emotional competence. This node was subdivided into two further nodes. In Node 3 we see how of those students who, in addition to not having siblings, have repeated a course, 88.5% are classified as having low emotional competence. In the group of students who have not repeated, the emotional competence is similar, although in this group it is influenced by having a partner, where those who did not have a partner were classified with 75% with low emotional competence (Node 7).

Node 2 classifies 72.4% of students who have siblings, where 69.2% have a high level of developmental emotional competence. Node 2 was subdivided into two additional nodes by the categories of having chosen the teaching career as a first choice or not. In Node 5, it can be seen that those who have siblings and who also chose the degree as their first option were classified with a 75.9% probability of having a high level of emotional competence.

Figure 2. *Segmentation of students' emotional competence*

The proposed model is correctly classified with approximately 69.4% of the students. Specifically, for each category of the emotional competence variable, it provided slightly higher correct percentage in the case of the "high emotional competence" category, with 94.8%.

Discussion

Considering all the variables included in the model as possible predictors for the development of emotional competence, only six were found to have a significant influence: average score in the first semester (ASFS), effort before the study, repeating a previous course, choosing the degree as first option (CDFO), having siblings and having a couple. Of these six, three can be directly related to academic performance: ASA, ASQ, and repeating a previous year. Therefore, it can be stated that several performance-related variables predict emotional competence,

supporting the findings of Del Rosal *et al.* (2018), Delgado *et al.* (2019), Deighton *et al.* (2019), MacCann *et al.* (2020), and Zhoc *et al.* (2020). The results showed that the students who achieved a higher grade in the first semester had a greater probability of having a high level of development of emotional competence; in addition, not having repeated a year and making greater effort in their studies, were associated with a higher level of development of emotional competence, which increased exponentially. Therefore, it can be confirmed, as Maguire *et al.* (2017) indicate, that the variables emotional competence and school performance are closely related, as emotional intelligence significantly influences cognitive engagement.

Nevertheless, the results obtained in this study also coincide with those obtained by Cabrera (2019) and Orden & Akun (2017) in showing that other variables that have a direct influence must also be taken into account. In the case of the present study, the variable having siblings is the variable with the greatest capacity for determination in the model. This result is in line with those obtained in other studies where it is stated that having a positive family bond favors the development of emotional competence (Kim, 2014; Storlie *et al.*, 2016; Garriott *et al.* 2017; Powers & Myers, 2017; Siddiqui *et al.*, 2019); moreover, having more than one sibling has a direct relationship with the level of development of emotional competence, coinciding with the results obtained by Sawyer *et al.* (2002) and de la Barrera *et al.* (2019). These results could indicate that those students who have more social relationships, could develop greater emotional competencies, whether the students live with other relatives, with siblings, and / or have a partner. In this sense, it would be advisable to delve into the type of relationships that occur within these social contexts, perhaps through more qualitative designs, such as interviews, case studies or discussion groups.

Finally, choosing to study the degree of teacher training as a first option also has a positive effect, where those students who are clear about what they want to study show a higher level of development of emotional competence. As Camino & Salvador (2007) and Latorre & Pérez (2005) have presented similar findings in previous studies.

In regard to the classification tree, it should be noted that having siblings was the main variable that determined the level of emotional competence. In this case, having siblings and choosing a teaching career as a first option produced a 75.9% probability of having a high level of development of emotional competence. This indicates that these students began the degree of teacher training with an optimal level of emotional competence, results that do not coincide with those obtained by Ruiz (2019), Gutiérrez (2020), Malinauska *et al.* (2018), and Andrade *et al.* (2016) since, according to these authors, students begin the aforementioned degree with a medium level of emotional competence.

Conclusions

Studying these characteristics can provide interesting insights to teachers, and to university teachers, about the variables that carry a greater weight in the development of emotional competence. Therefore, it is essential that university teachers develop an educational programme in the classroom where, on the one hand, they have the possibility of getting to know their students closely in order to identify their characteristics and peculiarities, identifying the variables that help or hinder the development of emotional competence. In order to achieve this, it should be a priority for the educational administration to provide these teachers with the necessary means to achieve it; that
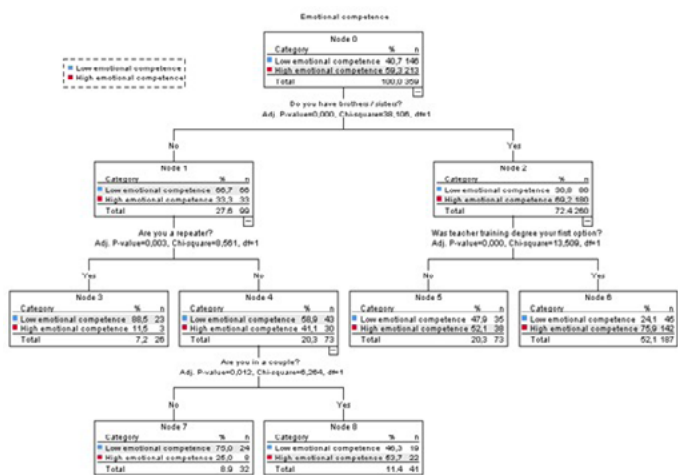
is, the appropriate conditions to be able to develop a positive, democratic, and relaxed classroom climate, in which teachers can have a close relationship with their students. To do this, one of the essential requirements would be to lower the educational ratio in the university classroom, as well as to increase the hours spent teaching the same class group. On the other hand, it would also be beneficial to establish training strategies, either transversally, or within a specific subject area, where, in the university environment, in particular in areas related to education, specific training programmes on emotional education are implemented that allow the students to develop their emotional competence, in each of its five dimensions.

One of the limitations of the present study is the size of the sample used. It is fundamental in research on these characteristics to have a larger sample, which allows the influence of a greater number of intervening variables to be significantly predicted. In possible future lines of research, it is proposed to increase the size of the sample, including participants both from the degrees linked to education and other degrees, as well as to establish a comparative analysis between the predictive variables established in the degree of teacher training with other degrees not associated with social sciences.

Another limitation is the type of procedure in the reception of the information, since it was only used an ad hoc design through surveys, which does not allow knowing other perceptions regarding the object of study. For this reason, it would be very interesting to be able to complement these results with a more holistic vision of reality, through a triangulation of information gathering instruments, such as interviews, discussion groups or case studies.

References

Andrade, A., Martins, R., Cunha, M., Albuquerque, C., & Ribeiro, O. (2016). Professional factors and emotional competence in healthcare professionals. *European Proceedings of Social and Behavioural Sciences*, 424–431. http://dx.doi.org/10.15405/epsbs.2016.07.02.40

Arntz Vera, J., & Trunce Morales, S. (2019). Inteligencia emocional y rendimiento académico en estudiantes universitarios de nutrición. *Investigación en educación médica*, 8(31), 82-91. https://doi.org/10.22201/facmed.20075057e.2019.31.18130

Bentler, P. M. (1989). *EQS structural equations program manual*. BMDP Statistical Software.

Bisquerra, R., & Pérez-Escoda, N. (2007). Las competencias emocionales. *Educación XX1*, 10, 61–82. http://www.doi.org/10.5944/educxx1.1.10.297

Bisquerra, R. (2009). *Psicopedagogía de las emociones*. Síntesis.

Brackett, M.A., & Carusso, D.R. (2007). *Emotionally literacy for educators*. SELMedia.

Cabrera, E.A. (2019). La inteligencia emocional y el rendimiento académico en los estudiantes de la Facultad de Ciencias de la Salud de la Universidad Nacional Toribio Rodríguez de Mendoza de Amazonas, Chachapoyas 2018. *Revista de Investigación Científica UNTRM: Ciencias Sociales y Humanidades* 2(1), 16–21. http://dx.doi.org/10.25127/rcsh.20192.462

Camino, A., & Salvador, M. I. (2007). Condicionantes y Características de los Estudiantes que Inician Magisterio. Estudio Descriptivo y Comparativo entre Especialidades. *Tendencias Pedagógicas, 12*, 245-262. https://revistas.uam.es/tendenciaspedagogicas/article/view/1885

De la Barrera, U., Schoeps, K., Gil-Gómez, J., A. & Montoya-Castilla, I. (2019). Predicting Adolescent Adjustment and Well-Being: The Interplay between Socio-Emotional and Personal Factors. *International journal of environmental research and public health*, 16(23), 1–17. https://doi.org/10.3390/ijerph16234650

Deighton, K., Hudson, J., Manley, A. J., Kaiseler, M., Patterson, L. B., Rutherford, Z. H., & Swainson, M. (2019). Effects of emotional intelligence and supportive text messages on academic outcomes in first-year undergraduates. *Journal of Further and Higher Education*, 43(4), 494–507. https://doi.org/10.1080/0309877X.2017.1377161

Del Rosal, I., Moreno, J.M., & Bermejo, M.L. (2018). Inteligencia emocional y rendimiento académico en futuros maestros de la Universidad de Extremadura. *Revista de Currículum y Formación del Profesorado, 22*(1), 257–275. https://doi.org/10.30827/profesorado.v22i1.9928

Delgado, B., Martínez, M.C., Rodríguez, J.R., & Escortell, R. (2019). La autoeficacia académica y la inteligencia emocional como factores asociados al éxito académico de los estudiantes universitarios. *Revista Gestión de las Personas y Tecnología, 35*, 46–60. https://doi.org/10.35588/revistagpt.v12i35.4003

Durántez, M. A. C., & Pérez, M. I. S. (2007). Condicionantes y características de los estudiantes que inician Magisterio: Estudio descriptivo y comparativo entre especialidades. *Tendencias pedagógicas*, 12, 245–264. https://revistas.uam.es/tendenciaspedagogicas/article/view/1885

Durlak, J., Weissber, R., Dymnicki, A., & Schellinger, K. (2011). The Impact of Enhancing Students´ Social and Emotional Learning: A Meta- Analysis of School- Based Universal Interventions. *Child Development*, 82(1), 405–432. https://doi.org/10.1111/j.1467-8624.2010.01564.x

Fernández-Lasarte, O., Ramos-Díaz, E.; Goñi, E., & Rodríguez-Fernández, A. (2019). Estudio comparativo entre educación superior y educación secundaria: efecto del apoyo social percibido, el autoconcepto y la reparación emocional en el rendimiento académico. *Educación XX1, 22*(2), 165-185. http://www.doi.org/10.5944/educXX1.22526

Fernández-Molina, M., Castillo, A. B., & Fernández-Berrocal, P. (2019). Profiles of perceived emotional intelligence in future preschool teachers: Implications for teacher education. *Revista Electrónica Interuniversitaria de Formación del Profesorado, 22*(1), 209-223. https://doi.org/10.6018/reifop.22.1.344131

Garriott, P. O., Navarro, R. L., & Flores, L. Y. (2017). First-generation college students' persistence intentions in engineering majors. *Journal of Career Assessment*, 25, 93–106. https://doi.org/10.1177/1069072716657533

Gutiérrez, N. (2020). Inteligencia emocional percibida en estudiantes de educación superior: análisis de las diferencias en las distintas dimensiones. *Actualidades en Psicología*, 34(128), 17–33. http://www.doi.org/10.15517/ap.v34i128.34469

Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure 17 analysis: Conventional criteria versus new alternatives. *Structural Equation 18 Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Kahraman, N., & Hiçdurmaz, D. (2016). Identifying emotional intelligence skills of Turkish clinical nurses according to sociodemographic and professional variables. *Journal of clinical nursing, 25*(7-8), 1006–1015. https://doi.org/10.1111/jocn.13122

Kim, E. (2014). When social class meets ethnicity: College-going experiences of Chinese and Korean immigrant students. *The Review of Higher Education, 37*, 321–348. https://doi.org/10.1353/rhe.2014.0015

Latorre, M. J., & Pérez, P. (2005). El perfil del estudiante de Magisterio y su formación práctica universitaria. *Revista Qurriculum, 18*, 255–274. https://ssrn.com/abstract=3265701

Ma, P. W. W., Desai, U., George, L. S., Filippo, A. A. S., & Varon, S. (2014). Managing family conflict over career decisions: The experience of Asian Americans. *Journal of Career Development*, *41*(6), 487-506. https://doi.org/10.1177/0894845313512898

MacCann, C., Jiang, Y., Brown, L. E., Double, K. S., Bucich, M., & Minbashian, A. (2020). Emotional intelligence predicts academic performance: A meta-analysis. *Psychological Bulletin*, *146*(2), 150–186. https://doi.org/10.1037/bul0000219

Machera, R. P., & Machera, P. C. (2017). Emotional Intelligence (EI): A Therapy for Higher Education Students. *Universal Journal of Educational Research, 5*, 461–471. http://www.doi.org/10.13189/ujer.2017.050318

Maguire, R., Egan, A., Hyland, P., & Maguire, P. (2017). Engaging students emotionally: The role of emotional intelligence in predicting cognitive and affective engagement in higher education. *Higher Education Research & Development, 36*(2), 343–357. https://doi.org/10.1080/07294360.2016.1185396

Malinauskas, R., Dumciene, A., Sipaviciene, S., & Malinauskiene, V. (2018). Relationship between emotional intelligence and health behaviours among university students: The predictive and moderating role of gender. *BioMed research international*, 1–11. https://doi.org/10.1155/2018/7058105

Mayer, J., Roberts, R., & Barsadé, S. (2008). Human abilities: Emotional Intelligence. *Annual review of psychology, 59*, 507–536. https://doi.org/10.1146/annurev.psych.59.103006.093646

Moyano, E., & Ramos, N. (2007). Bienestar subjetivo: midiendo satisfacción vital, felicidad y salud en población chilena de la Región Maule. *Universum, 22*(2), 177–193. http://dx.doi.org/10.4067/S0718-23762007000200012

Muratori, M., Zubieta, E., Ubillos, S., González, J. L., & Bobowik, M. (2015). Felicidad y bienestar psicológico: estudio comparativo entre Argentina y España. *Psykhe (Santiago)*, *24*(2), 1–18. http://dx.doi.org/10.7764/psykhe.24.2.900

Navea, A., & Varela, I. (2019). Variables motivacionales y cognitivas predictivas del rendimiento en estudiantes universitarios de ciencias de la salud. *Revista Cubana de Educación Médica Superior, 33*(1), 1-29.

Nikolayeva, I., Martin, B., Yessad, A., Chenevotot, F., Pilet, J., Prévit, D., & Luengo, V. (2018). How to help teachers adapt to learners? Teachers' perspective on a competency and error-type centered dashboard. In *European Conference on Technology Enhanced Learning* (pp. 596–599). Springer, Cham. https://doi.org/10.1007/978-3-319-98572-5_53

Nurmi, J. E., Viljaranta, J., Tolvanen, A., & Aunola, K. (2012). Teachers adapt their instruction according to students' academic performance. *Educational Psychology*, *32*(5), 571–588. https://doi.org/10.1080/01443410.2012.675645

Ordun, G., & Akün, F. A. (2017). Self Actualization, Self Efficacy and Emotional Intelligence of Undergraduate Students. *Journal of Advanced Management Science, 5*(3), 170–175. http://www.doi.org/10.18178/joams.5.3.170-175

Pérez-Escoda, N., Berlanga, V., & Alegre Bossello, A. (2019). Desarrollo de competencias socioemocionales en educación superior: evaluación del posgrado en educación emocional. *Bordón, 71*(1), *97-113*. https://doi.org/10.13042/Bordon.2019.64128

Pérez-Escoda, N., Bisquerra, R., Filella, G. R., & Soldevila, A. (2010). Construcción del cuestionario de desarrollo emocional de adultos (QDE-A). *Revista Española de Orientación y psicopedagogía*, *21*(2), 367–379. https://doi.org/10.5944/reop.vol.21.num.2.2010.11539

Pérez-Escoda, N., Filella Guiu, G., Soldevila Benet, A., & Fondevila, A. (2013). Evaluación de un programa de educación emocional para profesorado de primaria. *Educación XX1, 2013, 16*(1), *233-254*. https://doi.org/10.5944/educxx1.16.1.725

Pérez-Escoda, N., & Sabariego Puig, M. (2015). Valoración de la efectividad de la formación en competencias emocionales en educación superior. *Investigar con y para la sociedad, 2*, 965–976. Bubok Publishing.

Pérez Gómez, A.I., Soto, E., Sola, M., & Serván, M.J. (2009). *Aprender en la universidad. El sentido del cambio en el EEES*. Akal.

Powers, S. R., & Myers, K. K. (2017). Vocational anticipatory socialization: College students' reports of encouraging/discouraging sources and messages. *Journal of Career Development*, *44*(5), 409-424. https://doi.org/10.1177/0894845316660627

Richard, M. M., Solanas, A., Ledesma, R. D., Introzzi, I. M., & Ramón, M. F. L. (2008). Técnicas estadísticas de clasificación: un estudio comparativo y aplicado. *Psicothema, 20*(4), 863–871.

Ruiz, M.I. (2019). Inteligencia emocional en educación superior: contribuciones a la calidad educativa. *YACHANA Revista Científica, 8*(3), 53–60. https://doi.org/10.1234/ych.v8i3.608

Sánchez, L., Rodríguez, G., & García, E. (2018). Desarrollo de competencias emocionales a través del Programa AEdEm para Educación Secundaria. *Revista Complutense de Educación, 29*(4), 975–994. http://dx.doi.org/10.5209/RCED.54402

Santos Guerra, M. Á., & De la Rosa Moreno, L. (2017). La negociación, piedra angular de las investigaciones. *Educación Siglo XXI, 35*(2), 295-316. http://dx.doi.org/10.6018/j/298621

Sawyer, K. S., Denham, S., Denham, S., Blair, K., Blair, K., & Levitas, J. (2002). The contribution of older siblings' reactions to emotions to preschoolers' emotional and social competence. *Marriage & Family Review*, *34*(3-4), 182–212. https://doi.org/10.1300/J002v34n03_01

Shek, D. T., & Ma, C. M. (2016). Emotional competence: a key leadership competence for university students. *International Journal on Disability and Human Development*, *15*(2), 127–134. https://doi.org/10.1515/ijdhd-2016-0701

Siddiqui, N. B., Parveen, N., & Malik, M. (2019). Relationship of Emotional Intelligence with Parental Attachment among University Students. *Bahria Journal of Professional Psychology, 18*(1), 51–62.

Storlie, C. A., Mostade, S. J., & Duenyas, D. (2016). Cultural trailblazers: Exploring the career development of Latina first-generation college students. *The Career Development Quarterly*, *64*(4), 304-317. https://doi.org/10.1002/cdq.12067

Tisocco, F., Bruno, F. E., & Stover, J. B. (2019). Inteligencia emocional, sintomatología psicopatológica y rendimiento académico en estudiantes de Psicología de Buenos Aires. *ACADEMO Revista de Investigación en Ciencias Sociales y Humanidades*, *6*(2), 111–123. http://dx.doi.org/10.30545/academo.2019.jul-dic.2

Trigueros, R., Aguilar-Parra, J. M., Cangas, A. J., Bermejo, R., Ferrandiz, C., & López-Liria, R. (2019). Influence of emotional intelligence, motivation and resilience on academic performance and the adoption of healthy lifestyle habits among adolescents. *International Journal of Environmental Research and Public Health*, *16*(16), 1–12. https://doi.org/10.3390/ijerph16162810

Vaida, S., & Opre, A. (2014). Emotional intelligence versus emotional competence. *Journal of Psychological and Educational Research*, *22*(1), 26–33.

Zhoc, K. C., King, R. B., Chung, T. S., & Chen, J. (2020). Emotionally intelligent students are more engaged and successful: examining the role of emotional intelligence in higher education. *European Journal of Psychology of Education*, 1–25. https://doi.org/10.1007/s10212-019-00458-0